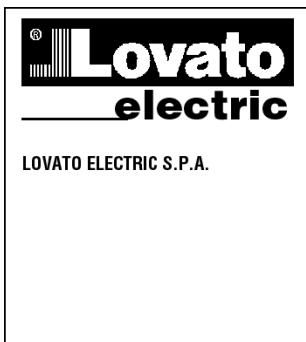


# البياس غالي و أولاده

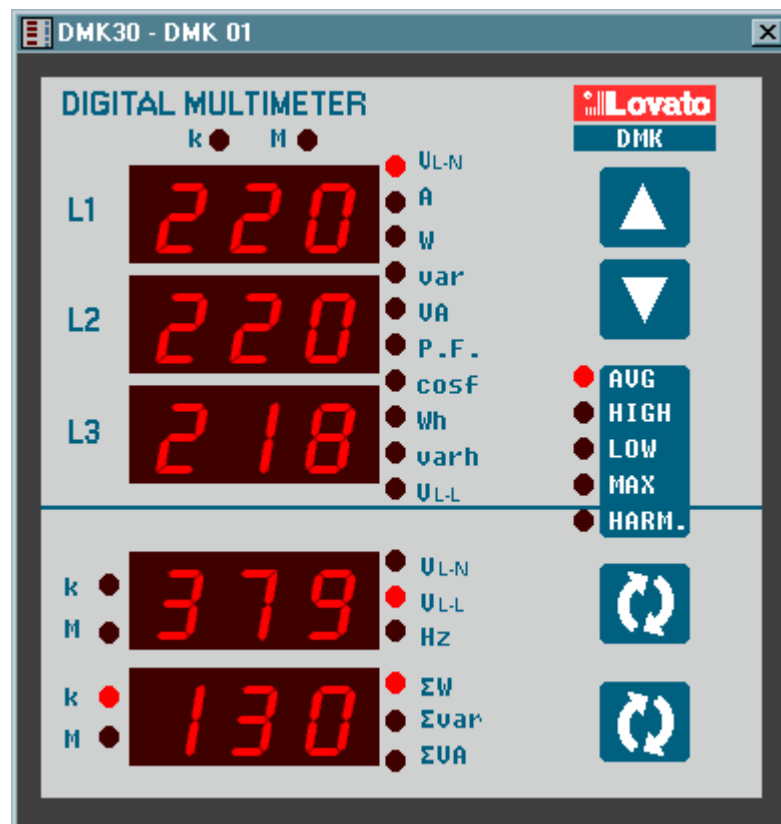
المركز التقني للاستشارات الهندسية الكهربائية

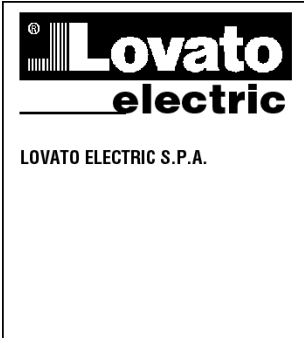


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DIGITAL MULTIMETER DMK32-62

REMOTE CONTROL SOFTWARE MANUAL





## DIGITAL MULTIMETER DMK32-62

### REMOTE CONTROL SOFTWARE MANUAL

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## Introduction

The remote control software allows to:

- Graphically show on a PC the measures read from the multimeters, in the form of 'virtual' instruments (gauges, bar graphs, displays, counters and more).
- Periodically sample a set of measurements defined by the user and save them on disk in different formats (MS-Access, ASCII text, MS-Excel).
- Plot graphs of the sampled measures.
- Apply alarm thresholds to the sampled measures.
- Save on disk the alarm and event sequence happened in the multimeters network.
- Show a 'virtual' front panel of the multimeter, with the possibility to view all the readings and to click on the pushbuttons.
- Show, modify, save on disk, reload and print the multimeter setup settings.
- Display a graph of the voltage and current harmonic content, using the FFT readings supplied by the multimeter.
- Customize the software pages, inserting indicators linked to measurements, background pictures, fixed texts, command buttons and more.
- Change the language of the software menus and commands, selecting among Italian, English, French, German and Spanish.

## Minimum PC hardware requirements

- Windows 95/98/2000 operative system.
- Graphic card with minimum resolution of 800x600, 1024x768 or more recommended.
- One free serial interface port (COM:)
- 64Mb of RAM
- Pentium-like processor or faster
- CD-ROM drive for installation

## Installation

To proceed with the installation, it is necessary that the PC is already working with the operative system and to have the CD ROM for the software setup.

It is also recommended that the user has at least a minimum experience with PCs and Windows environment.

The software is supplied on a CD with two different setup procedures. Under the *Setup1* directory there is a standard setup procedure used with Win95 and Win98 first releases.

The *Setup2* directory holds a new setup procedure which can be used with Win 98 second release and Win 2000.

### Setup1:

1. Close all applications
2. Insert the CD in the drive and wait for its recognition.
3. Select *Setup1* directory and launch *Setup.exe*.
4. Click on the square button with the PC icon to start the installation.
5. A dialog box will appear asking for the directory where to install the program. State the new name, if any, in the space.
6. Follow the given instructions. In case the PC indicates that more recent files are already installed, maintain the existing ones, that is answer **YES** or **KEEP**.

### Setup2:

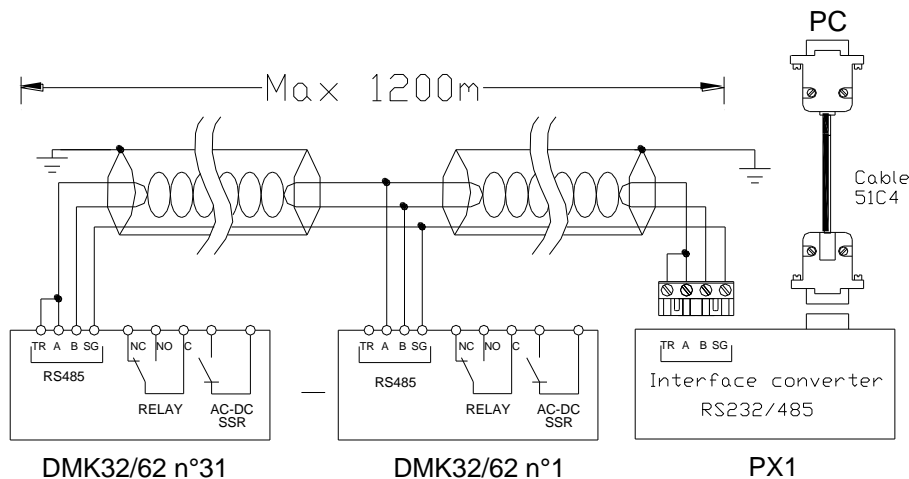
1. Close all applications
2. Insert the CD in the drive and wait for its recognition.
3. Select *Setup2* directory and launch *dmk.msi*.
4. If your PC does not recognize *.msi* files (microsoft installer), run *instmsia.exe*.
5. A dialog box will appear asking for the directory where to install the program. State the new name, if any, in the space.
6. Click *Next* to proceed
7. If at the end of setup process the installation program asks to reboot the Pc, .execute this procedure.

## Activation of the PC-DMK connection

To operate the remote control program, it is essential the PC and DMK can communicate by serial interface. To activate the serial link, follow these steps:

1. The first step is to make sure the PC has one free RS-232 serial communications interface port. Serial ports are normally indicated by the COM reference. They are usually numbered COM1: to COM4: although the majority of the brands on the market have only two available ports, COM1: and COM2:, identifiable by the 9-pin D-type male connector. Secondly, it is important to choose the PC port bearing in mind that one serial port is already used for the mouse in some cases.
1. Configure the software to use the selected serial port. This can be done when the DMK.exe software is executed for the first time and also later, using *Configuration-Options-General* menu (see the Configuration chapter). The factory default for the serial port is COM1: , 9600 baud, no parity.
2. Prepare the Rs-485 network. Connect the Rs-232/Rs-485 converter to the PC. Connect all multimeters interface terminals in parallel with the twisted-pair cable and then to the interface converter, as shown in the following wiring diagram. Make sure the polarity is correct ( A and B terminals).
3. We strongly recommend to use an interface converter supplied by Lovato. If the user wants to use an interface converter of another brand, we will not able to help with wiring, nor to assure that the communication will work properly. However, the interface converter must be insulated and have an automatic enable line control circuit.
4. From the front keyboard of each multimeter, enter the serial interface setup (P.41 →) and set one different serial address for each DMK, starting from address 01. Make sure that the PC speed and parity settings match the DMK setting.
5. At this point it is possible to launch DMK.exe. If the wiring and settings are correct, the link will be automatically established with DMK 01.

## Wiring diagram



## Troubleshooting

If the connection does not work (trying to enter Online mode, the program emits some beeps and automatically proceeds in Offline mode), carefully check the following points:

1. The PC COM port used for the connection must match the one selected in *Configuration-Options-General-Serial port settings* menu. That port must NOT be configured as a serial mouse port on the PC.
2. The communication rate set on the PC and all DMKs must be the same (e.g. 9600 bps for both).
3. If there are more than one DMK connected, then each must have a serial address different than all the others (e.g. 01, 02, 03, etc.). To set the serial address, program the relative parameter P.41
4. The converter connection polarity to the RS-485 bus must be correct; all A terminals (marked on the leads), plugged on to one bus connector and the B terminals with the other.
5. The maximum distance between the two most distant units on the RS-485 bus must not exceed 1000 m.
6. The two most distant units must be connected to the terminal resistor (TR).
7. The interface converter on the PC side must be switched on and correctly configured; see the relative technical sheet attached to the device. In particular, it must be set for automatic enable line switching (Data mode).



## Basic principles

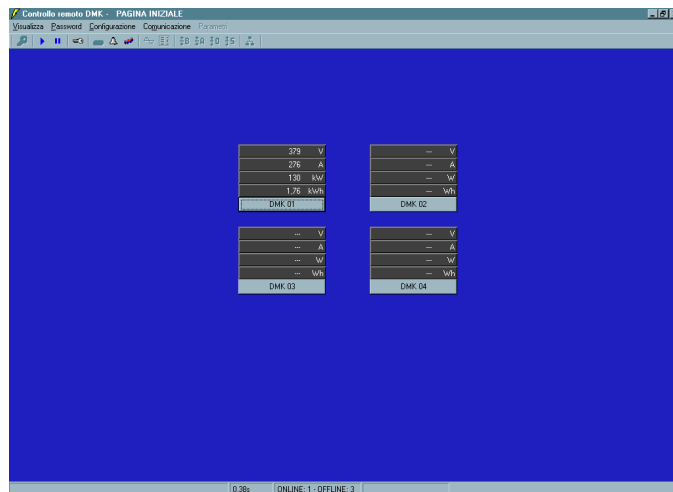
The working criteria of the program is to cyclically read the measures taken by connected DMKs and to display them in the form of indicators on the PC monitor. Information are grouped in *pages* that can be selected by the user during connection. When the software is installed, some already-made pages are supplied. The user, if needed, will be able to create new customized pages and/or to modify the existing ones.

Pages can be of two types:

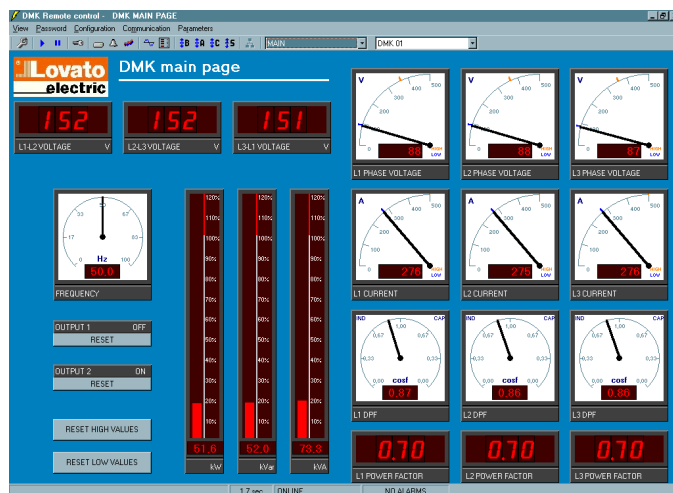
- Pages that groups data coming from different DMKs, for instance to show simultaneously voltage, current, power etc read from different points of a plant, each controlled by one DMK. In this case each indicator displays readings coming from one particular multimeter.
- Pages with indicators not assigned to one particular multimeter, where the user selects from which multimeter he wants to read data to be shown. In this case it is possible to concentrate many measures all coming from the same DMK (the one selected in that moment). With a simple click, the user can move its attention to another multimeter, and all indicators will be updated with data coming from the newly selected DMK.

Most common pages are of the second type. When the software is displaying one of these pages, one drop-down list will be shown allowing the user to select the DMK from which read measurements. In this case other functions will also be enabled, addressed to the selected multimeter, as for instance the access to setup parameters, harmonic contents graph, virtual front panel and so on.

