

# Power Quality Solutions

## BR7000-Soft V5.4 Manual



**Windows-Software for  
Power Factor Controllers  
and MMI7000 for  
parameterization, visualization, recording  
and analysis of grid parameters**

# Content

1. General	3
2. Preparation of the device	4
3. Installation	5
4. Start of program/start options	6
4.1 Connect (automatic)	7
4.2 Load file	8
4.3 Demo-Mode	8
4.4 Start-options (connection)	9
5. Display-Mode (grid parameters)	10
5.1 Adjustment of display	11
5.2 Grid parameter table	12
5.3 Maximum grid parameters	13
5.4 Internal error-memory	14
5.5 Display stage information	15
6. Configuration manager	17
7. Recording of grid parameters	18
8. Analysis Tool	21
9. Graphical display of harmonics	25
10. Error messages (selection & display)	26

# 1. General

## Main features and benefits of the software:

Comfortable and editable **Display mode** of all measured grid parameters

Compact overview about all **Stage information's** in the controller

**Record grid parameters** (free selectable) over a longer time

**Graphical Analysis** with the recorded parameters

Show voltage & current **Harmonics** in real-time as bargraph (FFT)

Read-out, edit, store and write all internal parameters / settings of the connected Power Factor Controller with a comfortable **Configuration-Manager**

The software is compatible with following devices:

- Power Factor Controller BR6000-R12/S485 from version 5.0 onwards
- Dynamic P.F. Controller BR6000-T12/S from version 5.0 onwards
- Hybrid P.F. Controller BR6000-T6R6/S from version 5.0 onwards
- Power Factor Controller BR7000 - all software versions
- Power Factor Controller BR7000-I-S - all software versions
- Multi-Measuring-Interface MMI7000-S/ -E - all software versions

## 2. Preparation of the device

To connect the Power Factor Controller with the computer, at the device the following settings have to be done:

Expert Mode 1 (Password: **6343**)

Type of device	Menu	Requested setting
BR6000	19 Protocol	[Modbus RTU]
	21 Address	[ n ] must only exist once for a BUS
BR7000	15 Protocol	[Modbus RTU]
	17 Address	[ n ] must only exist once for a BUS
MMI7000-S /-E COM1	3 Protocol	[Modbus RTU]
	5 Address	[ n ] must only exist once for a BUS
MMI7000-S COM2	16 Protocol	[Modbus RTU]
	18 Address	[ n ] must only exist once for a BUS

### Interface

BR7000-I-S	10 Protocol	[Modbus RTU]
	11 Baudrate	[ **** / NONE ]
	12 Address	[ n ] must only exist once for a BUS

To enable the communication between several devices and a PC, all devices must have the same baud rates, but different addresses. In case the values in the controller have changed, it may happen that the option **Load file** does not work appear→ a new search has to be done (**Automatically**) and the result has to be stored.

If the controller is not in “auto-mode” (cos phi), a connection to the computer is not possible. In this case the error message „No connection!“ will appear.

### NOTE:

The best way to get a direct connection to a PC via USB-interface is to use the USB-Adapter “CV-USB485” (ordering code B44066R3333E230)

# 3. Installation

The program installation is done via executable file “setup.exe” of the CD to a freely determinable folder (standard setup-program).

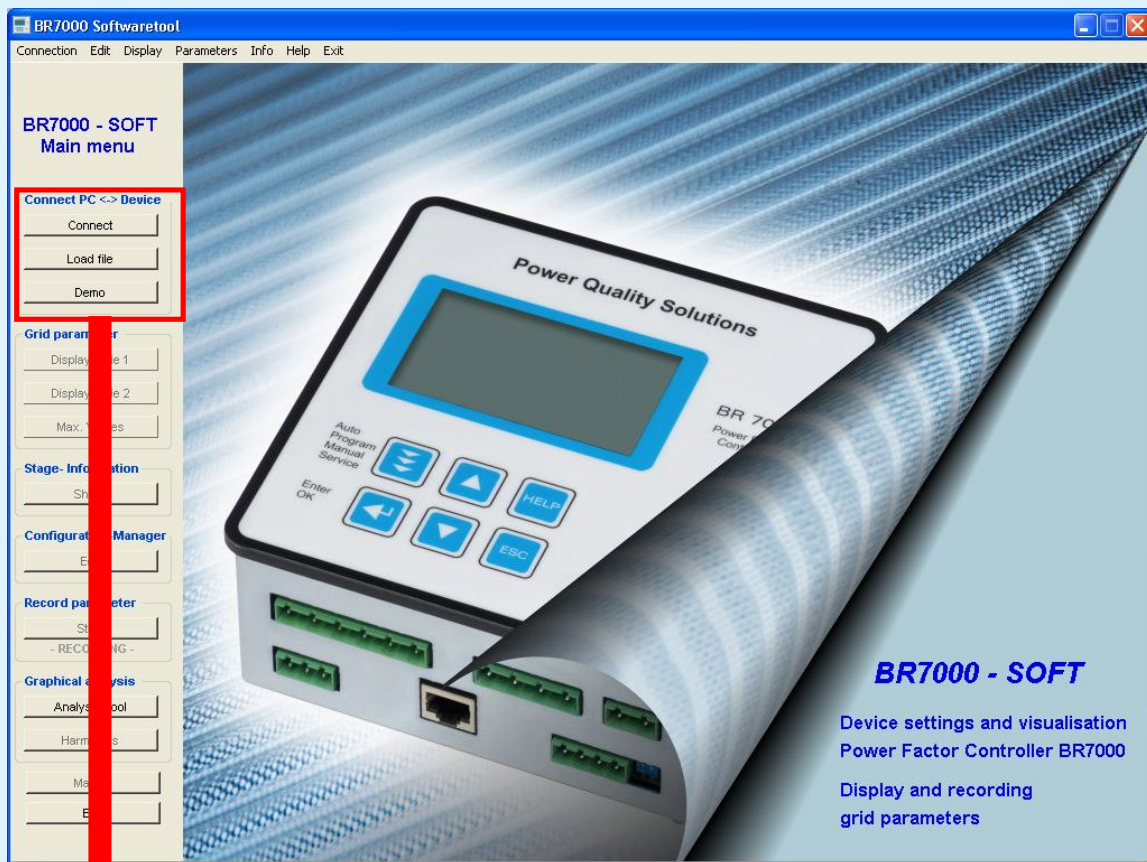
Please note that user has to be logged in as administrator.



# 4. Start of program / start options

Program start is either done via the icon generated on the desktop or by double click on the file “BR7000Soft.exe” in the installation folder.

The underneath shown start window of the program appears:



Start options

# Start of program/ start options

## 4.1. Connect

Active	Name	Input	Type	Version	Port	ID	Baud.	
<input checked="" type="checkbox"/>	PFC 1	<input type="button" value="Edit"/>	L1, L2, L3	BR7000	1.0	COM6	1	38400
<input checked="" type="checkbox"/>	PFC 2	<input type="button" value="Edit"/>	-	BR6000	5.0	COM6	2	38400

### 1. Interface settings

Select **“Auto”** to search all parameters (COM 1-20, Address 1-31, Baud rate 4800, 9600, 18200, 36400). Please note that this could take some minutes.

If you know one or more interface settings, choose them manually in the list boxes. Then the devices will be found much faster.

### 2. Find devices

Press the **“Search”** button to find devices connected with the computer. The line under this button displays the actual search status. However, if you found all known devices you can stop the search at any time.

### 3. Networkmode

If the answer from the device takes longer, because of signal delays, you can increase this option to get a stabile connection.

### Result table

Connected devices will appear in the table. Click **“Edit”** if you want to enter a new device/input name. **“Activate”** all devices you want to connect with the software.

### Connect

Press this button to connect activated devices (max. 10 devices) with the software and enter to the main screen.

