User's manual of the APRWIN software for Windows 95/98/NT4/XP

(Measurements processing and transmission software for the APR4u4i-APR8-APR16-APRV)

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Information

The use of the APRWIN software requires a good knowledge of the APR. If not, we advise you to refer to all own user's manuals :

- User's manual of the APR (APR8/APR16 or APR4u4i)
- User's manual of the BFOP (If the APR uses a BFOP)
- User's manual of the RACKAPR (In case of a composed site)
- User's manual of the 64 digital channels extension rack
- Installation guide of the APR
- User's manual of SANDRA (If this option was supplied)

But you are authorized to install this software on several PC (A desktop PC and a portable PC for example).

The APRWIN *Multi-machines* version allows you to manage a complete network of APRs.

The APRWIN *Single-machine* version allows you to drive a single APR.

Minimal configuration for using APRWIN

- Pentium 133MHz
- 16Mb Ram
- 40Mb free on hard disk
- 800 x 600 video card
- CDROM drive unit
- Ink jet or laser A4 printer (B&W or Colour)

Configuration recommended for using APRWIN

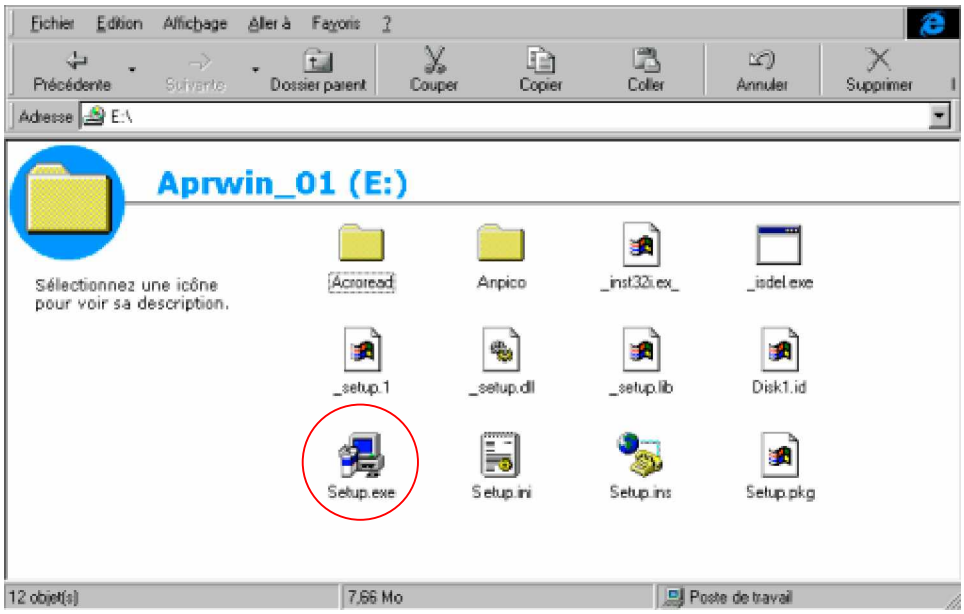
- Pentium II 233MHz
- 64Mb Ram
- 100Mb free on hard disk
- 1024 x 768 video card
- CDROM drive unit
- Ink jet or laser A4 printer (B&W or Colour)

Optimal configuration for using APRWIN

- Pentium II 450MHz
- 128Mo Ram
- 100Mo free on hard disk
- 1280 x 1024 video card 17" screen or more
- CDROM drive unit
- Ink jet or laser A4/A3 printer (B&W or Colour)

Installation

Insert the CDROM into the CD-Player to start the software installation on your PC. If the AUTORUN mode is confirmed on your system, the installation is going to start automatically, otherwise it will be necessary to execute SETUP.EXE program from the CDROM

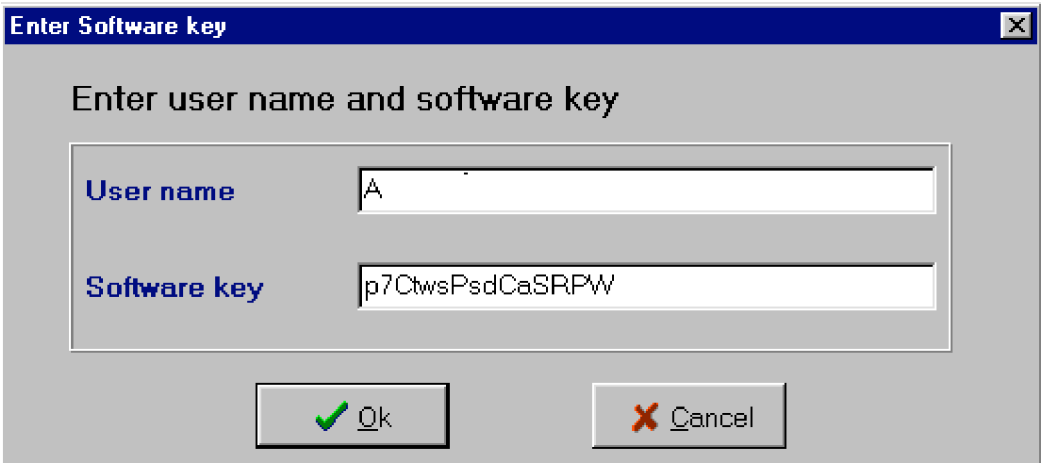


Software installation (Double click on SETUP to start installation)

Then, follow the instructions of the set-up program (It is advised to not change the paths and names by default).

Note : The installation of a new version does not require an uninstallation.

At first running, the software asks to enter a key. Enter the user name and the key supplied with the CDROM (The key is notified on the label sticked on the CDROM housing).



Notes :

- Enter small letters / capital letters for required key and name.
- You can not use the "O" letter for the software key.

New properties of the APRWIN software :

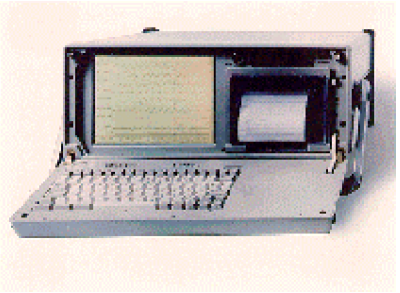
- "Off line" management (Memorization of the remote measurement tree) (content of the remote APR)
- Local view of the remote parameters (on PC).
- Each site has an associated *screenfile*.
- Optimization of transfers (if the APR is equipped with V2.20 software version)
- Integration of the SANDRA parameters (Ingoing/Outgoing feeders /GIS mapping)
- Management of scale groups (in the screen parameters)
- Memorization of thresholds for each site in the calculation of threshold overflows and affectation of a colour (in the trend software)
- New method used for the calculation of the energy (Separation of positive and negative energies that allows to manage the IPP (Independant Power Producer)
- Export of trend measurements towards a spreadsheet (by way of the clipboard)
- Printing of curves with a variable or constant number of pages
- Export of the harmonics towards a spreadsheet (by way of the clipboard)
- Printing of reports
- The APRs of a composed site are considered a single parameter setting
- Export of the list of the measurement files towards a spreadsheet (By way of the clipboard)

General description

The APRWIN software allows you to run measurements from Analyzers and Disturbance graphs of the APR range (APR4u4i , APR8 , APR16) with a PC equipped with the WINDOWS operating system (version 95 or 98).

The range of analyzers is consisted by 3 products :

APR16 (Disturbance recorder)



APR8 (Network Analyzer)

APR4u4i (Analyzer / Disturbance recorder)

<u>The APRWIN software lets you</u> :

- to drive independently all the APRs.
- to run the trend/ LF and HF measurement files.
- to program an APR for SANDRA's use (in local or remote mode).
- to dialog with the APR in order to reprogram them, import all the recorded measurement files and remotely display measurements.
- to manage sites consisted of several APRs.
- to work in "Off Line" mode for import or deletion

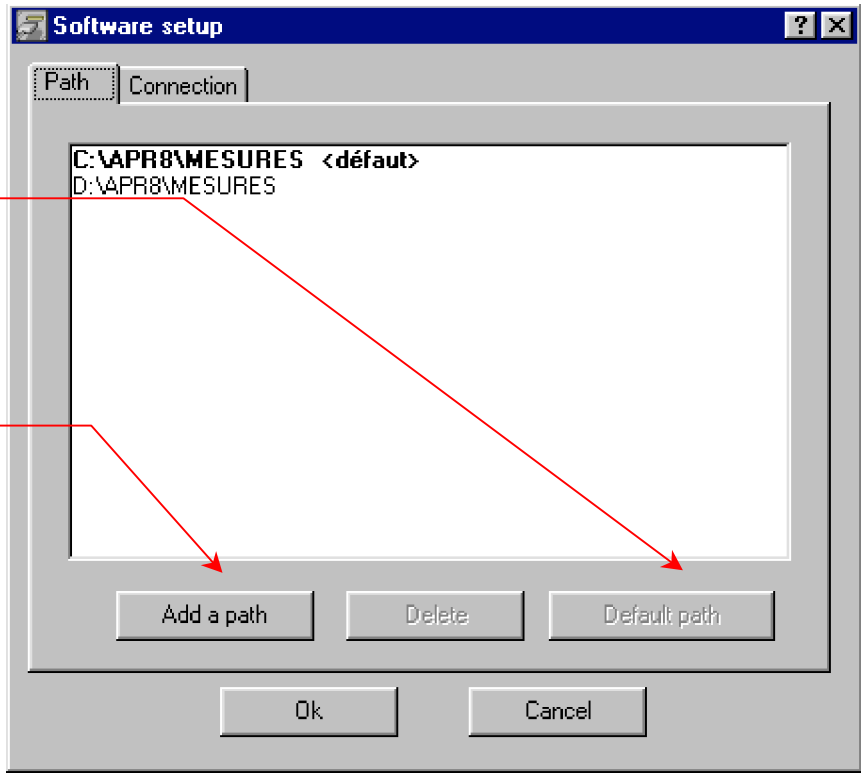
Fisrt starting up

General setup

Setup the paths by the *File/Setup* menu or by clicking the  icon.

Select a line and click here to define the path by default

Click here to add a path



Measurements are stored in a path (define several paths to have measurements on various disks : network operating for example). Paths contain " xxxx. SIT " directories.

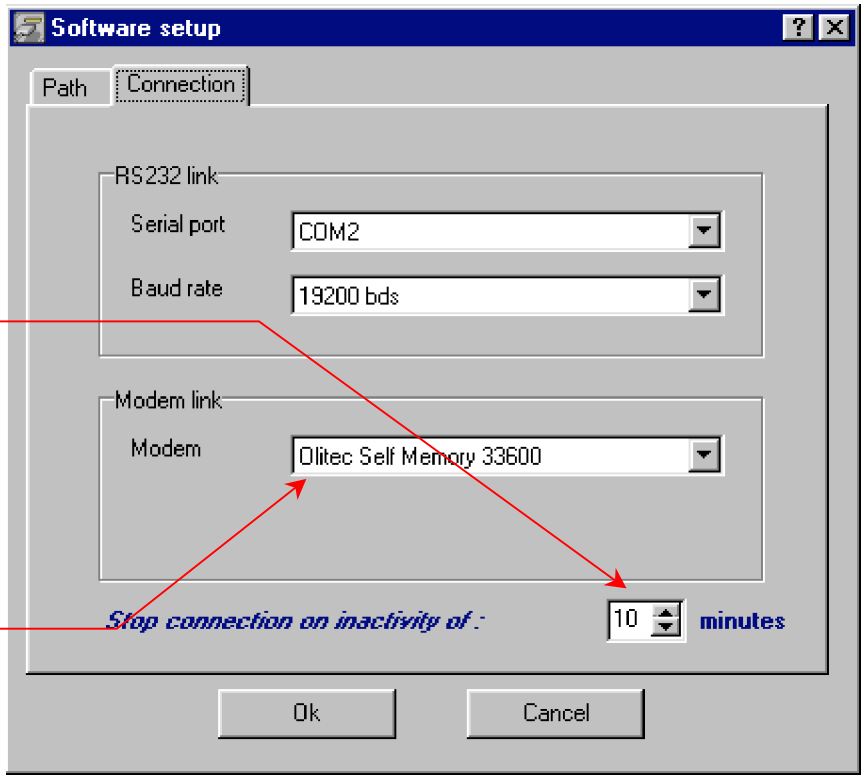
The imported measurements (manual or in automatic import) will be stored into the path by default .

Caution : Do not create a path on a removable disk or in read only mode.

Setup links (Local/Remote) by the *File/setup* menu or by clicking the icon.

Connection by modem is automatically cut after 10 minutes of inactivity. Enter 0 to disable.

Baud rate must be setup in the control panel of windows (19200 baud maximum)



Setup of connections

Notes :

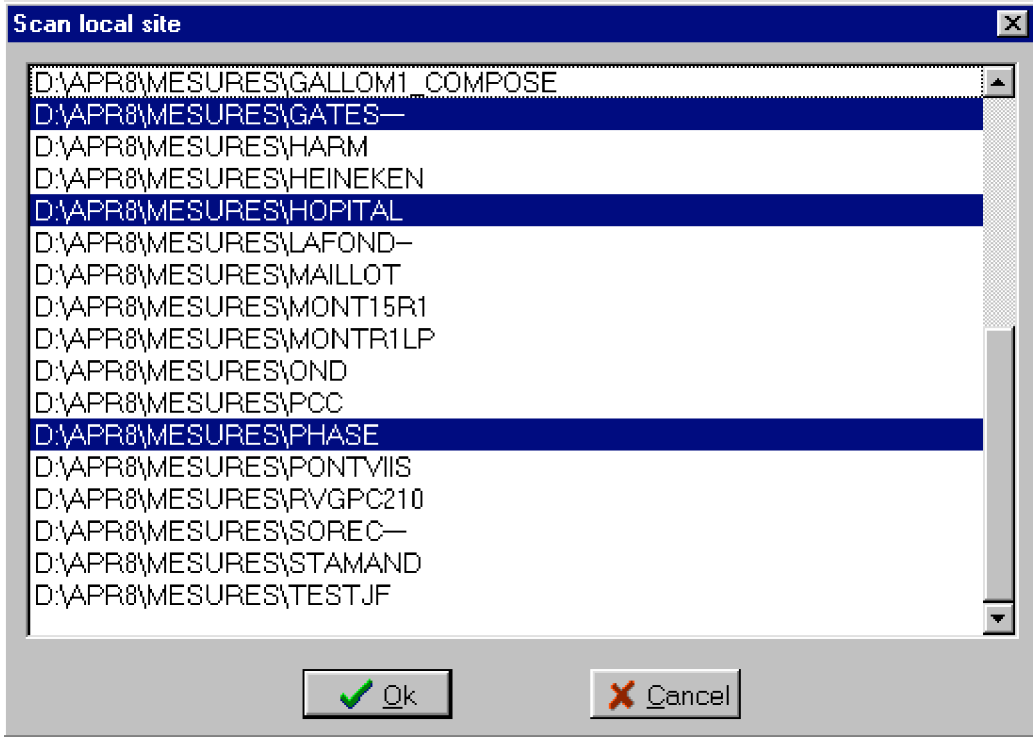
- The RS232 connection is used to dialog locally. 19200 bauds is maximum speed for the APR. Operating with a higher speed is not guaranteed with all the APR.

- The modem must have been installed in the Windows operating system first (refer to the WINDOWS help for the installation of peripherals).

Scan of sites

The APRWIN software needs to know the constitution of "sites machine" to operate. So, the following menu allows to create sites and import the existing measurement files into the APRWIN software data base, during the first starting-up of the software.

Select one or several sites to be imported and confirm by *OK*.



Scan of sites in all the defined paths

If the site is not in the list, the software creates it and asks you to enter their characteristics (see *Creation of a site* page 23). If parameter files have been stored on the PC (into the \APR8\PARAMETR directory), they are copied and stored into the *Programming/local* branch of the site manager.

Creating all the sites on the PC is necessary to correctly use the APRWIN software.

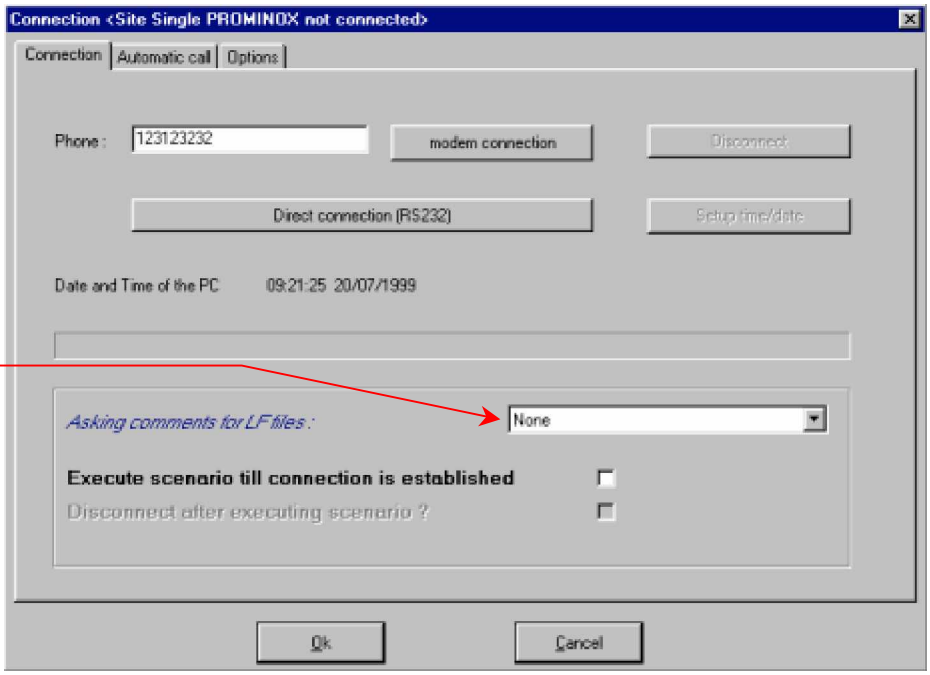
The scan of sites can be run at any time (when new measurements are stored in the PC for example).

Caution : The scan of sites does not move or erase measurements. It only references measurements stored in the PC towards the APRWIN software data base.

Transfer setup

For each site, setup the phone number and the transfer characteristics.

Comments and trigerring conditions can be not transfered in order to accelerate transfers



Setup of a call number

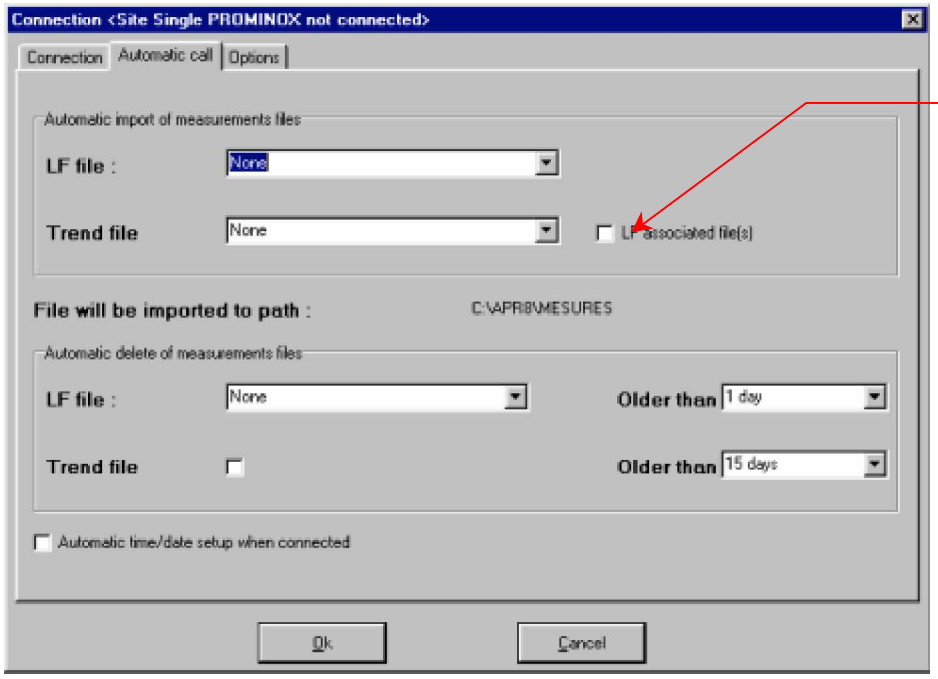
<u>The call number can contain special characters</u> :

W : Wait for tone : used to go out from an autoswitch.