Example of a page with data coming from different DMK



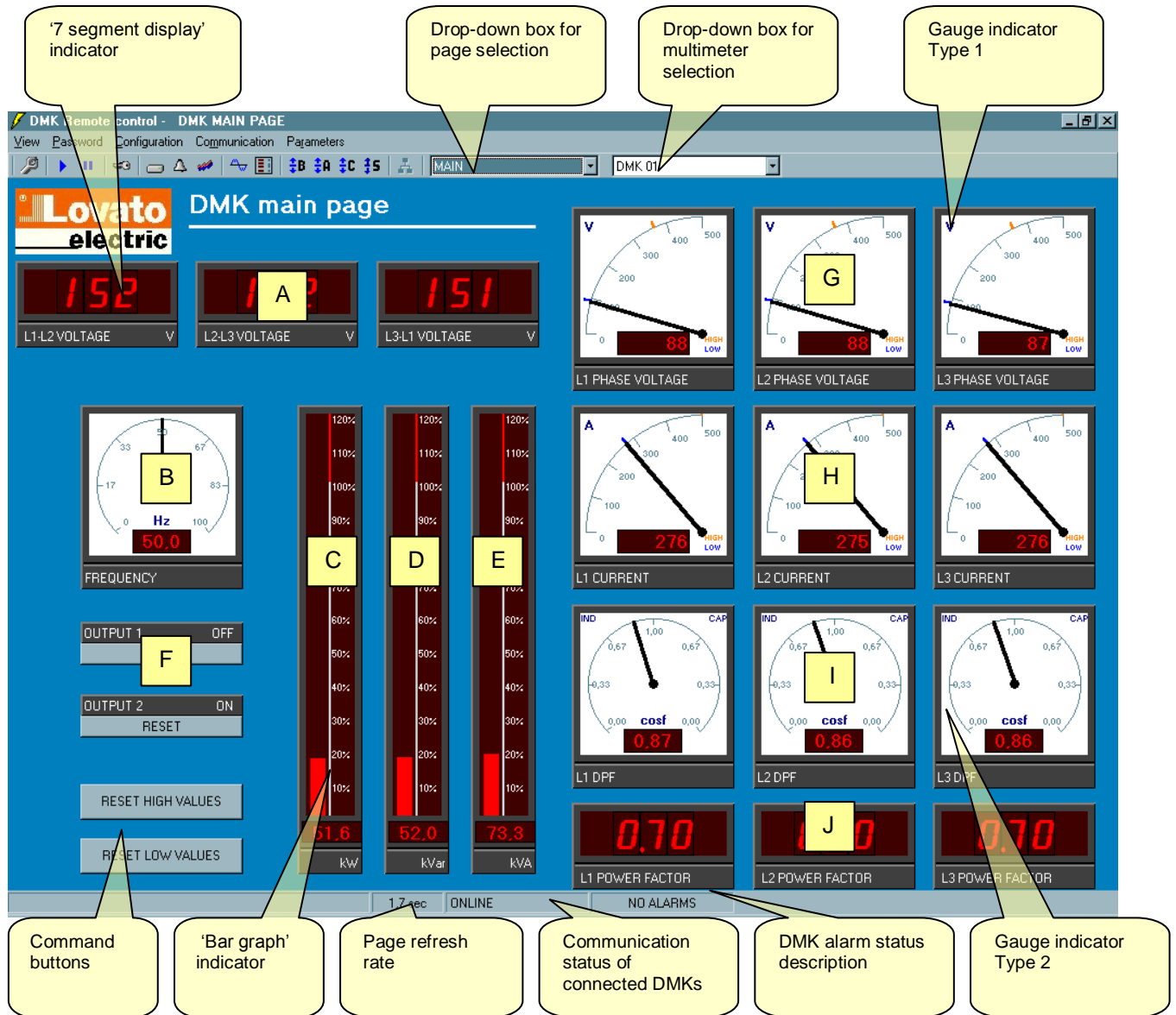
Example of a page filled with data coming from the same DMK



## Main window

The main window contains all menus and toolbars that allow the user to access to various functions of the software. Some of these functions that can modify the software and/or DMK configuration are protected by a password, and are disabled when the program is started. In the following figure is displayed the main page aspect , with highlights on the most commonly used controls.

Fig 1.1 – Main window



The page shown in figure 1.1, called *MAIN*, is one of the already-made pages supplied with the program. It is a non-associated indicator page, so the displayed measures are referred to the multimeter selected in the drop-down selection box placed top-right.

In this page are displayed many of the most important readings given by DMK, that is:

- Phase-to-phase voltages
- Frequency
- Total active power
- Total reactive power
- Total apparent power
- DMK digital outputs status
- L1, L2, L3 phase voltage, with instantaneous maximum and minimum values (HIGH and LOW functions of the DMK).
- L1, L2, L3 phase current with HIGH-LOW.
- L1, L2, L3 displacement power factor
- L1, L2, L3 total power factor

## System configuration

To access the configuration window it is necessary to enter the password. By default, the password is *LOVATO*. Click on *Password* menu, key-in *LOVATO* and then confirm with *OK*.

The configuration phase is a very important step to correctly define the program operation. In particular, in the case in which are connected more than one multimeter, the user will have to pay attention to the setting of each DMK connected to the network.

Before proceeding with the explanation of the various functions of the software, we will examine the configuration window, looking at the meaning of all settings.

Figure 2.1 – Configuration-Options-General

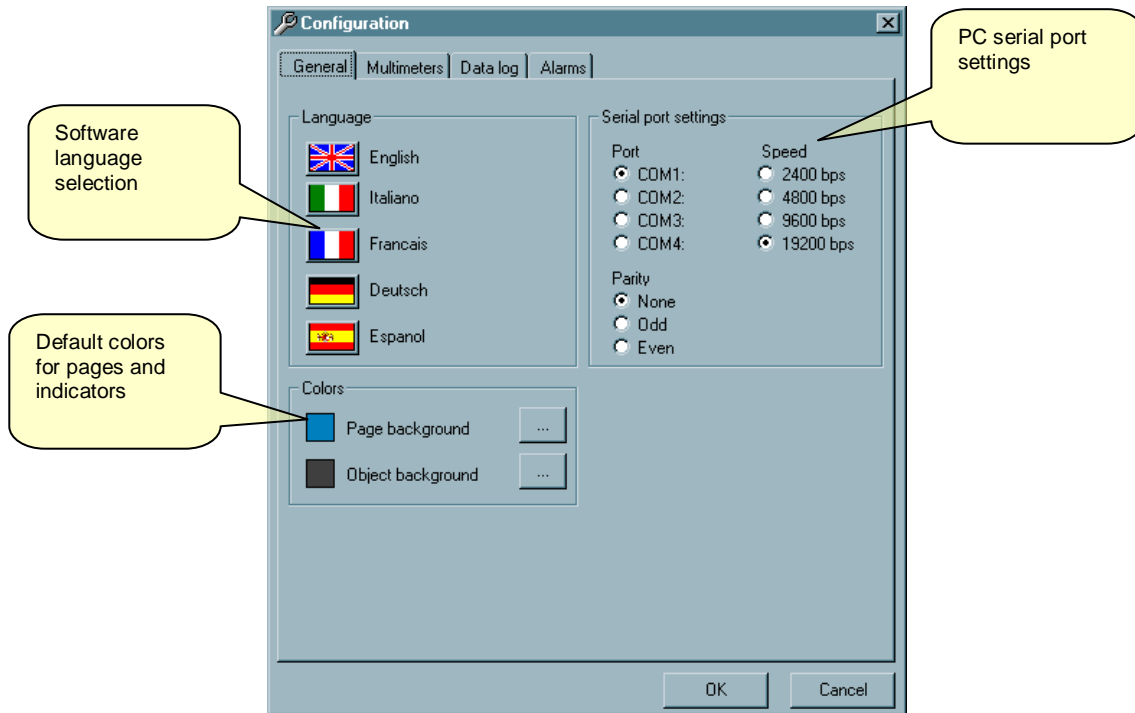




Figure 2.2 – Configuration-Options-Multimeters

The screenshot shows the 'Configuration - Multimeters' dialog box with the following settings and callouts:

- Selected DMK:** Points to the 'DMK 01' text field.
- Total number of configured DMKs:** Points to the 'Number of multimeters' field set to '1'.
- Add a new DMK to the network configuration:** Points to the 'Add' button.
- Removes the last DMK from the network configuration:** Points to the 'Remove' button.
- Enables / disables the serial communication with the selected DMK:** Points to the 'Multimeter enabled' checkbox, which is checked.
- Selects the previous / next DMK:** Points to the left and right arrow buttons.
- Description of the DMK. It is used to identify the multimeter in pages, data log, alarms and more.** Points to the 'Multimeter description' field.
- Nominal value setting for the indicator scale (sets 100% of bar graph indicators etc.) Must be set according to the DMK CT and VT ratio settings.** Points to the 'Nominal value' columns for Voltage, Current, and Power indicators.
- Maximum value setting for the indicator scale (sets full scale of all indicators) Must be set according to the DMK CT and VT ratio settings.** Points to the 'Full scale' columns for Voltage, Current, and Power indicators.
- Defines if an alarm message must be stored when digital output 1 trips:** Points to the 'Save Output 1 trip in alarm list' checkbox.
- Text of the alarm to be stored when output 1 trips:** Points to the 'Alarm text for output 1 trip' text field.
- Text of the alarm to be stored when output 2 trips:** Points to the 'Alarm text for output 2 trip' text field.
- Same as above, referred to digital output 2:** Points to the 'Save Output 2 trip in alarm list' checkbox.

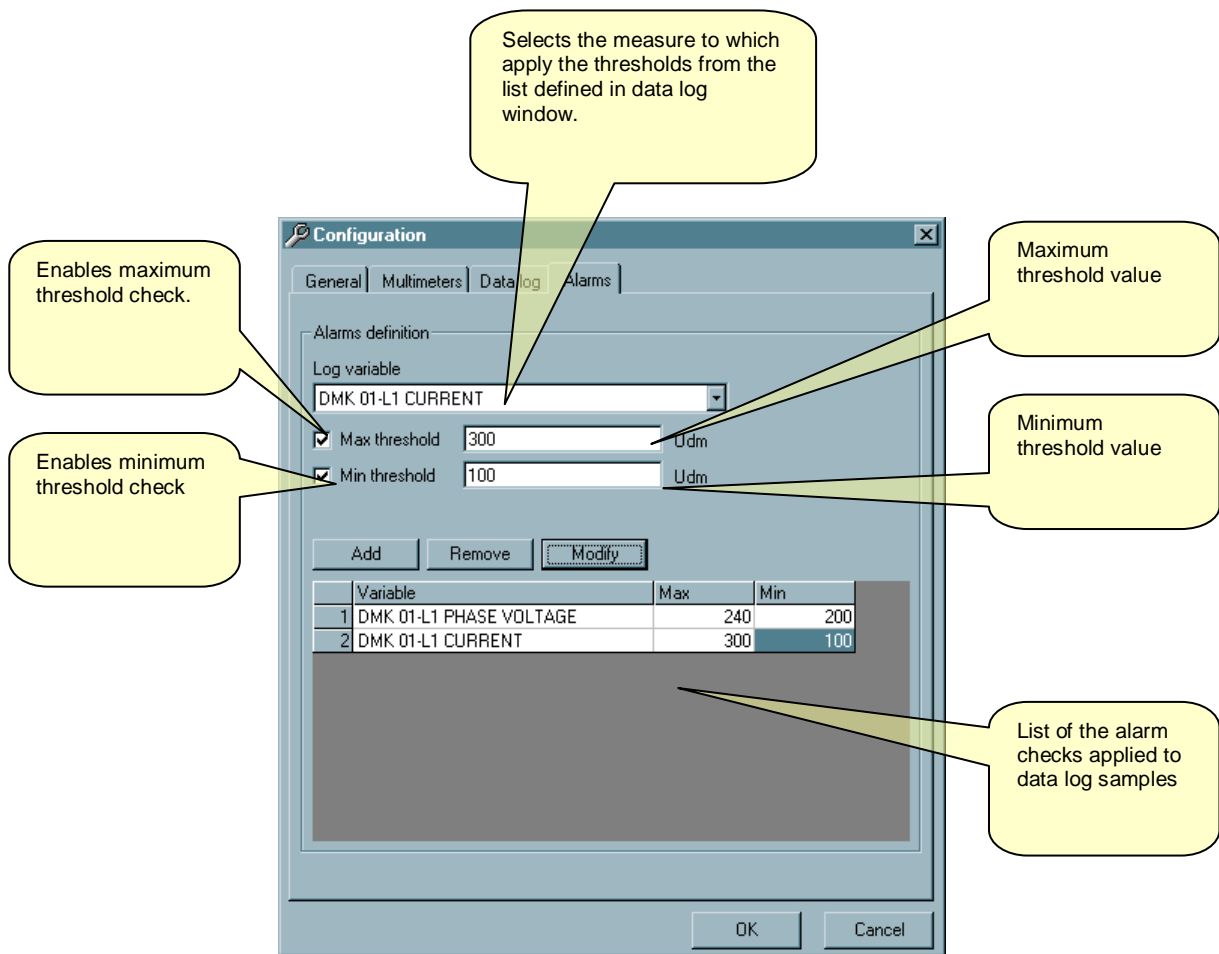
Figure 2.3 - Configuration-Options-Data log

The screenshot shows the 'Configuration' window with the 'Data log' tab selected. The window contains several input fields and a table. Callouts provide detailed explanations for each element:

- Time interval between data log samples / alarms check:** Points to the 'Sampling period' field, which is set to 5 seconds.
- Time interval between data log sample recording in the database:** Points to the 'Storing period' field, which is set to 60 seconds.
- Defines how many days the data log database will keep sample records:** Points to the 'Keep data of the last' field, which is set to 30 days.
- Defines if, in case of the last sample measures are out of alarm bounds, they must be saved in the database even if the recording time interval is not yet elapsed:** Points to the 'Store alarms' checkbox, which is currently unchecked.
- Selects the source multimeter for the measure to be sampled:** Points to the 'Select multimeter' dropdown menu, which is set to 'DMK 01'.
- Selects the measure to sample:** Points to the 'Select measure' dropdown menu, which is set to 'L1 PHASE VOLTAGE'.
- Adds a row to the data log list, copying the multimeter and the measure selected in the drop-down boxes:** Points to the 'Add' button.
- Deletes the selected row from the list. Note: Deleting fields in the data log database structure will mean losing of all currently present records.** Points to the 'Remove' button.
- List of the measures to be sampled. They will be sampled at the same time and will be used for alarms check (see next chapter), graph plots, data export etc. Max 16 measures.** Points to the table below.