### Cancel / Abort

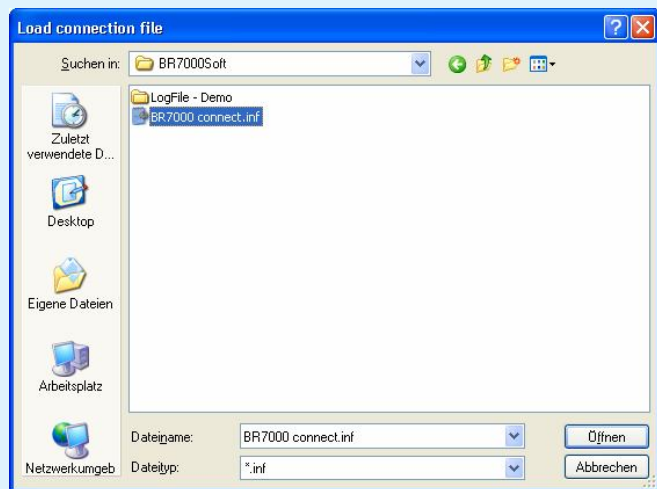
To exit the window and enter the main screen press **“Cancel”**. If searching is in progress press **“Abort”** to stop. Founded devices will be lost in the table.

# Start of program/ start options

## 4.2 Load file

In the dialogue **Load connection file** a (already stored) connection file can be loaded. To create this file see section **4.4 Start options**. In this file all information about earlier connected devices are stored.

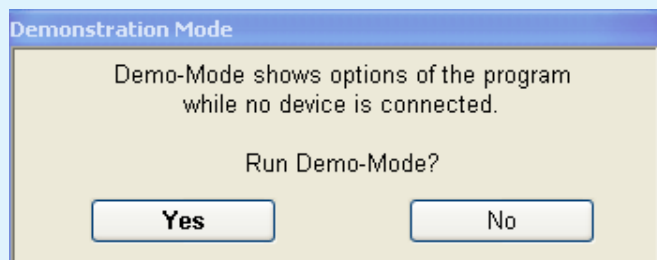
With the button “**Open**” a dialogue appears, identical to the window in 4.1. There are all stored devices in the table and you can select the requested devices to connect them.



## 4.3 Demo-Mode

No connection with a device is needed for the Demo-Mode (BR6000 V5.0 is simulated).

Nevertheless, a big part of the features can be demonstrated.



Note: The following options are not available in Demo-Mode:

- **Configuration-Manager**
- **Stage-Information**



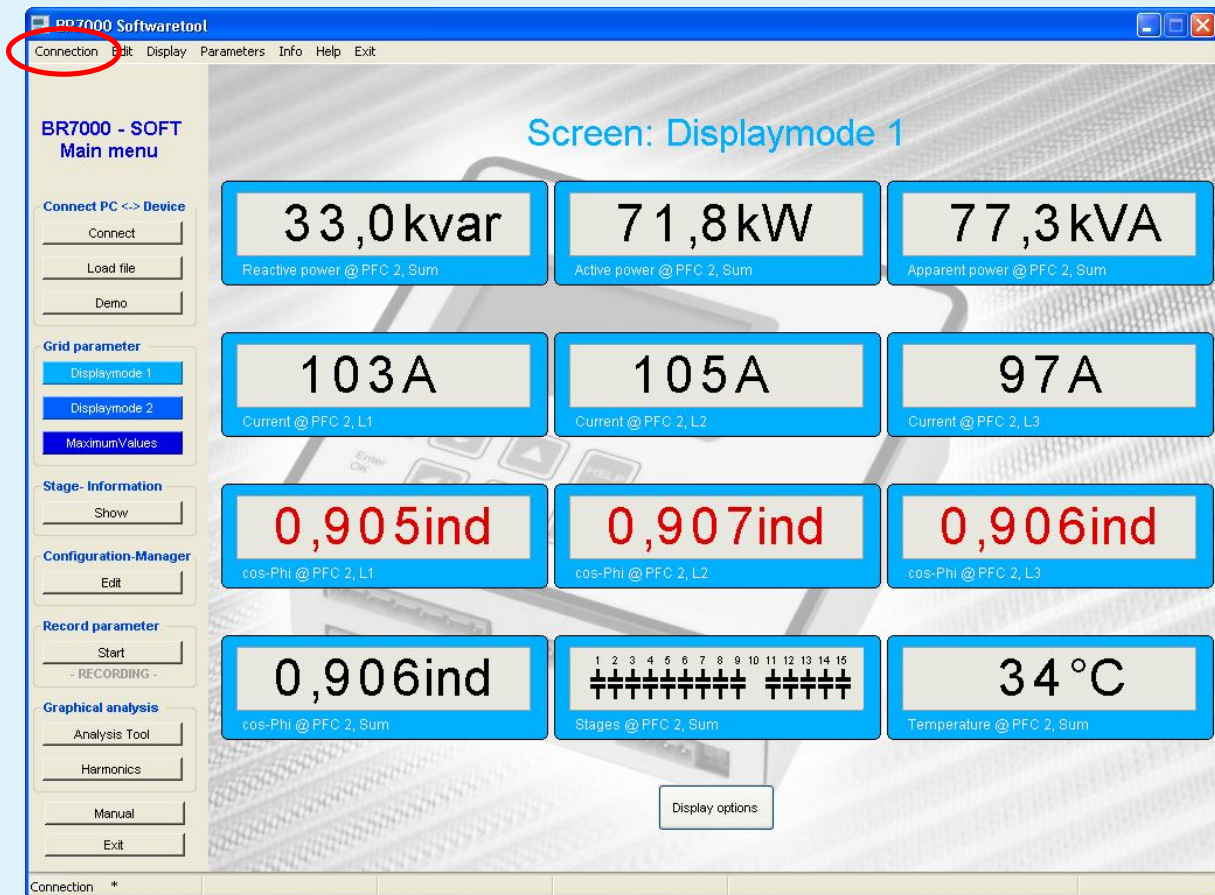
# Start of program/ start options

## 4.4 Start options (Connection)

After the devices have been connected, a connection file should be generated.

**Connection / Connect devices** opens a dialogue identical to the window in chapter 4.1

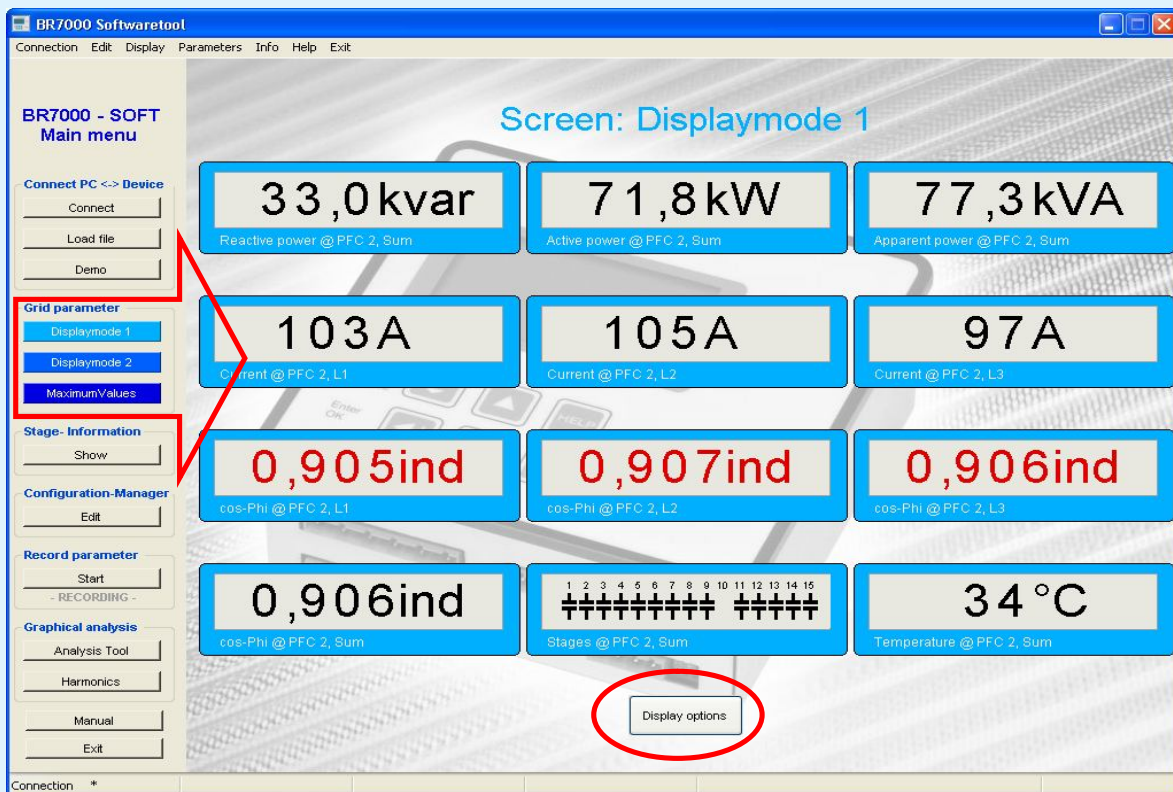
Via **Connection / Save current connection** the actual interface-settings can be stored. Using this connection file saved searching for devices when starts the program next time (with the same devices)



