

Power Quality Analyzer Alptec 2444 R & Duo

Installation Note

Included: First steps with the *WINALP2400* software.



ALPES TECHNOLOGIES

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The technical data contained in this document is subject to changes without prior notice, due to continued product development and improvements made by the manufacturer.

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1 About this Document

1.1 Document structure

This document consists of several chapters. Within these chapters, shoulder headings in the margin identify sections in the text focussing on the respective topic or procedure. Example:









"View details"

The text belonging to this shoulder heading informs you on how the details of a measured value can be viewed, including introductory notes, safety instructions, hints and tips, instructions on procedures, figures and tables, if any.

1.2 Signs and symbols

The following signs and symbols are used in this document:

Symbols

Symbol	Description
 identifies a requirement. This requirement must be met before you can proceed with the task described in this section of the text.
 identifies a mandatory action. You are requested to carry out a specified task.
 ... – or –  identifies a mandatory action to which there is an alternative procedure. The alternative procedure is introduced with "– or –" or by a left indent.
	... identifies general information and hints. In the related section of the text, you find important information regarding a certain system feature or procedure.
	... identifies important information. The related information and instructions must always be strictly followed.
	... identifies a warning relating to a risk to life and limb from electric shock. If the instructions are not strictly adhered to, there is an inevitable risk to life and limb.
	... identifies a warning relating to a potential risk or dangerous situation. If the instructions are not adhered to, there is a risk of death, injury or damage to property.

Text formats

Format	Description
<i>Detail</i>	Names of software and operating elements, lettering on the device as well as numbers and text shown on the display are printed in <i>italics</i> .

2 General Safety Instructions

The design and manufacture of this device conform to the latest state of technology and the safety standards lay down in IEC 61010-1/ 2nd edition. If used improperly, there is a risk of damage to persons and property.

Protection class

① Class II

Qualified people

- ▶ The device may only be operated by suitably qualified personnel.
- ▶ For the purpose of these instructions, all persons who are familiar with the installation, assembly, connection, inspection of connections and operation of the analyzer and who have completed training in at least one of the following areas:

switching on/off, enabling, earthing and identification of electrical circuits and devices/systems according to the applicable safety standards;
maintenance and operation of appropriate safety gear, in accordance with the applicable safety standards;
first aid.

Safe operation

- ▶ Ensure that all persons using the device have read and fully understood the operating manual and safety instructions.
- ▶ The device may only be used under certain ambient conditions. Ensure that the actual ambient conditions conform to the admissible conditions laid down in chapter "Technical Data".
- ▶ During operation, ensure that the cooling vents (if exist) are not obstructed in order to prevent heat accumulation inside the housing.
- ▶ Always comply with the instructions in chapter "Transport and Storage".
- ▶ Prior to any manipulation of the device, shut off all the electrical sources connected to the device.



Proper use

- ▶ Do not use the device for any other purpose than the measuring of voltages and currents that are within the measuring ranges and categories, including voltage to earth, laid down in chapter "Technical Data".
Improper use shall void all warranty.


Electrical connections

- ▶ Ensure that the power and connecting cables as well as all accessories used in conjunction with the device are in proper working order and clean.
- ▶ Ensure that the protective earth connector of the power lead is connected according to the instructions to the low-resistance unit earth cable.
- ▶ Install the device in such a way that its power cable is accessible at all times and can easily be disconnected.

- | | |
|--------------------------------|---|
| Risks during operation | <ul style="list-style-type: none">▶ For connection work, do not work on your own but in teams of at least two persons.▶ Do not use the device, if the housing or an operating element is damaged.▶ Ensure that the connected devices work properly.▶ In the case of a direct connection to current circuits (without transformer or shunt), ensure that the circuit is protected to max. 16 A. |
| Maintenance and repairs | <ul style="list-style-type: none">▶ Do not open the housing. Do not carry out any repairs and do not replace any component parts of the device.▶ Damaged connecting and power leads must be repaired or replaced by an authorised service technician.▶ Damaged or defective devices may only be repaired by authorised specialised technicians. |
| Accessories | <ul style="list-style-type: none">▶ Only use the accessories supplied with the device or specifically available as optional equipment for your model.▶ Ensure that any third-party accessories used in conjunction with the device conform to the IEC 61010-2-031/-032 standard and are suitable for the respective measuring voltage range. |
| Shutting down | <ul style="list-style-type: none">▶ If you detect any damage to the housing, controls, power cable, connecting leads or connected devices, immediately disconnect the unit from the power supply. |

If you are in doubt as regards the safe operation of the device, immediately shut down the unit and the respective accessories, secure them against inadvertent switching on and bring them to an authorised service agent.

2.1 Safety instructions on the device housing

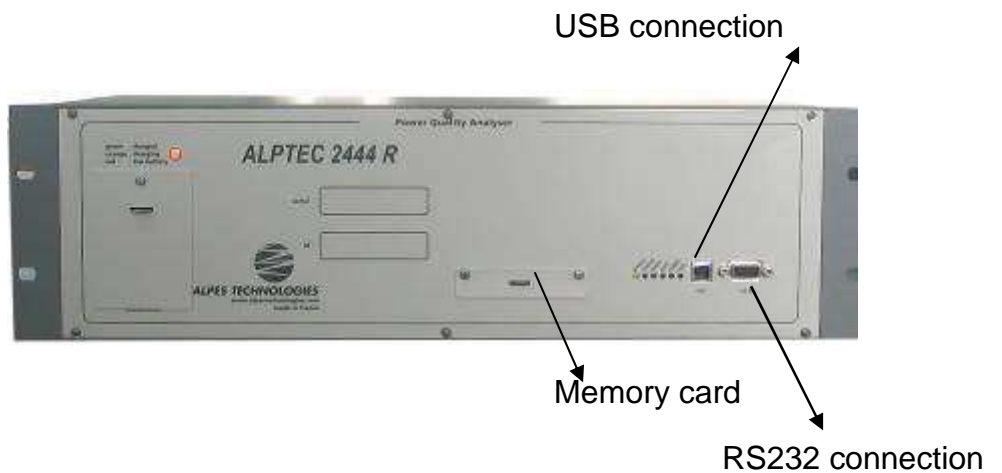
Mains connection	<ul style="list-style-type: none">▶ The mains connection must conform to the following ranges/values: 190-264VAC 240-360VDC.
Power supply from battery	The battery charge begins automatically when the power is on. When the power shut down, the battery will automatically power the device for 15 minutes (option 30 minutes).
Input voltage	The maximum input voltage to earth (\perp) may not exceed 750V CATII and 600V CATIII.
Input current	The maximum input current may not exceed 10Arms.
Servicing and maintenance	<ul style="list-style-type: none">▶ Do not remove the cover.▶ Refer servicing to qualified personnel.
Indoor use only	<ul style="list-style-type: none">▶ The device may only be used indoors.
	Conformity mark re. EC Low Voltage Directive 73/23/EEC and EMC Directive 89/336/EEC.
Protection class	IP 52

3 Design and functions

This chapter provides an overview of the terminals, communication ports and interfaces of this instrument, as well as a list of display and operating devices and a brief introduction to the basic functions of the unit.