	Multimeter	Measure
1	DMK 01	L1 PHASE VOLTAGE
2	DMK 01	L1 CURRENT

Figure 2.4 - Configuration-Options-Alarms



## View menu

### Data log

Variables defined in the *Data log* configuration (Figure 2.3) are sampled cyclically by the software, independently from which page is shown, with an acquisition rate defined by the user with the *Sampling period* setting. After each sample, data are compared with alarm thresholds defined by the user (if any). The same data are saved in the Data log database with a storing rate defined with *Storing period* setting.

For instance, it is possible to set a sampling period of 5 sec and a storing period of 30 sec. In this case, every 5 sec the software will read all variables defined in the data log configuration list, and will check those among them for which alarm thresholds have been defined. If there are no alarms, once every 30 sec the sample will be stored in a new record of the database. If the option *Store alarms* has been selected and one of the measures is out of bounds, its value will be saved in the database even if the storing period has not yet elapsed. Obviously, the user can decide to set a storing period equal to the sampling period. In this case, every sample will be saved in the database.

When the user defines the Storing period, he must pay attention to the disk space available on its PC. For instance, setting a storing period of 5 sec, a total of 17280 records/day will be added to the database, each one with date, time and value of each variable defined in the data log list.

This is the reason why it has been decided to separate the storing from the sampling period. This solution allows to check variables for alarms with a good frequency, but to store them only when they are out of bounds and however, with a slower ratio.

To limit the hard disk space occupation, it is possible to eliminate automatically from the database the samples older than a defined number of days. Setting *Maintain samples of the last...days* to 7, only records of the last week will be kept in the database.


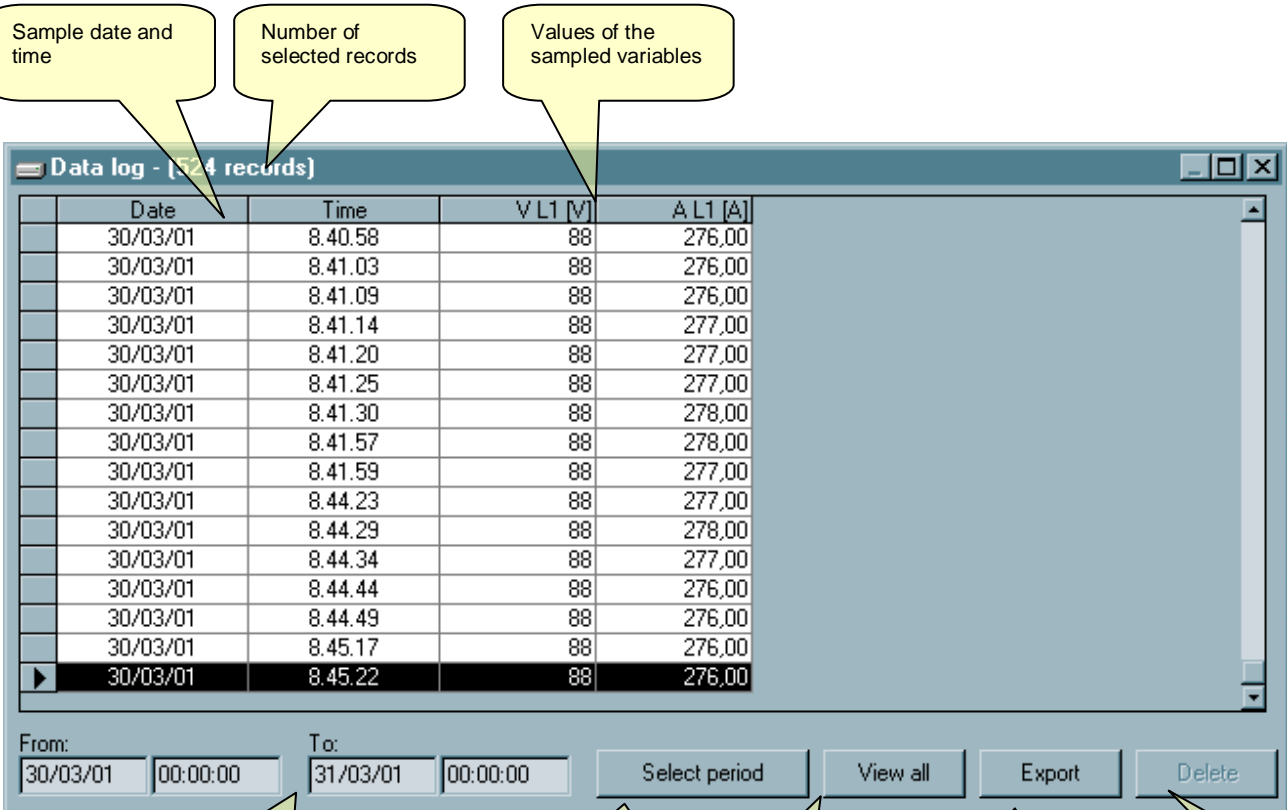
Data recorded in the database can be displayed in a table with View-Data log menu, or clicking on the corresponding  icon on the toolbar.

Figure 3.1 – View-Data log



The screenshot shows a window titled "Data log - [524 records]". It contains a table with the following columns: Date, Time, VL1 [V], and AL1 [A]. The table lists 20 records for the date 30/03/01, with times ranging from 8.40.58 to 8.45.22. The VL1 values are consistently 88, and the AL1 values range from 276.00 to 278.00. Below the table, there are input fields for "From:" (30/03/01 00:00:00) and "To:" (31/03/01 00:00:00), and buttons for "Select period", "View all", "Export", and "Delete".

Callouts provide the following information:

- Sample date and time:** Points to the Date and Time columns in the table.
- Number of selected records:** Points to the "[524 records]" text in the window title.
- Values of the sampled variables:** Points to the VL1 [V] and AL1 [A] columns in the table.
- Start / end date and time for extracting records from the database:** Points to the "From:" and "To:" input fields.
- Opens the window for defining start and end date:** Points to the "Select period" button.
- Displays all records of the database:** Points to the "View all" button.
- Allows to export data in ASCII text format or MS-Excel format:** Points to the "Export" button.
- Delete selected records from the database:** Points to the "Delete" button.

## Alarms

As described in the previous Alarm configuration page (Figure 2.4), the user has the possibility to apply thresholds (minimum, maximum or both) to the measures sampled with the data log. In the case in which one or more of the values is out of bounds, the alarm condition is always saved in the alarm database with date and time. When the alarm conditions ends, another record will be saved, allowing to define the duration of the abnormal situation.

In the *Multimeter configuration* window (Figure 2.3) it is possible to specify if the DMK digital outputs tip has to be saved as an alarm record into the alarms database. In this case it is possible to freely define the text that will be stored each time the output will be activated.

In the same database are stored also some *Events*, that is something that happened that can help to better understand the alarms sequence. One example of Event can be the activation of the remote control, that is the instant in which the software has been started and thus the measures sampling has been initiated. It is obvious that if the software or the Pc have been left inactive, then some alarm situation may not be found in the alarm recording. The same can happen if one multimeter has been left switched off for a certain period of time.

Events are stored in time sequence with alarms, but with the database window the user will be able to select the information with the following criteria:

- Period in which alarms and events have happened (date-time of start and end)
- View only alarms, only events, both
- View alarms/events from one particular multimeter or from all configured multimeters

Figure 4.1 – View-alarms

The screenshot shows a window titled "Alarms - Events - (9 records)". It contains a table with the following data:

Date	Time	Type	Event
30/03/01	8.40.45	Alarm	DMK 01-L1 PHASE VOLTAGE < 200
30/03/01	8.42.01	Event	REMOTE CONTROL STOPPED
30/03/01	8.44.19	Event	DMK 01 - ONLINE
30/03/01	8.44.19	Event	REMOTE CONTROL STARTED
30/03/01	8.44.23	Alarm	DMK 01-L1 PHASE VOLTAGE < 200
30/03/01	8.44.49	Event	REMOTE CONTROL STOPPED
30/03/01	8.45.12	Event	DMK 01 - ONLINE
30/03/01	8.45.12	Event	REMOTE CONTROL STARTED
30/03/01	8.45.17	Alarm	DMK 01-L1 PHASE VOLTAGE < 200

Below the table, there are controls for filtering and actions:

- Select view:** A dropdown menu currently set to "(view all)".
- Select multimeter:** A dropdown menu currently set to "(all multimeters)".
- From:** A date and time input field showing "30/03/01 00:00:00".
- To:** A date and time input field showing "31/03/01 00:00:00".
- Select period:** A button to open a window for defining start and end date.
- Export:** A button to export data in ASCII text format or MS-Excel format.
- Delete:** A button to delete selected records from the database.

Callouts provide the following explanations:

- Date-Time of alarm or event:** Points to the Date and Time columns in the table.
- Number of selected records:** Points to the "(9 records)" in the window title.
- Record type Event / Alarm:** Points to the Type column in the table.
- Description of the alarm or event:** Points to the Event column in the table.
- Select from viewing all only alarms only events:** Points to the "Select view" dropdown.
- Select records from a particular multimeter or from all multimeters:** Points to the "Select multimeter" dropdown.
- Opens the window for defining start and end date:** Points to the "Select period" button.
- Allows to export data in ASCII text format or MS-Excel format:** Points to the "Export" button.
- Delete selected records from the database:** Points to the "Delete" button.

## Graphs

The content of the Data log database can be shown in the form of a graph (strip-chart). In this way it is possible to have immediately a global idea of the trend of the most important measures, or to compare on the same graph two measures taken from two different part of the plant.

To open the graph window click on *View-Graph* menu or use the correspondent icon on the toolbar.

The operation criteria of this graph is very similar to on oscilloscope. The X-axis (horizontal) represents the time. The horizontal scale is common to all shown traces and is indicated with sample date-time labels .

It is possible to plot up to 4 traces simultaneously, selecting them among the measures defined in Data log. The selection is done by the four drop-down boxes, one for each trace color.