(Example : 0W2021222324)

, : Wait 1 second between 2 figures (Example: 2023242526,,,,4 to compose 2021222324 and switch on the channel 4 of a phone switch).

The *Automatic Call* tab defines commands to be run during the automatic connection to a site (Automatic scenario)



Click here to import the LF files corresponding to the imported trend cycle .

Setup of the automatic import (trend/LF/HF)

<u>Automatic import of LF measurements</u> :

Measurement LF stored on APR disk can be imported according to various criteria

- None
- The last ones 24 hours
- The last ones 48 hours
- The last ones 72 hours
- The week
- The month
- The last 2 months
- The last 3 months
- All the new files

<u>Automatic import of trend measurements</u> :

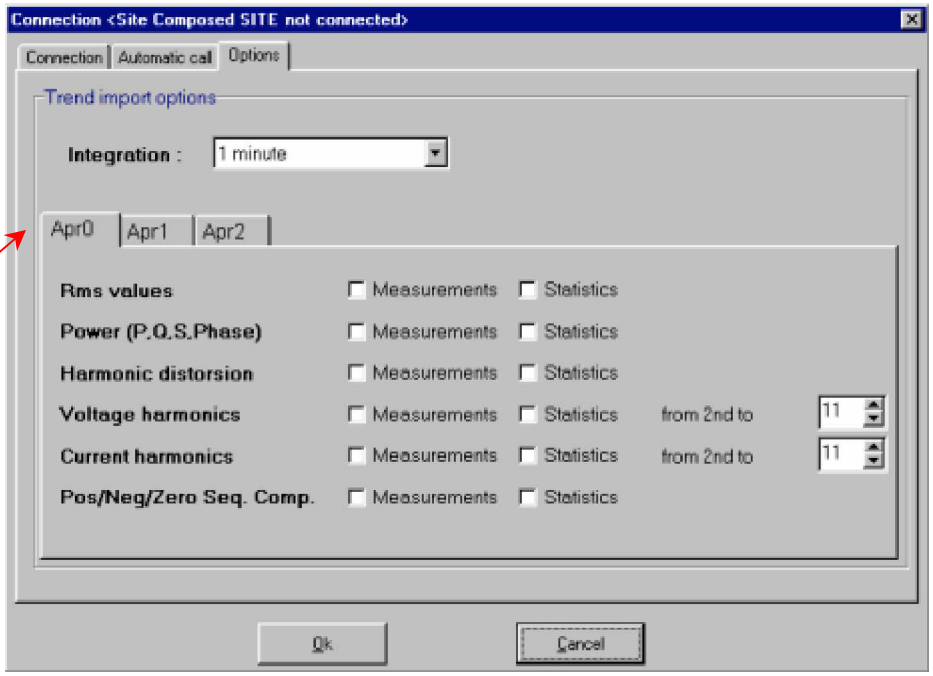
Trend measurements stored on APR disk can be imported according to various criteria :

- None
- The last complete files (the last ones complete 24 hours)
- The last day, the last 2 days, the last 3 days …
- The last week
- The last ones 15 days
- The last month
- All the new files

During the trend measurement import, you can import LF measurements corresponding to the period by checking the *LF associated file(s)* box.

Operating a selection of measurements to be transfered is recommended, due to the important size of the trend measurement files. The following window allows to create this selection ("Options" tab of the Connection window).

The choice of the trend measurement import is for each APR.



Selection of trend measurements to be automatically transfered

During the automatic import, the integration of trend measurements can be modified to spare time of transmission (i.e. : measurements averaged on 10 minutes, while the measurements were run over 1 minute, can be imported).

<u>The type of value to be transfered can be also selected</u> :

- Rms value
- Powers (P,Q,S Phase)
- Harmonic distortion (Global harmonic)
- Voltage harmonic (from number 2 to number X)
- Current harmonics (from number 2 to number X)
- Negative/Positive/Zero sequence components

Check the *Measurements* box if you wish to draw curves.

Check the *Statistics* box if you wish only the Account graphs.

<u>Note</u> : If you import measurements, statistics are automatically transfered.

LF or trend imports are optimized. If files (or measurements) are already present on the PC disk, they will not be imported.

LF measurement files remotely can be erased on the APR according to various criteria :

- No file
- All the files on PC dating more than X days
- All the files (Even though they were not imported) dating more than X days

The trend measurement files remotely can be erased on the APR if they are older of more than X days

Advise : If you did not download the APR measurements for a long time, you should set a transfer in limited time by the automatic transfer window (a week for example) or erase old measurements before running automatic import, otherwise the transfer time will be very long.

Automatic up-dating :

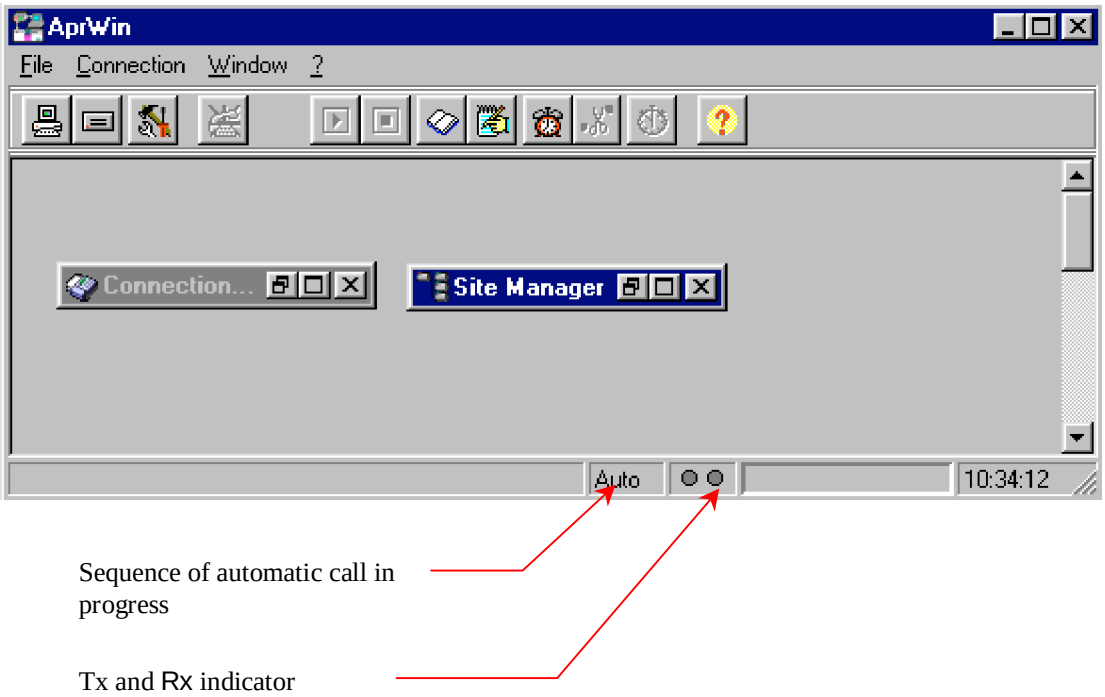
In each connection, the APR can be updated according to the PC time (The PC should naturally be up-to-date).

Caution : Do not confirm the automatic updating if the APR is equipped with a external time synchronization (SCLE RH2002 clock, ACEB HARPES or MOUSECLOCK).

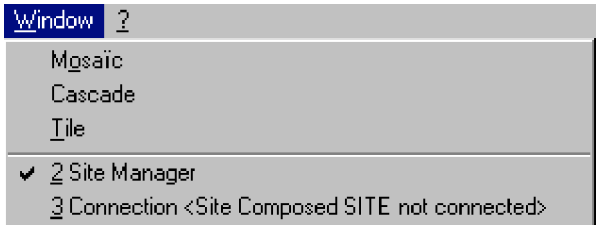
Main window

Description of the main window

It is the basic window of the software. It allows to call windows *Connection, Site manager, APR Parameters, LF Measurements …*



The *Window* menu lets you to select the different windows to be displayed or to select the mode of displaying mode of these windows (Cascade/Mosaïc).

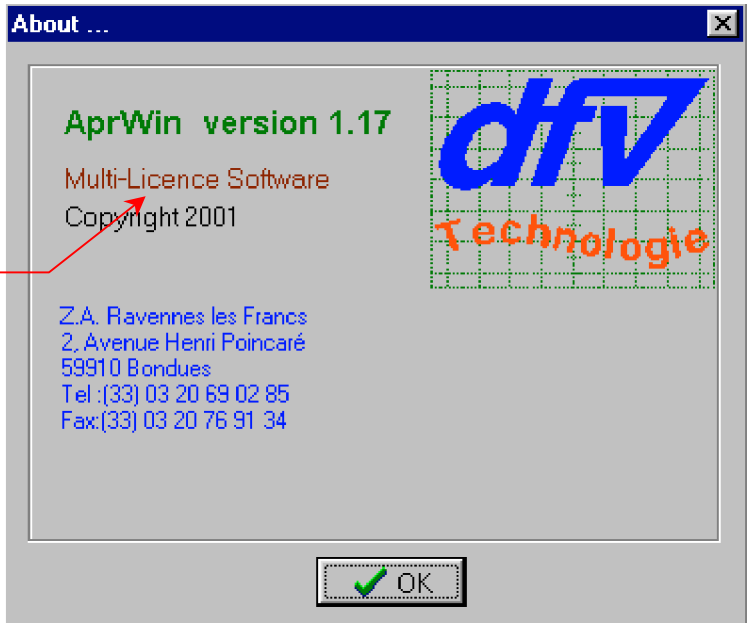


Choice of windows or of display mode

The ? menu runs the on-line help.

About

MONO or MULTI licence software type

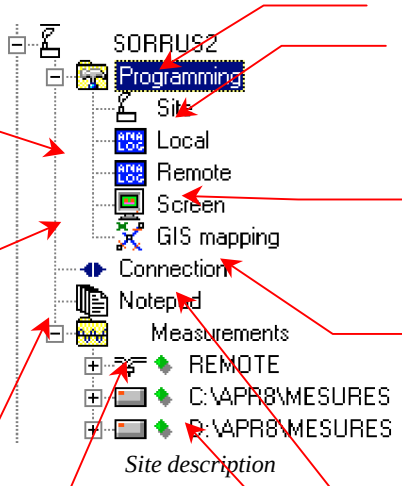


Site manager

Information about the site manager

The software data are structured by SITE. Each branch of the site manager represents a site. The following information are found in each site :

New



Site name

Site general parameters (Number of machines, serial numbers)

Library of parameters stored on the PC

View of the remote parameters (Parameters are saved from the APR at each connection)

Library of screen parameters.
Each site saves its own screen parameters by default.

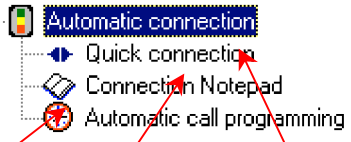
Library of GIS mapping files (GDO) used by SANDRA.

The notepad is the "black box" of connection for the site (success/failure) . Comments can be also saved.

Site connection (local or remote)

Measurements stored on PC (into the different paths)
Here :
C:\APR8\MESURES
D:\APR8\MESURES

View of measurements stored in one or all the remote APR.



Programming of the list of automatic call sites

Opening of a link between the PC and a single APR without notifying the site. This command is used to quickly restore data from an APR or to program it again.

Displaying of the Connection notepad (Black box)

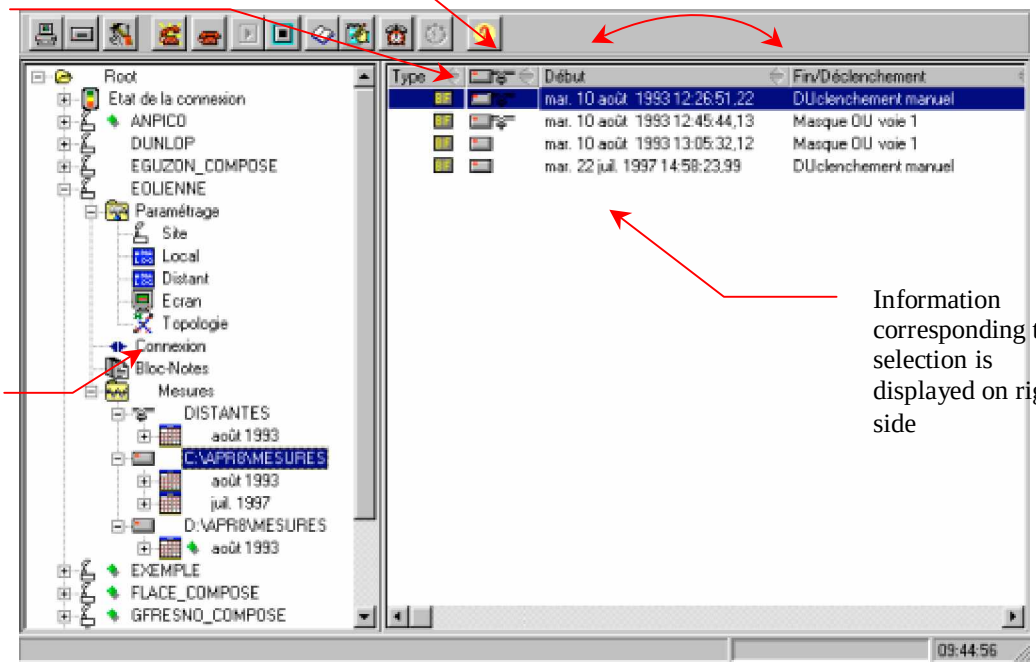
Using of the site manager

The site manager enables to access to all information about each site (parameters, LF, HF, trend measurements).

Click here to sort the columns by type

Select a column, drag and drop to move it

The icon indicates an file error (a file in a composed site is missing)

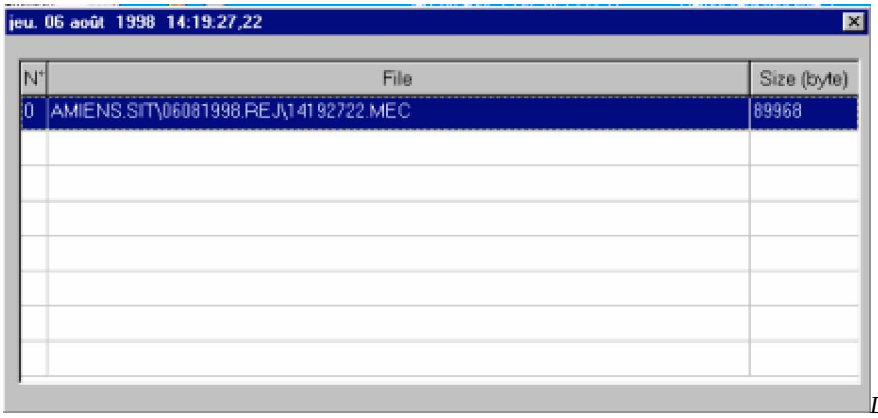


Information corresponding to selection is displayed on right side

Click the tree to select the branch you wish to reach.

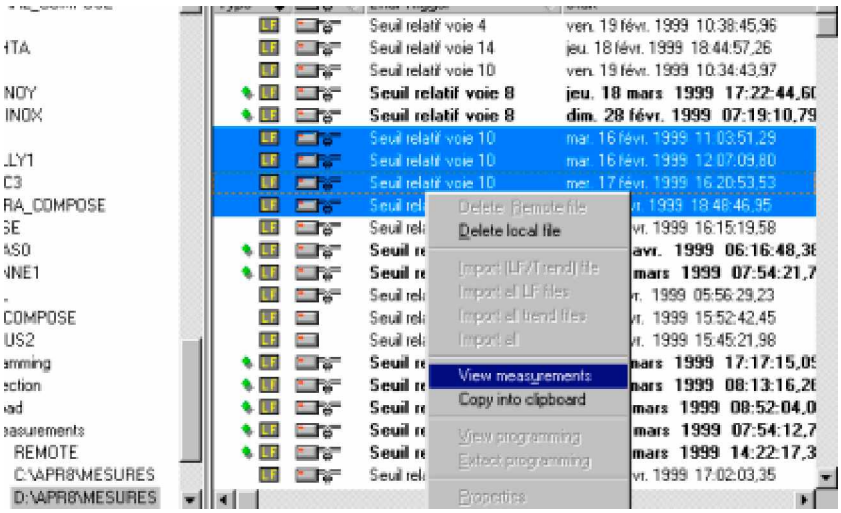
Example of window

To display the file properties, click the file, call the pop menu and select *Property* :



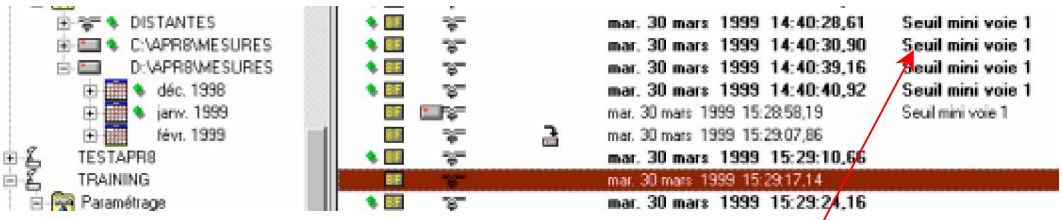
Displaying of LF file properties

To display one or several LF files, double click file or mark all the files to be displayed (use Multiselection by Ctrl or Shift), call the pop menu (by right click) and then select "*View measurements*".



Displaying of LF measurements

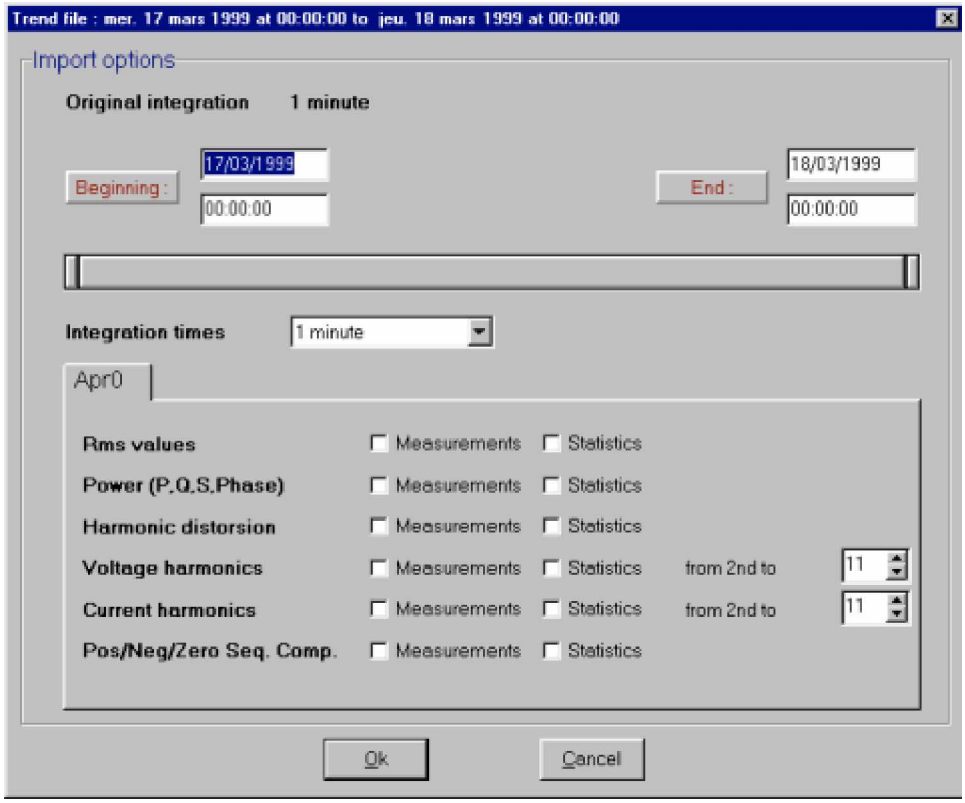
The conditions of LF file trigerring are not always notified in the REMOTE branch of the manager (if their transfer was not required to optimize the transfer times). If you wish to get these information (when you are connected), press the refresh key (F5).



Requirement of missing files

The trigerring conditions and the comments are missing. Press F5 to get information.