3.1 Terminals

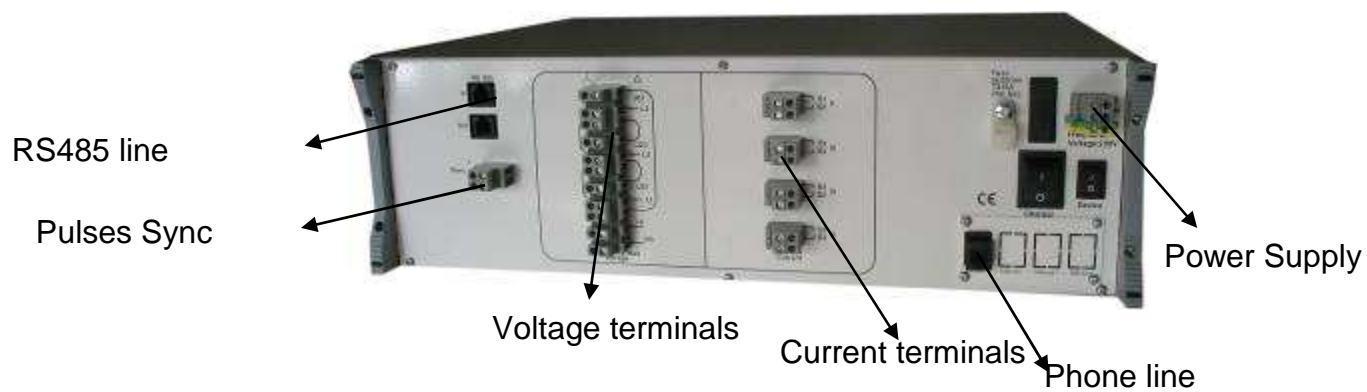
ALPTEC 2444R



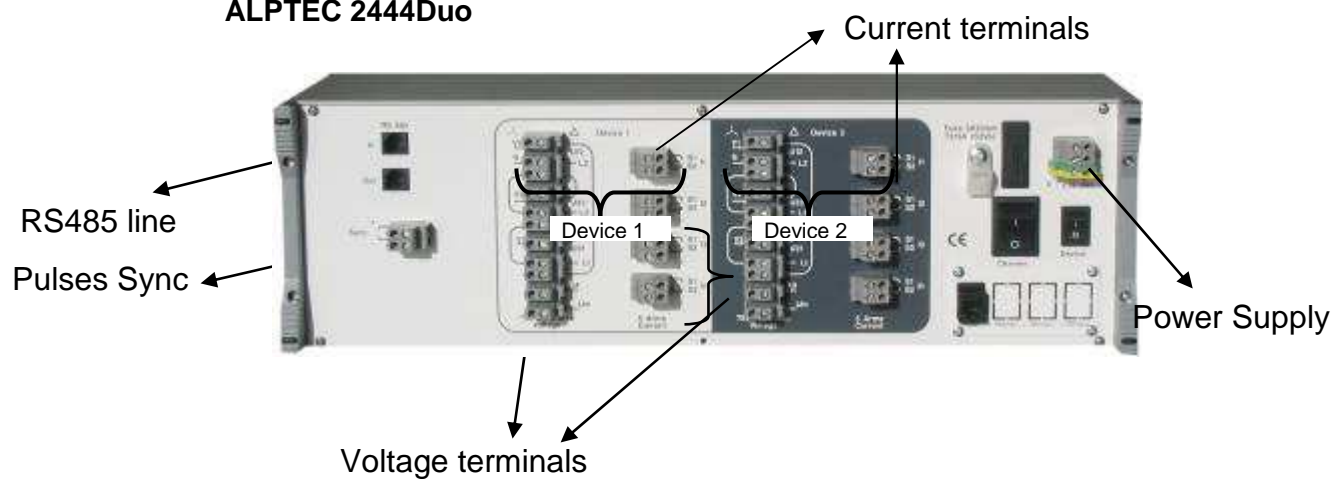
ALPTEC2444 Duo



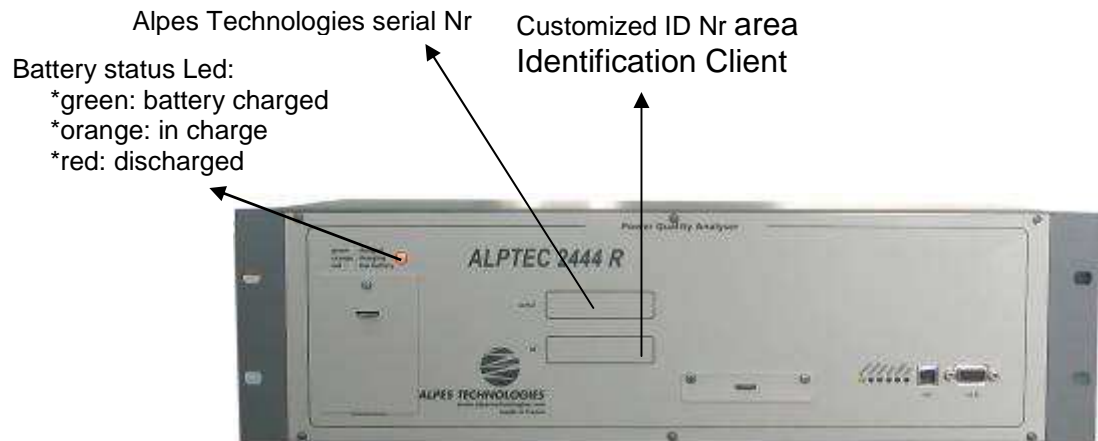
ALPTEC 2444R



ALPTEC 2444Duo



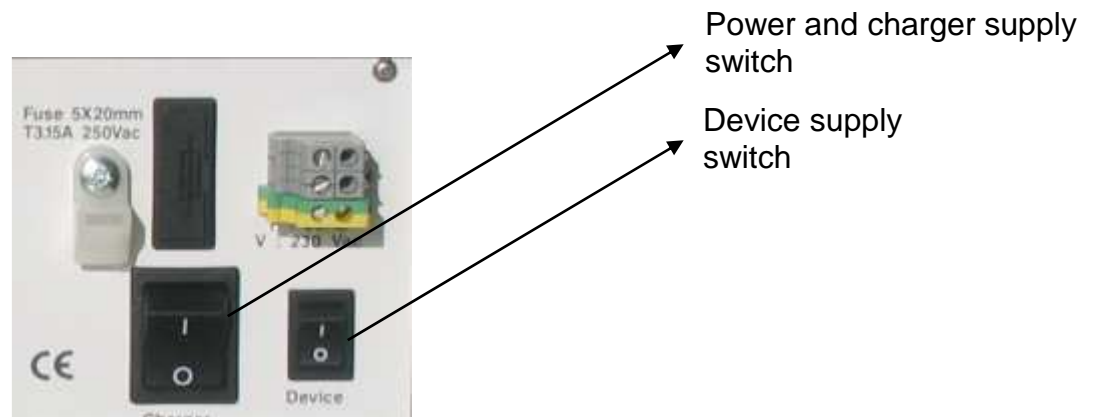
3.2 Operating controls and display



1. **usb** Led: orange when a USB cable is connected
2. **rs485** Led: orange when the RS485 is working fine
3. **com** Led: orange when the device is communicating
4. **mem** Led: writing on the Flash memory card (orange blinking = writing, green = reading)
5. **status** Led: DSP status (green blinking = measurement of a periodic signal, orange blinking = other cases)
6. **power** Led: green when the device is switched on



3.3 Function switches



In order to launch the device, the 2 switches must be at on. If the battery charger is requested without device (no measurements), just choose Power and charger supply switch.

3.4 Factory settings

General parameters:

Connexion : star
 Nominal voltage: 230 Vrms
 Nominal current : 5Arms
 Integration time: 10 minutes
 Network frequency: 50 Hz
 Voltage transformer ratio: 230/230
 Current transformer ratio: 5/5
 Decay in the GPS Synchro (h) : 2 h
 Voltage hysteresis: 10 %
 Current hysteresis: 10 %

Passwords:

Administrator password: 00000000
 User 1 password: 00000000
 User 2 password: 00000000

Communication (serial ports):

RS232 speed (frontpanel): 115200 bauds
 RS232 speed (rear panel or internal for modem): 115200 bauds
 RS485 speed: 115200 bauds
 Device with modem:
 Initialisation string: AT&F0
 Configuration string: ATS0=0&C1&D2&K3L1E0

Most of the case, it is not necessary to modify the initial configuration

Power Quality threshold: EN50160

Histograms:

Voltage: 200 to 250Vrms
 Power Factor: 0,5 to 1
 Frequency: 49,5 to 50,5Hz
 Other parameters: auto mode

► Ripple control:

Parameter	Telecom n°1 (Pulsadis)	Telecom n°2
Filter status	On	On
Applied to inputs:	V1, V2, V3	V1, V2, V3
Storage of the pulses	On	On
Number of pulses	40	50
Frequency (Hz)	175	188
Bandwidth (Hz)	5	5
Max level low status	0,6	0,6
Min level high status	0,9	0,9
Width of the high status of the first pulse (s)	1	2
Width of the low status of the first pulse (s)	2,75	1
Width of the high status of the next pulses (s)	1	0,5
Width of the low status of the next pulses (s)	1,5	0,5

4 Startup the device

4.1 Checking of delivery

- ▶ Prior to work with the device, check the delivery to ensure that it is complete, using the following list and the delivery specifications:.

4.1.1 Rackable devices (AT24xx R&Duo)

1 Power Quality Analyzer ALPTEC 24xx

1 bag including:

- * 1 RS232 cable of 3 meters length.

- * 1 power supply cable

- * if modem option: 1 RJ11 phone cable.

- * 1 USB cable

1 calibration certificate (2 calibration certificate for duo models).

1 manual « Installation Note for the ALPTEC 24XX Power Quality »

If delivered with the software:

- * 1 CD-ROM « WINALP 2400 » with the activation codes printed on the jewel case.

- * 1 manual « WINALP 2400 software User Guide».

4.2 Installation

Before cabling the device, be sure to understand correctly the specifications described in this section.

Installation



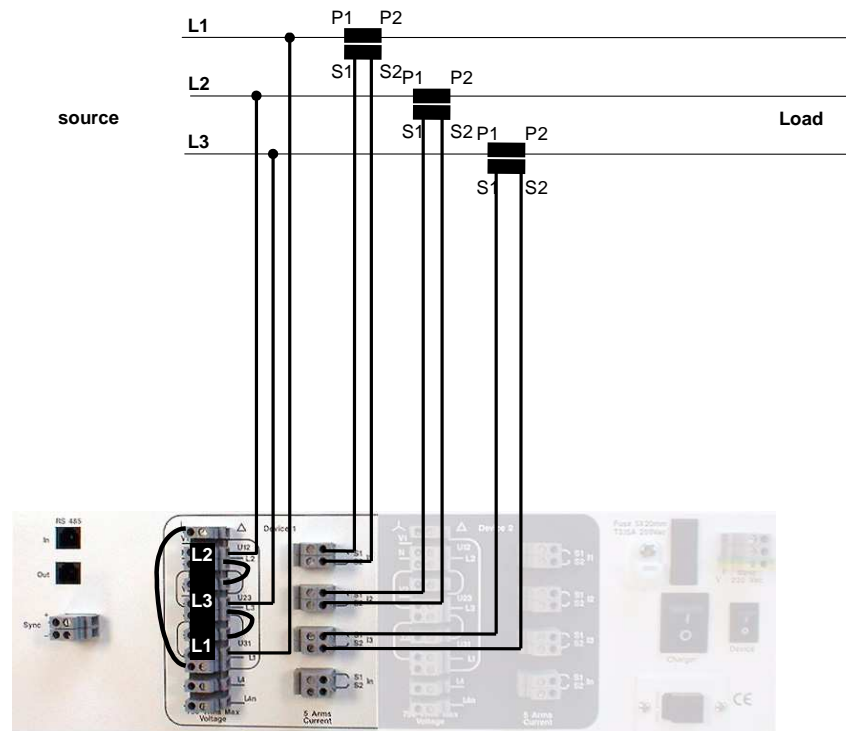
- ☑ Follow the safety instructions regarding ambient conditions and location of installation.
- ☑ Place the device onto a clean and stable surface or mount it to the appropriate DIN rail.

Risk to life and limb from electric shock!

- ☑ Follow all the instructions of the chapter “General Safety Instructions”.
- ☑ Shut off the power supply, Voltages and Currents circuits prior to connect the device.
 - ▶ Never open the circuit of a current transformer. Always bridge the inputs of the current transformer before connecting or disconnecting the ALPTEC device.
 - ▶ Never bridge the circuit of a voltage transformer.
- ☑ In order to ensure safe operation, first connect the device to the power supply circuit.
- ☑ Connect the voltage measurement circuits, ensuring that the maximum measuring voltage and max. Voltage to earth are not exceeded.
- ☑ Connect the current measurement circuits, ensuring that the maximum measuring current is not exceeded.
- ❗ Do not use leads and accessories that do not fulfil the relevant safety standards, as this could lead to serious injury or death from electric shock!

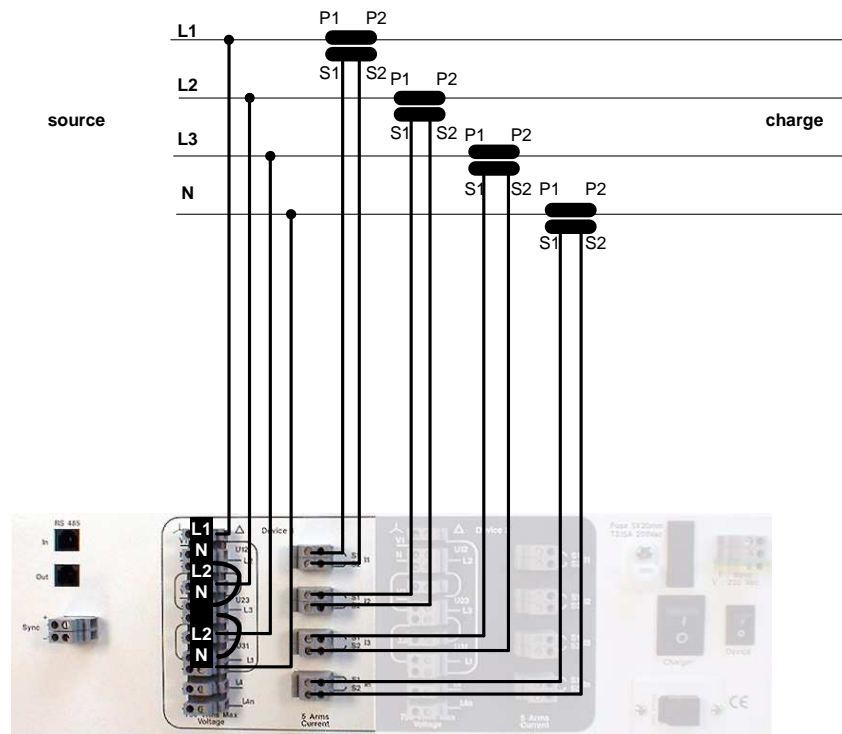
4.2.1 Triangle (Phase to phase) mode cabling

For ALPTEC2444R , ALPTEC2444duo device 1 and ALPTEC2444duo device 2 the wiring is the same :



4.2.2 Star (Phase to neutral) mode cabling

For ALPTEC2444R , Alptec2444uo device 1 and ALPTEC2444duo device 2 the wiring is the same :

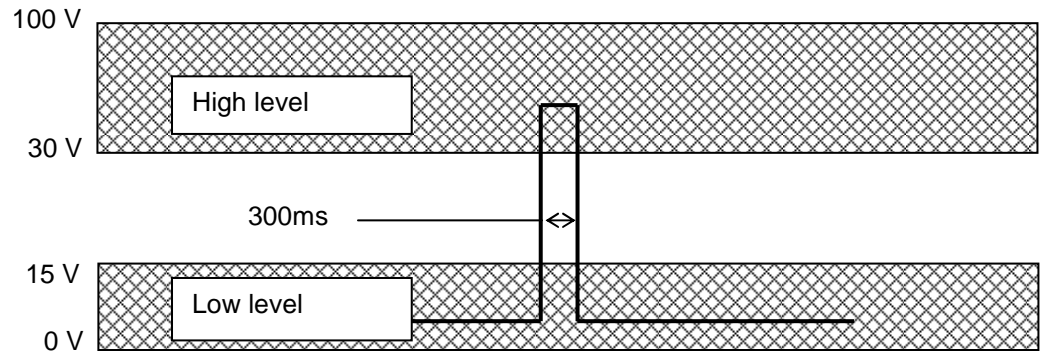


4.2.3 Cabling of the synchronization inputs

The device can be synchronized by means of 10 minutes pulses or by GPS.