# 5. Display mode (grid parameters)

The display-mode is made for a comfortable display of all measured grid parameters during online operation.

By pressing the colored buttons 3 different display-orders with up to 12 different parameters (each) can be displayed.



By selection of “**Display options**” a free configuration of numbers and contents of the display is possible.

# 5.1 Display mode (Adjustment of display)

## **Display options:**

In the field “**Screen Name**” a name for the screen can be created. It will be automatically shown at the colored buttons.

In the group **Display 1-12** the devices (top) and grid parameters (bottom) can be selected.

Screen Name:

Display	Device	Parameter
Display 1	PFC 2, Sum	Reactive power
Display 2	PFC 2, Sum	Active power
Display 3	PFC 2, Sum	Apparent power
Display 4	PFC 2, L1	Current
Display 5	PFC 2, L2	Current
Display 6	PFC 2, L3	Current
Display 7	PFC 2, L1	cos-Phi
Display 8	PFC 2, L2	cos-Phi
Display 9	PFC 2, L3	cos-Phi
Display 10	PFC 2, Sum	Energy (+)
Display 11	PFC 2, Sum	Stages
Display 12	PFC 2, Sum	Temperature

OK Undo

With “**OK**” the settings will be confirmed.

For changing the values in another view (e.g. Displaymode 2), return to the main window before.

# 5.2 Grid parameter table

## Grid parameter table:

- This window is located in **Display/Grid parameter table** and gives a review of all parameters from all devices and inputs
- Parameters that are not supported by the device/input stay empty
- To close this window choose any other option from the main menu

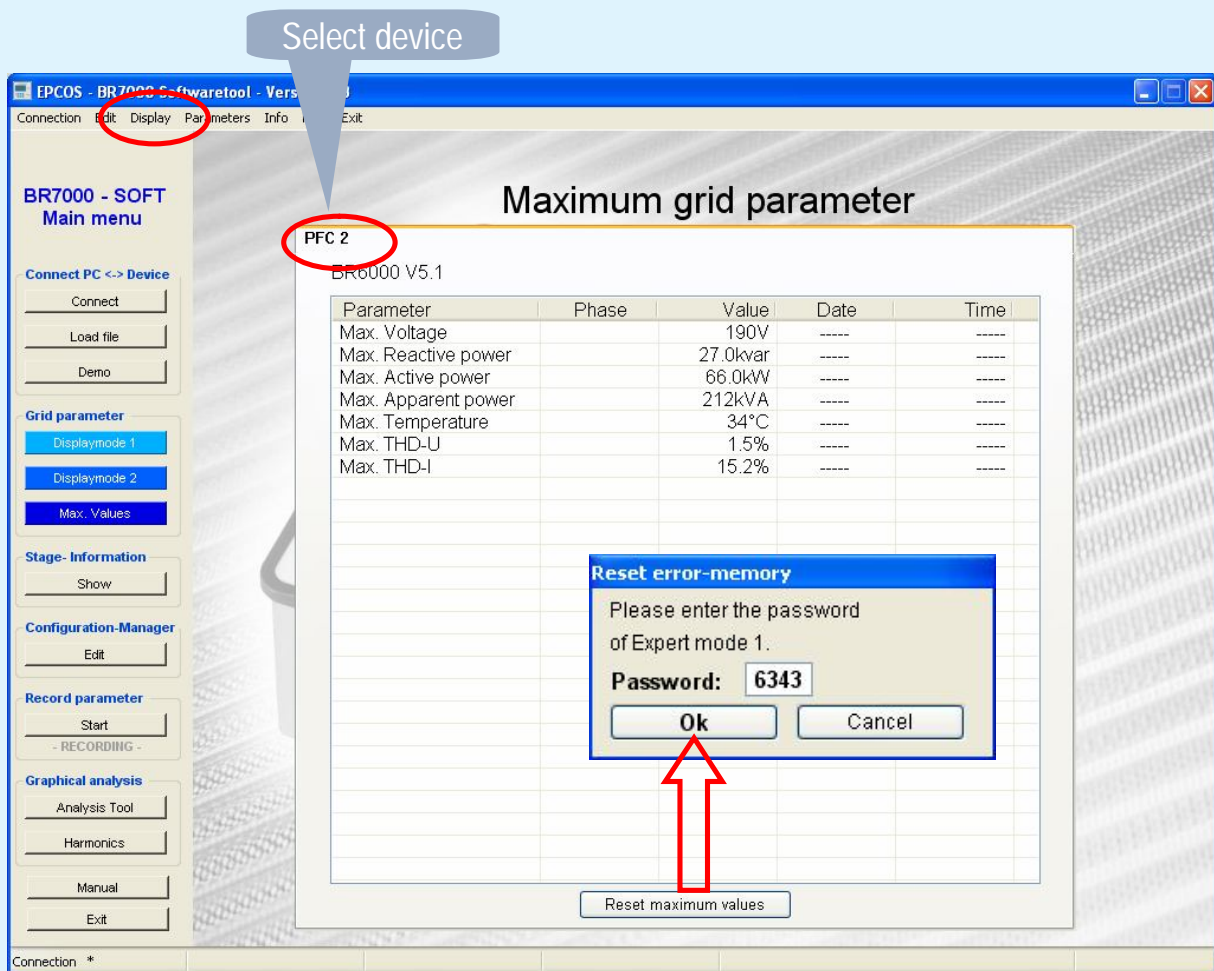
The screenshot shows the 'EPCOS - BR7000 Softwaretool - Version 5.3' window. The 'Display' menu item is circled in red. The main window displays the 'Grid parameter table - only information' table.