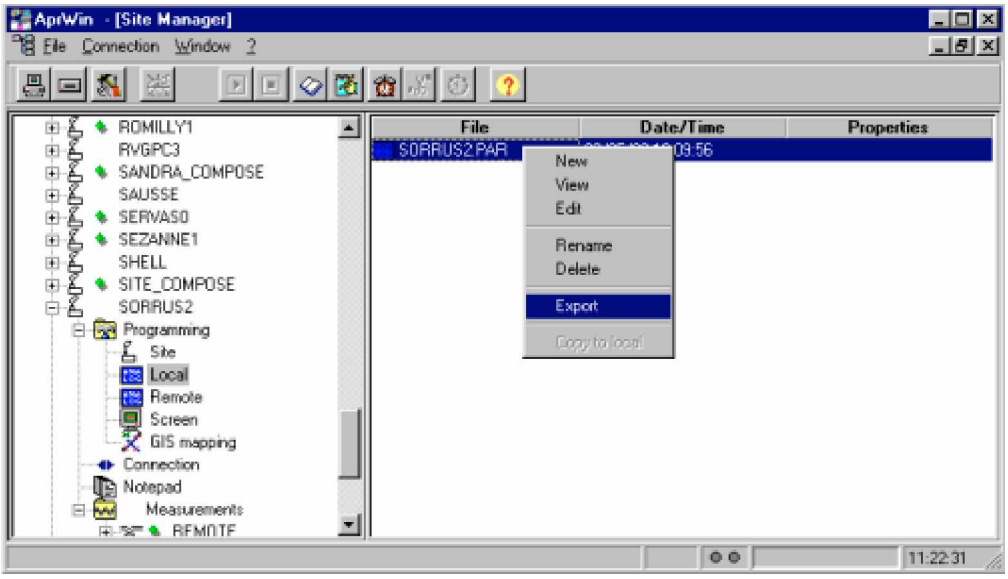
If you wish to import trend measurements, use the *LF/Trend Import* menu. Then, the following window appears.



Selection of trend values to be imported

To remotely reprogram an APR, create parameters into LOCAL branch and mark it *to be exported* (See page 50) .

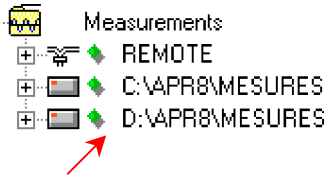
Note : shows a file to be exported.



Reprogramming of a site

Meaning of the different icons used

The measurements are preceded by a small green rhombus when something has been changed since the last consultation (new import for example). You have to look at the new measurements.



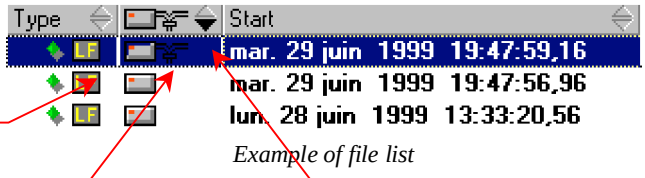
Each measurement can have different icons with each meaning :

The icons BF and CY indicates the file type.

means that the file is present on the PC hard disk (in one of the paths)

means that the file is remotely present on the APR disk.

Each column of the window has an icon that allows to sort out files in increasing or decreasing order (Click the header of the column).



Example of file list

LF measurement file

File present on the PC hard disk

File present on the remote disk (on the APR)

If the file is preceded by the icon , the file is damaged and unusable.

The icon S means "Analyzed by SANDRA"

The icon means "Localized by SANDRA"

The icon means "Localized by the user"

New

The file list can be printed (Local/Remote). Click on the right part of the window and call the pop menu (right click) and select "Copy into clipboard".

Example of printing :

Issue date : 12/04/99 09:12:46

Site : SORRUS2

Path : C:\APR8\MESURES

Analysis run by SANDRA or comment entered by the user

Type	LR	Start	End/Trigger	Analyze/Comments
LF	LR	sun. 03 janu. 1999 15:17:37,96	Relative threshold channel 12	
TR	R	Wen. 17 march 1999 00:00:00,00	thr. 18 march 1999 00:00:00,00 (1mn)	
LF	LR	wen. 03 febr. 1999 09:52:01,42	Relative threshold channel 12	
LF	LR	fri. 19 febr. 1999 10:38:45,96	Relative threshold channel 4	
LF	LR	Mon. 22 march 1999 08:13:16,26	Relative threshold channel 10	
LF	LR	Mon. 22 march 1999 17:17:15,09	Relative threshold channel 2	
LF	LR	Tues. 22 dec. 1998 11:56:03,62	Relative threshold channel 6	
LF	LR	Tues. 26 janu. 1999 20:07:21,45	Relative threshold channel 4	
LF	LR	Tues. 26 janu. 1999 20:07:23,45	Relative threshold channel 12	
LF	LR	Fri. 26 march 1999 08:52:04,07	Relative threshold channel 12	
LF	LR	Fri. 26 march 1999 14:22:17,31	Relative threshold channel 10	
LF	LR	Satu. 27 march 1999 07:54:12,71	Relative threshold channel 6	
LF	R	fri. 02 apr. 1999 06:16:48,38	Relative threshold channel 14	
LF	LR	fri. 02 apr. 1999 06:16:48,38	Relative threshold channel 14	

Note: L = Local file

R = Remote file

Description of different functions

Creation of a site.

Scan of sites. Search and storage of APR measurements in the data base eventually with creation of sites.

Software setup (Path and transmission port).

End of connection (local or remote). The modem is hung up in case of telephone line connection.

New

Starting up of the scenario (The programmed commands are run).

Example : Erase of files, reprogramming, …

Stand-by of the current scenario.

Displaying of the Connection notepad. The notepad allows to display all the connections and their state (Success / Failure)

Displaying of site notepad (Success / failure of connections and some information more)

Programming of calls (Display / Update of the list of automatic calls).

End of an automatic call sequence

Displaying of measurements in real time (The PC must be connected to the APR either in local or remote mode).

Software help

Creating/deletion of a site

Creating of a site

To create a new site, use *File/New* site command or click the icon , then enter the site name.

1st case : Single site : The site is called in the same way on the APR

2nd case : Site consisted of at least 2 APRs. The site is called XXXXX_COMPOSE on the PC and XXXXX0 AND XXXXX1 on the APR.

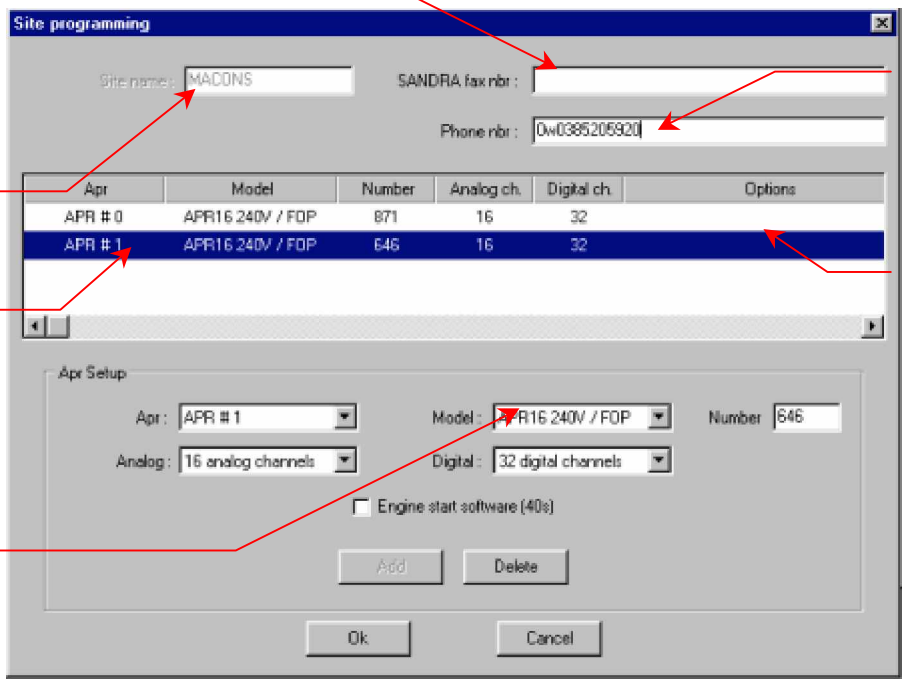
The site name is limited to a maximum of 8 characters (MSDOS compatibility).

If the APR is equipped with SANDRA on board, the nbr of FAX will be transmitted to the master APR during the APR reprogramming.

Site name (8 characters)

To modify the setup of a machine, click the corresponding line and type information in the "machine setup" window

Type of APR :
HF Standard APR8
HF Special APR8
APR16 240V/FOP
APR16 600V
APR8
APR4u4i



Site phone number

Software options are saved into the APR at the first connection. (Except 40s and HF)

Creating of a composed site

This number is the serial number of the APR. If this number is equal to 0 any APR can dialog. If number is not entered, call is not possible.

Notes : Number 0 is only possible in case of a single site.

If the software is a *Single - machine* version, the number of the APR can not be changed.

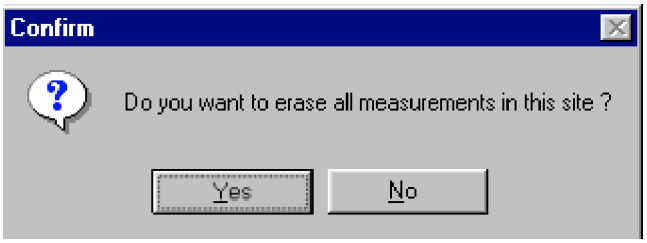
Site deletion

Click a site and press on *Del* key. After validation, each site information is erased. Caution : this command is **irreversible**.

Confirmation before site erasing

Note : This command erases the site from the APRWIN software data base as well as parameters (APR) and the screen parameters.

If *Yes* is answered at the previous question, the software asks if it is necessary to remove measurements.



Caution : The deletion of files is irreversible.

APR parameters

Information about APR parameters

The APR must be programmed with triggering and recording parameters to operate normally. This chapter shows you the way to program the APR with the APRWIN software.

First, parameters should be entered into the *LOCAL* branch of the PC, then transfered into the APR by using APR/PC transmission (*Export parameters* command see page 50).

<u>The APR parameters is shared in 6 parts</u> :

- General parameters (Number of used channels, range values of the personalized HF card).
- The channel parameters (Name of channels, scales …).
- The definition of ingoing feeders / outgoing feeders (Used especially for disturbance recorders with SANDRA).
- The parameters of LF triggerings.
- The HF parameters.
- The parameters of the recorder (Trend mode).

If the site is consisted of several APR, there will be only a single file of parameters which will regroup all the APR described in the site. In case the site is consisted of 4 APR for example (where each one is equipped with 16 analog channels and 32 digital channels), it will be necessary to program a pseudo APR which will have 64 analog channels and 128 digital channels.

The APR channels are notified as following :

A0:01:ANAL1 (**A**:Analog, **0:01** Apr n°**0** Analog channel **01**)

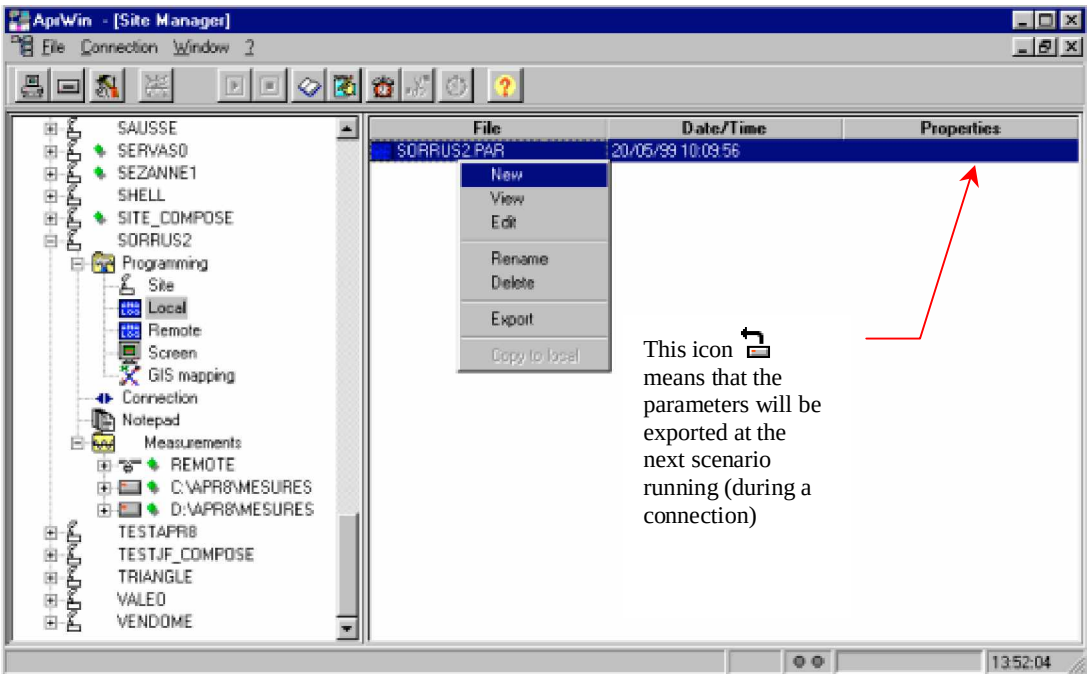
L0:01:LOG1 (**L**:Digital, **0:01** Apr n°**0** Digital channel **01**)

<u>Abseil</u> : The site is said "Single" if it is consisted of a single APR and "Composed" of several APR.

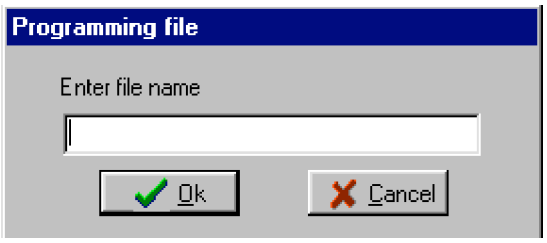
Creating of parameters

Select the concerned site and click *Programming/Local*. Move your mouse into the right part of the window and click the right button.

The following menu appears :



Click *New* then enter a name of parameters and type parameters.



If the site is not created, it is necessary to create it by using *Creating of a site* see page 23.

<u>Caution</u> : The name of the parameters must be the same that the site name using for SANDRA.

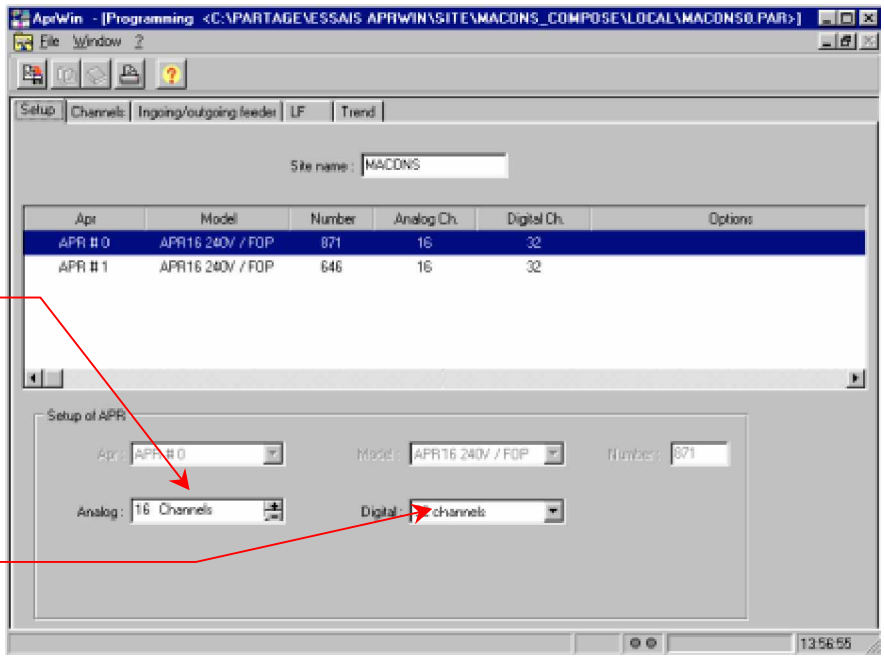
General parameters (Setup tab)

The first tab of the Screen parameters (Setup) corresponds to the site setup. In this window, the number of analog channels and the number of digital channels to be measured must be selected.

Number of analog channels to be measured

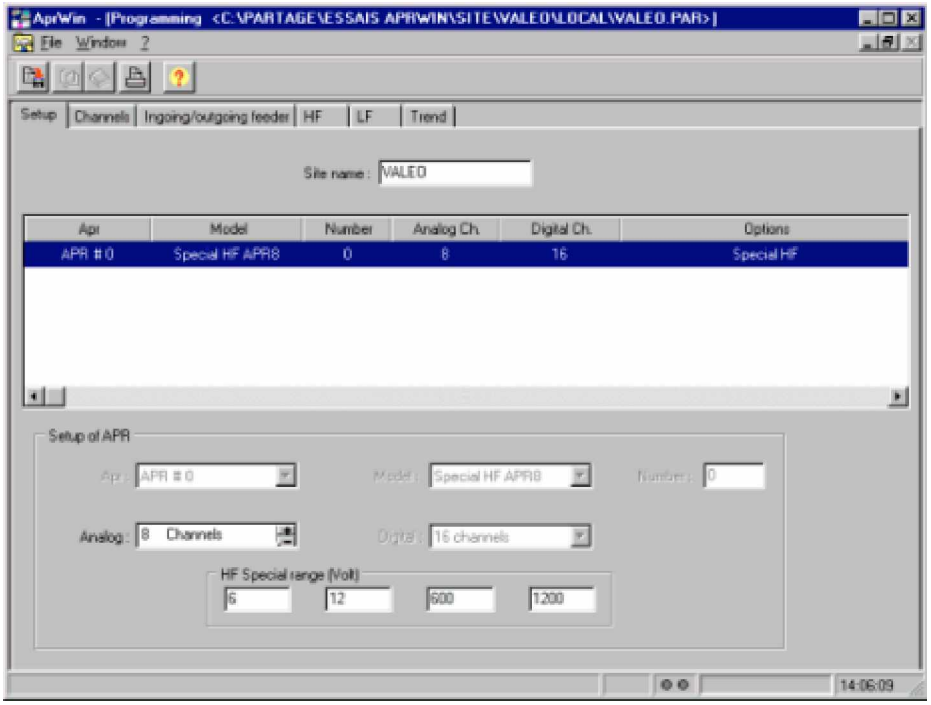
Number of digital channels :

16 or 32 for the APR8
16, 32 or 64 for the APR16
4 for the APR4u4i



Site parameters

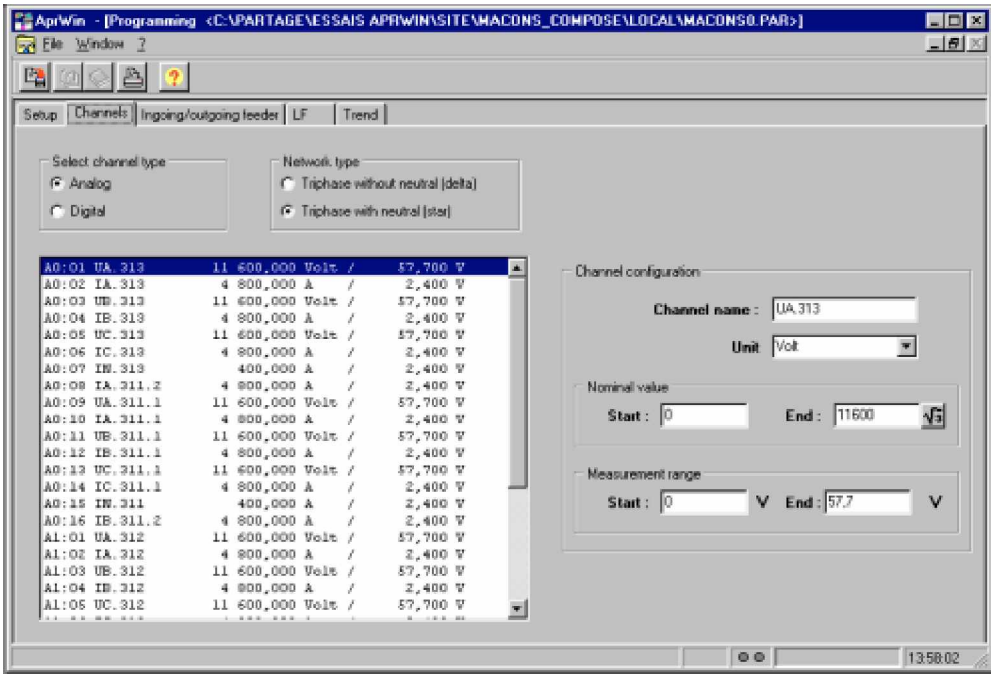
If the APR is equipped with a customer HF card, 4 ranges (in volt) must be entered.