10 minutes Synchronization

- ☒ The pulse rate is 10 minutes.
- ☒ The pulses for the synchronization have to be as follow:



Risk to life and limb from electric shock!

- ☒ Open the Pulse Generator circuit prior to connect the device.

- ▶ Connect the two wires from the pulse generator to the device at the *synchro* - + inputs.

GPS Synchronization

- ☒ Use a **GARMIN** ref. **GPS 16 HVS** GPS receiver.
 - ▶ Connect the GPS receiver to the *GPS sync* input.

4.2.4 Cabling of the different communication ports

To establish a communication between a local or a remote PC and the device, it is necessary to use the appropriate communication port of the device with the required cable.

USB point to point

- ☑ Install the following driver on your PC: FT232BM, driver VCP. This driver is located on the CD ROM. This is a USB 1.1 link

- ▶ Follow the instructions of the *USB application note* document.

RS232 point to point

- ▶ Connect the PC (com1 or com2 port) to the device (RS232 on the front panel), **using the cable delivered with the device.**

- ❗ This cable cannot be used with other device type (GSM modem or other)

Embedded modem

- ▶ Connect the *Phone* input to the phone line using a RJ11 cable (delivered).

External modem

- ▶ Connect the modem to the RS232 connector of the front panel of the device by means of the cable delivered with the modem.
- ▶ Follow the instructions of the *Modem application note* document.

Ethernet

- ☑ Install the following driver on your PC: *HelloComNT*. This driver is located on the CD ROM.

- ▶ Follow the instructions of the *Ethernet application note* document.

4.3 Switching on the device

Switching device on

- ▶ Switch on the power supply circuit, then the Voltages and Currents circuits.
- ▶ Switch on the Pulse synchronization circuit.
- ▶ Switch the *ON – OFF* switch on

- ❶ The Led labelled "Power" will light in green.
- ❶ The Led labelled "Status" will blink into 30 seconds.
- ❶ In case of error, verify the insertion of the Flash memory card.

Battery

- ❶ The device is equipped with an embedded battery.
The first time the device is used, the battery must be charged.
The battery will begin to charge when the device is connected to the power supply.
- ❶ The Led labelled "Charger Status" light in red during the battery charge time and then switch to green (~2h).
- ❶ If the Led "Charger Status" doesn't light:
 - ▶ switch the device off
 - ▶ Verify the wiring between the device and the power supply with a calibrated multimeter.

5 Starting with the software

5.1 Hardware requirements

- ☒ Personal Computer (PC)
 - ☒ Pentium 166 MHz (Minimum)
 - ☒ 128 MB RAM (Minimum)
 - ☒ 600 Mb of free disk space
 - ☒ CDROM player (for installation)
 - ☒ Windows 98, 2000, NT, XP
- Software installation (CD-ROM)

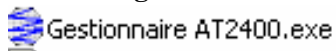
5.2

Installation

- ▶ From the CD-ROM “WINALP2400 software suite”
- ▶ Follow the instructions and enter the registration key which is on the CD jacket.

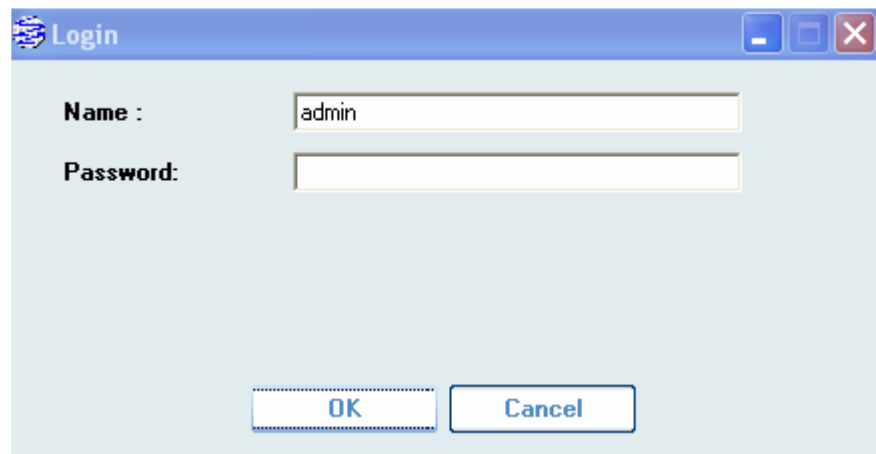
5.3 Launching the software

Login



click on the shortcut *ALPTEC 2400 manager* in the *WINALP2400 software suite*

- ❶ the default login is “*admin*”; no password.

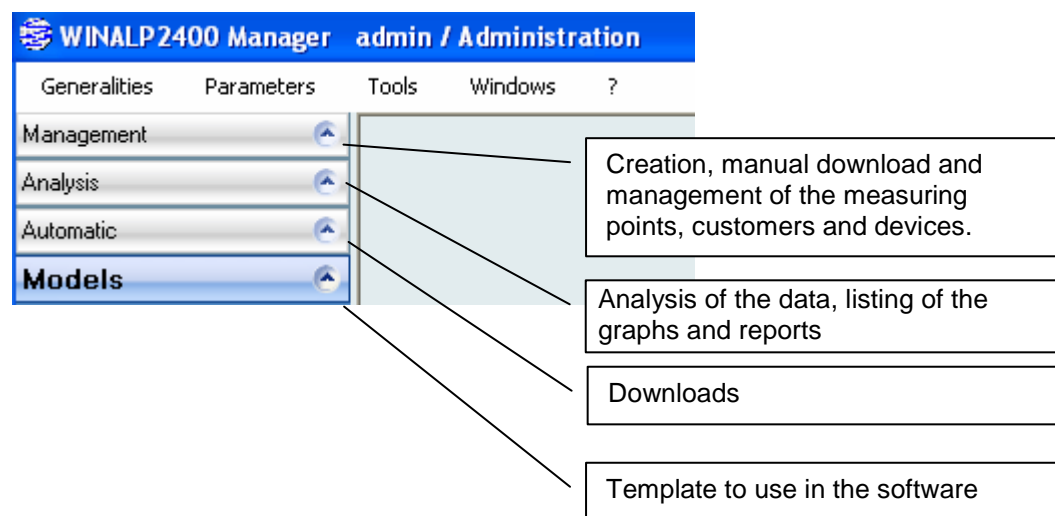


5.4 Choose the good language

- ▶ In the toolbar *tools*, choose *Configuration*.
- ▶ Then choose the good language and restart the application.

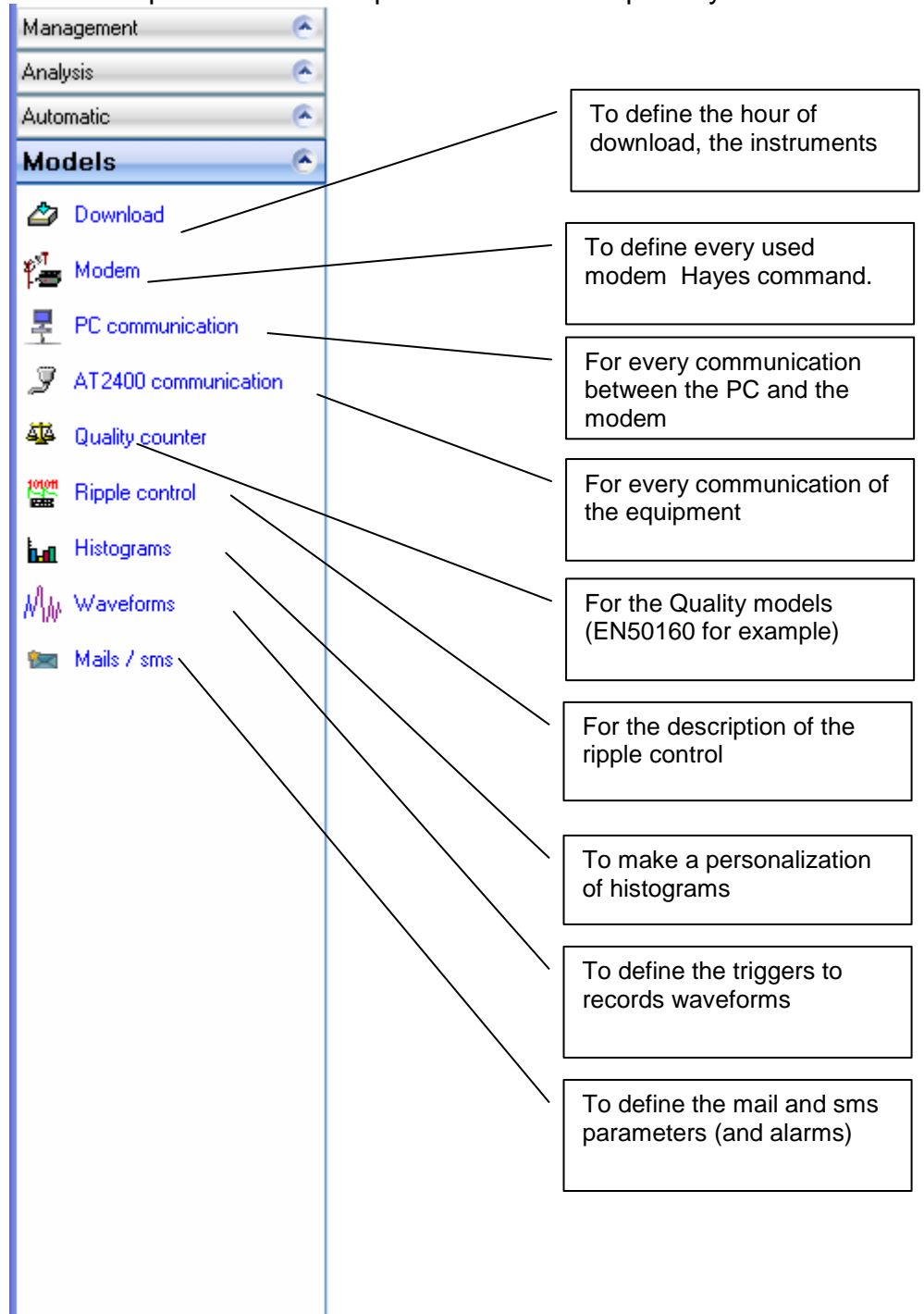
5.5 Menu description :

5.5.1 The different possibilities



5.5.2 List of the templates

These templates avoid to repeat the same setup every times.



5.6 Icons' description















The associated function may change with the different windows



Icons

The description of the function:

Common icons

- 
-  add a new form...
 -  Recopy the form
 -  Modify
 -  Delete
 -  display the details
 -  Print preview
 -  Print
 -  Setup
 -  Listing of the setups
 -  Listing of the advanced setup
 -  Real time measurement
 -  Manual download
 -  Reports

5.7 Measuring points management

The measuring point is the area where the ALPTEC is placed for measurements.

The data of the measuring point will be downloaded and added in the software data base

Each measuring point **MUST** be created in WINALP2400 software

- ❶ If the instrument is modified or exchanged, a new instrument is able to be associated to the same measuring point. The data from the new instrument will be added to the old data from the previous instrument. Then it will be possible to have a continuity for the analysis.

5.7.1 New measuring point

Create a new measuring point

The different steps to create a measuring point are described below :

- In the management tab, choose measuring points and the icon : « new »

- Then give a reference (the minimum information requested) and a communication model (how to join the instrument) and a download model (what to download)

- ❶ The communication model define the way to join the instrument and to download the data. Different models are still available in the software :

- ▶ Direct (port RS232 direct connection)
Just fill the port number to use
 - ▶ Ethernet
Fill the IP address and the port (usually 2001)
 - ▶ RTC (with a modem)
Give the phone number and if required the communication switch N° of the measuring point.
 - ▶ USB
Fill in the USB port number
- ❶ The download model explain what are the data to download. Some models are already available in the software (*Rms 10min* for example will download the data rms 10 minutes).