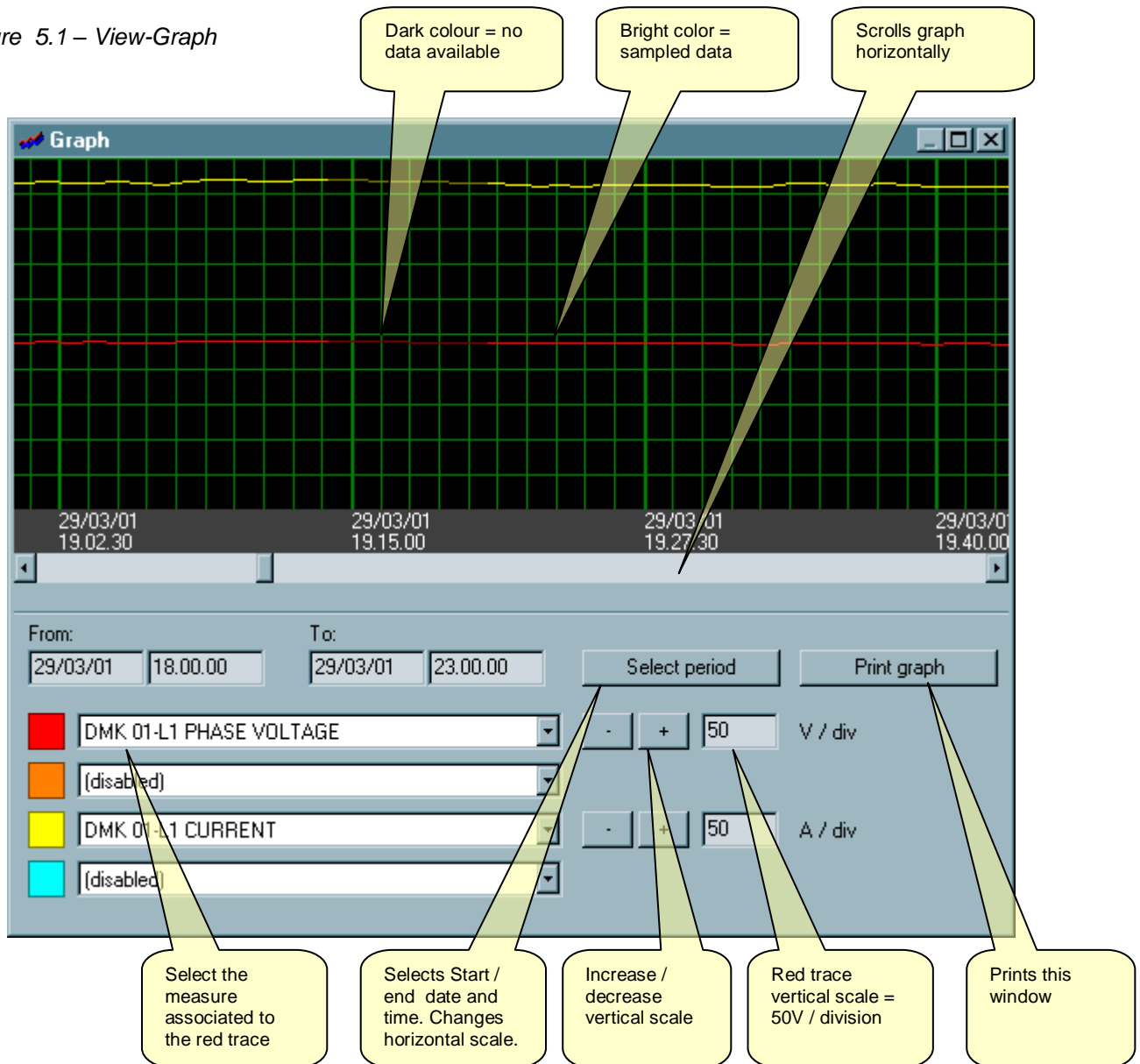
For each measure it is possible to modify the vertical scale using the + and – pushbuttons. The value of one measure in a certain moment can be calculated looking at the vertical scale division value (one square).

If , for instance, the vertical scale is 50V/division and the plot is about at 8 division, then the absolute value of the measure is about 400V. When looking at a graph of this type, it is more important to look at the trend of the measure rather than its absolute value.

The graph is 240 divisions wide per 10 division in height. When opened, the window is set to show data of the current date, that is from 00:00:00 of current day up to 00:00:00 of the next day (tomorrow). Using the Select period pushbutton it is possible to select a different period and also to change the horizontal scale resolution.

If in the database there is no data for a certain period of time (for instance because the software has been inactive) one straight line is drawn using a dark colour, connecting the two edges of the 'hole'.

Figure 5.1 – View-Graph



### Harmonics

DMK series multimeters have the possibility to measure the harmonic content of the voltage and current waveforms, for each phase, by means of an FFT algorithm (Fast Fourier Transform). By means of *View-Harmonics* menu, it is possible to display harmonic data on a bar-graph where on the horizontal axis are represented the order of the harmonic, from the 2<sup>nd</sup> to the 22<sup>nd</sup>, plus two bars that represents the THD (Total Harmonic Distortion) and RHD (Residual Harmonic Distortion).

The vertical axis represents the intensity of each harmonic, expressed as a percentage of the fundamental harmonic.

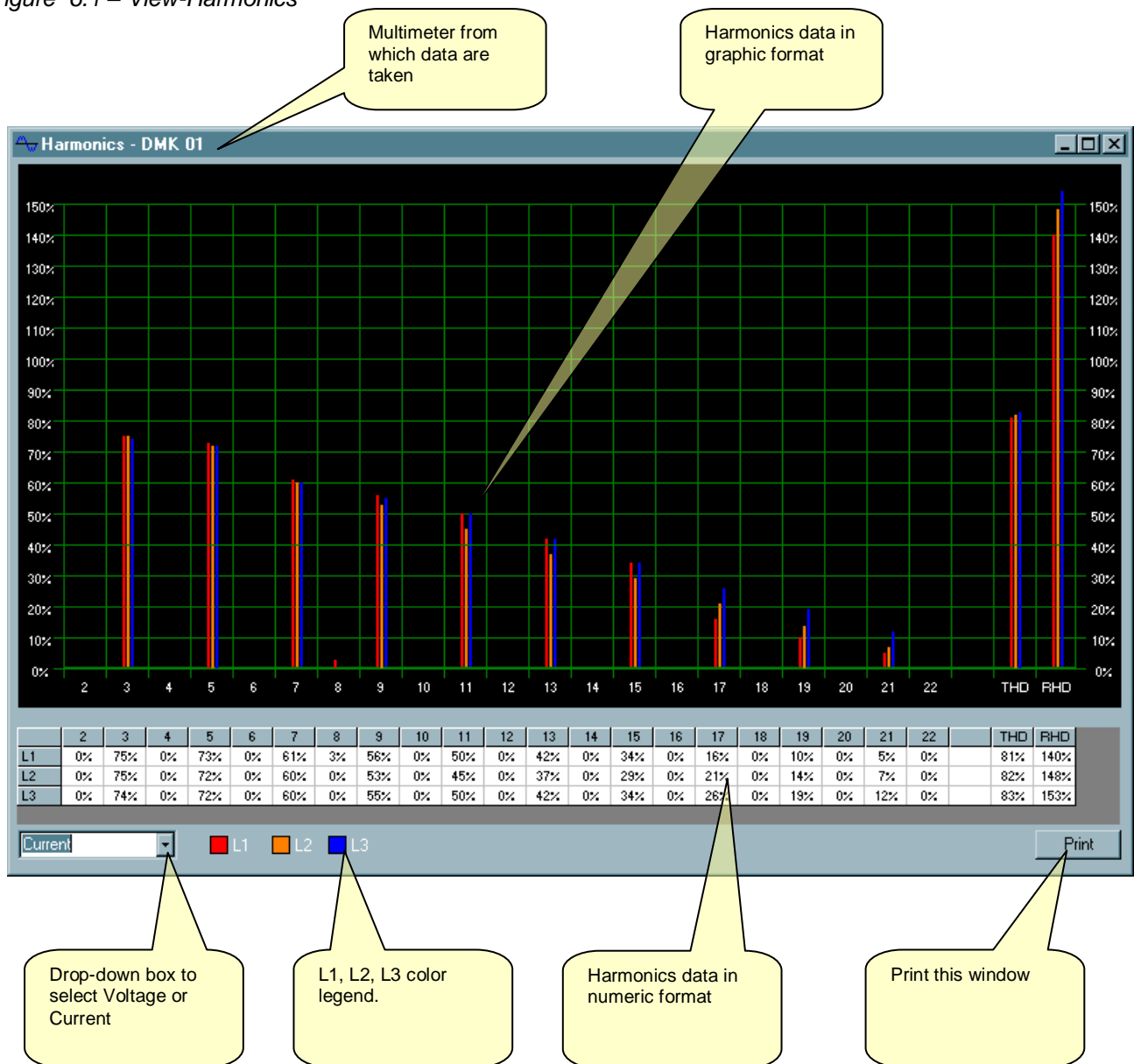
By means of a drop-down box it is possible to select between Voltage and current harmonic analysis. The single phases L1, L2 and L3 are displayed in three different bar colors.

Data shown is referred to the currently selected multimeter (see drop-down box in figure 1.1). If the software is showing a page with data coming from different multimeters, then it will not be possible to show the harmonic analysis window.

**Note:**

On DMK multimeters the FFT calculation can be disabled in order to have a better acquisition speed. In this case the graph will not show any data.

Figure 6.1 – View-Harmonics



### Front panel

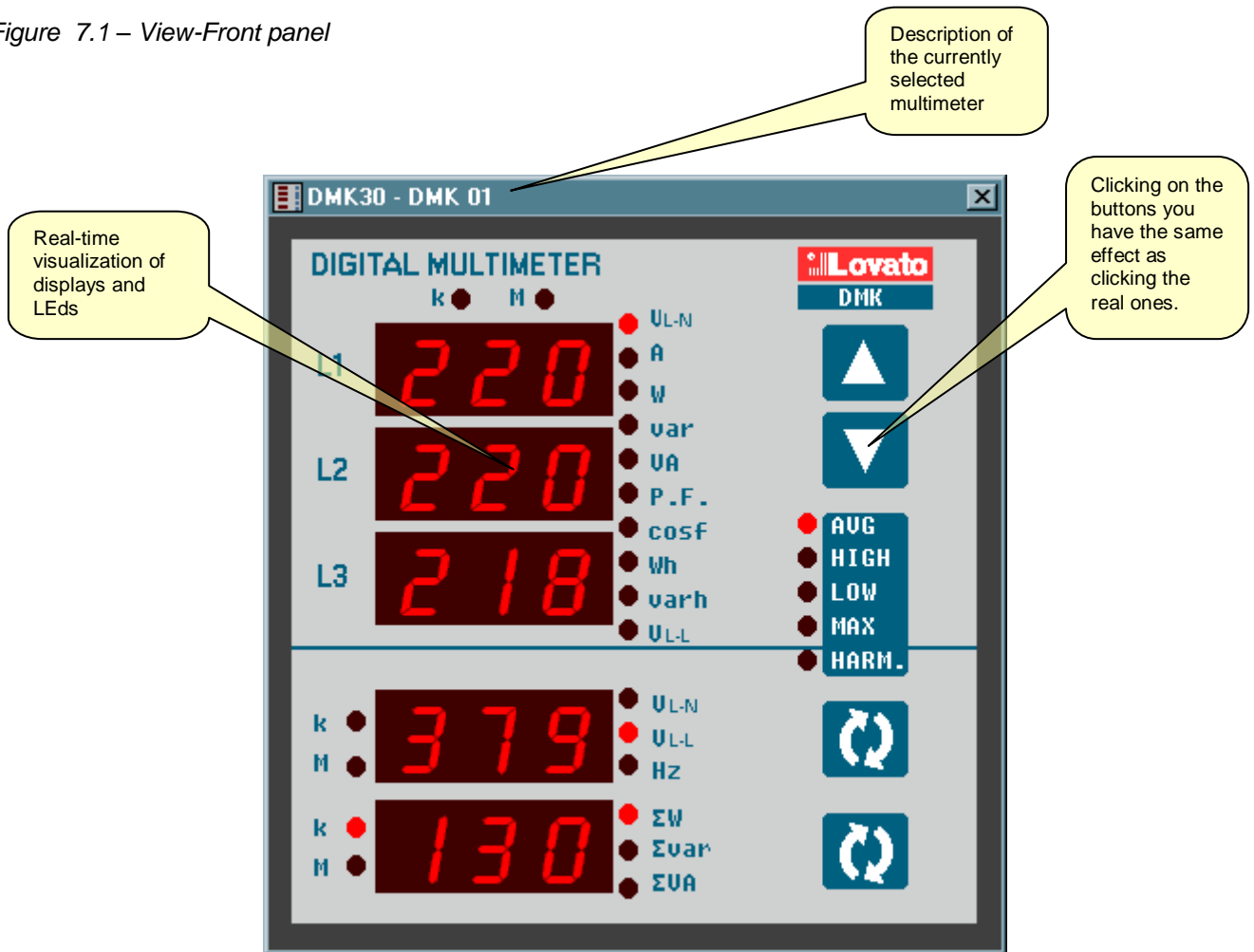
With the remote control software it is possible to display on the PC monitor a 'virtual' front panel of the DMK. The window can be opened with *View-Front panel* menu. It will show the panel of the currently selected multimeter, with real-time visualization of displays and leds status. Clicking with the mouse on the pushbuttons, the user will have the same effect as clicking the real DMK buttons, selecting measurements and functions. It will not be possible to access the functions (like entering setup , meters reset etc) that require the simultaneous pression of more than one button or the continuous pression of the same button for a certain period of time.

There are two types of front panels, that represents multimeters of DMK3x and DMK6x series. The front panel window shows the front panel that corresponds to the currently selected multimeter. For this reason, it will not be possible to view the front panel window when the software is showing a page with measures coming from different multimeters.

**Note:**

The quality of the graphic representation of the front panel may vary according to some PC settings, such as screen resolution, Font size etc.

Figure 7.1 – View-Front panel





## Password

When the software is started some of the functions are disabled. By means of the *Password* menu it is possible to key in the password that will allow access to all functions, including:

- Modifying remote control software settings
- Entering a new password
- Delete records from *Alarms* and *Data log* databases
- Use of the page editor
- Modify the DMK settings from the remote control

Figure 8.1 – Password



After the first installation the password is LOVATO. Later, the user will be able to customize its password, using the New Password button and then entering the new desired password two times.