Setup of an APR equipped with a customer HF card

Parameters of the analog channels (Channels tab)

Each APR analog channel must be defined by its name, an unity, a nominal value (measured value) and a sensor scale (Value set in the APR).



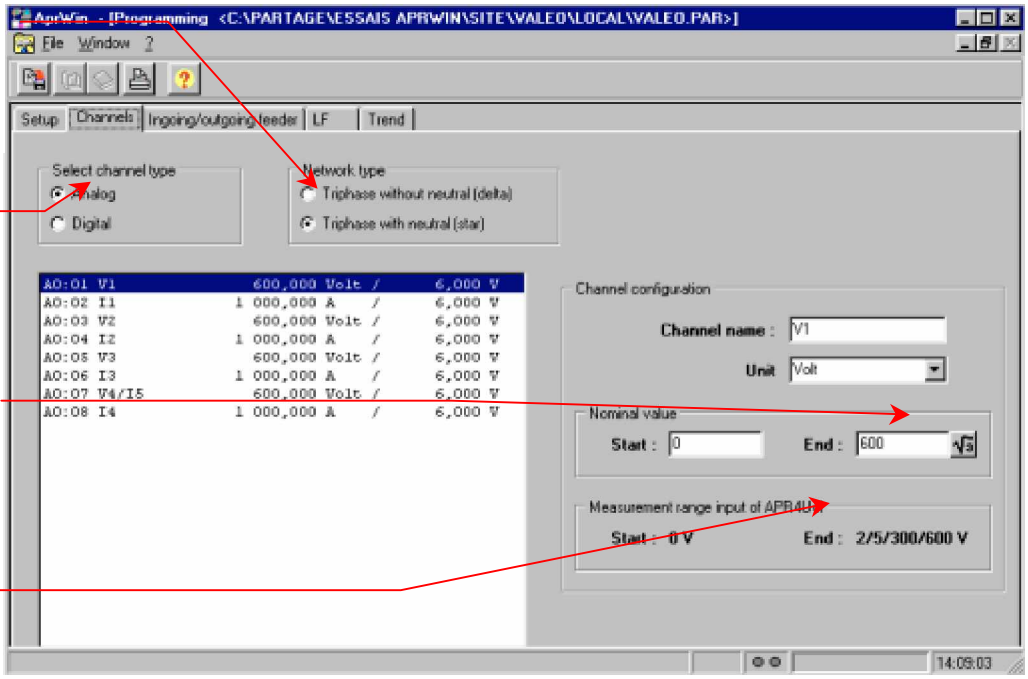
APR 8 or APR16 analog channel parameters

Select the network type (the calculations of powers will be depend on))

Click here to select the analog channels

Allows to calculate the single voltage from the composed voltage

The sensor scale of the APR4u4i can not be set.
The nominal value must be adjusted (see example following pages)



APR4u4i analog channel parameters

To copy a (analog or digital) channel, select it and click the right button then *Copy*. Select another channel and then *Right button/Paste*. Do not forget to rename the channel after copying (A channel which has been not renamed is notified by an *).

Advice : As possible, always work with a triphased network with neutral if the neutral is available. In the triphased mode without neutral, you can not get singlephased powers, Pos/Neg/Zero sequence components and harmonic powers.

APR8 and APR16 600V

The analog inputs are equipped with 2 ranges of measurements : from 0 to 600 volts/rms. The range is automatically switched according to the set values.

APR16 240V

The analog inputs are equipped with 2 ranges of measurements : from 0 to 2.4 volts/rms and from 0 to 240 volts/rms. The range is automatically switched according to the set values.

APR16 avec BFOP

The values of the end of sensor scale for current channels must be set with 2.4V.

APR4u4i

The analog inputs are equipped with 2 ranges of measurements :

From 0 to 2 V or from 0 to 5V for currents

From 0 to 300V or from 0 to 600V for voltages

The range is switched by means of a switch located in front of the APR4u4i.

Caution : Never set a value upper than the range.

Example : If a end of sensor scale is set on 10V, the APR8 will be on 600V range. 10V will be measured on a full scale of 600V (you will get a bad accuracy).

Examples of parameters :

Direct voltage input (230V) on the APR8 (from 0 V to 600 V)

Unity	VOLT
Nominal value	0.00 → 230.00
Sensor scale	0.00 → 230.00V

Input by means of an 20000 V / 100 V voltage transformer on the APR16 (in single voltage)

Unity	VOLT
Nominal value	0.00 → 11547 (20000/√3)
Sensor scale	0..00 → 57,7V (100/√3)

Note : Never indicate voltages in kV (the calculated powers would be uncorrect).

Measurement of current from an 500 Amp/5 Amp clamp-on current prob on the APR8

In that case the current/voltage adaptor unit must be used (ref -PE-ADAPT-I).

Plug the connector on the 5 A input of the unit and the output of the unit (5 V) on the input of the APR.

Unity	A
Nominal value	0.00 → 500
Sensor scale	0.00 → 5V

Measurement of current a 400 Amp / 5 A CT with a B8TC unit (scale 15A/2V) on the APR16

Unity	A
Nominal value	0.00 → 1200 (400 x 15/5)
Sensor scale	0.00 → 2V

Measurement of current from a 400 Amp/5 A CT with a B8TC unite (scale 5A/2V) on the APR16

Unity	A
Nominal value	0.00 → 400
Sensor scale	0.00 → 2V

Measurement of current from a 400 Amp/5 A CT with a BFOP unit set on 20A

Unity	A
Nominal value	0.00 → 1600 (400 x 20/5)
Sensor scale	0.00 → 2.4V

The programming of the end of scale is particular for the APR4U4I . Indeed the end of sensor scale (APR4U4I input) can not be set (Fixed by means of switches of range)

Example :

1) Transfo 20000V /100V (Input in single voltage 57.7)

- Switch on 300V position
- Nominal value (20000V / √3) x (300/57.7) equal to 60036V

2) Current transformer of 800A/5A with an 5A/5V measurement unit

- Switch on 5V position
- Nominal value 800A

Channels have be **imperatively** set as following, to run power measurements :

Channels 1, 3, 5, 7 : Voltages

Channels 2, 4, 6, 8 : Currents

If the APR is equipped with 16 analog channels :

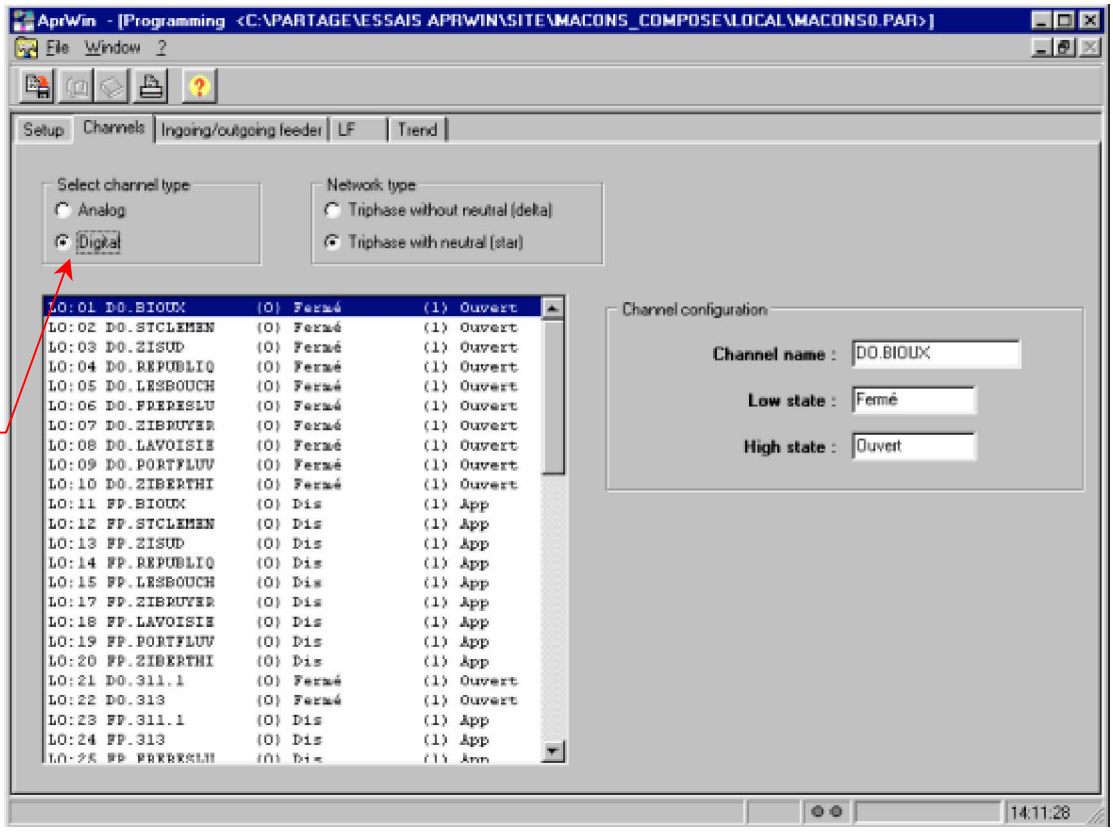
Channels 9, 11, 13, 15 : Voltages

Channels 10, 12, 14, 16 : Currents

Parameters of digital channels (Channels tab)

Each digital channel of the APR must be defined by its name, the name of the low status and the name of the high status.

Click here to select digital channels



Parameters of digital channels

Advices :

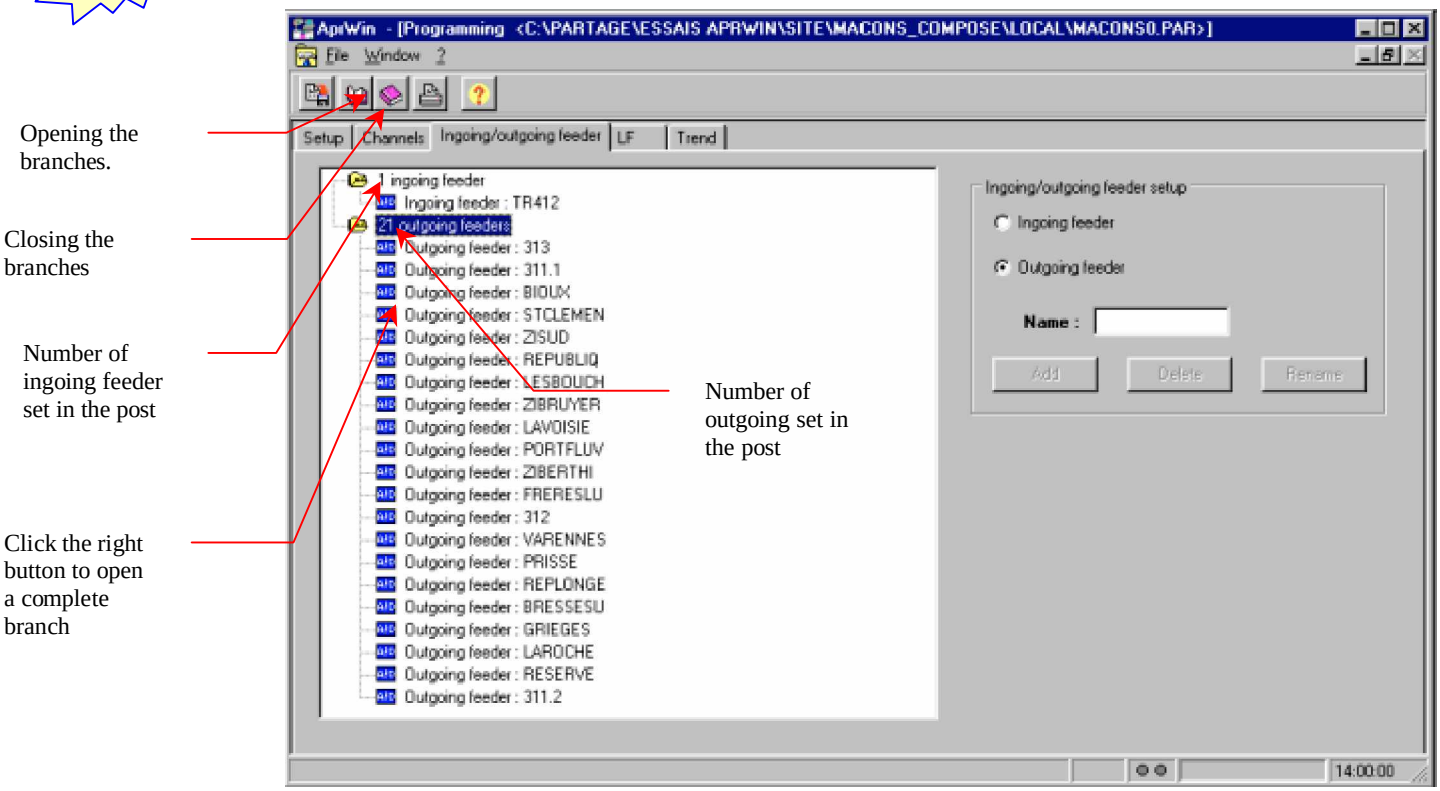
To use SANDRA, set the digital channels as following :

DO.Outgoing	Circuit breaker opened	State0=CLOSE	State1=OPEN
DO.Ingoing			
FP.Outgoing	Operating protection		
SH.Outgoing	Operating Shunt		
SA.Outgoing	Operating Shunt pole A		
SB.Outgoing	Operating Shunt pole B		
SC.Outgoing	Operating Shunt pole C		
EP.Outgoing	Operating EPATR		
TI.Outgoing	Instant earth		
AR.Outgoing	Fast autorization		

Parameters of Ingoing and outgoing feeders

New

The parameters of ingoing/outgoing feeders is used for the SANDRA automatic analysis software. It allows to declare the setup of the site to be controlled.



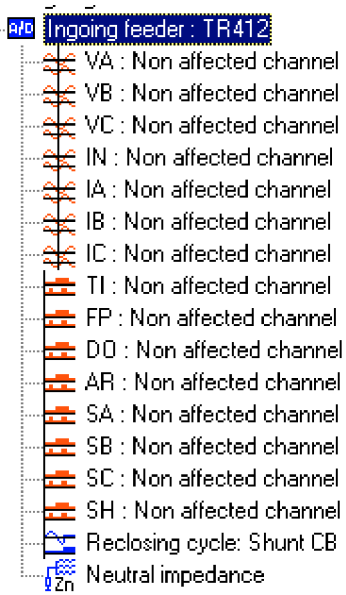
Parameters of ingoing and outgoing feeders

Click Ingoing or Outgoing feeders, enter the name and click *Add* to add an ingoing or an outgoing feeder.

Select the concerned ingoing or outgoing feeder and press *Delete* or *Rename* to delete or to rename an ingoing or an outgoing feeder.

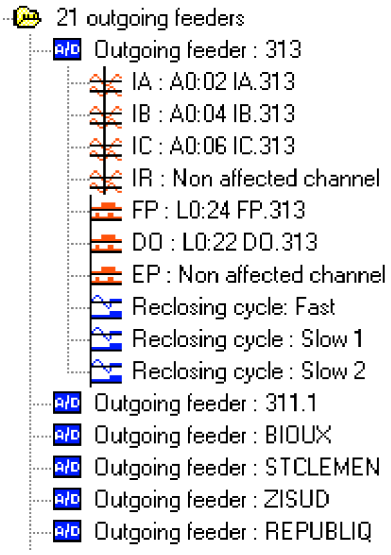
Ingoing/Outgoing feeders will also be used in the screen parameters (group of analog and digital channels), see page 59.

Programming of an ingoing :



VA, VB, VC	Voltages of the ingoing (compulsory for SANDRA)
IA, IB, IC	Currents of the ingoing
In	Neutral Current of the transformer (compulsory)
TI	Instant Earth
FP	Operating protection (compulsory)
DO	Circuit breaker opened (Compulsory)
AR	Fast autorisation
SA,SB,SC	Operating SHUNT Pole A B C
SH	Operating SHUNT
SHUNT reused	
Impedance of neutral	

Programming of an outgoing feeder :



IA, IB, IC	Currents of the outgoing feeder
IR	Zero sequence current (residual current of the outgoing feeders)
FP	Operating protection (compulsory for SANDRA)
DO	circuit breaker opened (compulsory for SANDRA)
EP	EPATR
Fast closing cycle	
Slow 1 reclosing cycle	
Slow 2 reclosing cycle	

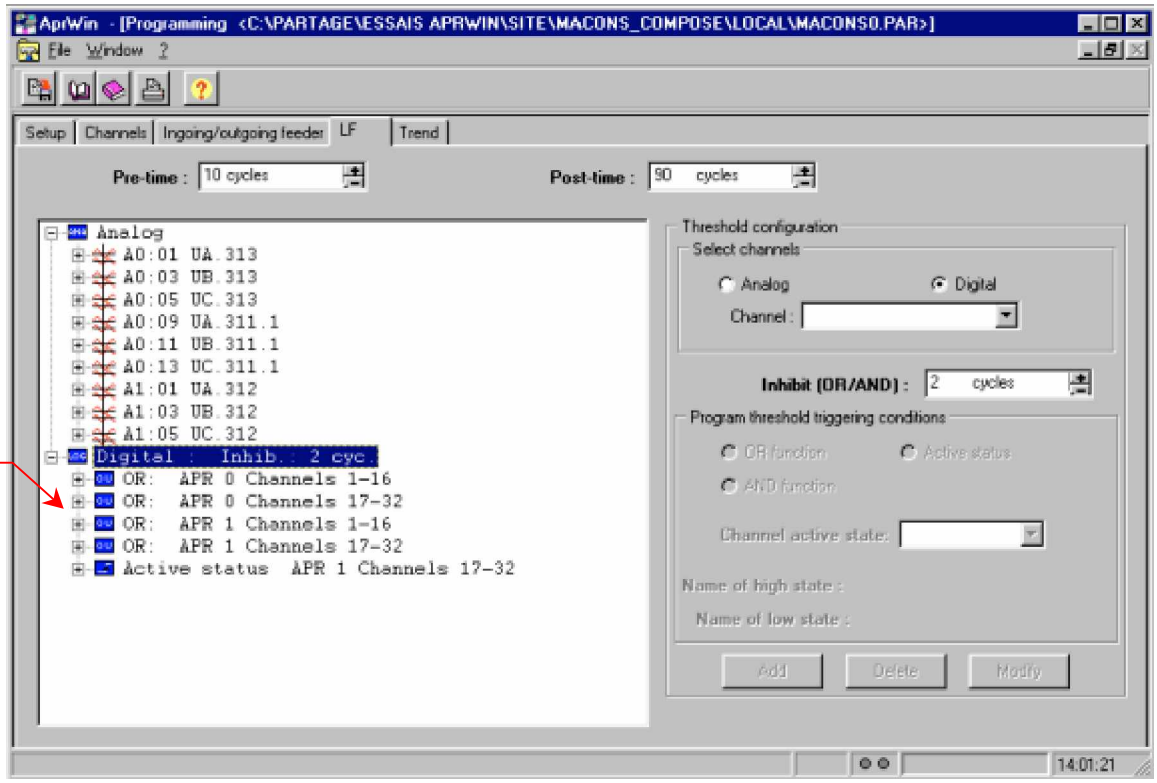
LF parameters (LF tab)

Thresholds on the analog and digital channels are displayed on tree which the main branches are *Analog* and *Digital*.

To add channels and thresholds, move the cursor at the good place in the tree, select the channel and the threshold to be added, enter values and click *Add*.

To delete a channel or a threshold, proceed in the same way and press the *Del* key.

The digital channel n°16 can not be set (synchro of a composed site)



Parameters of thresholds in LF mode

Durations (pre-time, post-time, inhibition, and duration of the relative threshold) are always given in number of cycles (the cycle is equal to 20ms in case of a 50 Hz network).