5.7.2 Setup of a measuring point

First use only

In order to have the correct information it is mandatory to synchronise the setup parameter of the instrument which are in the instrument memory with the matching measuring point in the software data base

Read and write the setup in the instrument



This will be done manually after the creation of a measuring point.

- ▶ Underline the measuring point and click on the tool : setup
- ▶ The windows with the setup read in the instrument will appear

- ❶ The instrument is now declared and ready for a setup. If you validate the windows it will be present in the data base.

Equipement setting: Ethernet

Author:

Create:

Update:

Caption:

Nominal values :

Voltage connection:

Current connection:

Nominal voltage (V) :

Rated current (A) :

Integration time (min) :

Rated frequency (Hz) :

Measurement inputs:

Channel	Primary	Secondary
V1	230,00	230,00
V2	230,00	230,00
V3	230,00	230,00
V4	230,00	230,00
I1	100,00	5,00
I2	100,00	5,00
I3	100,00	5,00
I4	5,00	5,00

Current inputs in use: ☒ 5A ☐ 1V

Status:

Serial number :

Firmware :

Last setting :

Last synchro pulse: Date :

Time:

Memory card :

Supply :

Other:

Modbus number (RS485) :

GPS synchro shift (h):

Deadband width used in the events detection :

Voltage (%UNom) :

Current (%INom) :

Time setting :

☒ PC date and time ☐ Fixed date and time



- ▶ Change the setup if necessary (change the ration for example) and at the end click on the 'send the configuration' tool (the flag)
- ▶ The instrument is now declared and the change are done inside the calculation board.

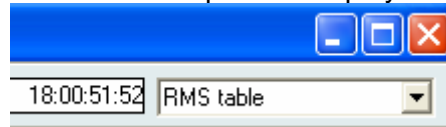
Check the wirings

With the real time measurement it is possible to check the wirings (the direction of the current and the phase order).

- ❶ Winalp2400 offers different way to display the real time measurements: RMS value, RMS table, Scope meter, symmetrical components.



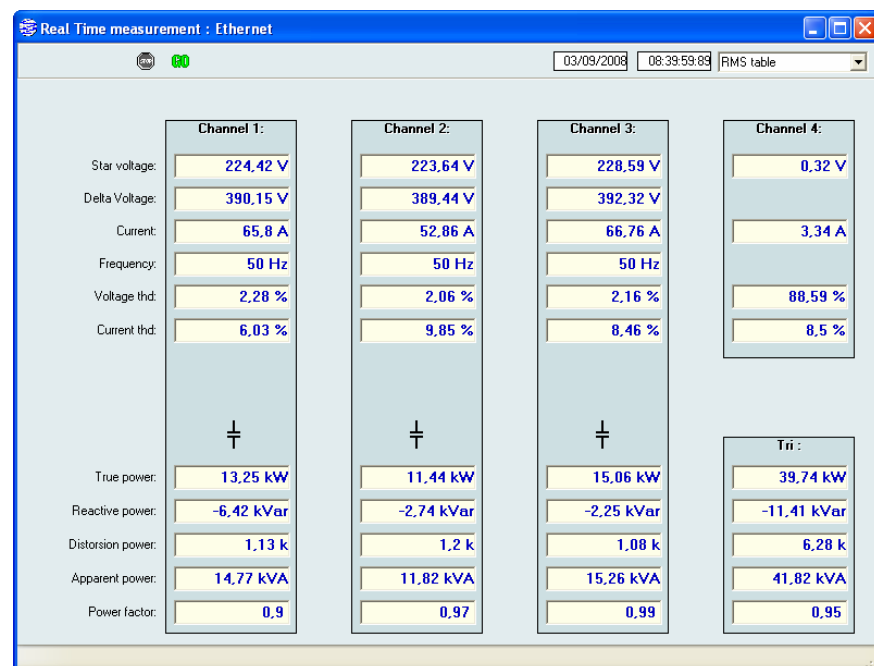
- ▶ in order to see real time display click on the icon
- ▶ To change the display, click on STOP
- ▶ Choose the requested display



- ▶ then read the value with 'GO'.
- ▶ To stop the real time reading click on STOP

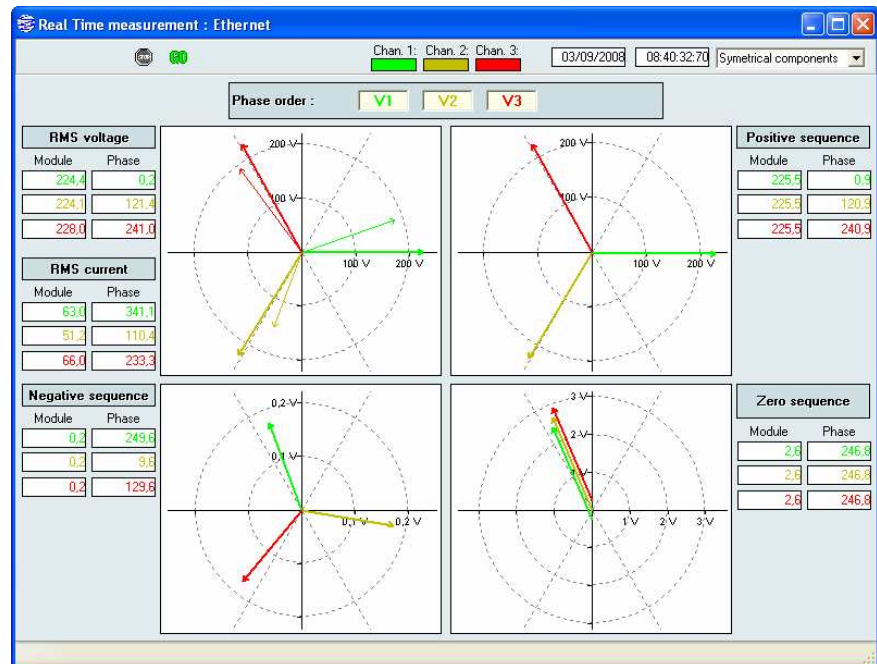
RMS table

This tool offers a summary of all the important values
This will give real time RMS values:



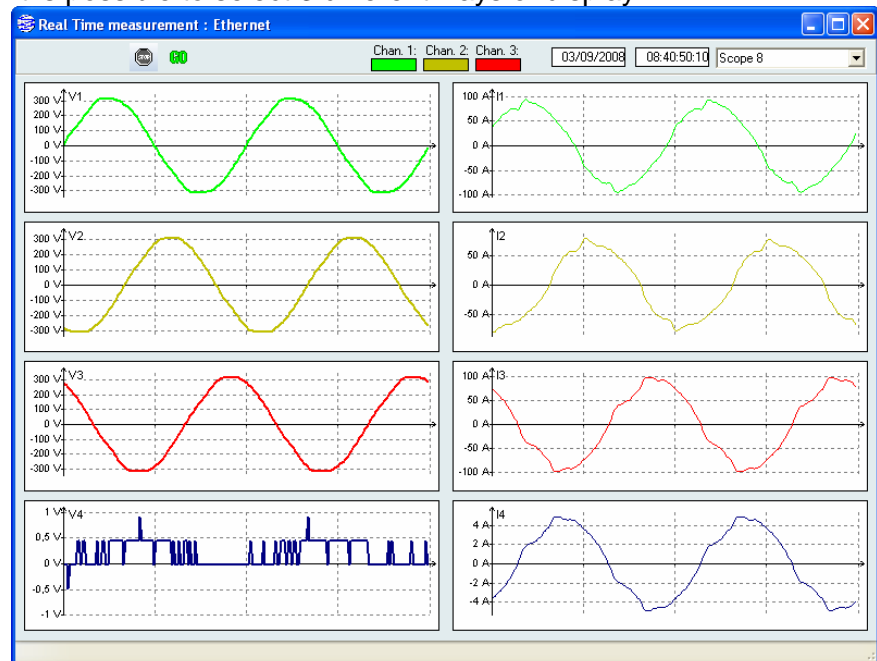
Symmetrical components

This tool is made to check the phase angle and the phase orders. The software displays the 3 voltage phase and the 3 current phases (at the top left windows)



Scope meter

This tool displays the waveform of the voltage and the current as a real scope meter. It is possible to select 3 different ways of display.



5.8 Download the data

In order to realize the analysis, the data must be downloaded first from the device to the data base computer.

This download will be done between the computer and the instrument with the communication model defined with the measuring point.

- ❶ The available communication modes are: RS232, RS485, USB, Ethernet, modem, modem GSM/GPRS.

It is possible to launch a manual download whenever it is desired or with a defined schedule and the server software with the automatic download feature.

5.8.1 Manual download for a measuring point

- ▶ In the measuring points list select (underline) the required measuring point.
- ▶ Click on the icon [download](#).



To do :

Measuring point Attempt n° Download n°

Measuring point	Attempt n°	Download n°
Ethernet	1	

In progress Download Firmware Time setting Configuration CF Erasing Communication

☒ **Enable**

Download limits:

Beginning date: 28/08/2008 End date: 01/01/2020

Beginning time: 08:09 End time: 00:00

☒ Link the download to the previous

Download model:

Download : rms value ... 10 min

Downloaded items:

☐ Ripple control
☐ Quality counters
☐ Events
☐ Waveforms
☒ RMS
☐ Histograms
☐ Device report

Period (rms):

☒ Integration time
☐ 1 hour (2h)
☐ 24 hours
☐ 7 days

Period (histograms):

☐ 24 hours
☐ 7 days



- ▶ Select the **download** tab, then it is possible to change the download data model. It is also possible to give the date and time
- ▶ Click on Go to launch the downloading

5.8.2 Automatic download for several measuring points

This feature enables the automatic download for one or more measuring points with a programmed schedule.

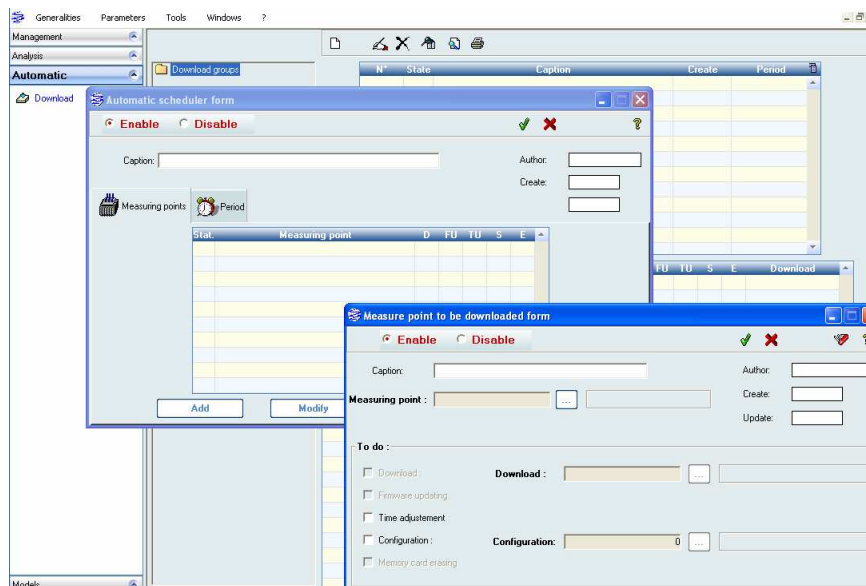
Create a download group

In the 'Automatic' menu.

A **download group** is a template with a list of instrument with the associated download template and the associated day, hour of download



- ▶ In the tab **Automatic**, select **Download**.
- ▶ Click on **new** in order to create a new group of download.



Add

- ▶ Click on **Add** in order to add a measuring point.
- ▶ Choose the measuring point and the required action (download, time adjustment,...) and the requested download model.



- In the tab *Period*, define a download schedule.