Register	PFC 1 (BR7000)	PFC 1, L1	PFC 1, L2	PFC 1, L3
Reactive power	42,1 kvar	12,3 kvar	15,1 kvar	14,7 kvar
Max. Reactive power	88,5 kvar	26,2 kvar	31,8 kvar	31,1 kvar
Active power	-52,5 kW	-15,3 kW	-18,8 kW	-18,4 kW
Max. Active power	63,0 kW	18,8 kW	22,3 kW	22,1 kW
Apparent power	68,9 kVA	20,1 kVA	24,6 kVA	24,2 kVA
Max. Apparent power	91,3 kVA	27,0 kVA	32,6 kVA	31,8 kVA
Diff. Reactive power	31,5 kvar	9,2 kvar	11,3 kvar	11,0 kvar
Energy (+)	342 kWh			
Energy (-)	213 kWh			
Energy (IND)	1084 kWh			
Energy (CAP)	231 kWh			
Temperature	30 °C			
Voltage		233 V	232 V	232 V
Min. Voltage		0 V	0 V	0 V
Max. Voltage		242 V	242 V	242 V
Current		86 A	106 A	104 A
Max. Current		115 A	139 A	135 A
cos-Phi	0,780 ind	0,779 ind	0,780 ind	0,781 ind
Frequency		50 Hz	50 Hz	50 Hz
Parameter set	1			
Max. Temperature	35 °C			
Stages	1111111111111111...			
Voltage-THD		0,9 %	1,0 %	0,9 %
Current-THD		4,0 %	4,0 %	4,0 %
Max. THD-U		1,2 %	1,2 %	1,3 %
Max. THD-I		9,3 %	9,3 %	88,0 %

# 5.3 Maximum grid parameter

## Maximum grid parameter:

- This window is located in **Display/ Maximum grid parameter** and shows all max. values from the selected device with date and time stamp\*.
- Value and time stamp\* are stored at the device.
- **Reset maximum values** clears the max. value memory at the device\*\*. Password for expert mode 1 (**6343**) is needed to reset!
- To close this window choose any other option from the main menu



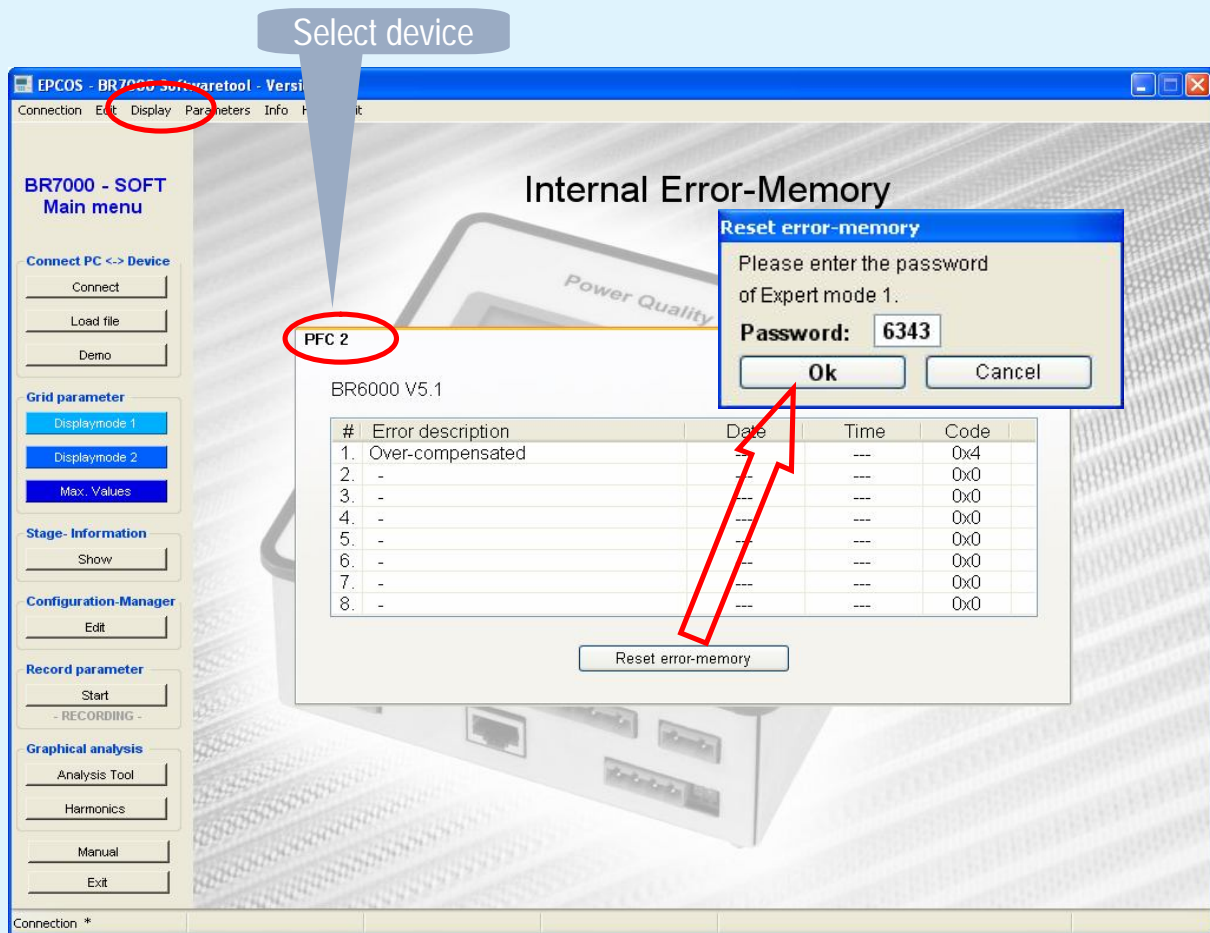
\* BR7000 and MMI7000 only

\*\* BR6000 V5.1 and higher only

# 5.4 Internal error-memory

## Internal error-memory\*:

- This window is located in **Display/ Error- Memory** and displayed the last 8 error messages. Number 1 is the latest error.
- Error code is stored at the device.
- Using the button "**Reset error-memory**" and enter the password of expert mode 1 ( **6343** ) will clear the internal error memory of the device.
- To close this window choose any other option from the main menu

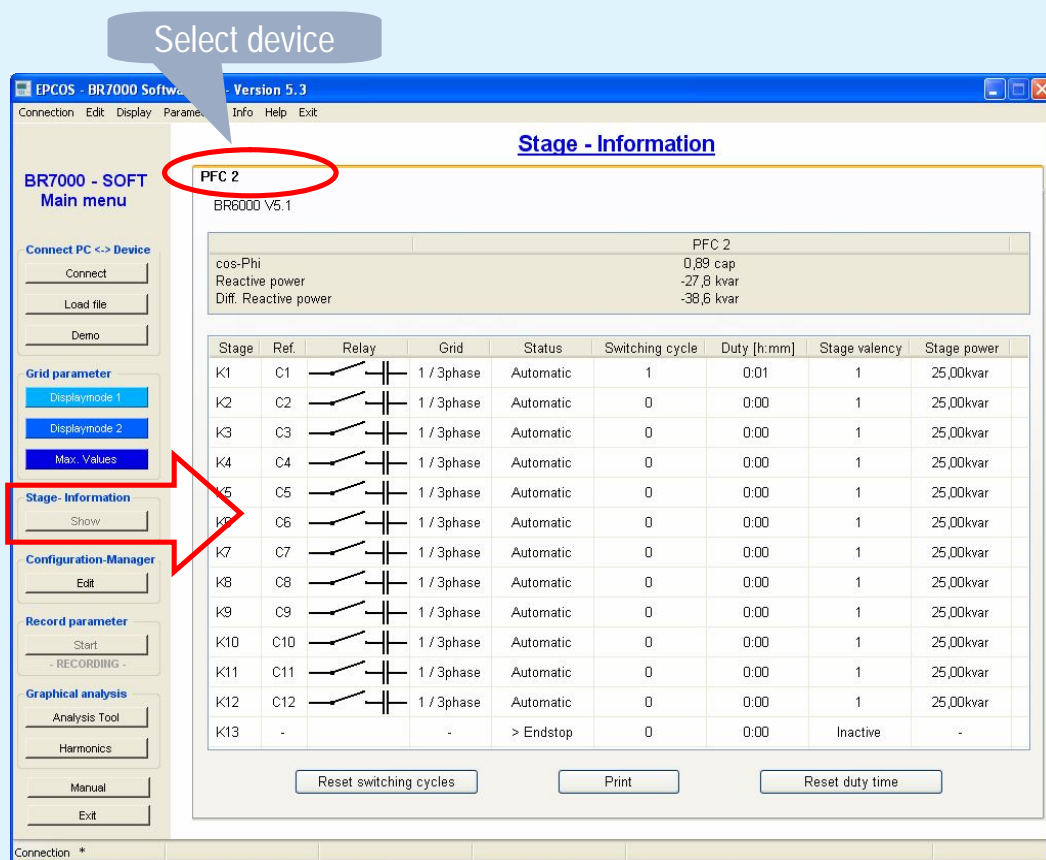


\* BR6000 V5.1 and higher only

# 5.5 Display mode (Stage information)

## Stage- Information\*:

By using the button “**Show**” in the group **Stage-Information** the following window will appear:



Select a device with the attendant **tap**.