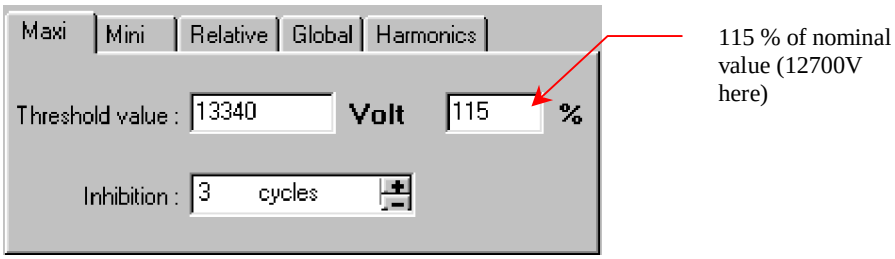
<u>Advices</u> :

The pre-time must be always set to 10 cycles, the post-time must be set to 90 cycles for using SANDRA.

Parameters of the analog channels

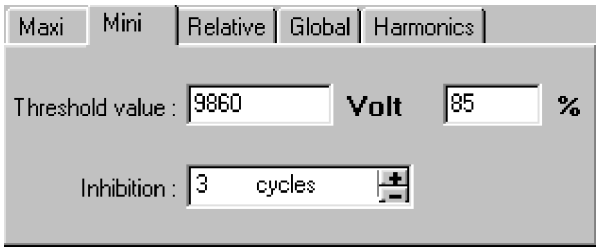
The analog channels can be set to trigger on a maxi threshold, a mini threshold, a relative threshold (slope) and a threshold on the rate of harmonic distortion (Global harmonic) and several thresholds on harmonic numbers.

The maxi threshold can be entered in value or in percentage according to nominal value (End of value scale)



Maxi threshold

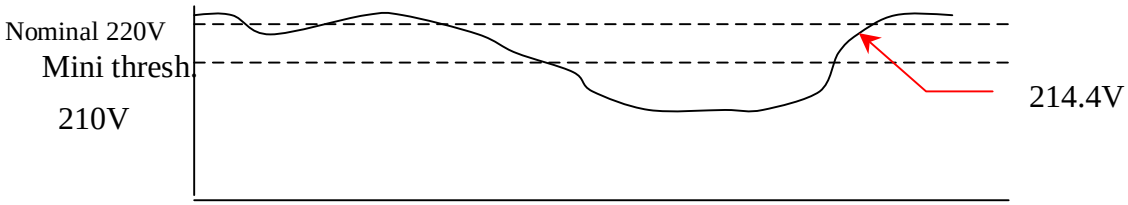
The mini threshold can be entered in value or in percentage according to nominal value (End of value scale)



Mini threshold

Triggering on maxi/mini threshold is subjected in a hysteresis of 2 % of nominal value on the APR8/APR16 and 1 % on the APR4u4i. This hysteresis avoids the APR continually triggering if the measured value is close to the set threshold.

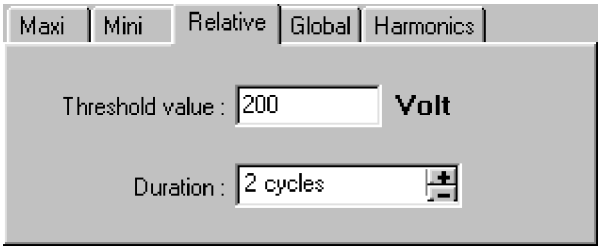
<u>Example (with an 220V nominal voltage)</u> :



Hysteresis for an APR8/APR16 : 220 x 2% = 4.4V

The threshold is rearmed when voltage reaches 210V (mini threshold) + 4.4V so 214.4V

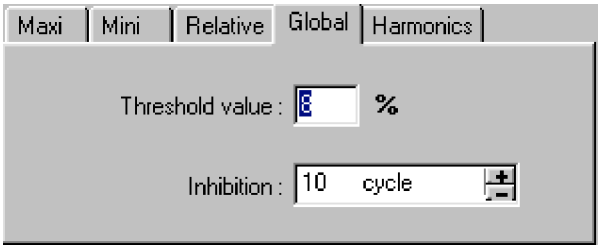
The relative threshold must be entered in value. This threshold is valid in positive or in negative mode.



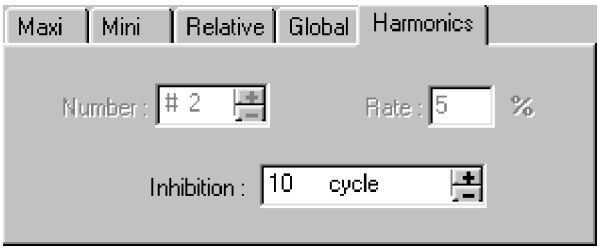
Parameters of the relative threshold (pente)

The relative threshold is used to detect fast variations of signal.

Example : Evolution of the current.



Parameters of the global harmonic ratio



Parameters of thresholds on the harmonic numbers

Advices :

- Avoid to set thresholds on the current harmonics.
- Set always an important inhibition (10 or 20 cycles) to avoid to trigger on transient phenomena.

- Harmonics can disturb only if they are kept during a long time (Because they cause heatings of the reels of transformers or engines)

Parameters of the digital channels

Advice : To supervize protections : use the "OR" command

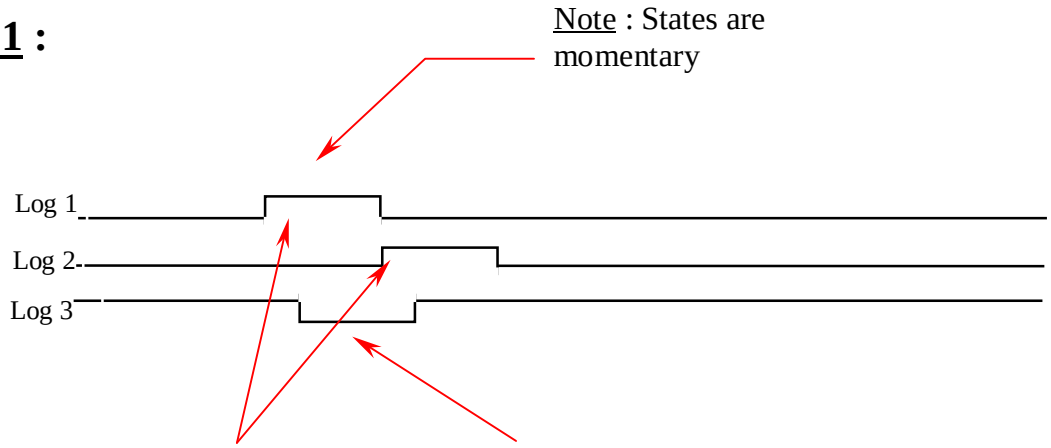
To supervize circuit breakers : use the "active status" command

Notes :

-After a first triggering on the OR mask, all the digital channels having contributed to this triggering must **return to the inactive state** to allow a later triggering on the same mask.

-After a first triggering on the AND mask, at least one of the channels having contributed to this triggering must **returns to the inactive state** to allow a later triggering on the same mask.

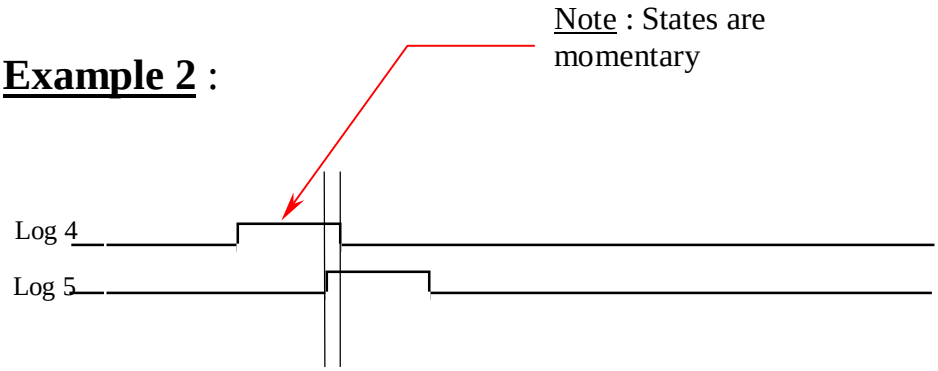
Example 1 :



To "trap" the status 1 of the digital channels (1 , 2) or the status 0 of the channel 3, the following command must be set :

Function OR 1:High status **OR** 2:High status **OR** 3:Low status

Example 2 :



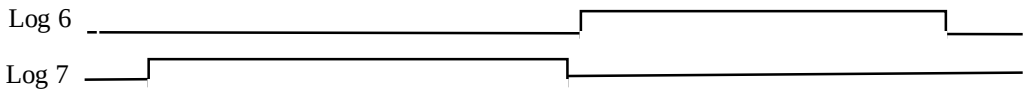
To "trap" the moment when channels 4 and 5 are simultaneously in the high status, the following command must be set :

Function AND : 4:High status **AND** 5:High status

Note : Do not set an inhibition in that case, not to mask a triggering.

Example 3 :

Note : States can be permanent
(Case of circuit breakers)



To "trap" the moment when channels 6 or 7 are in the high status, the following command must be set :

Function ″Active forehead ″ : 6:High status **OR** 7:high status

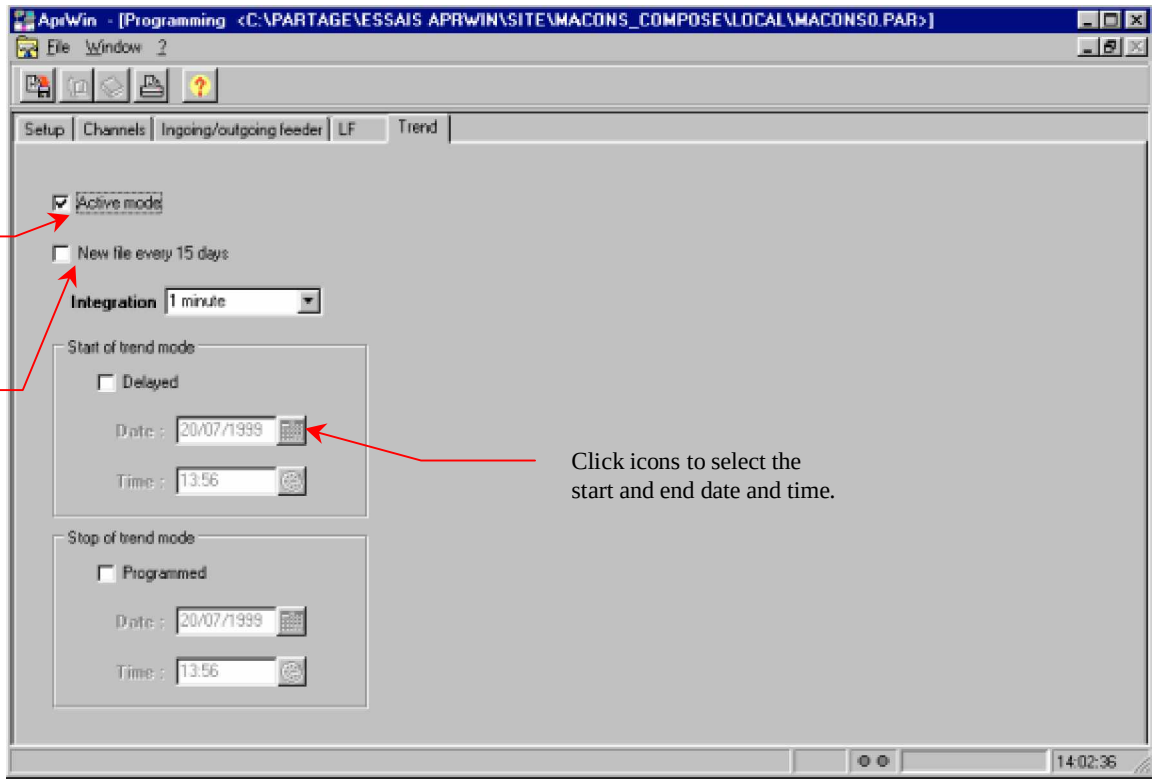
If the states of the digital channels could be permanent (circuit breakers), you have to set a "Active forehead", otherwise a permanent active state of a digital channel would lock the triggering.

Note : There is no inhibition when using the "active status" function.

Trend parameters (Trend tab)

Click here to activate trend measurements

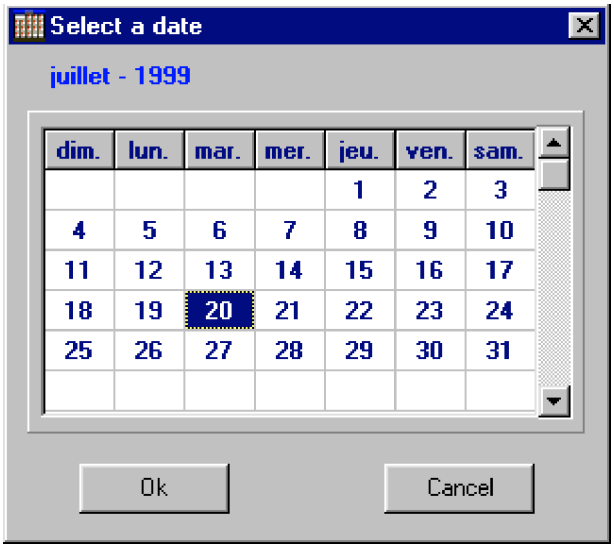
If this box is checked, trend mode does not work any more in mode cycling on 15 days but generates a new file every 15 days.



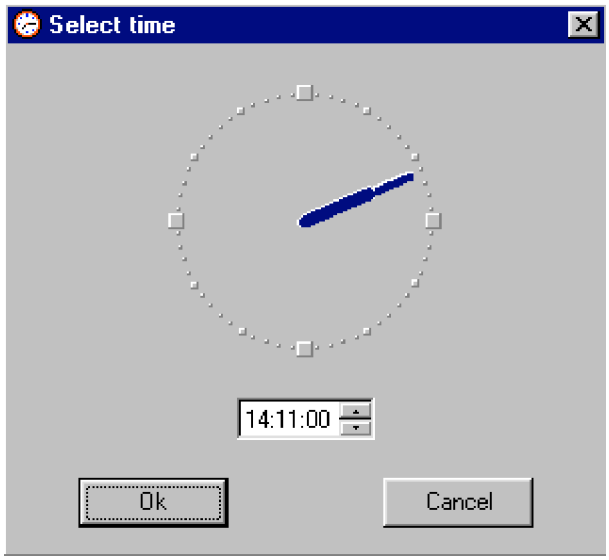
Click icons to select the start and end date and time.

Parameters of the trend mode

Starting up and the end of the trend software can be set. This option is not compatible with the *New file every 15 days* mode *(Not cycling mode)*.



Choice of date



Choice of time

Caution :

- A measurement integrated over 1 minute and on 16 channels takes 1 Mb a day.
- A measurement integrated over 10 minutes and on 16 channels takes 100Ko a day.

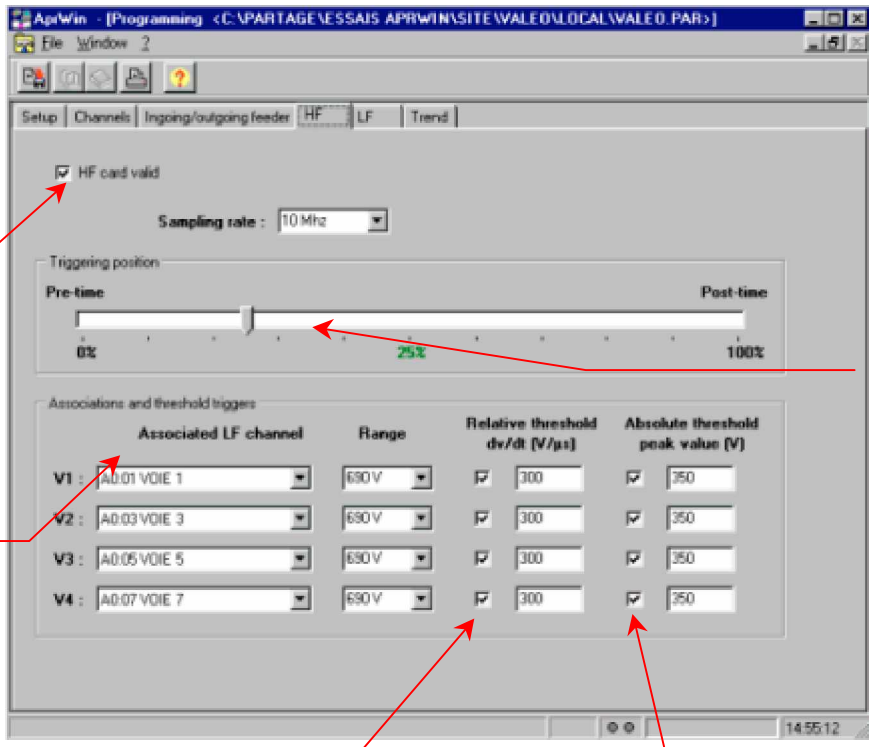
To avoid a lot of information volumes, avoid to record measurements integrated over 1 minute if they are not usable for you.

HF parameters (HF tab)

If the APR8 is equipped with a HF card, you can access to the parameters.

Check the box to use the card

Association of LF links to HF links



Parameters of the HF card

The pre time and post time adjustment is done in % according to the available memory size.

Validation of the relative threshold (slope) channel by channel

Validation of the absolute threshold channel by channel

-The dv/dt allows to trigger whatever the position of the disturbance.

-Amplitude triggers only if the disturbance exceeds some peak value.

Programmable minimal values of the thresholds Frequency 1MHz				
Range	**690 V**	**1500 V**	**3000 V**	**6000 V**
Amplitude	**69 V**	**150 V**	**300 V**	**600 V**
dV/dt	**22 V/µs**	**47 V/µs**	**94 V/µs**	**188 V/µs**

Programmable minimal values of the thresholds Frequency 2MHz				
Range	**690 V**	**1500 V**	**3000 V**	**6000 V**
Amplitude	**69 V**	**150 V**	**300 V**	**600 V**
dV/dt	**44 V/µs**	**94 V/µs**	**188 V/µs**	**376 V/µs**

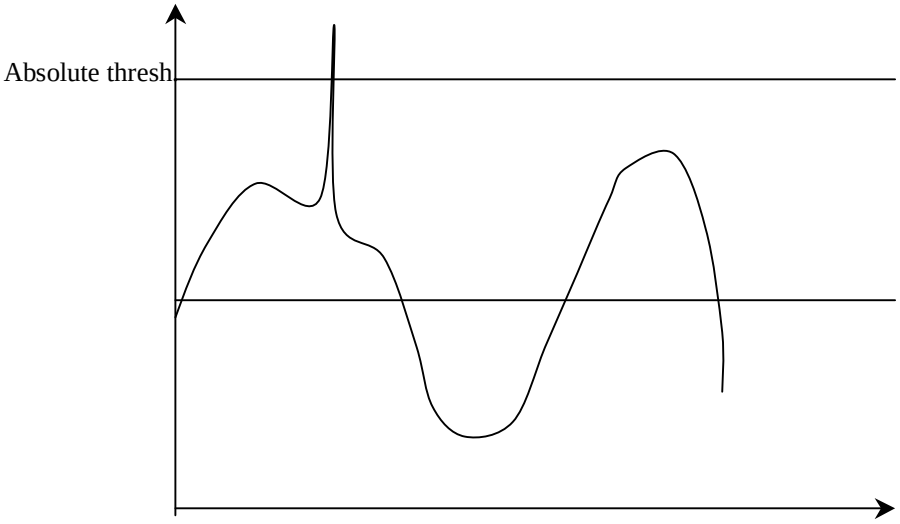
Programmable minimal values of the thresholds Frequency 5MHz				
Range	**690 V**	**1500 V**	**3000 V**	**6000 V**
Amplitude	**69 V**	**150 V**	**300 V**	**600 V**
dV/dt	**110 V/µs**	**235 V/µs**	**470 V/µs**	**940 V/µs**

Programmable minimal values of the thresholds Frequency 10MHz				
Range	**690 V**	**1500 V**	**3000 V**	**6000 V**
Amplitude	**69 V**	**150 V**	**300 V**	**600 V**
dV/dT	**220 V/µs**	**470 V/µs**	**940 V/µs**	**1880 V/µs**

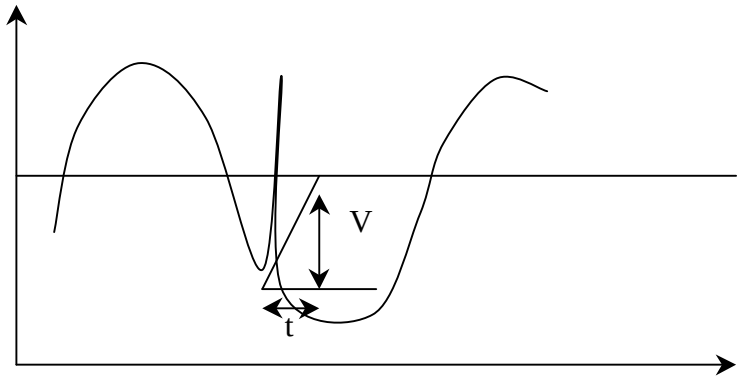
The software checks that entered values are correct and according to values above.