Period	Time
All days (1) :	12:00
All days (2) :	
All days (3) :	
All days (4) :	
All days (5) :	
All days (6) :	
All days (7) :	
All days (8) :	
All days (9) :	
All days (10) :	



- Give a name (caption) for this automatic download and save it with the validation tool.

5.8.3 Launch the download server

In order to start the automatic tasks, launch the *Download server*. This program as to be considered as a background task and will automatically start the download as they have been scheduled

N°	Measuring point	Caption (Measuring point)	Caption (download group)	Atte.
1	CHAMBERY-2/A	Aussois-1	chambery	1



- ❶ It is possible to change some parameters (the refresh time ...) in the tab *Parameters*.

6 Data analysis

This manual won't give all the possibilities for the analysis. Below you will find some example.

6.1 Events

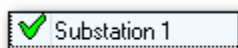
One event may be a dip or a swell, an interruption or another magnitudes out of the limit (frequency, harmonic, flicker). This data is associated with its measuring point, its event type, its beginning, its channel, its extremum and its length.

Choose the data

The different step to display the events are described below. It is as a wizard :

In the analysis tab, choose *Event* and follow the steps below:

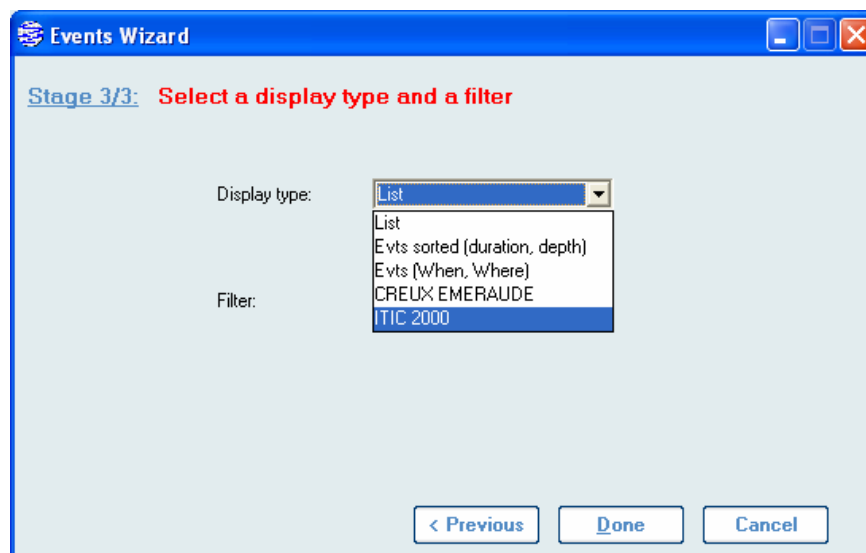
- ▶ Select one measuring point (or more)



- ▶ Choose a period for the analysis

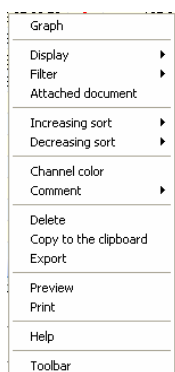
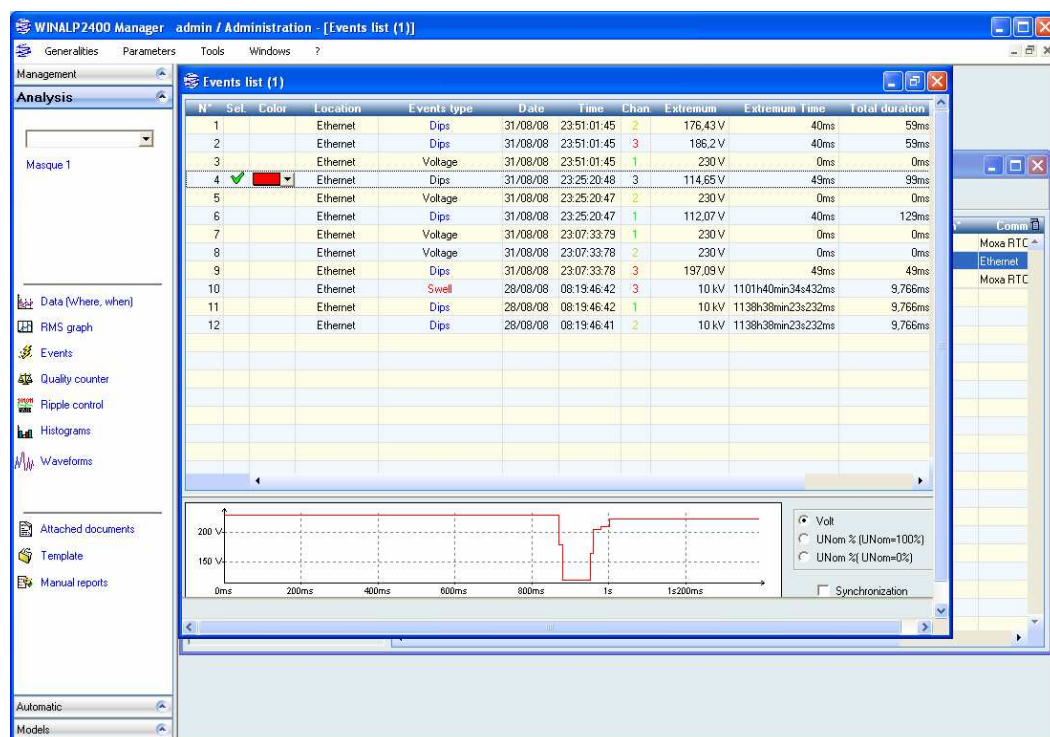
- ▶ Choose a way to display the data.

- ❗ The events may be displayed following different way : a table (UNIPÉDE), a listing, an ITIC graphs (extremum vs length)



Liste

- ▶ The list option will display a listing of all event with their main characterization (the measuring point, the event type, the beginning, the channel, the extremum and the length). The selected event displays the shape on the bottom table.



- ❶ With a right click it is possible to have several options to modify some parameters and some displays.

Table duration/depth

- In the option 'event sorted' : every event is classified in an UNPEDE table. This table only gives the number of events for a length and an extremum.

Events sorted by duration and depth (2)

Thres. (%UNom)		Duration of the voltage fault (s)															
UNom = 100% OV = 0%		from		to		from		to		from		to		from		to	
from	to	0,10	0,30	0,30	0,50	0,50	0,60	0,60	0,70	0,70	0,80	0,80	1,00	1,00	180,00	180,00	>
100,0	90,00	0,0		0,0		0,0		0,0		0,0		0,0		0,0		0,0	
90,0	80,00	0,0		0,0		0,0		0,0		0,0		0,0		0,0		0,0	
80,0	70,00	0,0		0,0		0,0		0,0		0,0		0,0		0,0		0,0	
70,0	65,00	0,0		0,0		0,0		0,0		0,0		0,0		0,0		0,0	
65,0	50,00	0,0		0,0		0,0		0,0		0,0		0,0		0,0		0,0	
50,0	30,00	0,0		0,0		0,0		0,0		0,0		0,0		0,0		0,0	
30,0	10,00	0,0		0,0		0,0		0,0		0,0		0,0		0,0		0,0	
10,0	0,00	0,0		0,0		0,0		0,0		0,0		0,0		0,0		0,0	

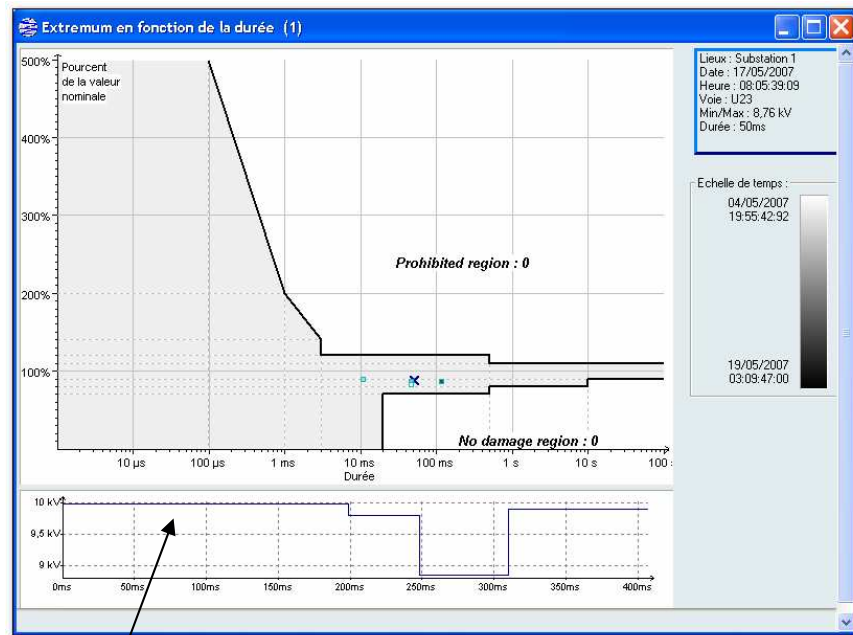
Calculation mode : Events number
Dips : 0
Swell : 0
Total : 0

Seuils (%UNom)			
UNom = 100% OV = 0%		de	à
de	à	0,10	0,30
100,0	90,00	0,0	
90,0	80,00	1,0	

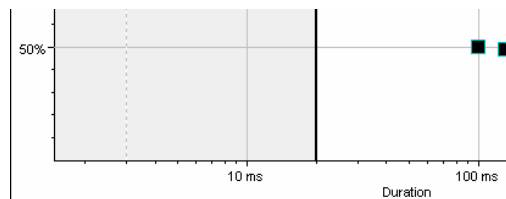
- ❶ For example a dip with duration from 0.25 s and an extremum 84,3% from nominal U will be added as « 1 » dip in the case 0.10/0.30 – 90.0/80.0.

ITIC

- In the option « ITIC 2000 » every data will be sorted following the duration and the depth and represented by a point in the good abscises and ordinate in the graph :



- ❶ For example a dip of 100ms and a depth of 50 % of nominal voltage will be displayed like this :



Measuring point : Ethernet/
Date : 31/08/2008
Hour : 23:25:20:47
Channel : V1
Extremum : 112,07 V
Duration : 129ms

With the double click on the point, it is possible to display the shape of the event.

- ❶ The details of the event which is selected by the mouse is given on the top left of the representation.

6.2 Quality counters

The quality analyzer ALPTEC2444 records a statistical analysis for the quality of the electricity. After the download, the data are sorted for daily, weekly or monthly quality reports. This feature gives a summary for the power quality.

The default thresholds are defined by the EN50160 standards. It is still possible to give your own threshold and to follow your own standards.

- ❶ The conformity request is mostly limited to 95% of the time. For rms voltage and frequency a second threshold is defined for 100% of the time.