**Grid- table** displays important and actual grid-parameters.

The next table shows following stage-information:

**Stage:** Relay name K1 – K13 / K15 (backside of controller)

**Reference:** Depending of the controller-mode:  
compare with controller manual and service-menu

\* **BR7000, BR6000 only (Hybrid- & Dynamic PFC are not supported)**

## 5.5 Display mode (Stage information)

- Relay:** closed switch: stage active; open switch: stage inactive
- Grid:** capacitor connection in the grid (depends on the controller-mode)
- Status:**
- **Automatic** (stage used for automatic controlling)
  - **Fix** (stage is fix connected to the grid, no controlling)
  - **Off** (stage is disconnected to the grid, no controlling)
  - > **Endstop** (stage not existing, because out of end-stop)
- Switching cycle:** numbers of switching operations of this stage.
- Duty [h:mm]:** cumulated operation time of the particular step.
- Stage valency:** describes the ratio of the capacitor branch. If a stage is not switched to **Automatic**, e.g. it is not used for compensation, its rating is *inactive*.
- Stage power:** indicates the power of the step (in kvar). Also applicable here: if the stage is not in **Automatic**, it is marked as “---”.
- Print:** Printing the table to archive switching cycles and duty time of the stages.
- Reset switching cycles\*:** Reset counter for switching cycles at the controller e.g. after contactors are replaced. Password for expert mode 1 (**6343**) is needed to reset!
- Reset duty time\*:** Reset the operating time of all stages e.g. after replacing capacitors. Password for expert mode 1 (**6343**) is needed to reset!

\* **BR6000 V5.1 and higher**



# 6. Configuration Manager

The configuration manager is made for complete read-out, editing, storage and writing of all parameters of the Power Factor Controller via PC.

## **Configuration-Manager:**

Press the “**Edit**” button in the group **Configuration-Manager**

Use the settings that you would like to adjust. A window, listbox or up/down-control will appear to change settings.

Pressing the icons on the right site allows to **send**, **read**, **load** and **store** the settings.

Note: you can load the **basic settings** by pressing the corresponding button.

Select device

BR7000 - SOFT  
Main menu

Connect PC <-> Device  
Connect  
Load file  
Demo

Grid parameter  
Displaymode 1  
Displaymode 2  
MaximumValues

Stage-Information  
Show

Configuration-Manager  
Edit

Record parameter  
Start  
RECORDING

Graphical analysis  
Analysis Tool  
Harmonics  
Manual  
Exit

Manage device configuration via serial interface

PFC 2

Language	English	
Control-mode	Mode 2	
Control input / 2nd set	No	
Parameter set	1st set	2nd set
Control princip	Intelligent	Intelligent
Target cos-phi	0,98 ind	0,98 ind
Additional option	No	No
2nd target cos-phi	0,90 ind	0,90 ind
Start time	Mo..Fr - 16:00	Mo..Su - 9:03
End time	Mo..Fr - 7:00	Mo..Su - 18:00
Sec. I-converter	5 A	5 A
Prim. I-converter		
End stop	3	3
Control series	111111...	111111...
Power 1st stage	13,00 kvar	25,00 kvar
	<input type="checkbox"/> Extended range 0..2550kvar (Resolution 10kvar)	
Switch-on timing	10 s	40 s
Switch-off timing	10 s	40 s
Discharge timing	10 s	60 s
Measurement voltage L-L (L-N)	400 V (231 V)	
Voltage converter	No	
Alarm temperature	55 °C	
Function of message relay	Energy Supply	
V-Harmonics threshold	7,0 %	
Fan startup temperature	30 °C	

Sum L1 L2 L3

Send to device

Read device

Load from file

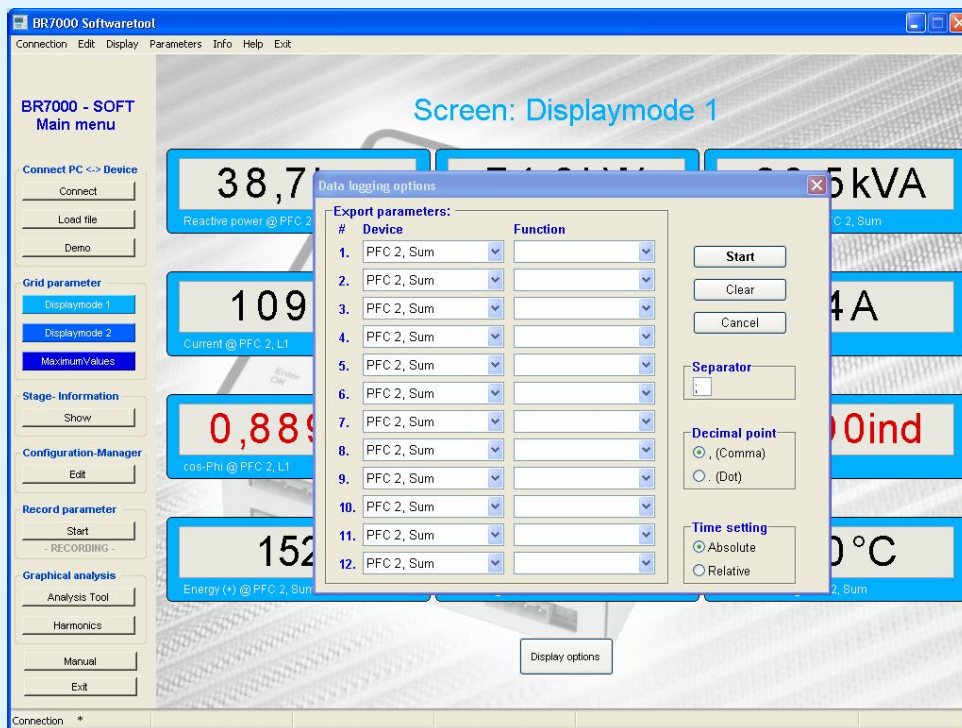
Store into file

Load Basic Settings

# 7. Recording of grid parameters

This part of the software is created for online-recording (on your computer hard drive) of free editable grid parameters (over a longer time) for later analysis.

- Start: Press the **“Start”** button in **Record Parameter**
- In the next window **Data logging options** the **Devices** whose measuring values should be stored can be chosen and
- parameters which shall be recorded could be selected in the **Function** column



# 7. Recording of grid parameters

Additional the following parameters for record-file could be selected here:

- **Separator** (separates values in the internal file → Semicolon for .csv)
- **Decimal point** (country specific decimal separators)
- **Time setting** (only for csv):
  - Absolute** (actual time – HH:MM) or
  - Relative** (starting at 0)
- “**Clear**” will delete the column **Function**.

After pressing „**Start**“ the system will ask for a record-file name.

Recommended is a \*.csv-file that can be opened in MS Excel. This file must be situated in the program folder (e.g. C:\Program Files\BR7000-Soft V5) ! Then the recording will start.

During recording the program generate 2 kinds of files:

1. \*.csv-file that can be opened in excel: **Parameters/Open with Excel**
2. Linking-file (e.g. Logfile.csv) and a folder with an equal name. This folder contains the graphic data. To display the data by open the linking-file at the analysis tool.