Figure 8.2 – New password



## Communication menu

### Online

The *Communication-Online* menu allows to re-establish the serial link after it has been stopped by the user with the Offline command. When clicking Online, the software executes a complete scan of all configured DMK, to verify their status.

### Offline

With communication-Offline the user has the possibility to temporarily suspend the serial communication link between the PC and the DMK network. When the software is in Offline mode, all indicators are shown in a disabled status and Alarm checking and Data log are suspended.

This command is to be used when, for instance, it is necessary to modify the network wiring or when DMK are to be switched off. The System Offline status is displayed on the main page Toolbar (at the bottom of the main window).

The system passes automatically in Offline mode when the user opens the *Configuration* window or the *Page editor*.

## Parameters menu

The multimeters setup settings can be viewed and modified using the Parameters menu. This way of accessing to the DMK setting is far more immediate and easy than using the direct access from the DMK front keyboard, because on the PC window displays:

- The parameter code
- Parameter description
- Set value
- Bar graph or drop-down box with possible options

Parameters are grouped into four menus that follow the structure described on the DMK manual and addendum. The four available menus are:

- Base setup (basic settings like CT ratio, VT ratio etc.)
- Advanced setup (settings of the digital outputs)
- Capacitor overload setup (settings for the capacitor protection function)
- Serial communication setup (parameters regarding serial interface)

### Base setup

Figure 9.1 – Parameters-Base setup

The screenshot shows a 'Setup table' window for 'Base setup'. It contains a table of parameters with their codes, descriptions, numerical values, and graphical controls. Callouts provide detailed instructions for each element.

Parameter code	Description	Numerical value	Control
P.01	CT ratio	250.0	Slider bar
P.02	VT ratio	1.0	Slider bar
P.03	Max power integration time	15min	Slider bar
P.04	Average filter	10	Slider bar
P.05	Wiring system	003	Drop-down box (Three-phase)
P.06	Frequency acquisition	000	Drop-down box (Aut)
P.07	Harmonic analysis	001	Drop-down box (On)

Buttons at the bottom: Transmit, Receive, Default, Exit.

Callouts:

- Parameter code:** Points to the 'P.01' column.
- Description:** Points to the 'CT ratio' column.
- Numerical value of the parameter. Highlighted in yellow if different from the factory setup. Double-clicking on this box will open a window for setting the parameter with the numeric keyboard.** Points to the '250.0' value.
- Bar-graph. Drag with the mouse pointer to change value of parameter** Points to the slider bar for P.01.
- Transmits the displayed value into the DMK memory. Enabled only with password.** Points to the 'Transmit' button.
- Receives values from the DMK memory and displays them in the window** Points to the 'Receive' button.
- Resets the values to the factory default.** Points to the 'Default' button.
- Drop-down box with the possible options** Points to the 'Three-phase' dropdown.
- Closes setup window** Points to the 'Exit' button.

### Advanced setup

Figure 9.2 – Parameters-Advanced setup

Box for values with a very high range. Double-click to set value. Select:  
**k** for value x 1000  
**M** for value x 1000000  
 Same method of DMK display.

**Setup table**

Parameter ID	Parameter Name	Value	Options
P.11	Output 1 (SSR) measure	001	L1,L2,L3 phase voltage
P.12	Output 1 function	000	Min
P.13	Output 1 idle status	000	De-energized
P.14	Output 1 Low setting	0.00	<input type="checkbox"/> k <input type="checkbox"/> M
P.15	Output 1 High setting	1.00	<input type="checkbox"/> k <input type="checkbox"/> M
P.16	Output 1 latch	000	Yes
P.17	Output 1 low delay	0s	[Slider]
P.18	Output 1 high delay	0s	[Slider]
P.19	Energy meter count base	000	0.1k

vvv

Transmit Receive Default Exit

Scroll bar to access following parameters

### Capacitor overload setup

Figure 9.3 – Parameters-Capacitor overload setup

**Setup table**

Parameter ID	Parameter Name	Value	Options
P.31	Capacitors rated voltage	OFF	<input type="checkbox"/> k <input type="checkbox"/> M
P.32	Capacitor rated frequency	50Hz	[Slider]

Transmit Receive Default Exit

## Serial interface setup

Figure 9.4 – Parameters-Serial interface setup

The screenshot shows a 'Setup table' window with the following parameters:

Parameter	Value	Unit/Option
P.41 Serial address	001	
P.42 Baud rate	005	19200 bps
P.43 Parity	000	None

Buttons at the bottom: Transmit, Receive, Default, Exit.

It is not possible to modify serial interface settings THROUGH the serial interface itself.

## Save-Load-Print

Parameters values (of all four menus) can be saved on disk in a ASCII text file, allowing the user to load them in another multimeter in a very fast and comfortable way.

This function is useful when it is necessary to program various multimeters with the same settings or when the user wants to keep track of the setting of one particular plant.

To save on disk, select *Parameters-Save* and enter the desired file name. The extension for this type of file is .PAR. To execute the reverse operation, that is transfer a file to the DMK memory, use *Parameters-Load* menu.

It is also possible to have a printout of the settings, useful to archive with the plant documentation, using *Parameters-Print* menu.

## Page editor

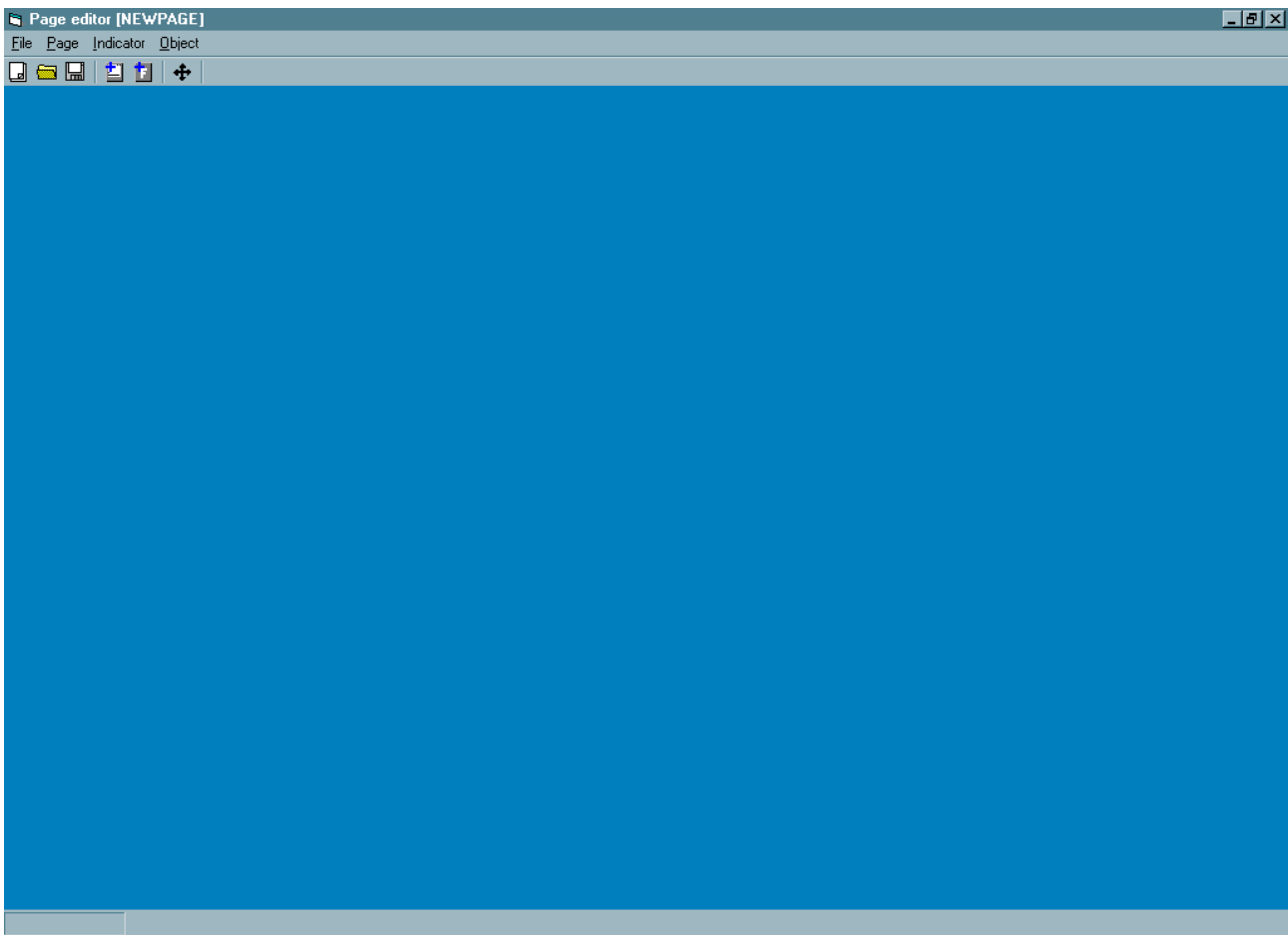
The Page editor is the part of the remote control software that allows the user to create some custom pages, inserting indicators and fixed objects.

This argument, that should be a part of the configuration Chapter, has been left as the last part of the manual because it is intended for experienced users.

To open the page editor, enter the password and click on *Configuration-Page editor*.

Please note that during page editing, as during configuration change, the software enters Offline mode, that is the serial communication with the multimeters is stopped.

When started, the page editor shows an empty page. With *File* menu it is possible to execute the common operations of loading, saving and generating a blank new page. The pages used by the remote control software are placed in a directory (named ...\PAGES\ENG when the software is set for English language). The pages are loaded and saved only from this directory. For this reason, the Open and Save windows do not appear as the common Windows file open/save dialogs.

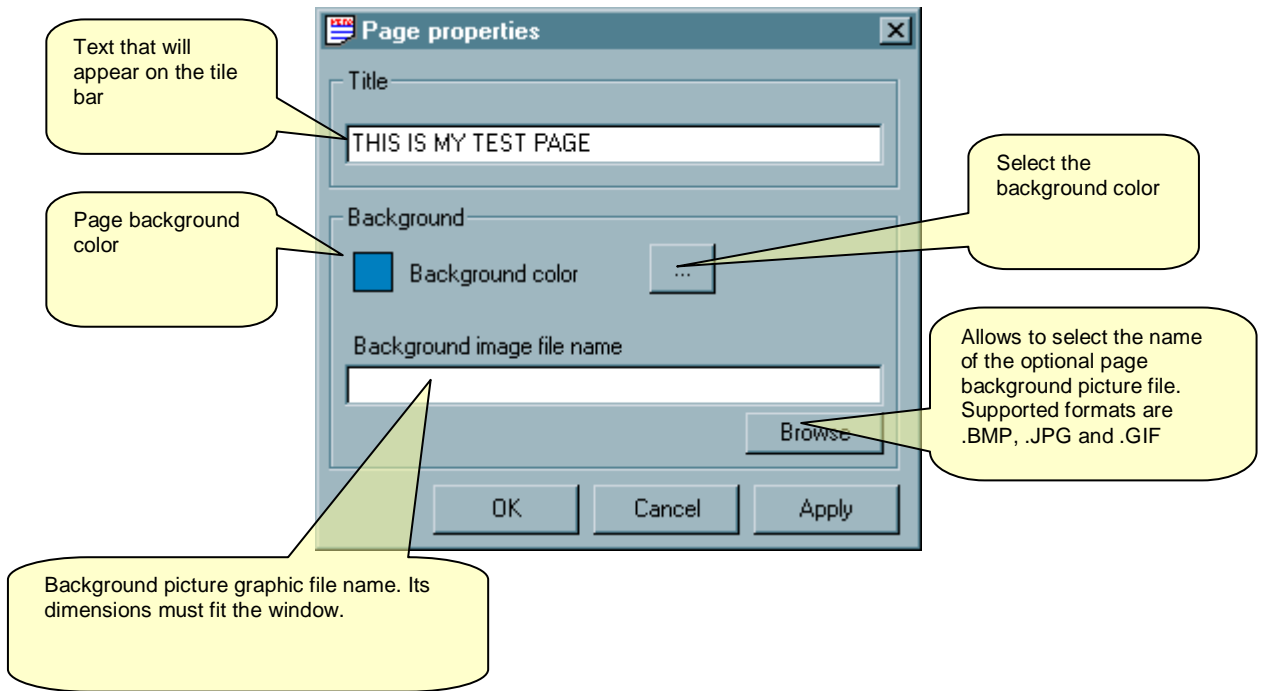


In the following paragraphs we will explain the functionality of the page editor by means of a very simple example that will create a test page.