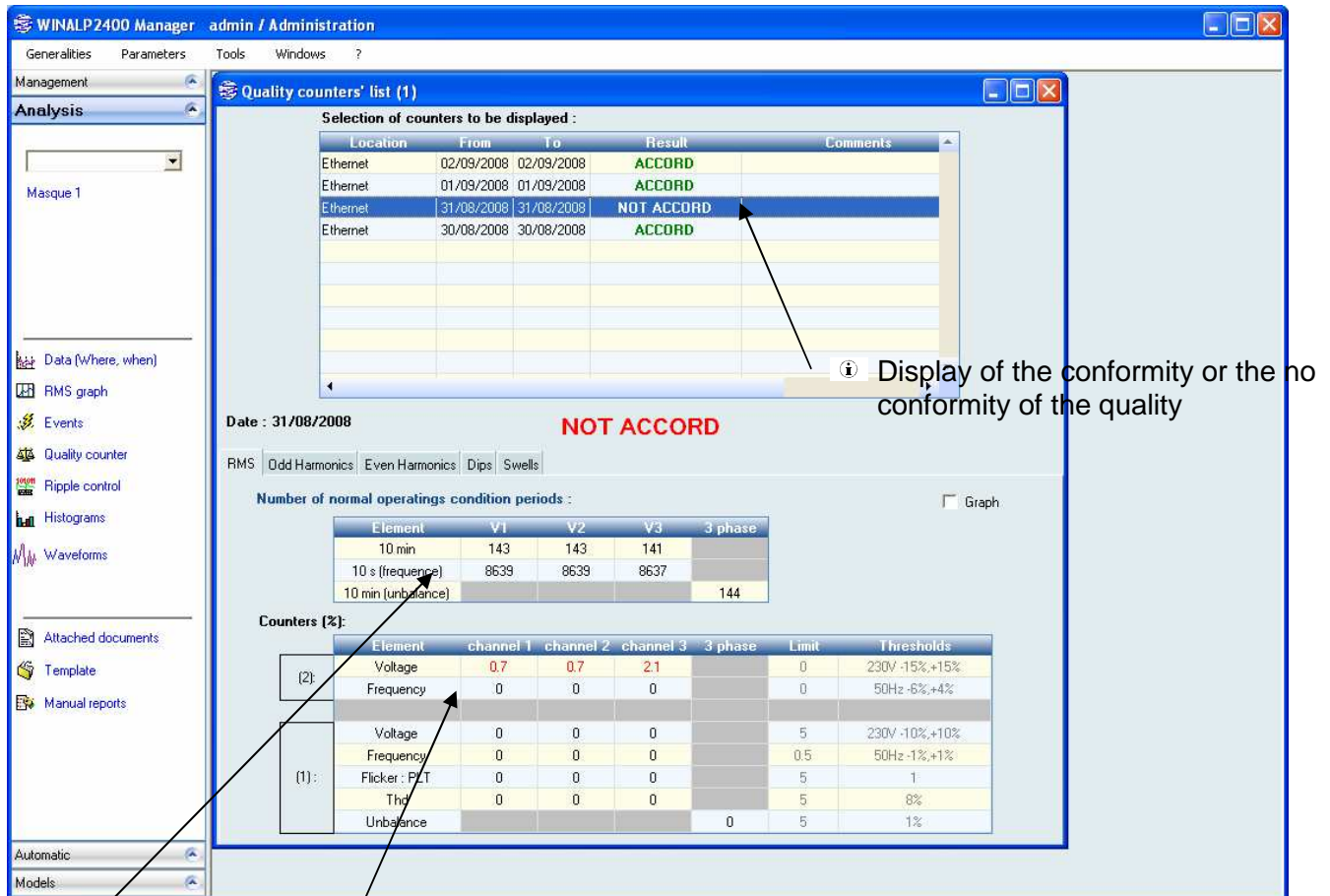
In the report the data are sorted by type: rms values, harmonic even and odd.

It is also possible to analyze and to sort the dpth and duration table as requested. It will create a DISDIP table.

Choose the data

The different step to display the quality counters are described below :

- ▶ In the analyze menu, choose *Quality counters*
- ▶ Select minimum one point
- ▶ Choose an analysis period
- ▶ Choose the display mode (listing or graphical)
- ▶ Choose an aggregation (daily, weekly, monthly)
- ▶ Choose the standard thresholds

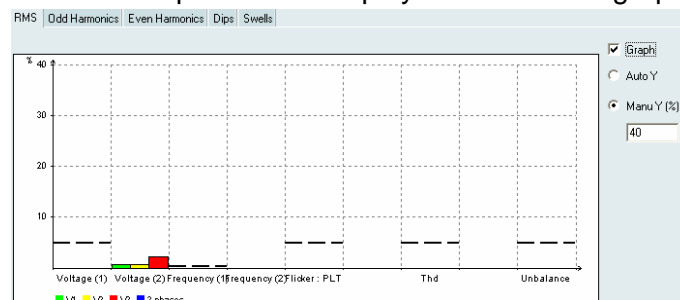


① % gives the % of the total duration (day, week or month) where the voltage was out of the limits.

① The total duration is equal to the intervals multiplied by the number of these intervals (here 144 x 10 min for 24Hrs).

① During an event the correspondent intervals are excluded from the quality counters tables.

① It is also possible to display the over limits graphically



6.3 RMS measurements

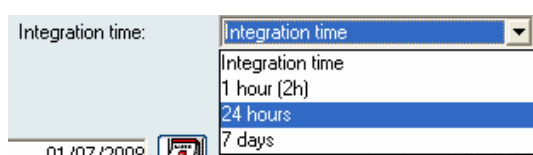
The network analyzers ALPTEC2444 will record ALL the data for different integration period.

The integration period is the periods during all the RMS 200msec value calculated by the analyzer are integrated.

Choose the data

The different step to display rms values from one or more measuring point are described below:

- ▶ In the analysis menu, choose *RMS graph* and follow the steps below:
- ▶ Select one or more measuring points.
- ▶ Choose an analysis period and an integration period.
- ▶ Several integration periods are available :



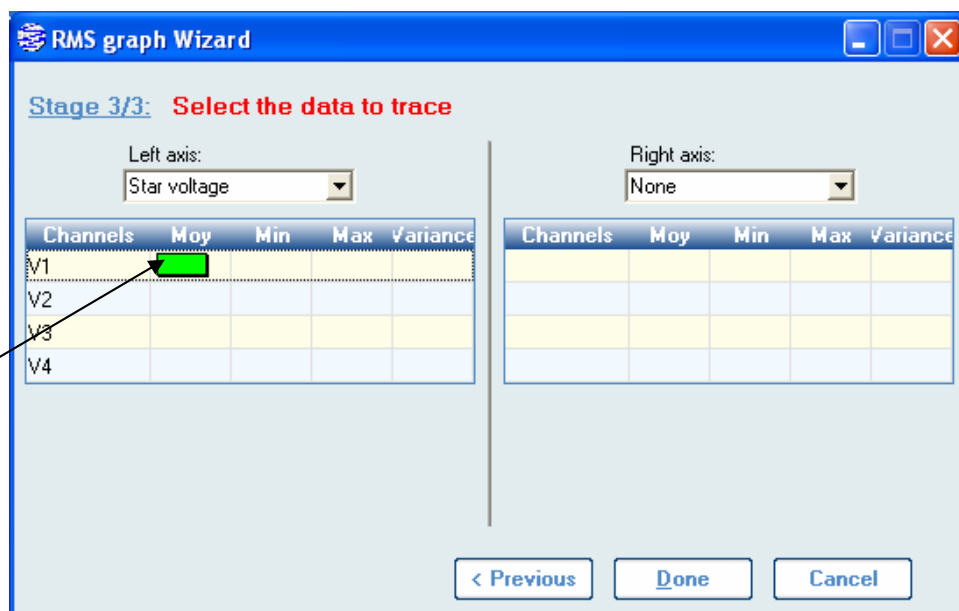
Integration time (10 min is the default parameters, it is possible to set from 1min to 60 minutes)

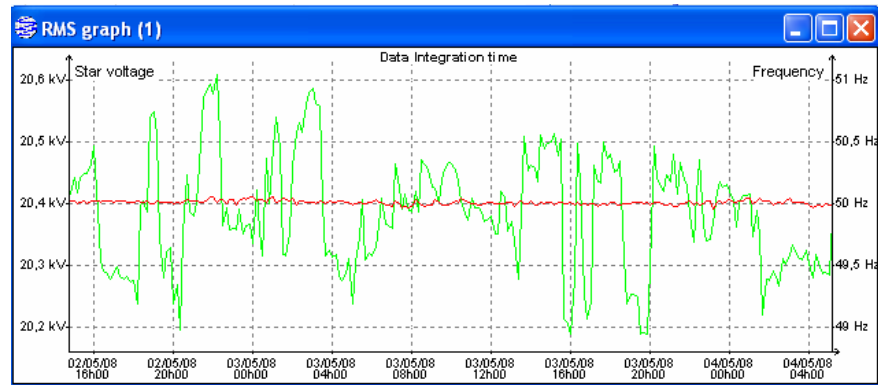
1 hour
24 hours
7 days.

- ☒ If the corresponding period was not downloaded no data will appear. Select an integration time after the download of the matching period.

- ▶ Choose the data to display (axis, type of data and channel).

① Click to select the value

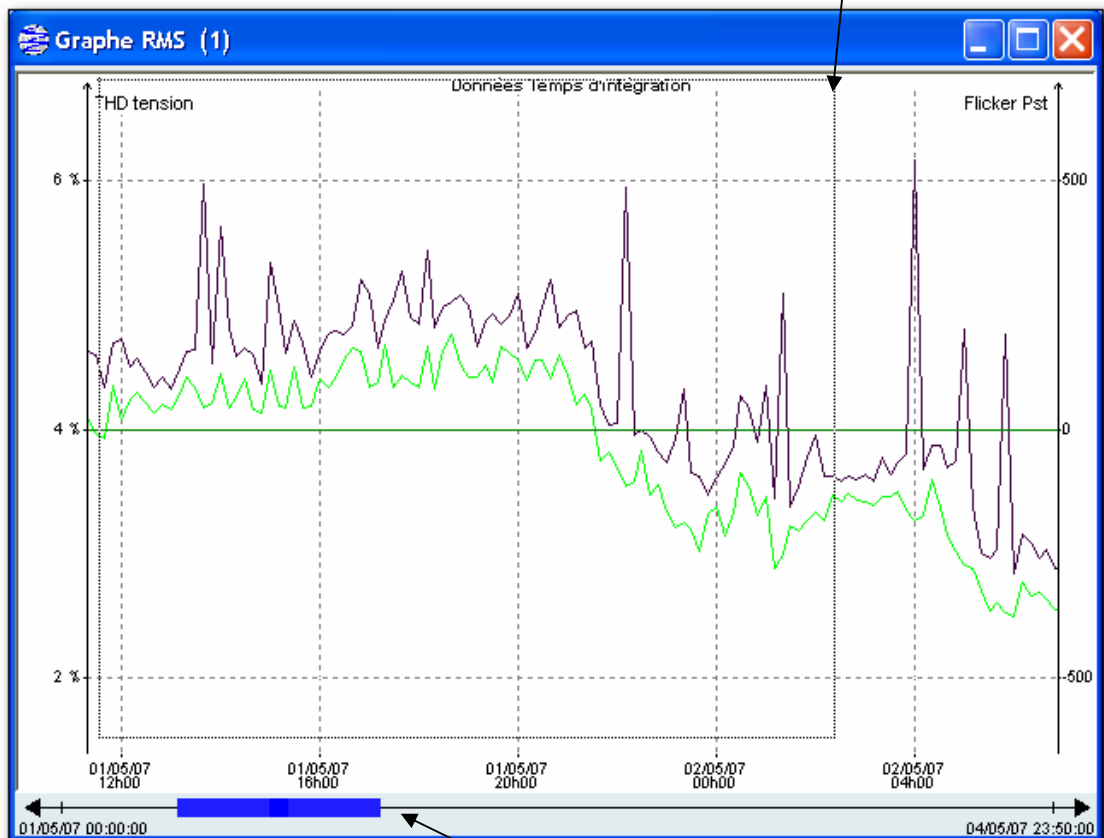
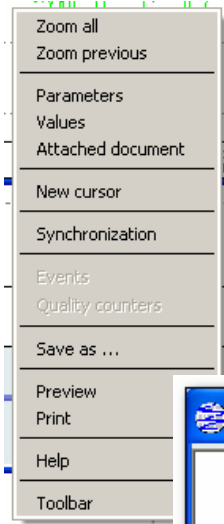




❶ It is possible to display on the same windows 2 different magnitudes

❷ With a right click it is possible to display a pop up menu with different option to modify the display or add different features (legend...)

❸ It is possible to use the lasso zoom.



❹ With the bottom cursor it is possible to change the time or to change the resolution

❺ It is possible to add as many windows for rms value as requested and the procedure will be shorter because the period had still been selected.