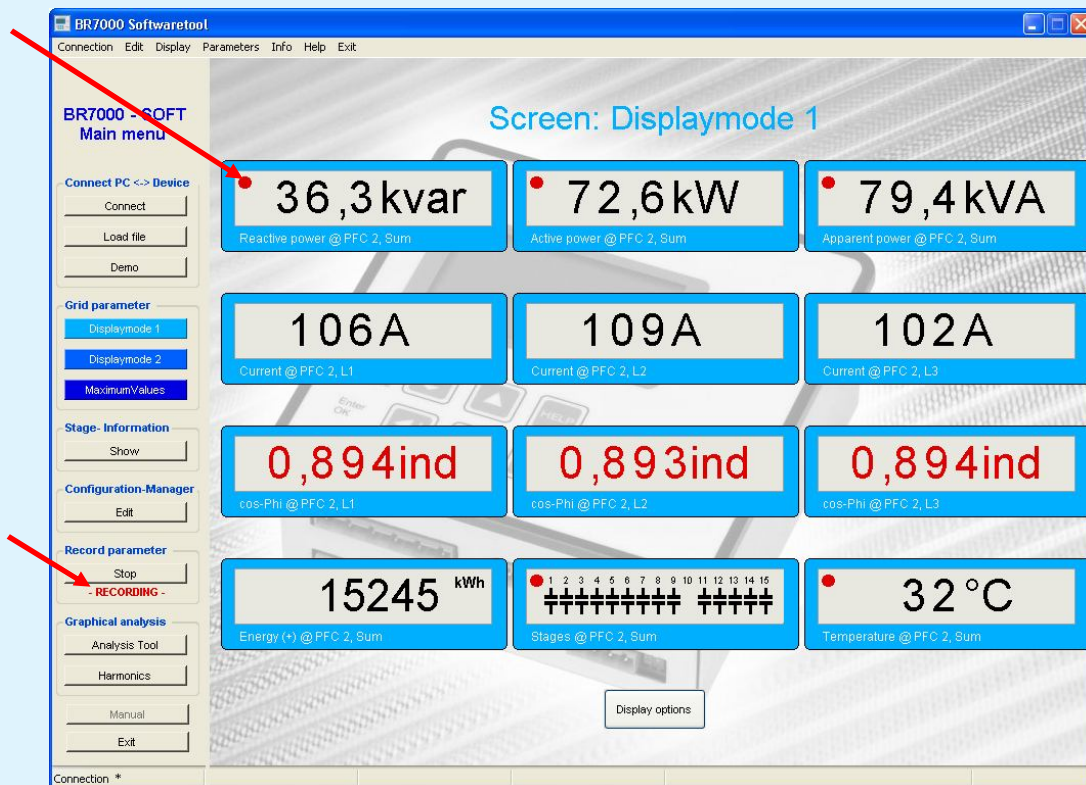
# 7. Recording of grid parameters

The red dot ● in Display-Mode shows all parameters which are recorded.

A permanent recording is also displayed in the main menu by :

**– RECORDING –**

The button **Stop** at **Record parameter** will stop the recording.



Please note that during recording it is not possible to

- search for devices
- configure devices
- display stage information

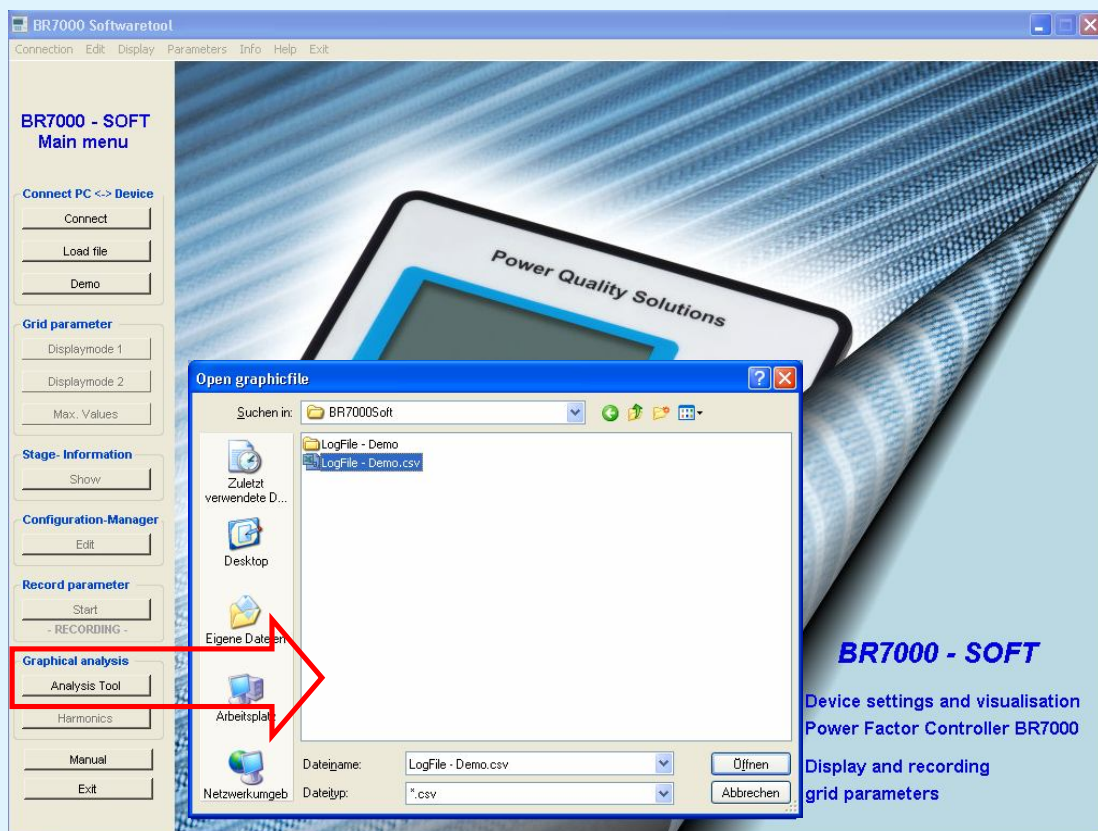
# 8. Analysis Tool

In the main menu **Graphical analysis / Analysis Tool**, stored parameters can be displayed graphically.

This option is also active if no controller is connected to the software.

Before starting with the graphical analysis, a .csv-file generated with BR7000-Soft has to be opened.

For demonstration purpose a file named „LogFile\_DEMO.csv“ is already delivered during the installation.