**Step 1**

The first operation that the user can carry out is to define some general properties of its new page, such as the title, the background color, and an optional background picture. For this purpose, use the Page-Properties menu and open the following window:

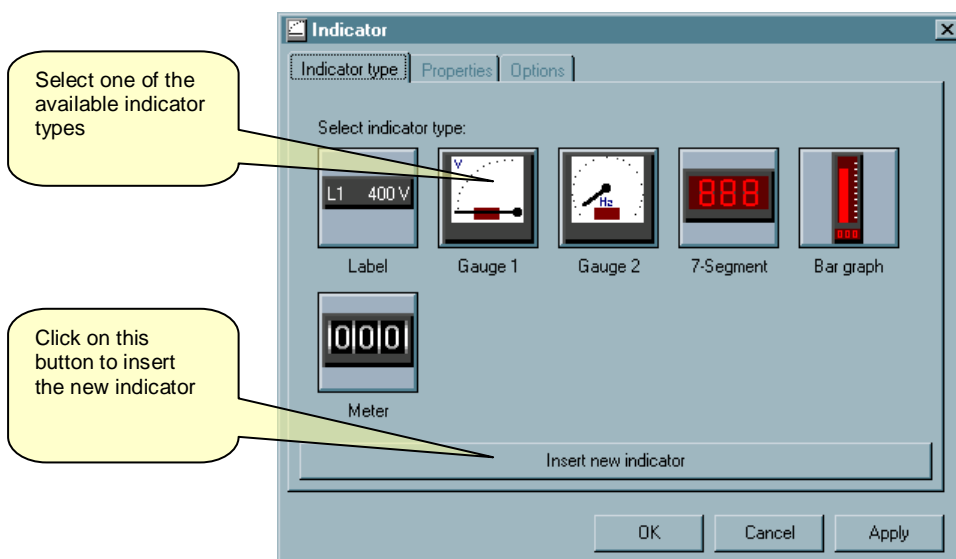
Figure 10.1 – Page-Properties



**Step 2**

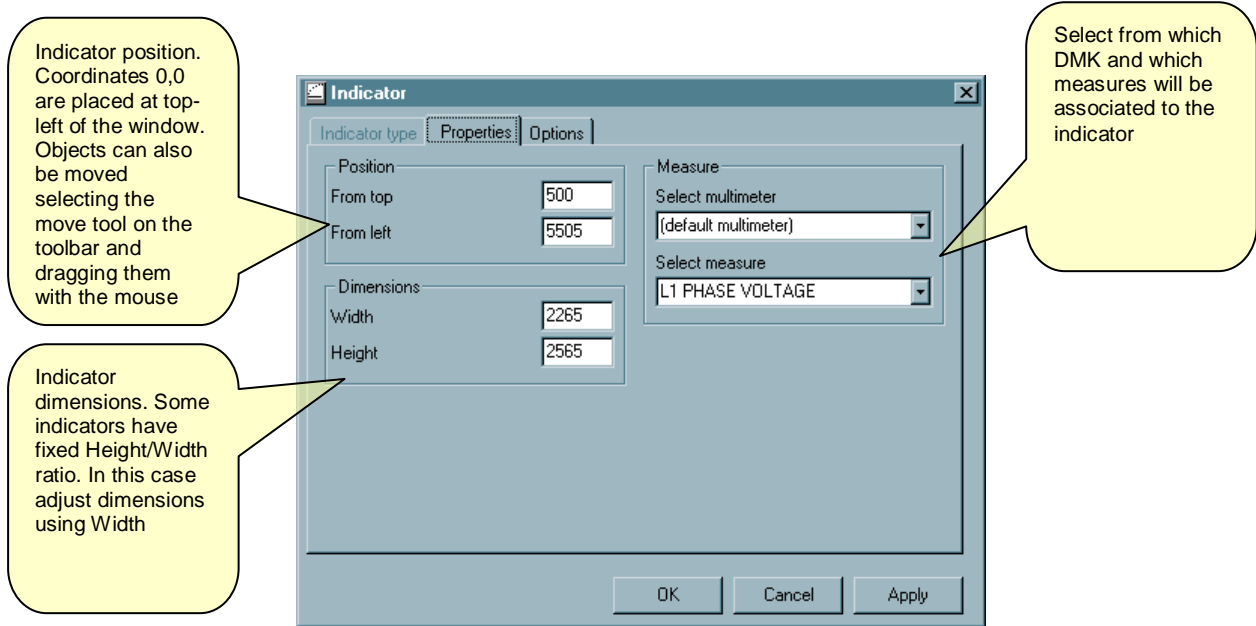
At this point, the user may want to add to its page one needle indicator that will show the equivalent phase voltage. Select Indicator-Add menu or right-click on an empty point in the page and select Add indicator from the pop-up menu. The following window will be shown:

Figure 10.2 Indicator-Add-Indicator type



Select the button with the *Gauge 1* indicator and then click on the button *Add new indicator*. At this point on the page a new indicator will be shown, with standard position and dimensions. At the same time, the window moves to the basic properties for all indicators:

Figure 10.3 – Indicator -Properties



The properties shown in Figure 10.3 are common to all kind of indicators.

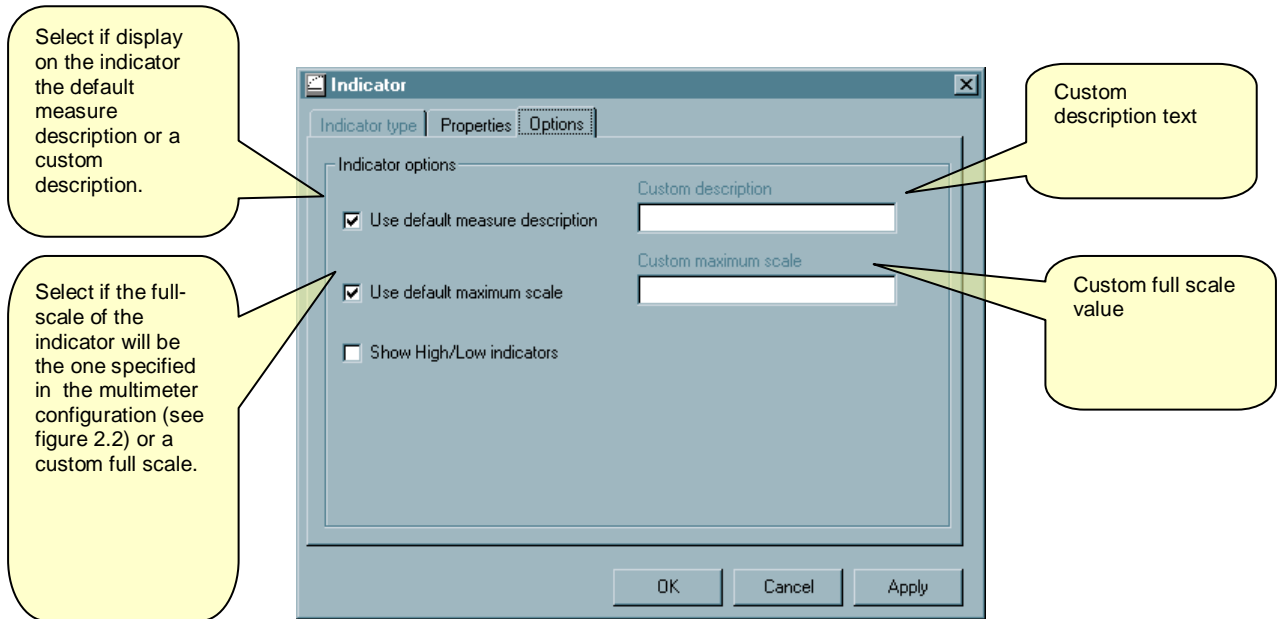
When specifying the multimeter from which read the measure, please take into account that:

- If in the *Select multimeter* drop-down box you choose one of the configured multimeters, the measure displayed by the indicator will always be read from that specific multimeter. This solution must be used when we want to put in the same page measures coming from different multimeters.
- If the *Select multimeter* drop-down box is left to *Default multimeter*, the indicator will show the measure read from the multimeter currently selected in the main page (see figure 1.1). Building one page with all indicators set in this way will enable the user to use the same page with all of the multimeters, one at a time.

After having specified position and dimensions of the new indicator, leave the *Multimeter selection* box to *Default multimeter* and then select from the possible measures the one that we want for our example, that is *Equivalent phase voltage*.

At this point we can move to the Options page of the Indicator window and fill-in some options for the Gauge 1 indicator type. This Options are different from one indicator to the other. In our case, for example, we can disable the Use default description checkbox and specify a custom description to be placed on our indicator.

Figure 10.4 – Indicator-Options (for Gauge1 type indicator)



Clicking on OK the options are applied and the window is closed.

Following the same procedure, it is possible to add other indicators to our page.

To modify the properties of an already-placed indicator, select it clicking with the mouse (the indicator is highlighted with a frame) and then use *Indicator-Modify* menu or right-click and select *Modify* from the pop-up menu.

In the same way, after having selected one indicator, it is possible to delete it with *Delete*.

### Step 3

At this point we have created a very simple page that is ready to be loaded by the software. Let's save the page with File-Save as , specifying , for instance, TESTPAGE. This command will create a text file, called TESTPAGE.PGD and placed in the ... \PAGES\ENG\ directory with the other pages. For those interested, the file content can be examined and eventually modified with a standard text-editor.

### Step 4

Now, close the page editor with File-Exit page editor. The program loads the MAIN page (figure 1.1) or the START page (in this case select one of the DMK to move to MAIN page). Now, in the page selection drop-down box we will find our TESTPAGE. Selecting it, the page will be shown and the indicator will display the equivalent phase voltage read from the currently selected multimeter.

At this point we have concluded the very minimum sequence to create a custom page. We will now explain the other capabilities of the software that will enable to create more complex pages.



## Indicator types

### Label indicator

The label indicator shows one measure in numeric format.

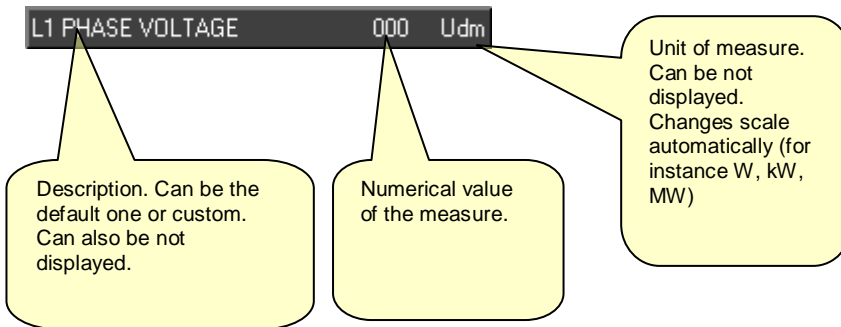
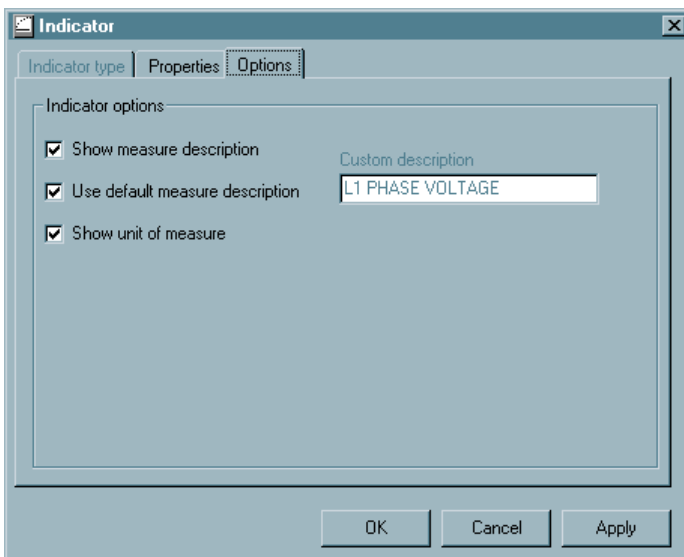


Figure 10.5 – Indicator-Options (for label indicator)