6.4 Graphical help to select the measurement

The mode 'Data (Where, When)' is a very interesting way to have an overview of what is in the data base. It will display on a time based graph all the type of data and show if the data is present or not

Choose the data

The different steps to displays the data from one or more measuring points are described below:

- ▶ In the Analysis menu choose *Data (where, when)* and follow the different steps :
- ▶ Select one measuring point or more.
- ▶ Choose a period of analysis
- ▶ Select at least one data type to display
- ▶ Choose the integration period and the eventual filters

Data graph Wizard

Stage 3/3: **Select the elements to trace**

<input checked="" type="checkbox"/> RMS data	1 hour (2h)	<input checked="" type="checkbox"/> Ripple control	Aucun
<input checked="" type="checkbox"/> Events	Aucun	<input checked="" type="checkbox"/> Histograms	7 days
<input checked="" type="checkbox"/> Quality counters	Day	<input checked="" type="checkbox"/> Waveforms	Aucun

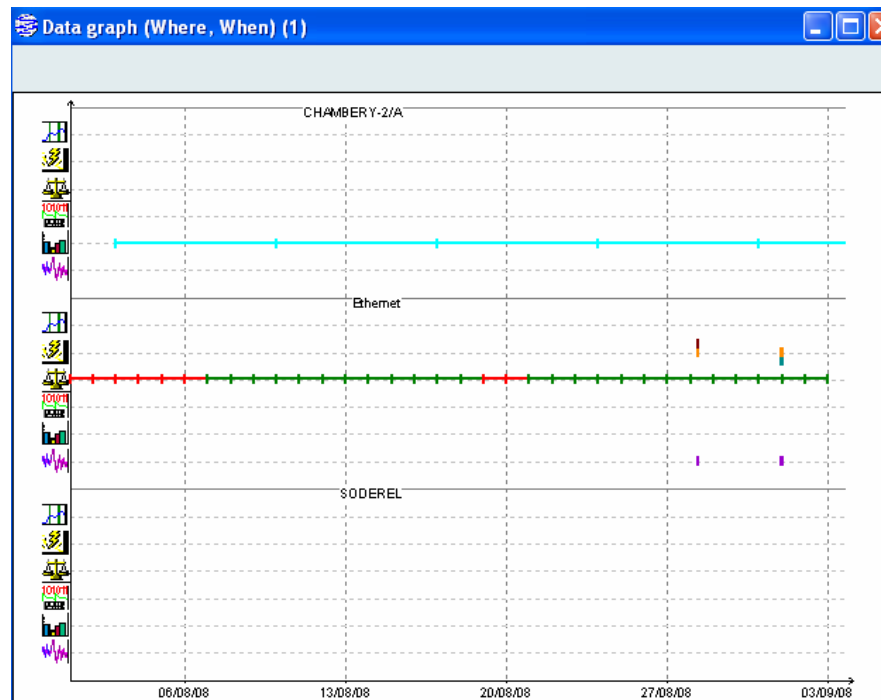
(Limits = EN50160)

< Previous Done Cancel

A graphical display will show all the data from the different type and measuring points.

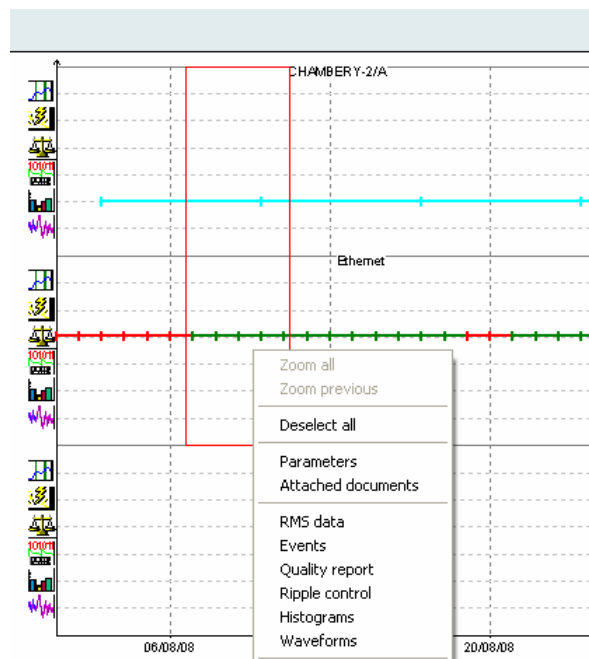
The quality reports which are not according the standards will be displayed in red.

All the type of data are displayed on one graph



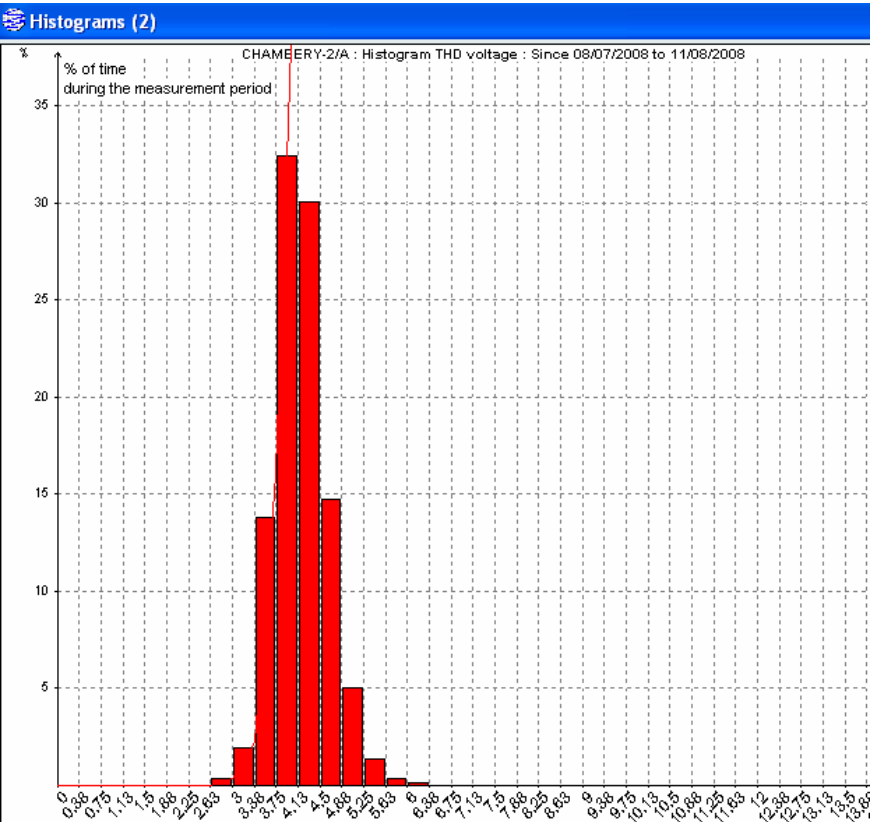
In order to display the data select them with a lasso and with a left click select the desired value in the pop up menu

Select the data to display with the lasso limits for requested period.



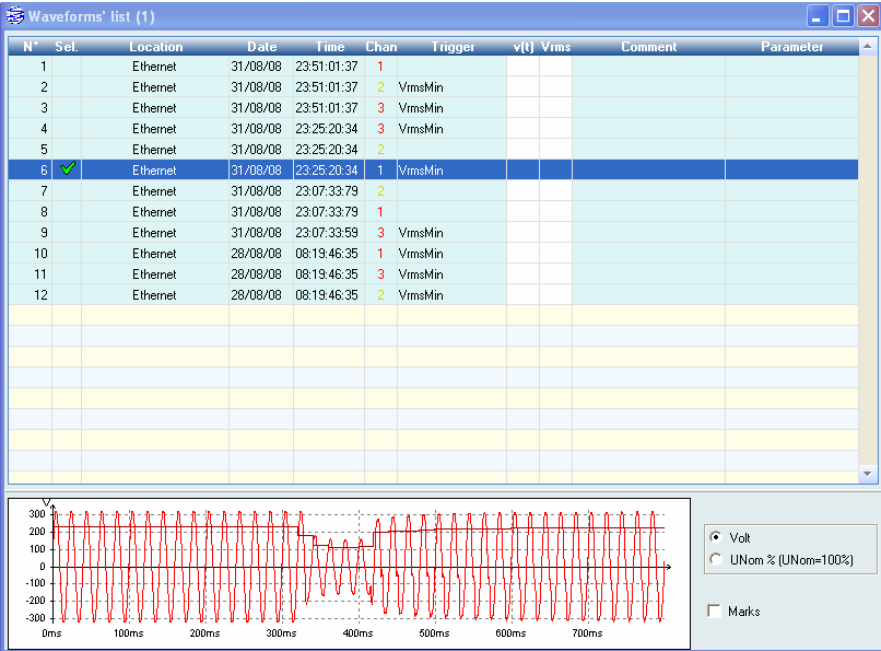
Display the histograms

Select the data from the step by
sep menu and display the
requested histogram



Option: display the waveform

- Graphie
- Affichage
- Filtre
- Document annexe
- Tri Croissant
- Tri Décroissant
- Couleur des voies
- Commentaire
- Supprimer
- Copier dans le presse papier
- Exporter
- Aperçu
- Imprimer
- Aide
- Barre d'outils



7 Transport and Storage

7.1 Transport

- ▶ Transport the device only in its original packaging.
- ▶ Keep the operating manual supplied with the device for future reference.
- ▶ Protect the device during transport against heat and moisture; do not exceed temperature range of -20 °C to +50 °C and max. Humidity of 85 %.
- ▶ Protect the device against impacts and loads.

7.2 Storage

- ▶ Keep original packaging, as it might be required at a later stage for transport purposes or to return the device for repairs. Only the original packaging guarantees proper protection against mechanical impacts.
- ▶ Store the device in a dry room; the temperature range of -20°C to + 50 °C and maximum humidity of 85 % may not be exceeded.
- ▶ Keep the operating manual supplied with the device for future reference.
- ▶ Protect the device against direct sunlight, heat, moisture and mechanical impacts.

8 Warranty

- ❶ The warranty period for faultless operation and compliance with the specified uncertainty of measurement is limited to 2 years from the date of purchase.
- ❶ The warranty is only valid if accompanied with the respective invoice or receipt of payment.
- ❶ Not covered by warranty are damages due to improper use, overload or operation under conditions that are outside the range of permitted ambient conditions.
- ❶ Warranty covers only technical data that is specified with a tolerance range. Values or limits for which there are no tolerances specified are intended for information purposes only.

9 Recalibration

- ❶ ALPES TECHNOLOGIES recommends recalibrating the device every 2 years. The device can be calibrated by the ALPES TECHNOLOGIES service department or any other calibration specialist. Refer to the *Calibration Application Note*.

10 Maintenance

- ❶ The device is maintenance-free.

10.1 Replacement of internal parts

- ❶ Follow the safety instructions regarding ambient conditions and location of installation.

10.2 Error messages

Power Led: green when the device is powered (12 Volts).

Status Led: general status of the device.
Green blinking = measurement of a periodic signal of 200msec.
Orange blinking = Memory full – disabling of the dips recording → **bad threshold configuration of the dips/swells/interruptions – change the configuration of the device.**
Green or orange = internal error → **reboot the device.**

Mem Led: Status of the memory interface.
 Green = read data in the CompactFLASH memory
 Orange = write data in the CompactFLASH memory
 Red = Format the CompactFLASH memory

Com Led: Orange = send data to one of the serial or modem communication port.

Boot sequence:

- ☑ Power Led green: Device is powered,
- ☑ Status Led red and Mem Led green: BOOT procedure.
- ☑ Memo Led green (blinking or not): Verification of the CompactFLASH memory, duration: appr. 30 Sec.
- ☑ Com Led Orange: search a modem and initialize it.



If this Led is on during more than 1 Sec:

- the device is not equipped with an embedded modem.
- It is a device type ALPTEC 2444 Duo.
- **the device cannot communicate with the modem.**

- ☑ Status Led green blinking: end of the boot sequence.

10.3 Problem with the modem

The device cannot communicate with 2 communication ports at the same time. It is then not authorised to call simultaneously the device with the RS232 port and the internal modem or the RS485 port.