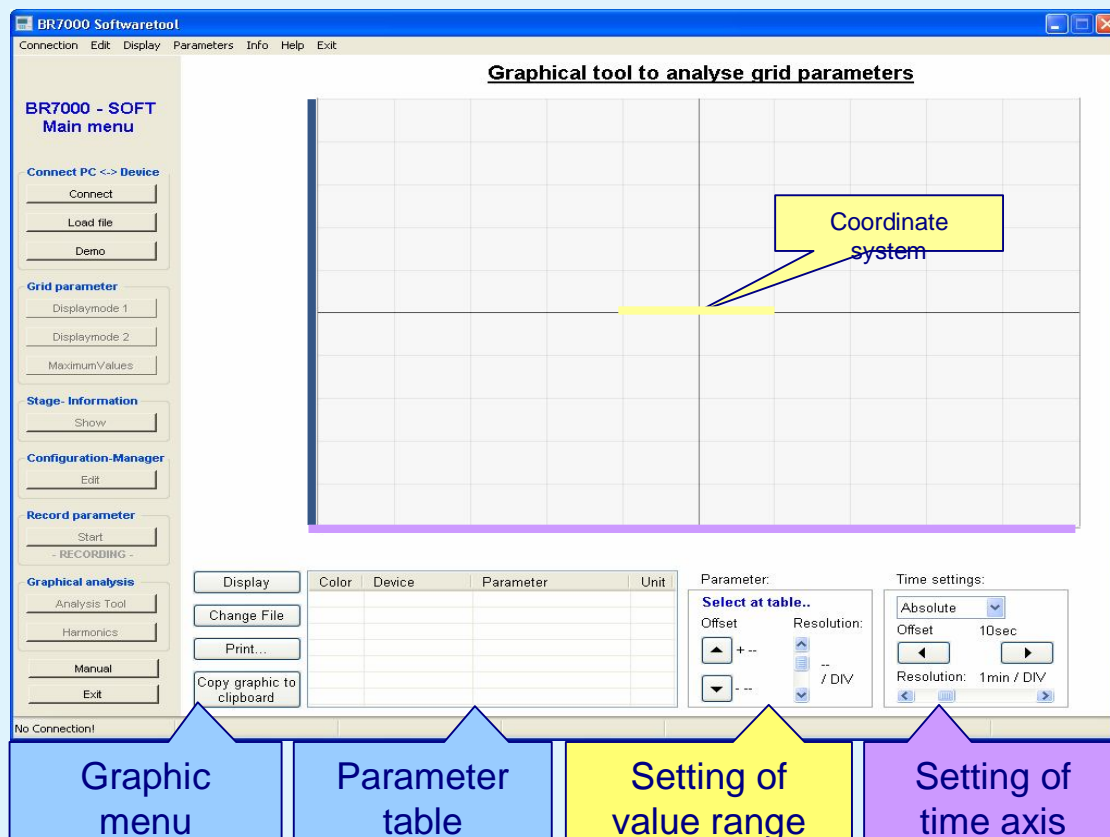


# 8. Analysis Tool

After the graphic file has been loaded, the graphic tableau will be opened.  
If a file is loaded the first time, the parameter table is empty and standard scaling values are loaded.

## Graphic menu

- After pressing “**Display**” button selection of up to 7 parameters is possible.
- By pressing the button “**Change File**”, another file can be loaded.
- The actual graph can be printed with “**Print**”
- By pressing the button “**Copy graphic to clipboard**” the actual diagram is copied to the clipboard and can be included into other programs with [Ctrl] + [V]. (Paste)



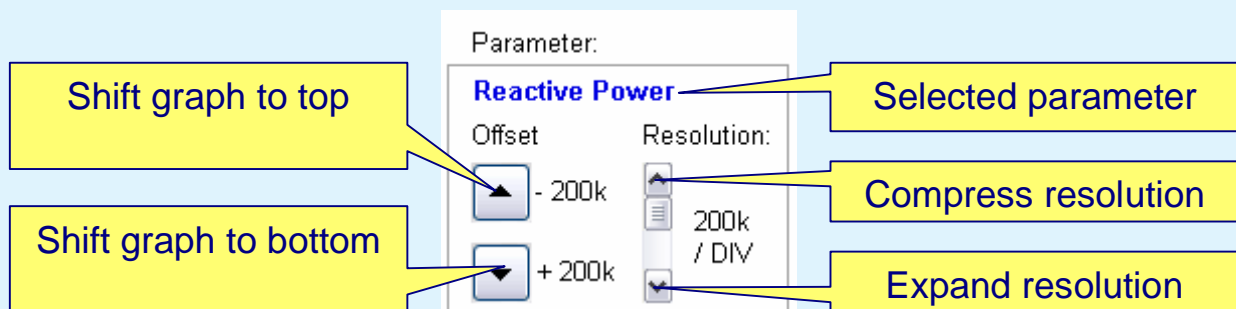
# 8. Analysis Tool

## Parameter table

A parameter can be marked by clicking on the particular line in the table.

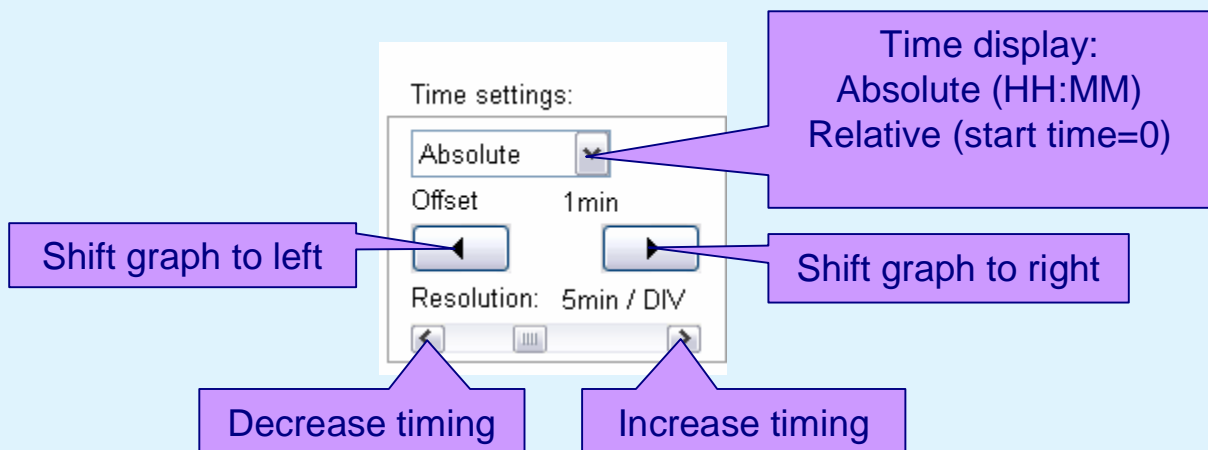
- Marked parameters are brought to the foreground of the diagram
- The range-scale of the marked parameters is shifted to the right side.
- Situation and resolution of the graph can be changed in the menu

## Settings of value range



For some parameters resolution and shifting is locked to avoid senseless displays.