### Gauge1 indicator

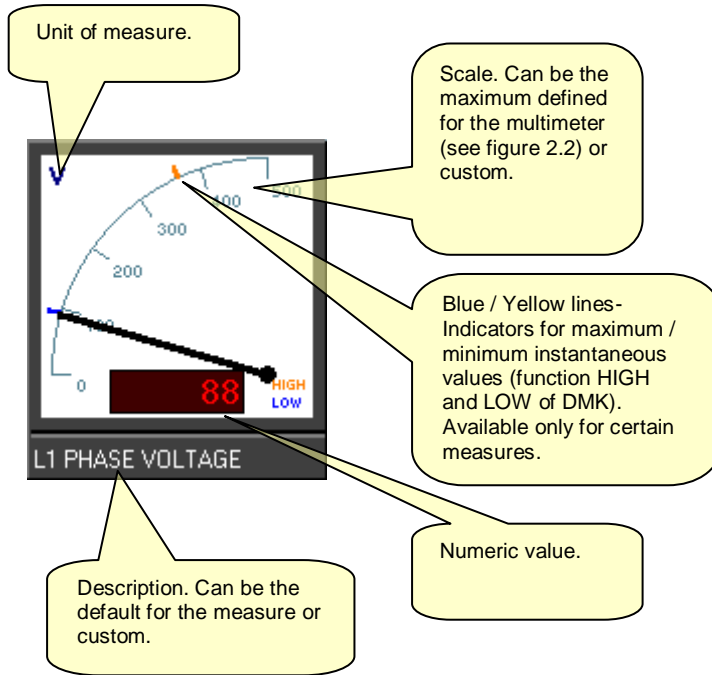
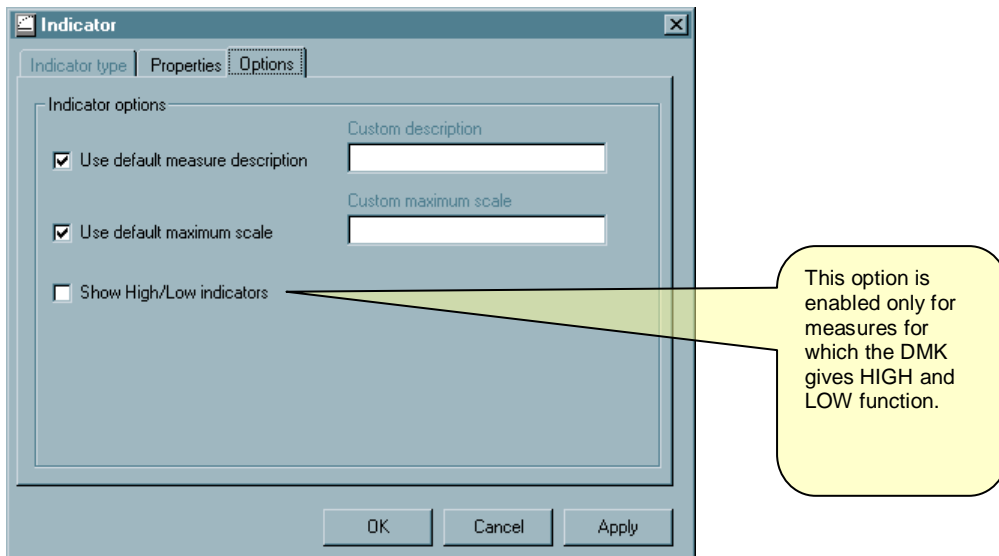


Figure 10.6 – Indicator-Options (for Gauge1 indicator)



Gauge2 indicator

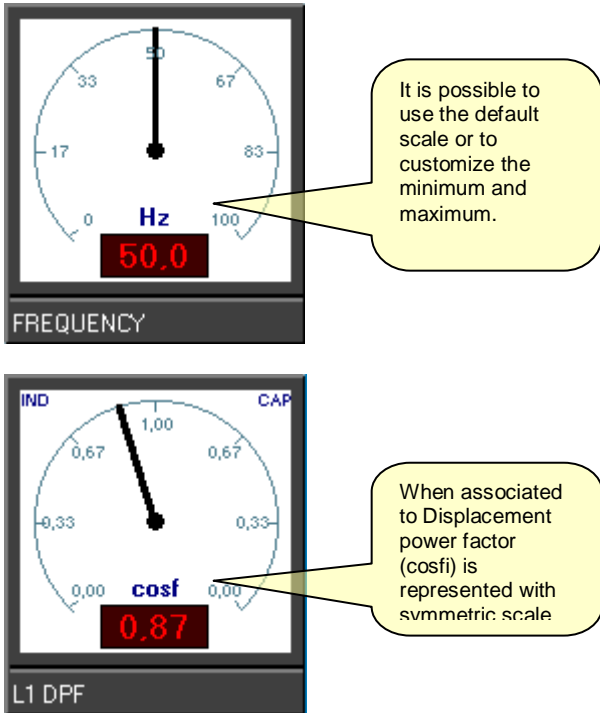
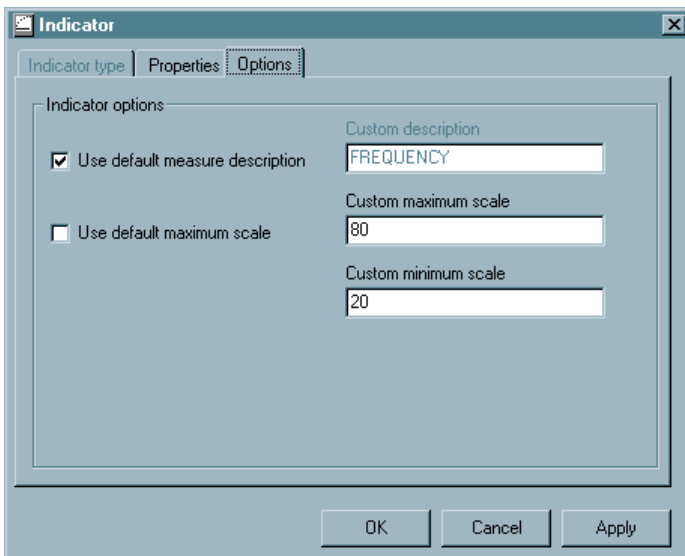


Figure 10.7 – Indicator-Options (for Gauge2 indicator)



### Seven-segment indicator

Operation similar to the label indicator, with 7-segment Led display visualization.

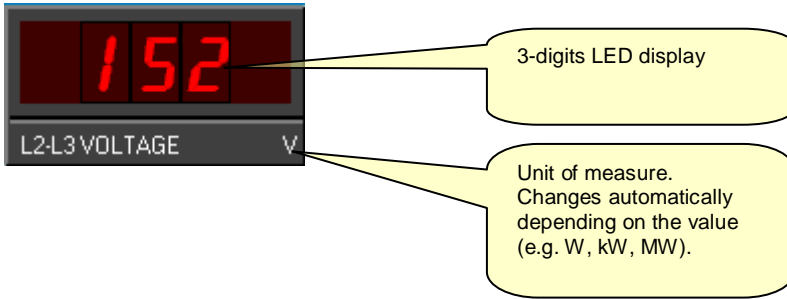
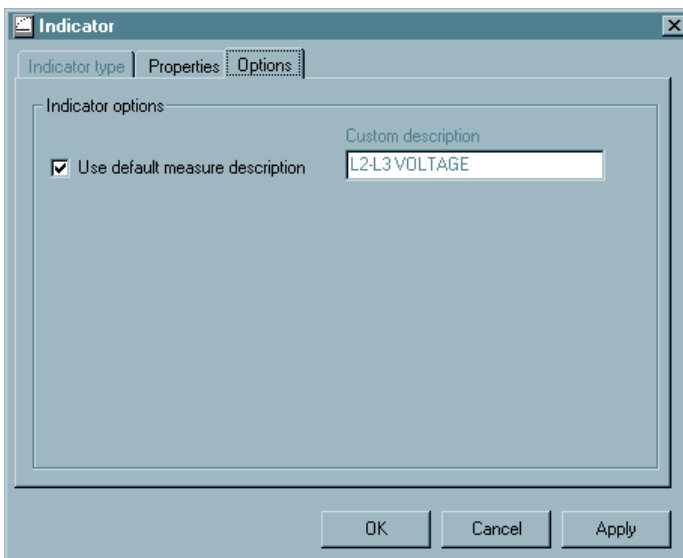


Figure 10.8 – Indicator-Options (for Seven-segment indicator)



### Bar-graph indicator

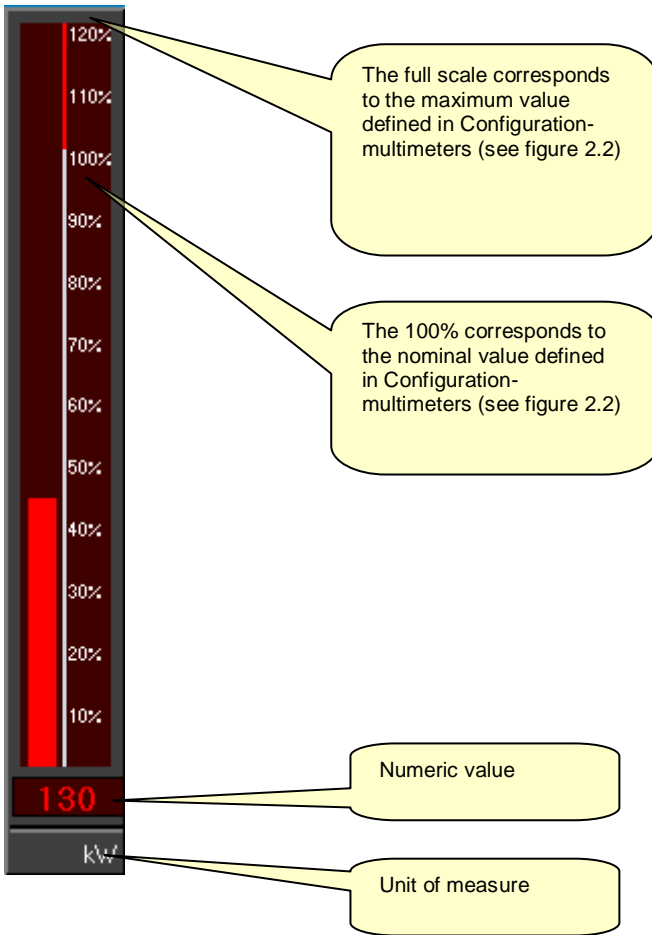
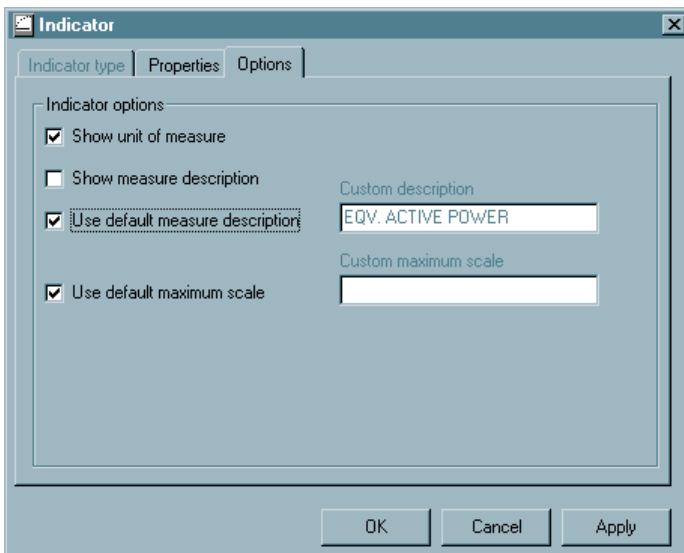


Figure 10.9 – Indicator-Options (for Bar-graphs indicators)



## Energy-meter indicator

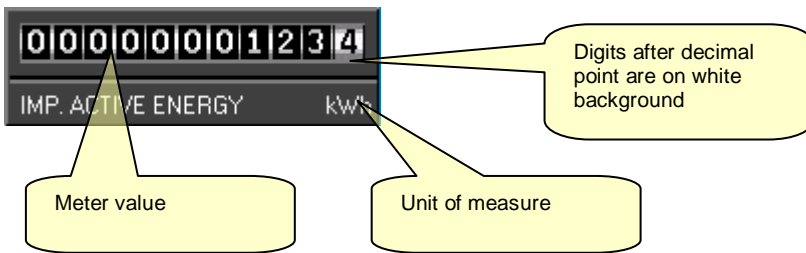
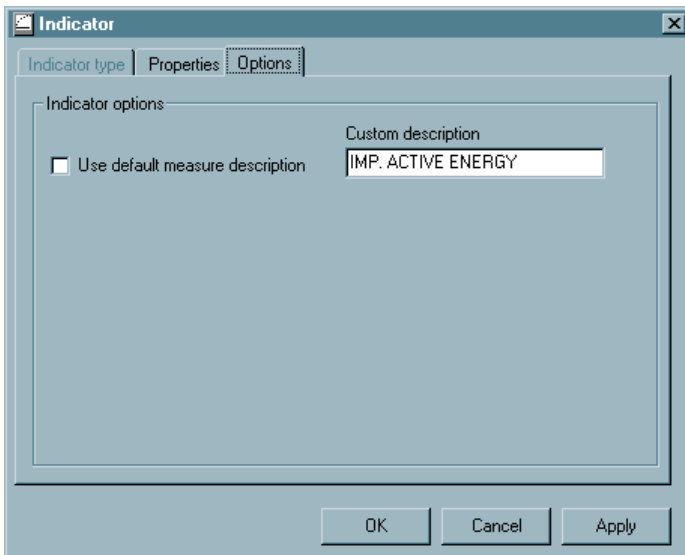


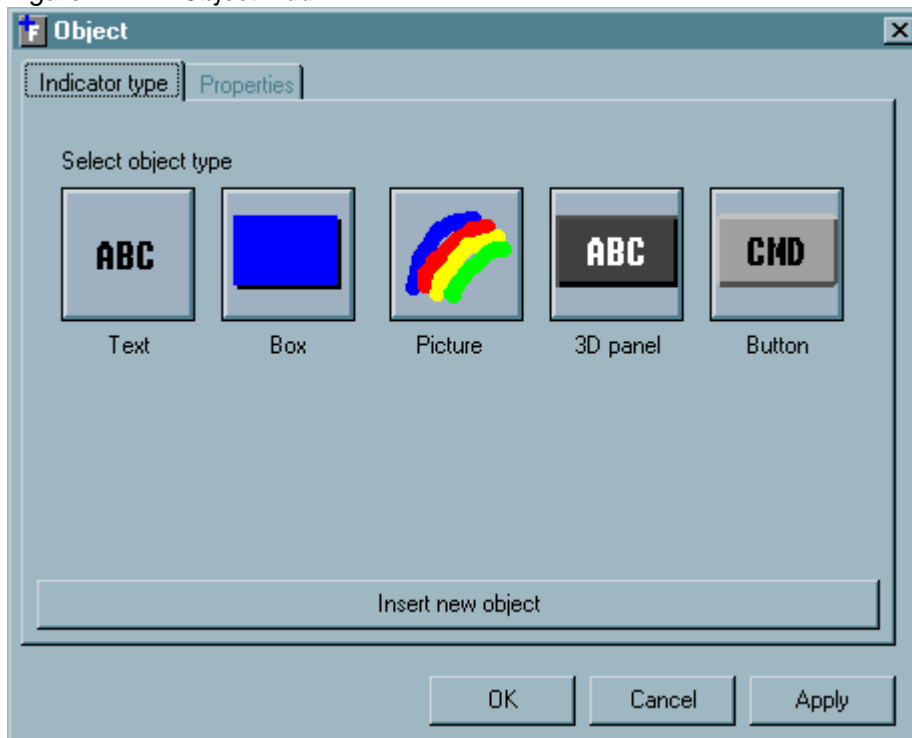
Figure 10.10 – Indicator-Options (for Energy-meter indicator)



## Objects types

On a page it is possible to add other objects, some of them fixed (such as fixed texts, lines, pictures etc.) and others with an active function (for instance command buttons). Inserting and editing of these objects is done in the same way as for the indicators. Using Object-Add it is possible to open the window that allows to select the object type and to specify its options.