- ☑ If the internal modem doesn't answer, verify the HAYES commands sent to the device in the configuration part of the software (Ref. *Modem application note*).

10.4 Replacement of batteries

- ☑ The device doesn't record anymore after a power supply failure.
 - ▶ The battery has to be changed.
Battery type: NP1.2-12 battery (YUASA) lead-acid battery, 12V, 1.2Ah.
Alpes Technologies recommends changing the battery every 2 years.



- ▶ Prior to opening the battery slot lid, disconnect the power supply of the device.
 - ▶ Unlock the battery slot lid (remove screws, open mechanism) and open it.
 - ▶ Insert the batteries, ensuring correct polarity.
 - ▶ Before operating the instrument, check whether the battery slot lid is properly replaced and the screws are tightened.
 - ▶ Dispose of spent batteries according to the applicable waste disposal regulations.
- ☑ The device time or date appears to be wrong.
 - ▶ The lithium cell has to be changed.
Cell type: Lithium cell 3 Volts, 130 mAh.
The internal clock is powered by a lithium cell built to back up data over approx. 10 years.
Contact Alpes Technologies to change the battery.

If batteries or cells other than those included in the delivery or specified in these instructions are used, the warranty shall be void.

10.5 Replacement of fuses

- ▶ **The device is protected by internal fuse (250V 3AT).**
Contact Alpes Technologies to change the fuses.

10.6 Cleaning

Do not wash the device with water.
The device housing can be cleaned with an isopropanol-soaked rag.

11 Decommissioning and Disposal

11.1 Shutting down

- ▶ Shut off the power supply, Voltages and Currents circuits prior to connect the device.
- ▶ Never open the circuit of a current transformer. Always bridge the inputs of the current transformer before connecting or disconnecting the ALPTEC device.
- ▶ Never bridge the circuit of a voltage transformer.
- ▶ Remove all connected devices.
- ▶ Secure the unit against inadvertent switching on.
- ▶ Ensure that the operating manual is kept near the device.

11.2 Recycling and disposal

Packaging

- ▶ Always adhere to the applicable statutory regulations for recycling and waste disposal.
- ▶ The following licence agreements have been entered into for the disposal of the packaging: (France).

Housing

- ▶ The housing is made in metal and can be recycled.
- ▶ The electronic components including the power adapter, filter, plug-in modules and wires have a weight of approx. 1500 g and a volume of approx. 3000 cm³.
- ▶ The Lead-acid battery and the lithium cell must be waste following the 98 / 101 / EG rule.

12 Technical Data

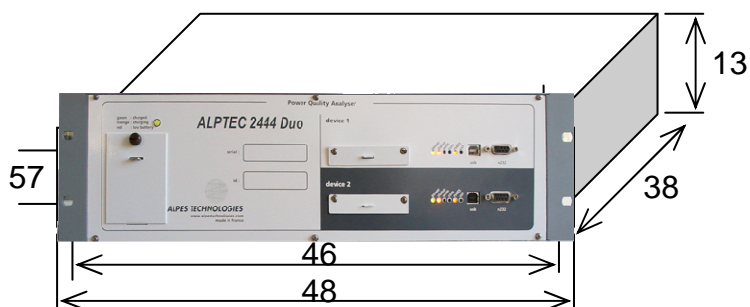
General technical data

English

Generalities:	Digital Signal processor (DSP) synchronized PLL (Phase-Lock-Loop)
Display:	Real time display with PC interface.
Configuration:	Trough direct PC connection (USB / RS232) or remote communication (modem, Ethernet, RS485).
Quality System:	Design and manufacture following DIN ISO 9001:2000.
Calibration:	Recommended calibration Interval: 2 years.
Precision:	Precision of the data display: ±0.1% of the reading data from 10 V to 600 Vrms ±0.1% of the reading data from 200 mArms to 9 Arms.
Calibration:	23°C ±1°C. 230 Vrms / 50 Hz ±0.1 Hz / 3 Arms 50 Hz ±0.1 Hz. Stabilization interval: 10 minutes. Star connection.
Environmental conditions:	Working T° range: -10°C to +55°C. Storage T° range: -25°C to +70°C. Relative humidity: 0% to 80 % (without condensation).
Protection class:	IP30.

• ALPTEC 2444 Duo :

↳ Dimensions :



↳ Weight (Kg) :

- 19 pouces DUO : 8

EMC

Emission: Conform to the applicable levels.

Power Supply

Working range: Standard
AC: 190 TO 264 Vac (50Hz, 60Hz).
DC: 240 to 360 Vdc.
Lead acid internal battery (12V/1,2Ah), autonomy: avg. 30 min.
Consumption: 27 VA (100 VA during charging period).

Option 1: 48 VDC: range 38 to 74 Vdc.
Without battery.
Consumption: 25VA max.

Option 2: 127 Vdc: range 68 to 158 Vdc.
Without battery.
Consumption: 25VA max.

Ground isolation: 300V CATII following IEC/EN61010-1.

Test voltage: 1,5 KV.

Voltage inputs

Inputs: 4 differential voltage inputs.

Connection: Star or Delta.

Input range: 0-600 Vrms AC 30 - 2200 Hz.

Full scale: 1150 V peak.

Over voltage: **2 kV (continuous).**

Amplitude: Class A following IEC61000-4-30.

Input Impedance: **4 MΩ.**

Current inputs (ALPTEC 2444 only)

Inputs: **4 current inputs isolated by transformer.**

Nominal current: **5 Arms.**

Full range: **14 A peak.**

Over current: **3 x I nominal (continuous).**

Consumption: **0,01 VA.**

Precision – Measurement methods

Recorded data: **Average rms data.**
200 msec, 10 min, 1 h and 24 h intervals.

Frequency: **45-57,5Hz (60Hz option).**
Resolution: 10 mHz.
Intrinsic error: 30 mHz.
Class A following IEC-61000-4-30.

Sampling frequency: **10240 Hz synchronized with the network frequency (PLL).**
Precision 10 cycles FFT (Fast Fourier Transform) – Bandwidth 30-2200 Hz.

Dips and Swells: **RMS data on 1 cycle, sliding window of ½ cycle.**
Reference voltage: U nominal or average.
Intrinsic error: <1% of U nominal.
Class A following IEC-61000-4-30.

Flicker : **Pst (10 minutes), Plt (2 hours).**
Following IEC-61000-4-15.

	Measurement range: 0-20. Intrinsic error: <5% of Unominal. Class A following IEC-61000-4-30.
Voltage Harmonics:	Measurement range : H2 – H51. Recorded data: 200 msec, 10 min, 1 h, 24h. Following IEC-61000-4-7 Class I. Class A following IEC-61000-4-30.
Current Harmonics:	Measurement range : H2 – H51. Recorded data: 200 msec, 10 min, 1 h, 24h. Following IEC-61000-4-7 Class I. Class A following IEC-61000-4-30.
Unbalance:	Class A following IEC-61000-4-30.
Active Power:	following IEC-61036 class 2.
Reactive Power:	following IEC-61268 class 2.
Distortion Power:	following IEC-61036 class 2.

Standard references

EN 50160 "Voltage characteristics of electricity supplied by public distribution systems"
UNIPED, 230.02 "Measurement guide for voltage characteristics, cat 1".

Standards Compliance

IEC 61000-4-30 "Electromagnetic compatibility (EMC) - Part 4-30: Testing and measurement techniques - Power quality measurement methods"
IEC 61010-1 /2001 "Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements".
IEC 61000-4-6 "Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields."
IEC 61000-4-7 "Electromagnetic compatibility (EMC) - Part 4-7: Testing and measurement techniques - General guide on harmonics and interharmonics measurements and instrumentation, for power supply systems and equipment connected thereto".
IEC 61000-4-15 "Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques - Section 15: Flickermeter - Functional and design specifications".
IEC 61036 "Alternating current static watt-hour meters for active energy (classes 1 and 2)"
IEC 61268 "Alternating current static var-hour meters for reactive energy (classes 2 and 3)"
73/23/EEC EC Low Voltage Directive
89/336/EEC EMC Directive
See the "Type test" document for other standards compliance.



13 Service and accessories

13.1 Equipment

Optional extras

Product	Description/technical specifications	Prod. no.
Ethernet	Ethernet Communication and Website	
Modem	Embedded PSTN Modem with cable	
GSM Modem	Embedded GSM/GPRS Modem with antenna	

Accessories

Product	Description/technical specifications	Prod. no.
NOVAFAX 56000	Modem for PC-side KORTX Novafax 56000	
GPS	GPS for synchronisation	

Software

Product	Description/technical specifications	Prod. no.
WINALP2000	WINALP2000 Software	
ServerBridge	Multi-modem and multi-users add-on	

13.2 Service

- The instrument may only be serviced by specialised service workshops authorised by ALPES TECHNOLOGIES.

Service

Product	Description/technical specifications	Prod. no.

13.3 Serial number

- ① The serial number is as follow:
CXX-AAMM-NNN
C : Device version => ALPTEC 24xx
AA : Production year of the device
MM : Production month of the device
XX : Following the selected option:
Mechanical and measurement interface:
X0 : Rackable device (19 inches)
X1 : Portable device
X2 : Portable IP53 device
X5 : Device for DIN rail
Communication type and power supply type:
0X : Device without option
1X : Device with embedded PSTN modem
2X : Device with embedded GSM modem
3X : 3 hours battery
4X : 3 hours battery + modem
5X : 3 hours battery + GSM modem
6X : Device with Ethernet
7X : Device with Ethernet and modem
8X : Device with Ethernet + 3 hours battery
9X : Device with Ethernet + 3 hours battery + modem
NNN : Number of the device in the serie
- ① The memory size is not indicated in the serial number.

14 Definitions

CBEMA-Curve	In 1977 the Computer and Business Equipment Manufacturers Association provided an energy performance profile for computer equipment known as the CBEMA curve. Revised by the Information Technology Industry Council (ITIC) in 1996 it will continue to be referred to as the "CBEMA Curve". It is a necessary tool in determining the immunity limits in modern office electronic equipment. Voltage levels and durations at the equipment terminals, within the tolerance envelope, represent acceptable energy being delivered. http://www.itic.org/technical/iticurv.pdf
ITIC-Curve	See CBEMA-Curve
Coverage (statistics)	The percentage of available data compared to the expected available data for a selected period of time
Device	Any measurement equipment.
DISDIP	DISDIP was initially the name of workgroup of the UNIPED that has been working on a classification of dips, swells and interruptions. By extension, the name DISDIP has been given to tables that resulted from this workgroup.
Electrical variable	Any parameter that might be used to define the shape of an electrical signal. This might be a long or short-term phenomenon, affecting the wave shape or the RMS values. Ex: Harmonics, dips, flicker...
Event	An event is short size information provided by a PQ device. Events are usually punctual (dip) but may cover over longer periods (EN50160 report event). Example: * A triggering condition was met (dip, flicker...) OR * A report was issued (EN report, Signalling voltages...) OR * Information from a device following a normal or abnormal behaviour (reset, clock synchronization...) * Information provided by the software.
Histogram	A histogram is a graphical representation of the evolution of a parameter where time information is lost and focus is given on the statistical dispersion of the parameter.
Permanent recording	Unconditional/continuous (usually long term) temporal recording of a variable. The permanent recording is logged usually at a defined time interval (typically 10 minutes, one hour...)
Power Quality (PQ)	Any power problem manifested in voltage, current, or frequency deviation those results in failure or disoperation of end-user equipment.
Triggered recording	Recording that start and stop when triggering conditions are met. This type of recording is "finite" in time, contrary to the permanent (continuous) recordings (10-Min, statistics, User Recordings). Usually the triggering condition encountered when an electrical variable value overshoots of a threshold.
User	Is a person that will log on the system to use it. It is recommended to use dedicated log ins for each user and to allocate permissions according to the authority of each individual on the system. This enables traceability of all actions and provides security at the same time.

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