## Settings of the time axis



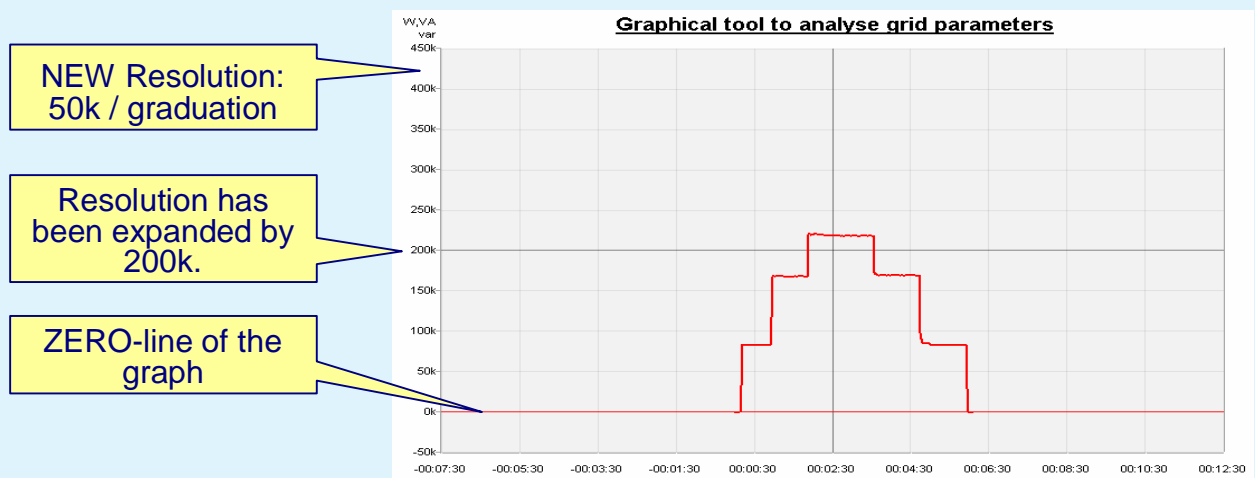
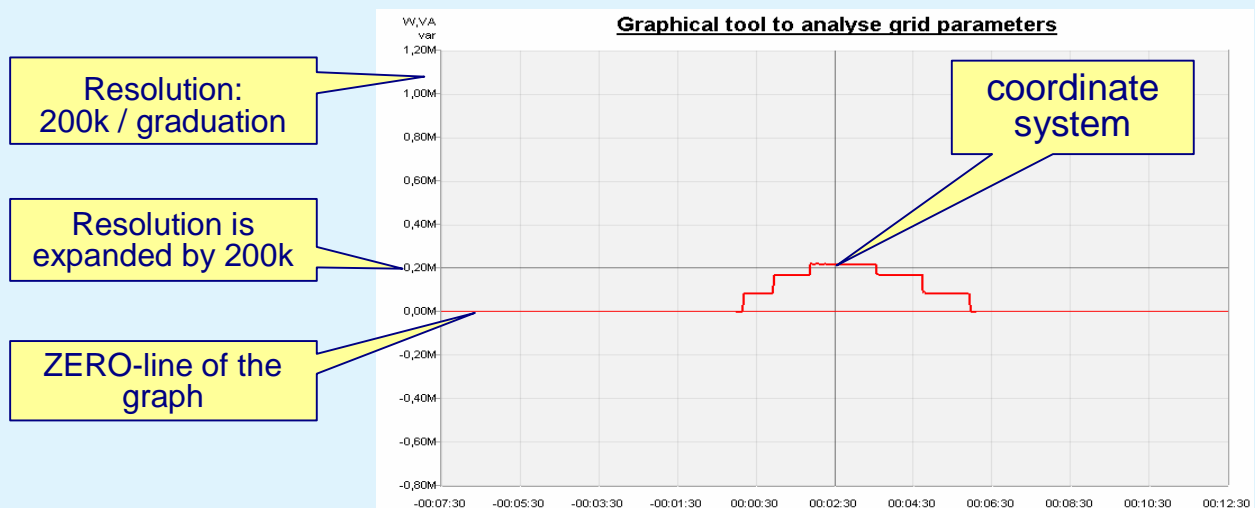
# 8. Analysis Tool

## Coordinate system

If the resolution of the value range has changed, this change is related to the horizontal line (axis of abscissa) of the coordinate system.

If the resolution of the time axis has changed, this change is related to vertical line (axis of ordinates) of the coordinate system.

## Example for expanding the resolution of a graph





# 9. Graphical display of harmonics

In the window **Graphical analysis / Harmonics** all measured actual harmonics in the grid are displayed as bargraph (FFT – Fast Fourier Transformation).

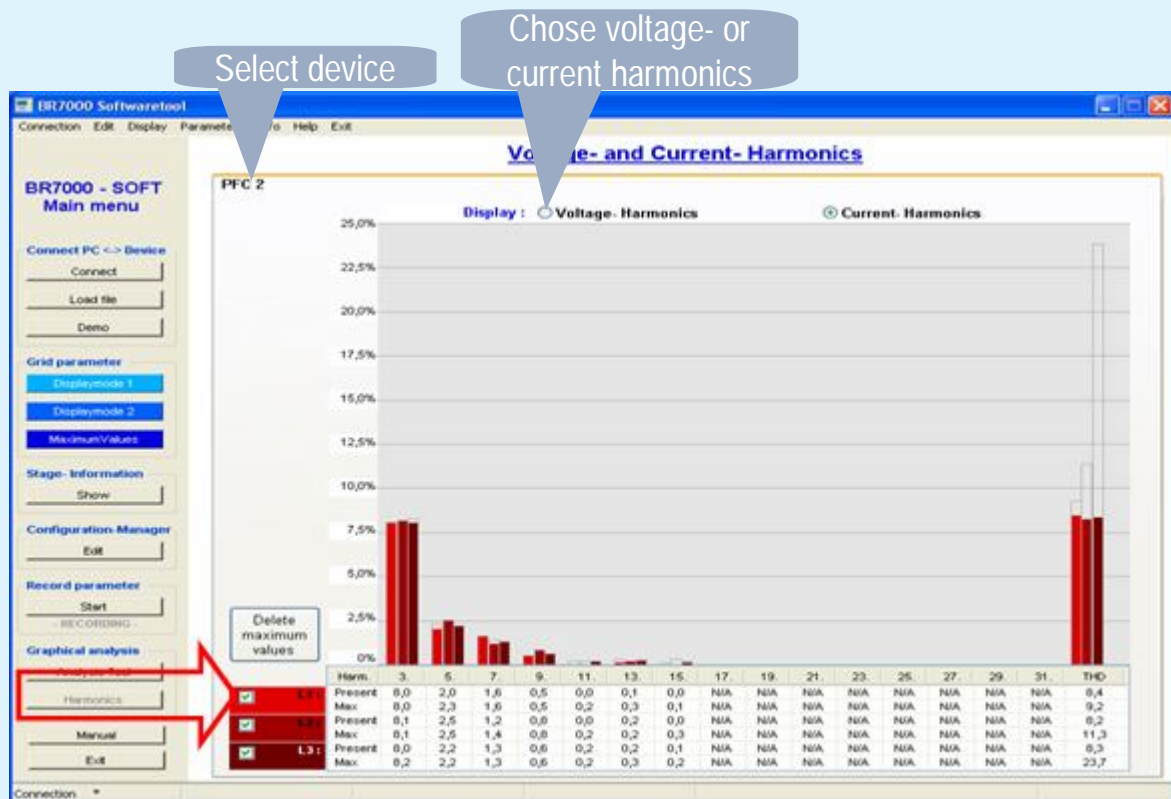
- Select a device with attendant **tap**
- Select voltage- or current harmonics by selection of the radio button

Green-bars: Voltage harmonics (max. values: gray frame)

Red-bars: Current harmonics (max. values: gray frame)

“**Delete maximum values**” clears the memory of the maximum harmonics. Max. THD is not deleted. This has to be done at the device !

**N/A** means: the value is not measured with this device



Note: The indication is updated each 10 - 30 seconds (depends on the number of devices.) Automatic dynamic adjustment of the value range is done. Dynamic and Hybrid PFC are not supported

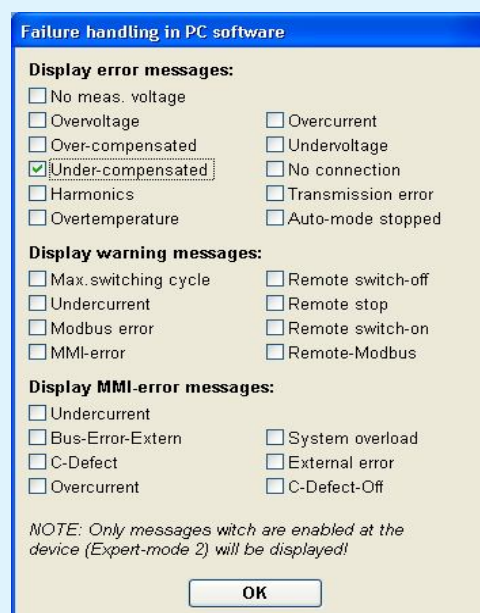
# 10. Error messages

The BR6000 and BR7000 controllers are able to display different warnings and error messages. These warnings will also appear in the window of the PC-software.

Open **Edit / Error messages** in the task-bar to enable (check box) or block error messages in the program.

If an error message is enabled the **ERROR / WARNING** window will pop-up.

**Note:** It is only possible to indicate errors which also enabled in the device as well!



## Error messages

If an error occur during the connection with the controller, it will be displayed in the window **ERROR / WARNING**.

Press "**Close**" to confirm the information and close the error-window.

Confirmed error messages can be displayed in the **Info / Open error file** again.



Show actual errors and warnings by opening **Display/ Active Errors**. The error-flags are not masked by BR7000Soft (see top).