Figure 11.1 – Object-Add



The available objects type are

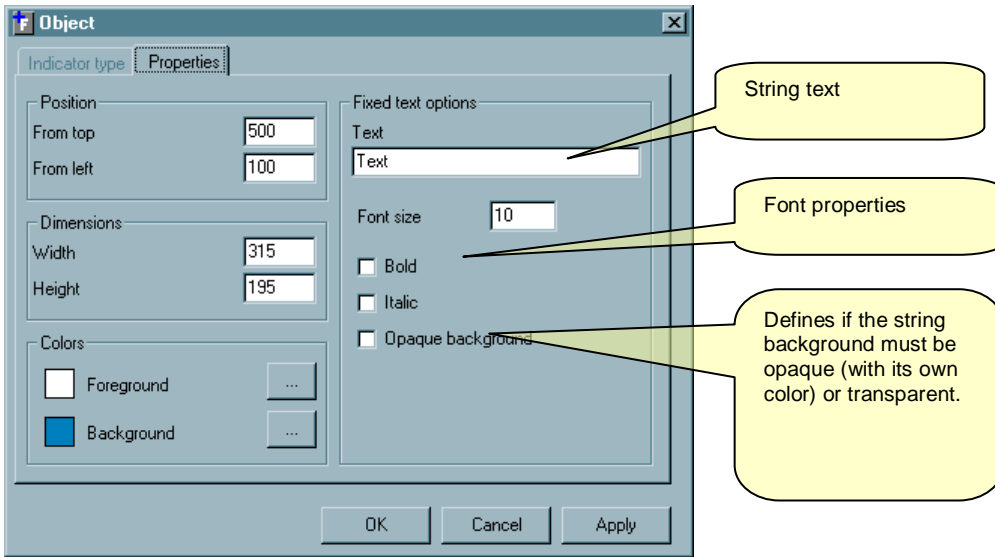
- Fixed text                      Fixed string with customizable colors and dimensions
- Rectangle (line)              Painted rectangle. Modifying its dimensions is possible to draw lines.
- Picture                          Box showing a graphic file
- 3D panel                         Fixed string on a 3D panel
- Command button                Button that can carry out particular functions

Just like the indicators, objects have different properties depending on the object type. In the following pages we will explain the function of this properties.

**Text Object**

Inserts a fixed string on the page background.

Figure 11.2 – Object-Text-Properties



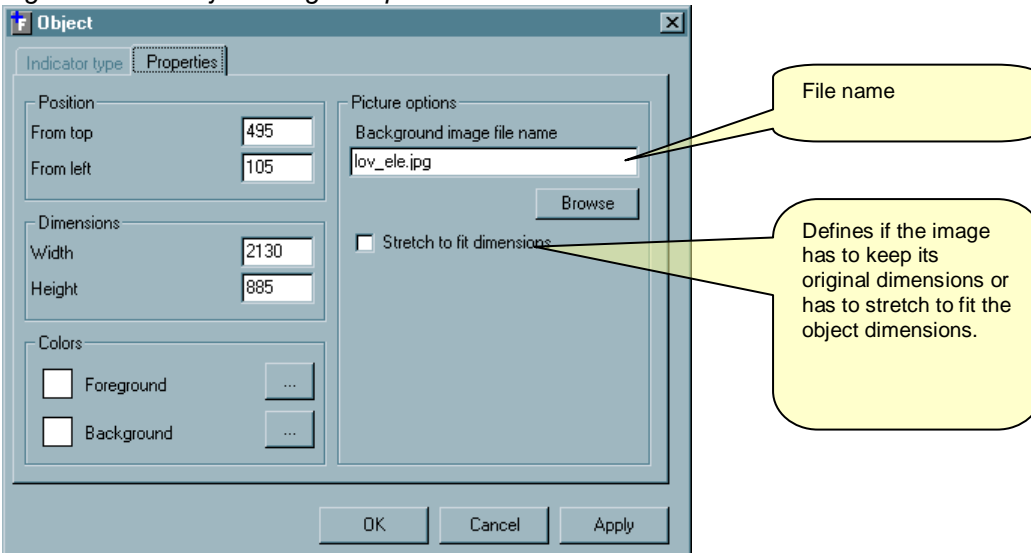
**Rectangle Object**

Allows to place a filled rectangle on the page background. Modifying its dimensions it is possible to draw orthogonal lines.

**Image object**

Inserts a box displaying a graphic file in BMP, JPG or GIF format.

Figure 11.2 – Object-Image-Properties



**3D panel object**

Similar to the text object, but placed over a 3D-effect panel



### Command button object

The command button is an active object. Clicking it with the mouse can execute a series of commands selectable by the user. In the Property window, besides the common settings such as position, dimensions, text etc., the user must define also the *Action* for the command button and an optional *Operand* for that action.

The possible *Actions* are the following:

- **COMMAND**

Sends a command to the multimeter. In this case the operand defines the type of command to send. The possible commands are:

- Reset energy meter
- Reset HIGH function values
- Reset LOW function values
- Reset MAX function values
- Reset digital output 1
- Reset digital output 2
- Reset multimeter

- **END**

Quit the remote control software

- **NEWPAGE**

Loads a new page. In this case the operand must be selected among one of the existing pages.

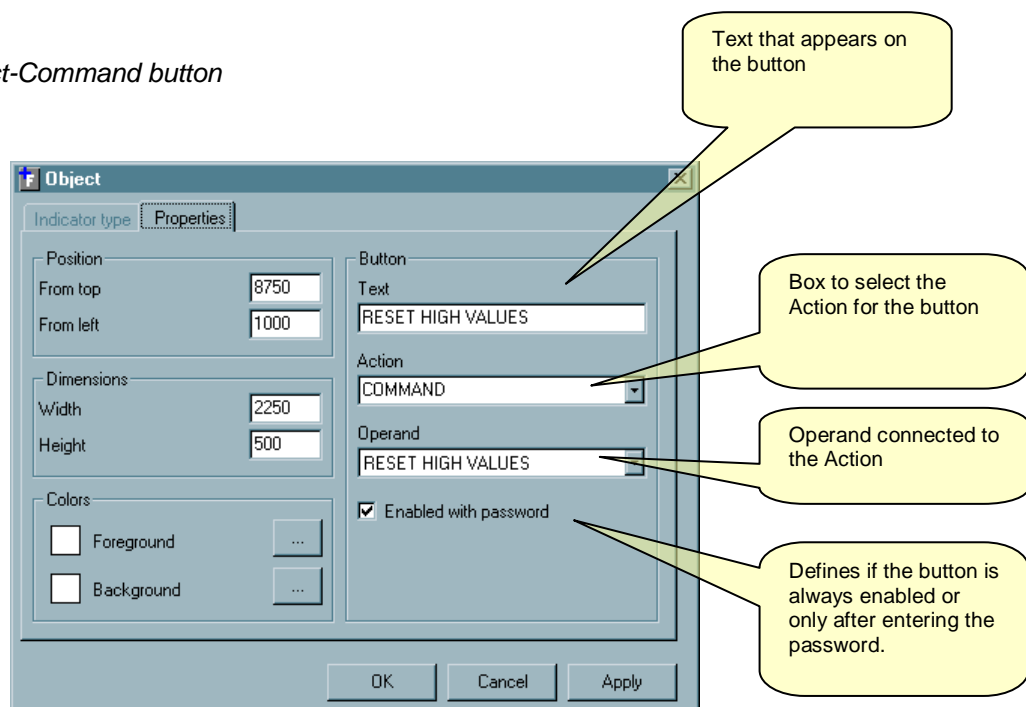
- **NEWNODE**

Selects a new multimeter. In this case the operand must be selected among one of the configured multimeters.

- **PANEL**

Shows the front panel of the multimeter specified in the operand.

Figure 11.3 – Object-Command button



## Start page generation

When the software is started, it loads a page with the following criteria:

- If there is only one DMK in the configuration, the page named 'MAIN' is loaded.
- If there are more than one multimeter, then the program loads the page named 'START'

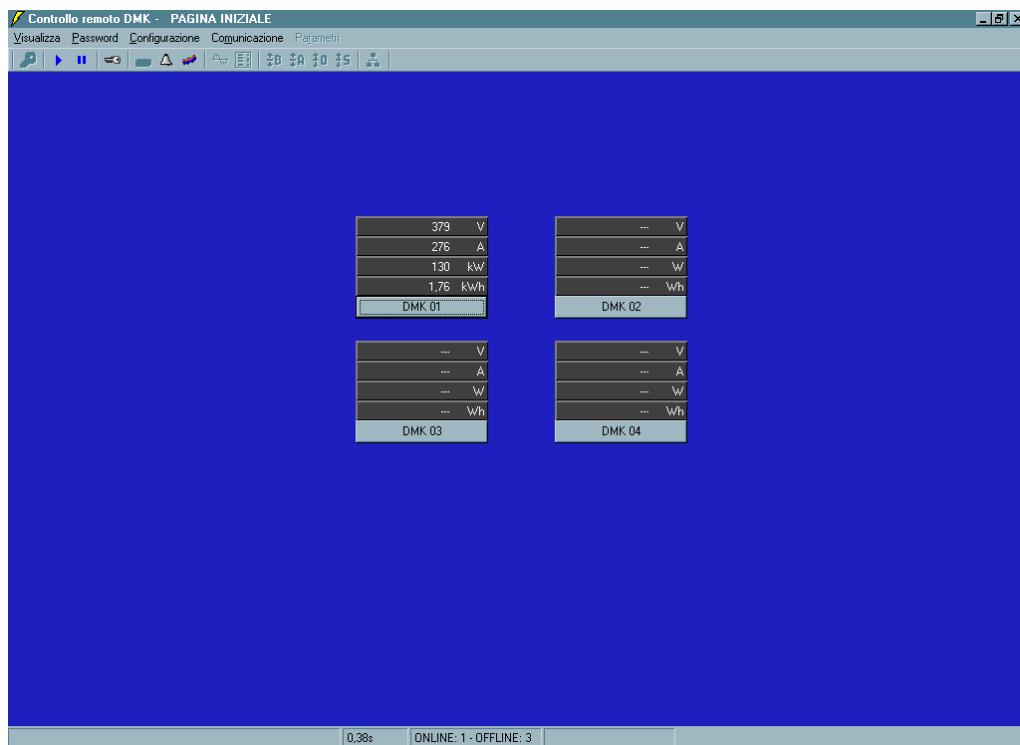
These page names are valid when the software is configured in English. The user, if he wants, can customize these pages with the page editor, but it is necessary that the files MAIN.PGD and START.PGD are not deleted.

There is the possibility to automatically generate the 'START' page, displaying one panel for each DMK. This operation can be carried out after having finished the configuration phase, opening the page editor and selecting *Page-Generate start page*.

In this way, the software automatically generates the page file START.PGD, inserting for each DMK in the network a panel with:

- Four label indicators that show
  - Equivalent phase-to-phase voltage
  - Equivalent current
  - Equivalent active power
  - Active energy meter
- One command button that allows to open the MAIN page selecting the desired DMK .

After having generate the page, the user has the possibility to customize it using the common commands of the editor. The following picture shows an example of start page automatically generated for a four-DMK network.



At this point the user can add, for instance, a picture with a scheme of its plant and then place the panels in the correct positions.

When the software is installed for the first time, it is supplied a START page with only one DMK. This page can be overwritten by the one customized by the user, that will be automatically loaded every time the software is started.

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