Example of parameters :

To "trap" a disturbance which destroys surge absorber, use the absolute threshold (set a peak value).



Use the dv/dt (or slope) to "trap" a disturbance which causes the dysfunctionning of a computer without stopping by surge absorber.

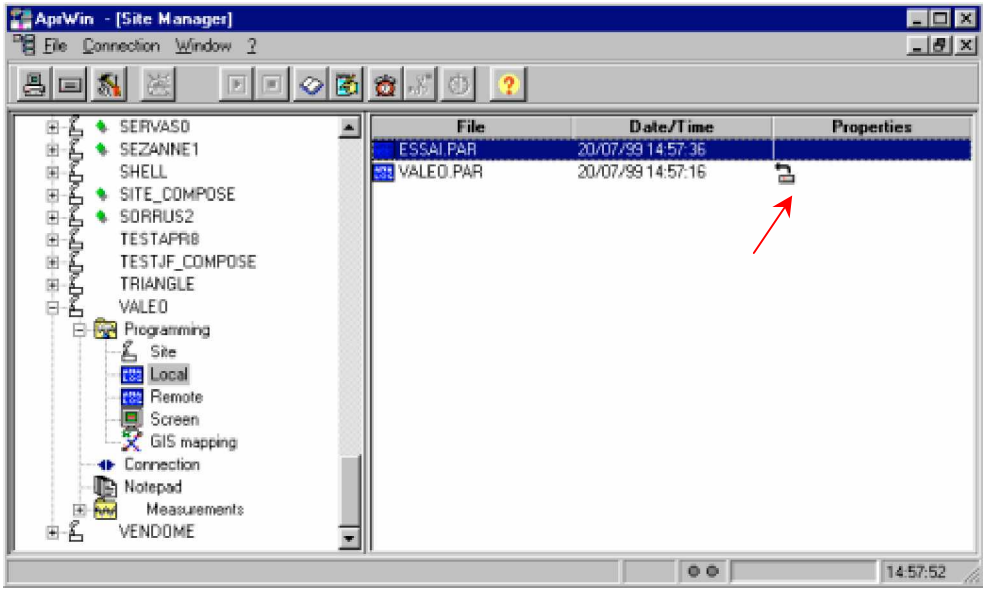


The amplitude of the disturbance does not exceed the defined thresholds. But its raising time is very brief and can cause a dysfunctionning of a computer.

<u>Note</u> : If the calibre can not be defined (690V, 1500V, 3000V, 6000V), channels can be linked in parallel mode and select a different scale for each channel.

Export of parameters towards an APR

When the APR parameters was created on the PC (One or several xxx.PAR files are created), mark parameters "*To be exported*" in the site manager. Then, the icon appears in front of the file.



Export of the parameters towards the APR

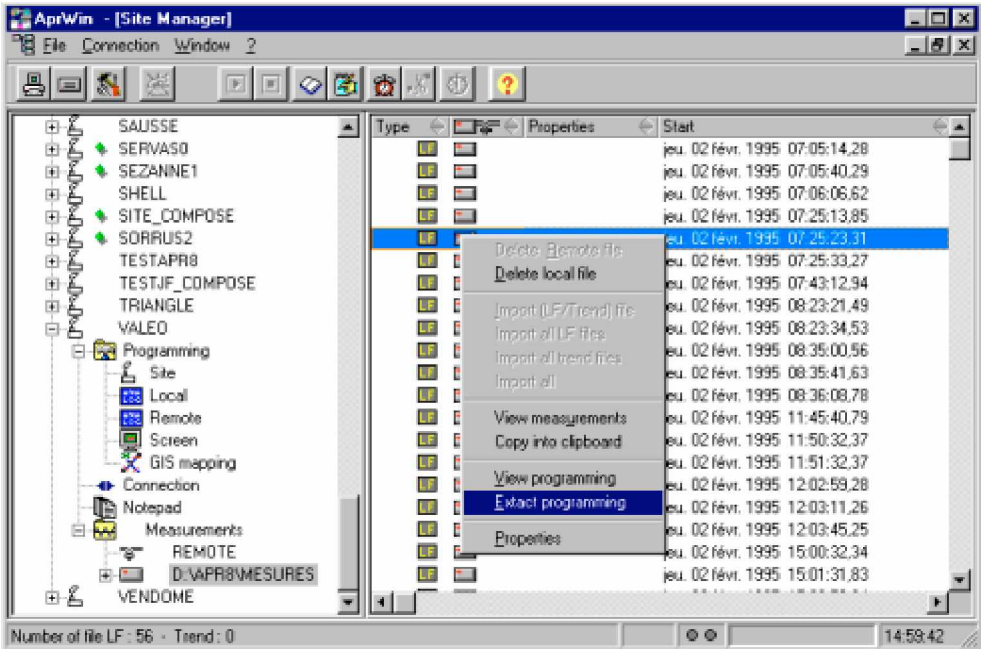
The TEST2.PAR file of the EOLIENNE site will be exported towards the APR during the next connection (during the running of the scenario).

If an immediate export of the parameters is wished, click the icon to start the scenario.

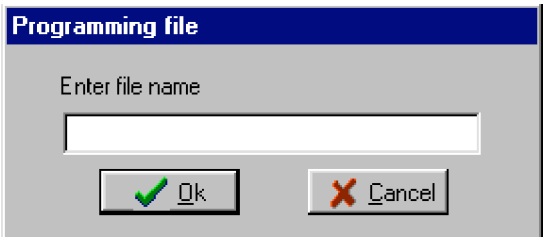
Extract programming

Each LF measurement file contains the parameters which served for generating it. A file of parameters can be recreated from a measurement file.

The list of measurement files has to be displayed, press the right button of the mouse and ask *Extract programming* option. After typing the name of the new file, this one is stored in the *PROGRAMMING / LOCAL* branch.



Extract of measurement file programming



Enter file name

<u>Note</u> : It is not possible to extract the programming of a "trend" file

Printing of a programming

Display or edit the programming and click the icon for printing a programming.

The following pages give an example of the printing of the programming.

<u>Advice</u> : It is advised to print the programming of each site (notably when SANDRA is used)

Printing of the site programming

Printed 26/07/1999 at 10:13:05

Site setup

```
Site name ...... : NOUETTE
File name ....... : C:\PARTAGE\ESSAIS APRWIN\SITE\NOUETTE_COMPOSE\LOCAL\NOUETTEO.PAR

Pre-time ..... : 10 cycles
Post-time..... : 90 cycles
Triphase .... : With neutral (star)

List of associated GIS mapping files :
    C:\APR8\MESURES\NOUETTEO.SIT\MAILLY.GDO at 18/02/97
    C:\APR8\MESURES\NOUETTEO.SIT\NOGENT.GDO at 05/01/98
    C:\APR8\MESURES\NOUETTEO.SIT\TAISSY.GDO at 13/01/98

List of associated GIS mapping files :
    D:\APR8\MESURES\NOUETTEO.SIT\MAILLY.GDO at 18/02/97
    D:\APR8\MESURES\NOUETTEO.SIT\LUDES.GDO at 18/02/97
    D:\APR8\MESURES\NOUETTEO.SIT\BEAUMONT.GDO at 15/12/97
    D:\APR8\MESURES\NOUETTEO.SIT\NOGENT.GDO at 05/01/98
    D:\APR8\MESURES\NOUETTEO.SIT\TAISSY.GDO at 13/01/98

Sandra FAX .... : 1234567

Phone Nbr ..... : 03456782
```

Apr	Model	Number	Analog Ch.	Digital Ch.	Options	Special HF ranges
APR # 0	APR16 240V / FOP	1	16	32		
APR # 1	APR16 240V / FOP	2	16	32		
APR # 2	APR16 240V / FOP	3	16	32		
APR # 3	APR16 240V / FOP	4	16	32		

Printing of the programming of analog channels

Printed 26/07/1999 at 10:13:05

Analog channel setup

Site name ..... : NOUETTE
File name ..... : C:\PARTAGE\ESSAIS APRWIN\SITE\NOUETTE_COMPOSE\LOCAL\NOUETTEO.PAR

Measurement scale = nominal value
Input scale = Value entered into the APR

Name	Unit	Measurement range Beginning	Measurement range End	Input range Beginning	Input range End
A0:01 VA.RAME1	Volt	0	20000	0	100,000
A0:02 IA.RAME1	AMP	0	4800	0	2,400
A0:03 VB.RAME1	Volt	0	20000	0	100,000
A0:04 IB.RAME1	AMP	0	4800	0	2,400
A0:05 VC.RAME1	Volt	0	20000	0	100,000
A0:06 IC.RAME1	AMP	0	4800	0	2,400
A0:07 VN.RAME1	Volt	0	20000	0	100,000
A0:08 IN.RAME1	AMP	0	400,000	0	2,400
A0:09 IR.BEAUMONT	AMP	0	1600	0	2,400
A0:10 IA.BEAUMONT	AMP	0	1600	0	2,400
A0:11 IB.BEAUMONT	AMP	0	1600	0	2,400
A0:12 IC.BEAUMONT	AMP	0	1600	0	2,400
A0:13 IR.MAILLY	AMP	0	1600	0	2,400
A0:14 IA.MAILLY	AMP	0	1600	0	2,400
A0:15 IB.MAILLY	AMP	0	1600	0	2,400
A0:16 IC.MAILLY	AMP	0	1600	0	2,400

Printing of the programming of analog triggerings

Printed 26/07/1999 at 10:13:05

Analog channels threshold setup

Site name ..... : NOUETTE
File name ..... : C:\PARTAGE\ESSAIS APRWIN\SITE\NOUETTE_COMPOSE\LOCAL\NOUETTE0.PAR

Name	Maxi threshold Value	Maxi threshold Inhibition	Mini threshold Value	Mini threshold Inhibition	Relative threshold Value	Relative threshold Duration	Global harmonic Value	Global harmonic Inhibition
A001 VA.RAME1			11180	2 Cycle				
A002 IA.RAME1								
A003 VB.RAME1			11180	2 Cycle				
A004 IB.RAME1								
A005 VC.RAME1			11180	2 Cycle				
A006 IC.RAME1								
A007 VN.RAME1								
A008 IN.RAME1								
A009 IR.BEAUMONT								
A010 IA.BEAUMONT								
A011 IB.BEAUMONT								
A012 IC.BEAUMONT								
A013 IR.WALLY								
A014 IA.WALLY								
A015 IB.WALLY								
A016 IC.WALLY								
A101 VA.RAME2			11180	2 Cycle				
A102 IA.RAME2								
A103 VB.RAME2			11180	2 Cycle				
A104 IB.RAME2								
A105 VC.RAME2			11180	2 Cycle				
A106 IC.RAME2								
A107 VN.RAME2								
A108 IN.RAME2	5,000	0 Cycle						
A109 IR.NOGENT								
A110 IA.NOGENT								
A111 IB.NOGENT								
A112 IC.NOGENT								
A113 IR.N46								
A114 IA.N46								
A115 IB.N46								
A116 IC.N46								
A201 VA.RAME3			11180	2 Cycle				
A202 IA.RAME3								
A203 VB.RAME3			111800	2 Cycle				
A204 IB.RAME3								
A205 VC.RAME3			11180	2 Cycle				
A206 IC.RAME3								
A207 VN.RAME3			11180	2 Cycle				
A208 IN.RAME3								
A209 IR.LUDES								
A210 IA.LUDES								
A211 IB.LUDES								
A212 IC.LUDES								
A213 IR.TANGY								
A214 IA.TANGY								
A215 IB.TANGY								
A216 IC.TANGY								
A301 VA.RAME4			11180	2 Cycle				
A302 IA.RAME4								
A303 VB.RAME4			11180	2 Cycle				
A304 IB.RAME4								
A305 VC.RAME4			11180	2 Cycle				
A306 IC.RAME4								
A307 VN.RAME4			11180	5 Cycle				
A308 IN.RAME4								
A309 IR.REG 072								
A310 IA.REG 072								
A311 IB.REG 072								
A312 IC.REG 072								
A313 IR.REG 073								
A314 IA.REG 073								
A315 IB.REG 073								
A316 IC.REG 073								

Printing of the programming of digital channels

Printed 26/07/1999 at 10:13:05

Digital channel setup

Site name ..... : NOUETTE
File name ..... : C:\PARTAGE\ESSAIS APRWIN\SITE\NOUETTE_COMPOSE\LOCAL\NOUETTEO.PAR

Name	Name of low state (0)	Name of high state (1)
L0:01 OU.DISJ 312	FERME	OUVERT
L0:02 SURINT 312	DISP	APP
L0:03 TER INS 312	DISP	APP
L0:04 TER TST 312	DISP	APP
L0:05 MAS TAB R1	FIN	DEBUT
L0:06 ENC POLES	OUVERT	FERME
L0:07 POLE A FERM	OUVERT	FERME
L0:08 POLE B FERM	OUVERT	FERME
L0:09 POLE C FERM	OUVERT	FERME
L0:10 AUT RAP R1	DISP	APP
L0:11 DEF POLY R1	DISP	APP
L0:12 OU.CONDB1	FERME	OUVERT
L0:13 PR.CONDB1	DISP	APP
L0:14 DEF GRADIN	DISP	APP
L0:15 OU.RESERVE		
L0:16 RES SYNCHRO		
L0:17 OU.AR812	FERME	OUVERT
L0:18 PR.AR812	DISP	APP
L0:19 DO.BEAUMONT	FERME	OUVERT
L0:20 FP.BEAUMONT	DISP	APP
L0:21 DO.MAILLY	FERME	OUVERT
L0:22 FP.MAILLY	DISP	APP
L0:23 OU.RESERVE	FERME	OUVERT
L0:24 PR.RESERVE	DISP	APP
L0:25 OU.RESERVE	FERME	OUVERT
L0:26 PR.RESERVE	DISP	APP
L0:27 OU.RESERVE	FERME	OUVERT
L0:28 PR.RESERVE	DISP	APP
L0:29 OU.RESERVE	FERME	OUVERT
L0:30 PR.RESERVE	DISP	APP
L0:31 OU.RESERVE	FERME	OUVERT
L0:32 RES SYNCHRO		

Printing of the triggerings on digital channels

Printed 26/07/1999 at 10:13:05

Digital triggering setup Apr 0

Site name ..... : NOUETTE
File name ..... : C:\PARTAGE\ESSAIS APRWIN\SITE\NOUETTE_COMPOSE\LOCAL\NOUETTE0.

Inhibit on digital channels (OR/AND) : 1 cycle

Name	OR (State)	AND (State)	OR (active status)
L0:01 OU.DISJ 312			
L0:02 SURINT 312			
L0:03 TER INS 312			1: APP
L0:04 TER TST 312			1: APP
L0:05 MAS TAB R1			1: DEBUT
L0:06 ENC POLES			
L0:07 POLE A FERM			
L0:08 POLE B FERM			
L0:09 POLE C FERM			
L0:10 AUT RAP R1			
L0:11 DEF POLY R1			
L0:12 OU.CONDB1			
L0:13 PR.CONDB1			
L0:14 DEF GRADIN			
L0:15 OU.RESERVE			
L0:16 RES SYNCHRO			
L0:17 OU.AR812			
L0:18 PR.AR812			
L0:19 DO.BEAUMONT	1: OUVERT		
L0:20 FP.BEAUMONT	1: APP		
L0:21 DO.MAILLY	1: OUVERT		
L0:22 FP.MAILLY	1: APP		
L0:23 OU.RESERVE			
L0:24 PR.RESERVE			
L0:25 OU.RESERVE			
L0:26 PR.RESERVE			
L0:27 OU.RESERVE			
L0:28 PR.RESERVE			
L0:29 OU.RESERVE			
L0:30 PR.RESERVE			
L0:31 OU.RESERVE			
L0:32 RES SYNCHRO	1:		

Printing of the programming of an ingoing feeder

Printed 26/07/1999 at 10:13:05

Ingoing/outgoing feeders Setup

```
Site name .... : NOUETTE
File name .. : C:\PARTAGE\ESSAIS APRWIN\SITE\NOUETTE_COMPOSE\LOCAL\NOUETTE0.PAR
Number of ingoing feeders : 4
Number of outgoing feeders : 11

IN ............ : transformer neutral current
TI ............ : Immediate Earth
FP ............ : Protection tripping
DO ............ : CB status
AR ............ : Fast authorization
SA ............ : Pole A of shunt CB close
SB ............ : Pole B of shunt CB close
SC ............ : Pole C of shunt CB close
SH ............ : Shunt CB tripping
```

Type / Parameters	Informations
Ingoing feeder	RAME2
VA	A1:01 VA.RAME2
VB	A1:03 VB.RAME2
VC	A1:05 VC.RAME2
IN	A1:08 IN.RAME2
IA	A1:02 IA.RAME2
IB	A1:04 IB.RAME2
IC	A1:06 IC.RAME2
TI	Non affected channelDelay: 0 ms
FP	Non affected channelDelay: 0 ms
DO	Non affected channelDelay: 0 ms
AR	Non affected channelDelay: 0 ms
SA	Non affected channelDelay: 0 ms
SB	Non affected channelDelay: 0 ms
SC	Non affected channelDelay: 0 ms
SH	Non affected channelDelay: 0 ms
Reclosing cycle: Shunt CB	Inactive
	Fault duration before shunt CB: 0 ms
	Shunt CB duration: 0 ms
Neutral resistance	0,0 Ohm
Neutral reactance	0,0 Ohm

Printing of the programming of an outgoing feeder

```
Printed 26/07/1999 at 10:13:05


IR ........... : 3Io Faulty current
FP ............ : Protection tripping
DO ............ : CB status
EP ............ : EPATR
```

Type / Parameters	Informations
Outgoing feeder	BEAUMONT
IA	A0:10 IA.BEAUMONT
IB	A0:11 IB.BEAUMONT
IC	A0:12 IC.BEAUMONT
IR	A0:09 IR.BEAUMONT
FP	L0:20 FP.BEAUMONT Delay: 0 ms
DO	L0:19 DO.BEAUMONT Delay: 0 ms
EP	Non affected channelDelay: 0 ms
Reclosing cycle: Fast	Inactive
	Fault duration before fast: 0 ms
	Fast duration: 0 ms
	Fault reapear time: 0 ms
Reclosing cycle : Slow 1	Inactive
	Slow duration: 0 ms
	Fault reapear time: 0 ms
Reclosing cycle : Slow 2	Inactive
	Slow duration: 0 ms
	Fault reapear time: 0 ms

Printing of the trend programming

Printed 26/07/1999 at 10:13:05

Trend setup

Site name ..... : NOUETTE
File name ..... : C:\PARTAGE\ESSAIS APRWIN\SITE\NOUETTE_COMPOSE\LOCAL\NOUETTE0.PAR

State of trend mode New file every 15 days Integration	Non valid Non valid 60 minutes
Delayed start	Non valid 22/07/1999 07:58
Programmed stop	Non valid 22/07/1999 07:58

Screen parameters

Information about screen parameters

The screen parameters allows to modify how information are displayed.

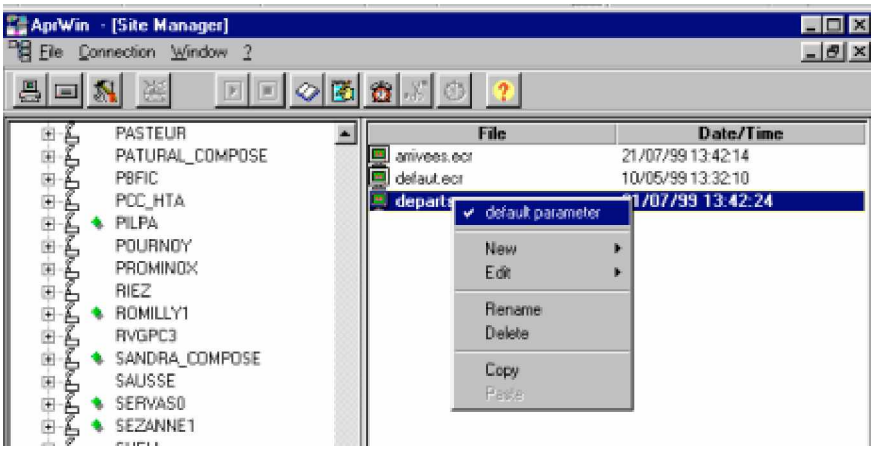
Example : To display voltage of the first channel in blue colour, or to display currents of a same channel in 3 different colours with a scale from 0 to 1500A.

The window is divided by channels in which curves (unities or values) or digital channels can be drawn.

Furthermore, several channels can be regrouped to form a group.

Example of group : Voltages, Ingoing feeder (3U In Ih), Outgoing feeder (3I +Ih) …

With the APRWIN software, each site has its own file of screen parameters. The user can have as many files of screen parameters as he wants.



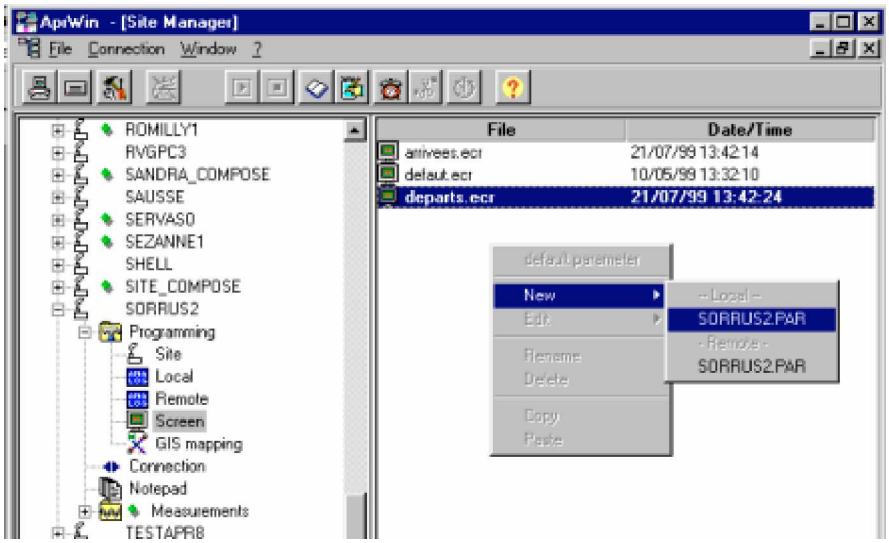
Screen parameters by default

In case of several screen parameters, the file of parameters by default has to be selected. The LF and trend measurements will be displayed by means of this file setup.

Creating of screen parameters

In the site manager (SITE/Programming/Screen branch), click in the right part of the window, press the right button and click *New* and then enter a name of screen file.

Then select the parameters from which you want to create the screen parameters (local or remote). Indeed, the screen parameters refers to the name of channels included in the parameter file.



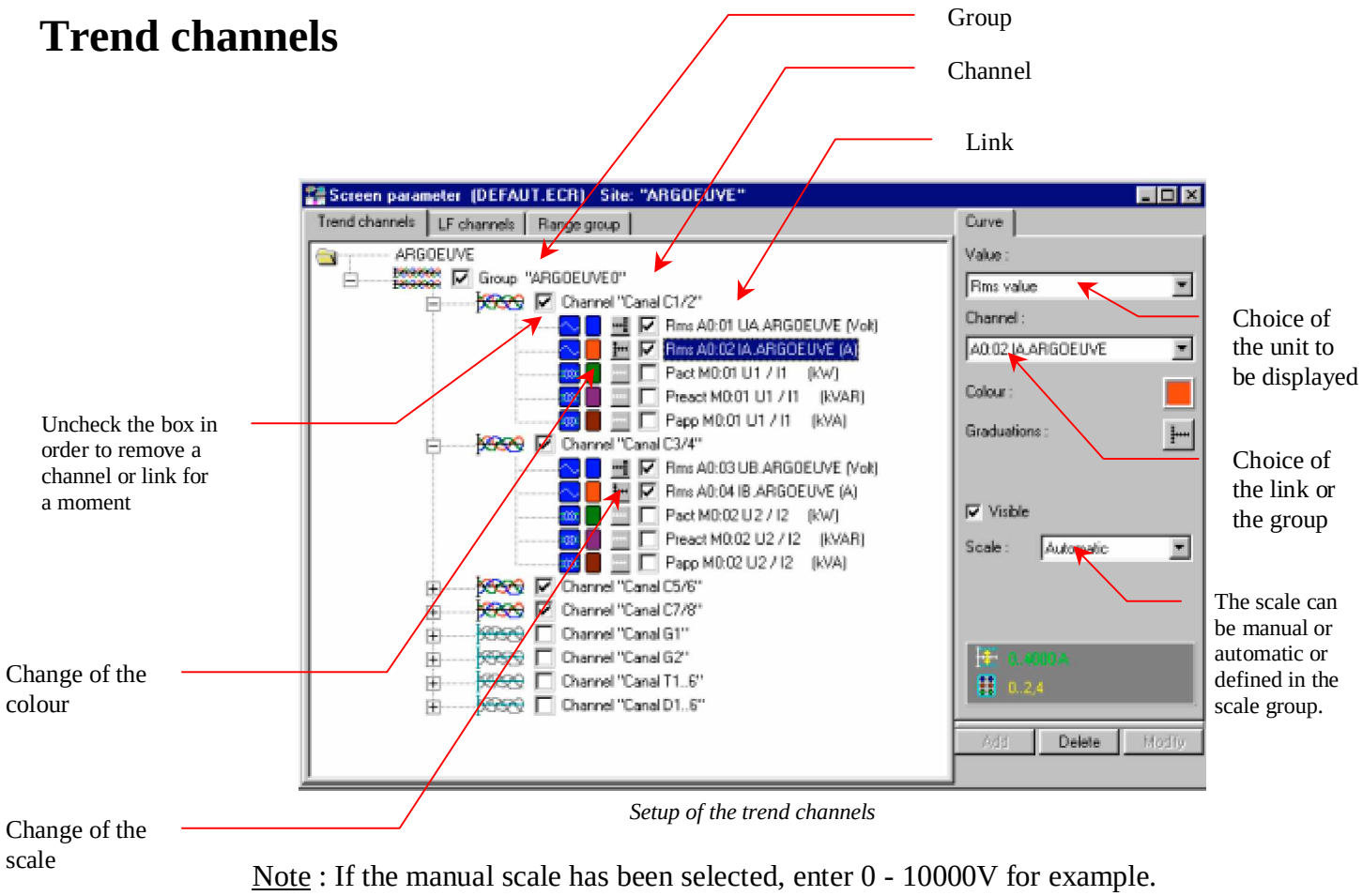
Creation of a screen parameters from the local or remote parameters

Notes :

Creating a screen parameters is impossible if there is no created local/remote parameters. Nevertheless, it will be possible to display LF or trend files, because a programming by default has been saved.

Several screen parameters for a same site can be also created. So, the same information will be displayed in a different way. (Example: parameters which regroups all the voltages of a channel and parameters which allocates one voltage to one channel)

Trend channels



Setup of the trend channels

<u>Note</u> : If the manual scale has been selected, enter 0 - 10000V for example.

Trend values are regrouped into a group (engine here) , and into channels (Voltages, Currents …)

<u>Several values are affected for each link</u> :

- : Rms value
- : Harmonics (of numbers from 2 to 63)
- : Global harmonic
- : Phase/Cosinus/Tangente
- : Singlephased power (Active/Reactive/Apparent)
- : Triphased power (Active/Reactive/Apparent) or Negative/positive/Zero sequence voltage

Another icon allows to select the scale :

: No displayed scale

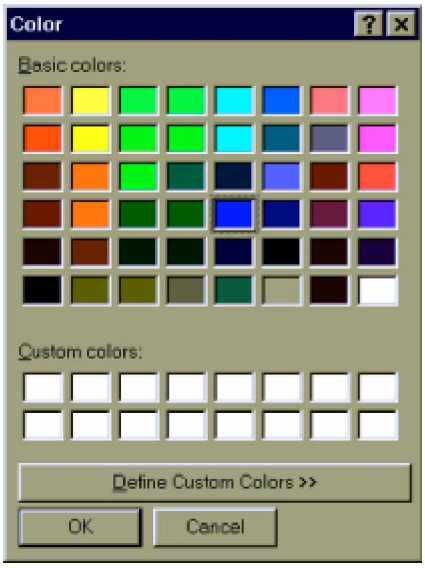
: Scale drawn to the left of the graph

: Scale drawn to the right of the graph

: Scale drawn to the right and to the left of the graph

Click the icon to change the displaying mode of the scale (successive choice of 4 possibilities).

Click the icon to modify the colour of the value. As you click you display the palette which allows to select the colour.



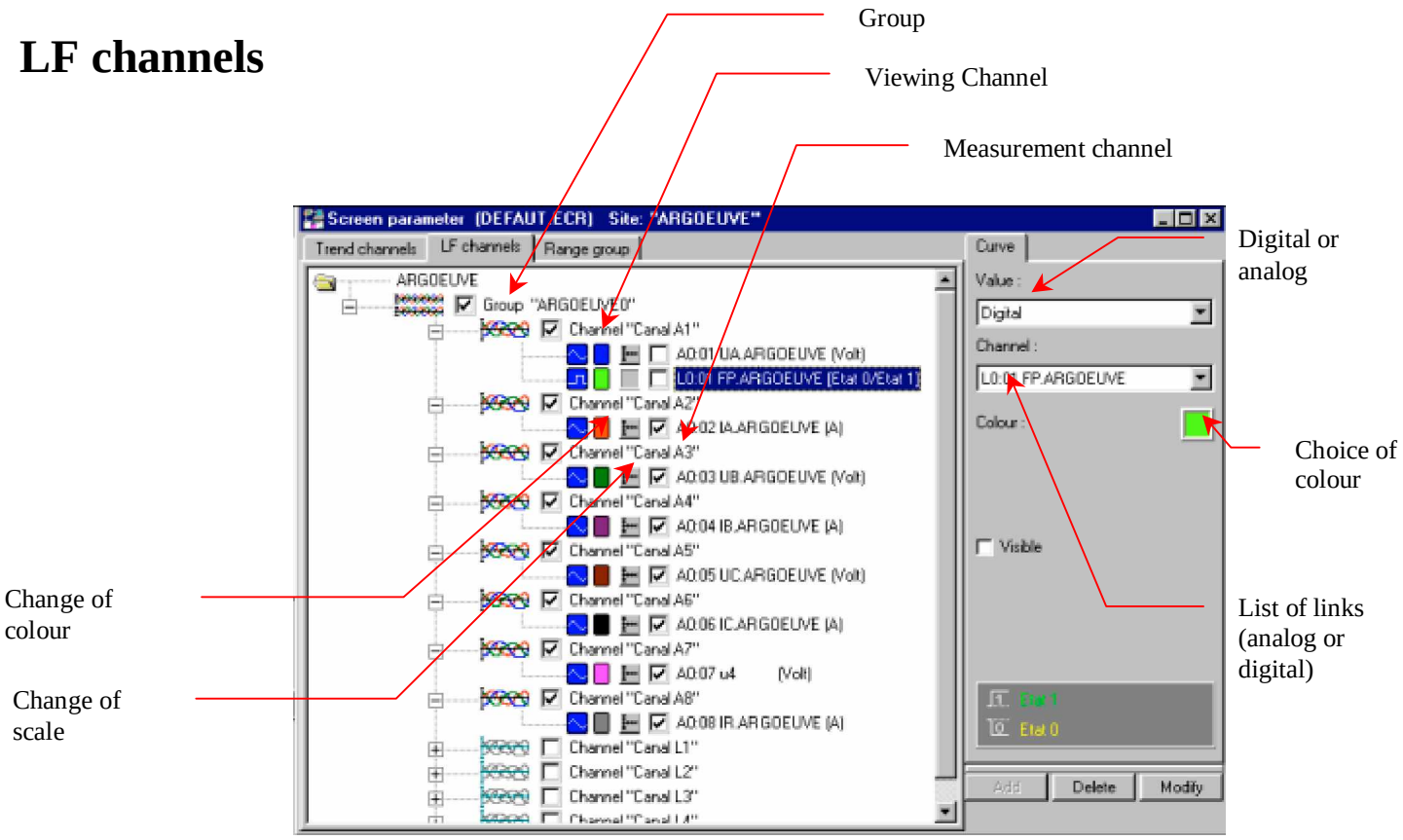
Choice of the colour by means of the palette

To add groups, channels or links, set correctly the cursor in the tree, select values (Vrms, Harmonic, Phase …) then channel or group and click the *Add* button.

To modify a group, a link or a channel, set the cursor above, type modifications and click the *Modify* button.

To delete a group, a link or a channel, press the *Suppr* key or click the *Delete* button.

LF channels



Setup of LF channels

LF channels are regrouped into a group (i.e. EOLIENNE0) and into channels (Channel A1, Channel A2 …)

In each link, analog channels (i.e. A0:01 voltage1) and digital (L0:01 contact) are affected.

<u>Another icon allows to select the scale</u> :

: No displayed scale

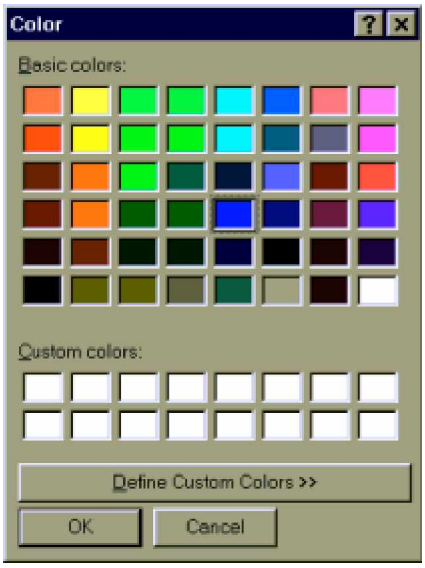
: Scale drawn to the left of the graph

: Scale drawn to the right of the graph

: Scale drawn to the right and to the left of the graph

Click the icon to change the displaying mode of the scale (successive choice of 4 possibilities).

Click the icon to modify the colour of the value. As you click you display the palette which allows to select the colour.



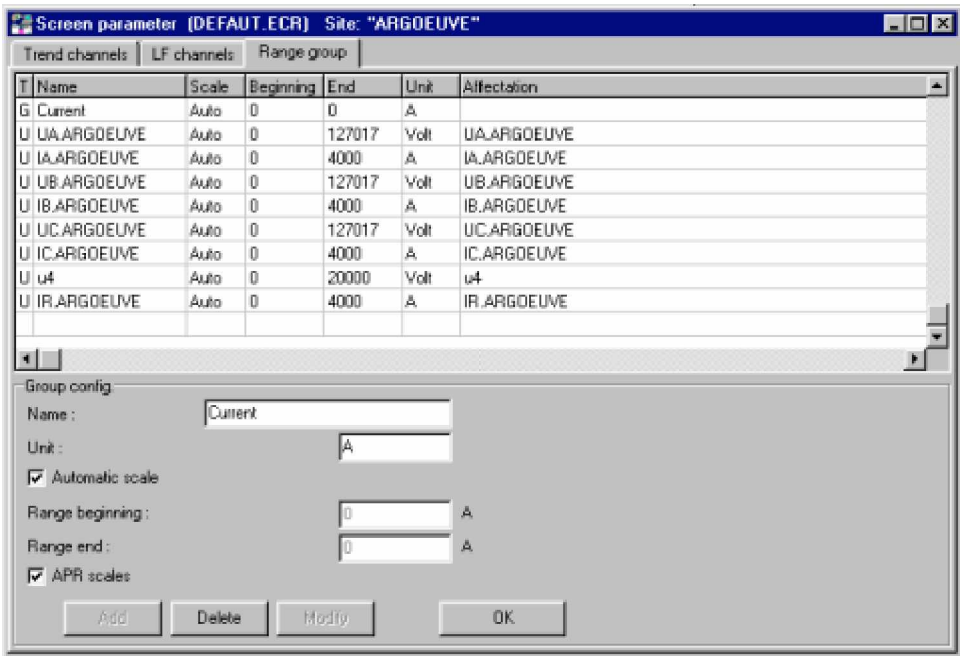
Choice of the colour by means of the palette

To add groups, channels or links, set correctly the cursor in the tree, select values (digital/analog) then link or group and click the *Add* button.

To modify a group, a link or a channel, set the cursor above, type modifications and click the *Modify* button.

To delete a group, a channel or a link, press the *Del* key or click the *Delete* button.

Scale groups



Each channel can be automatically or manually scaled or can be a part of a scale group.

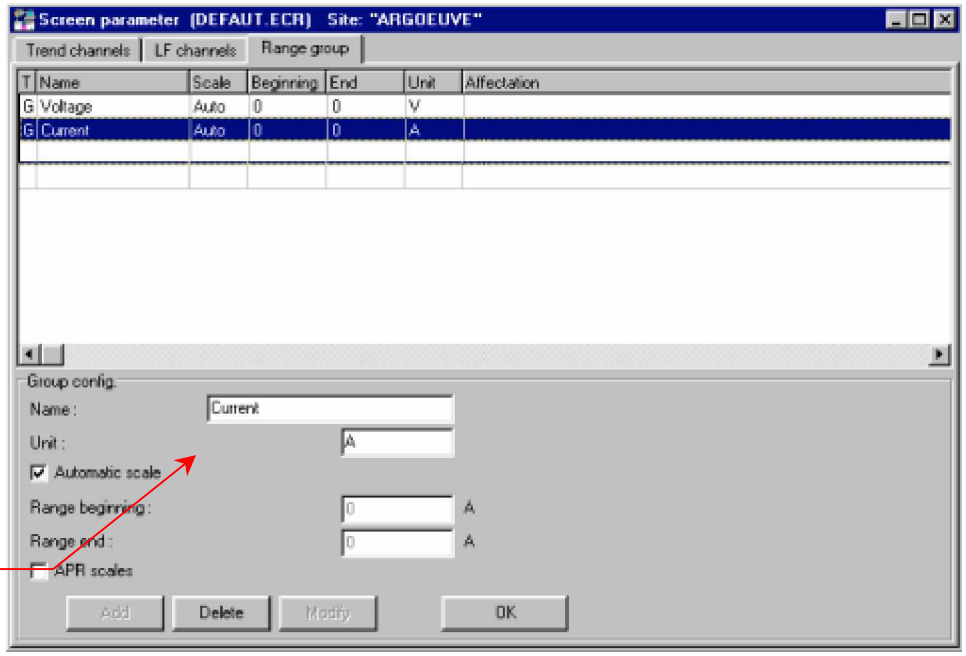
<u>Example</u> : It is possible to define a scale group named *Voltage* which is defined from 0 to 11500V and a scale group named *Current* which is defined from 0 to 1000A.

So, all the measured voltage channels will be referenced on the scale group named *Voltage*.

If you wish to modify the scale of displaying of voltages for example, you will just have to do only one modification to redraw correctly all the channels dependent of this scale.

G=Group of scales

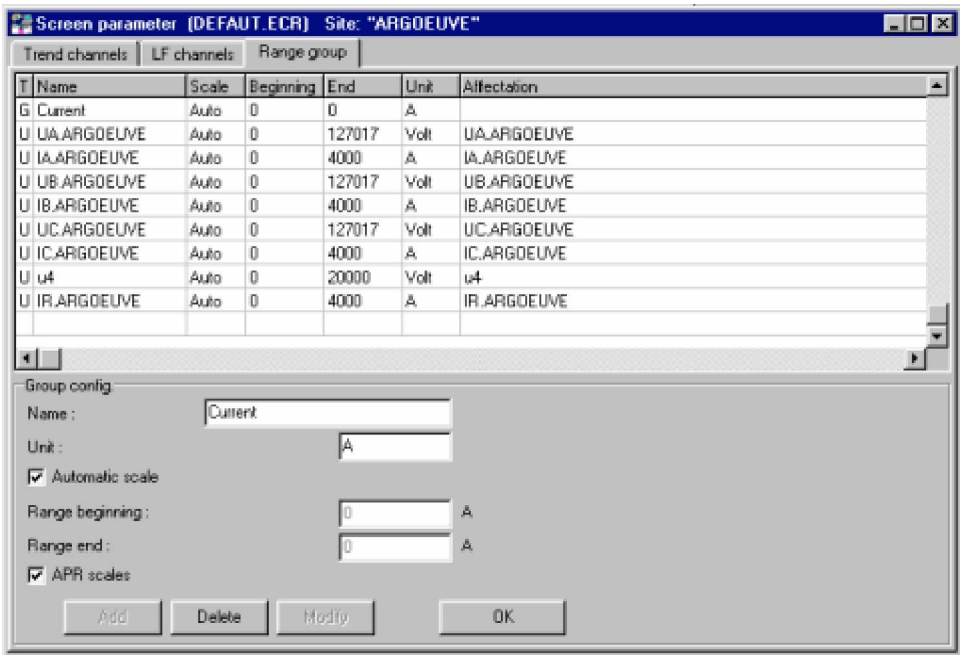
Enter data and click *Add* to create a new scale group



Parameters of scale groups

Check the *APR scales* box to display the scales of the analog channels. This allows to display the scales of the various channels and to be inspired by it to create a scale group.

U=APR scale



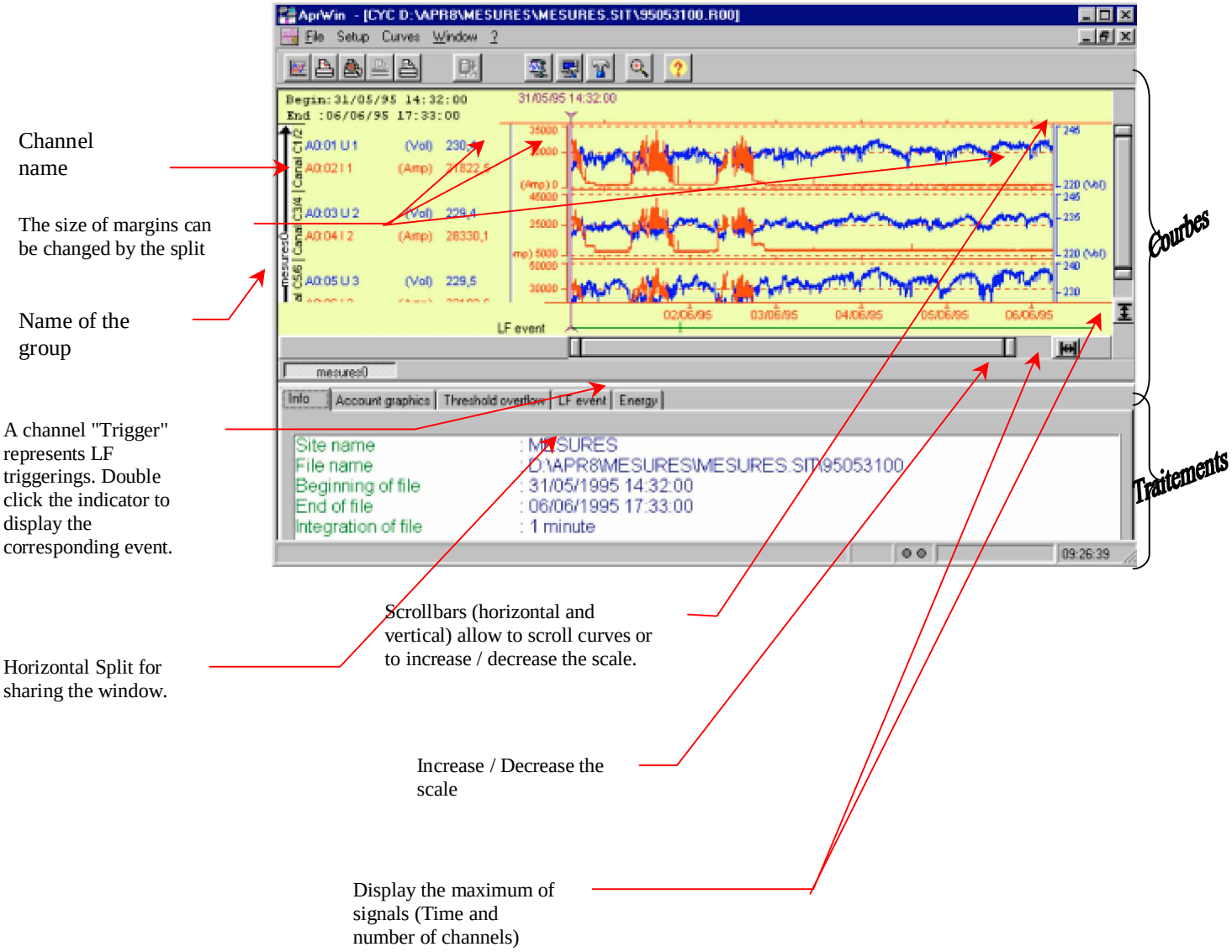
Displaying of APR scales

Trend measurements

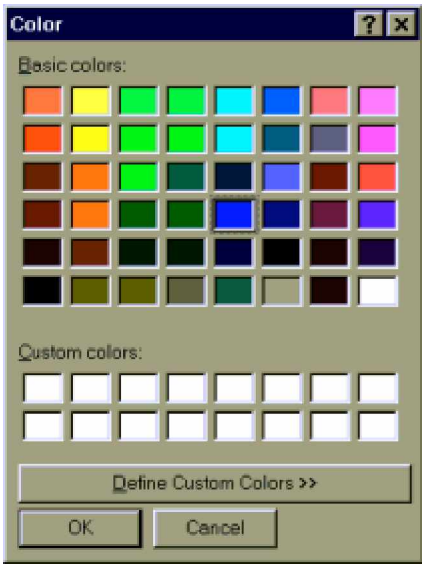
Information about trend measurements

Reminder : The trend software is an optional software which is installed into the APR. The trend module of the APR software allows to program and run the trend measurements.

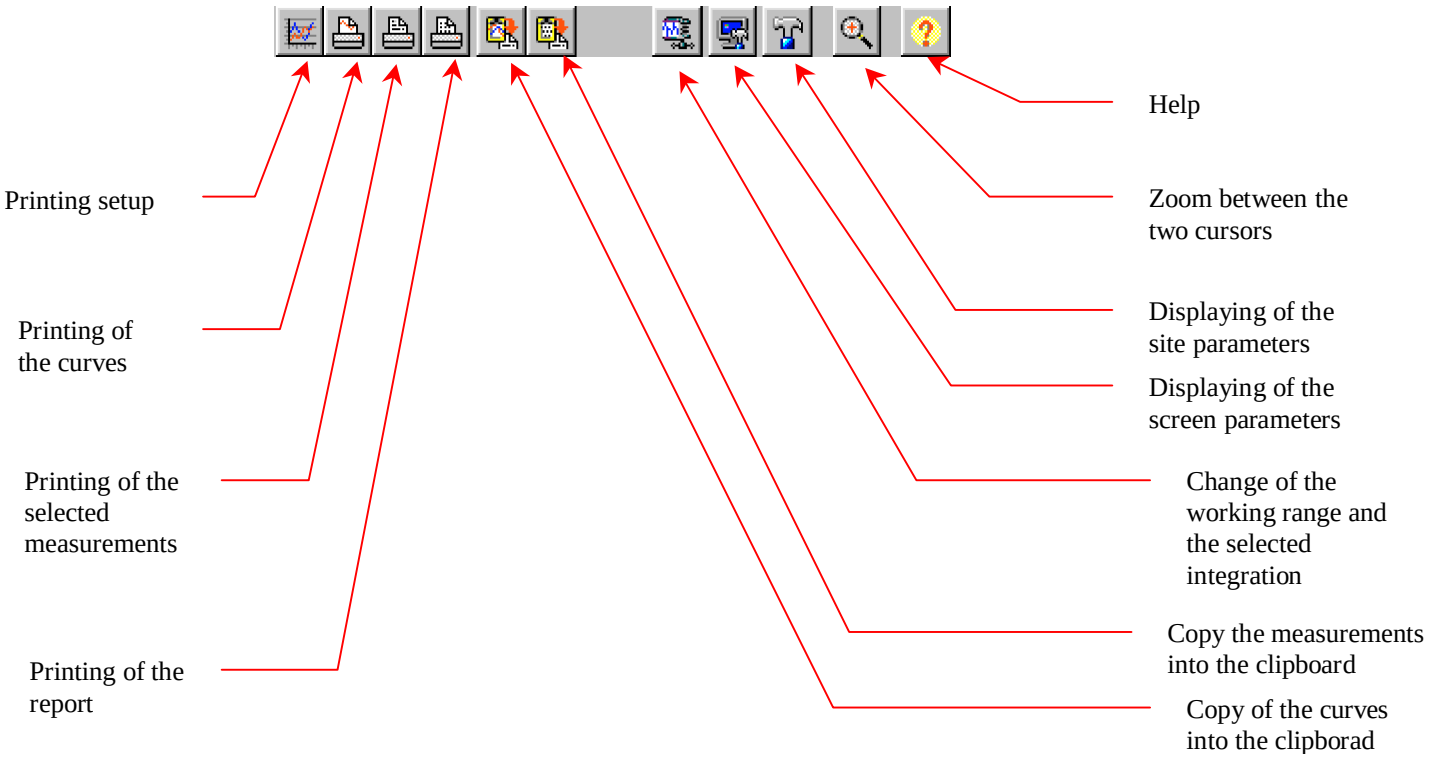
The window is divided into 2 zones, upper zone which contains curves and lower zone which contains treatments (RMS value, powers …). The one or another one of the parts can be enlarged or reduced thanks to the horizontal *Split*.



Use the menu *Curves/colours* to change the background colour of the window.

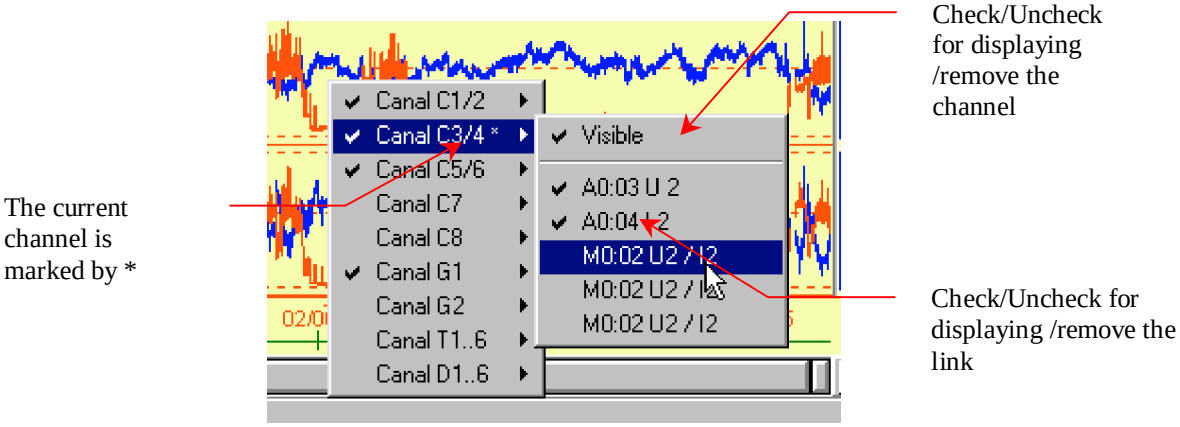


Description of the icon bar :



Press the right button of the mouse to delete or to add a link or a channel. Then, a menu appears and channels and links can be selected/unselected.

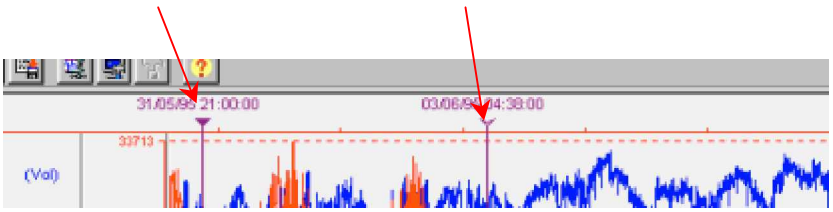
The menu lists the links/channels of the selected group (which is defined where you clicked).



Selection of links/channels

Two cursors are set on the screen :

An active cursor ▼ and an inactive cursor Y.

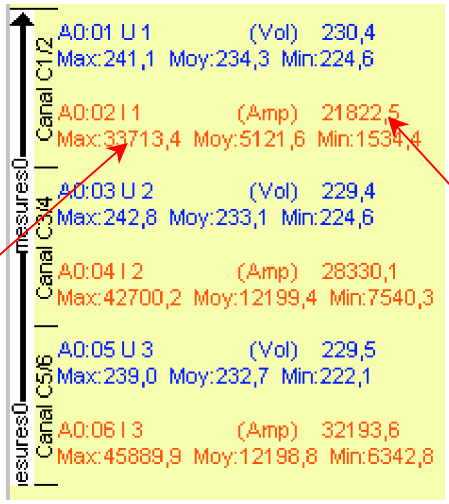


Active and inactive cursors

If the cursor is not displayed (out of the window to the right or to the left side), click at the top of the screen to move it where the mouse is.

To display the screen parameters of a special curve, double click on this curve.

Left margin allows to display either the name of the channel or the values of cursors (active/inactive). Click in the margin to change the display mode.

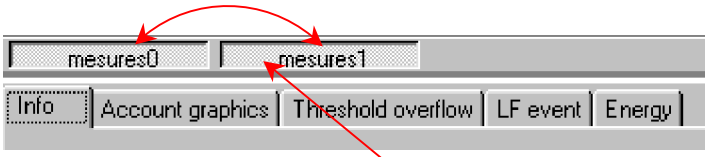


Value of the active cursor

Maxi/Mini/Average of the selected range

Left margin

The bottom of the screen displays all the groups which were defined in the screen parameters. By clicking buttons, you can valid/unvalid the displaying of a complete group. To reverse the order of displaying of the groups, drag and drop to the wished place.

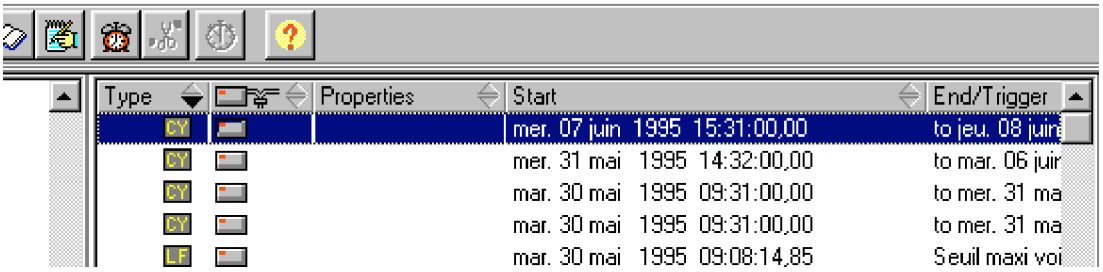


Selection of one or all groups

Groups

Displaying of curves

Select a file of trend measurements in the site manager and select the displaying by double clicking.

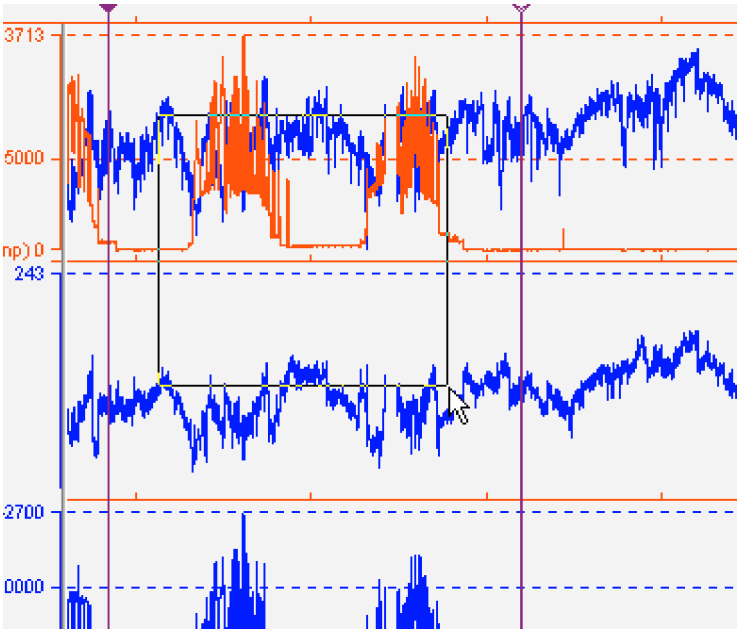


Choice of trend cycle to be analyzed

Curves will be displayed with the current screen parameters (defined in the site manager).

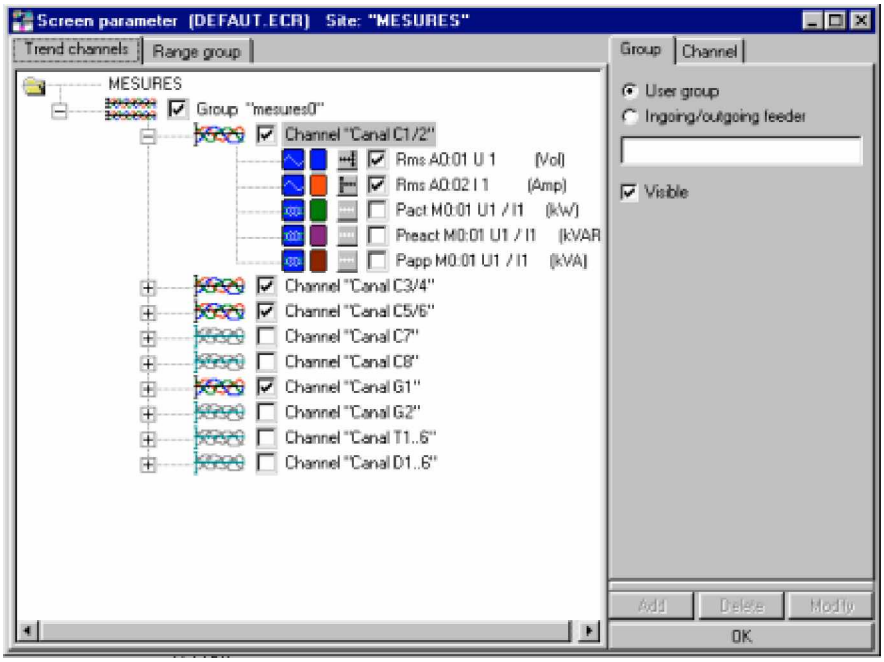
The  icon allows to zoom between the cursors.

For zooming on a part of the screen, drag the beginning of the zone and drop to the end of the zone.



Zoom on a part of the curves

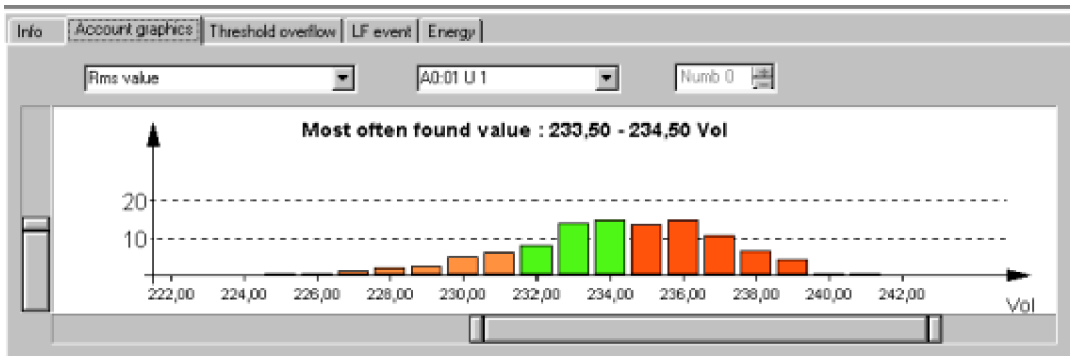
The  icon allow to display the screen parameters (groups, channels, colours, scales) (see page 59) . You can also display the screen parameters by double clicking a channel.



Screen parameters

After modification of the parameters, press *OK* to redraw the screen.

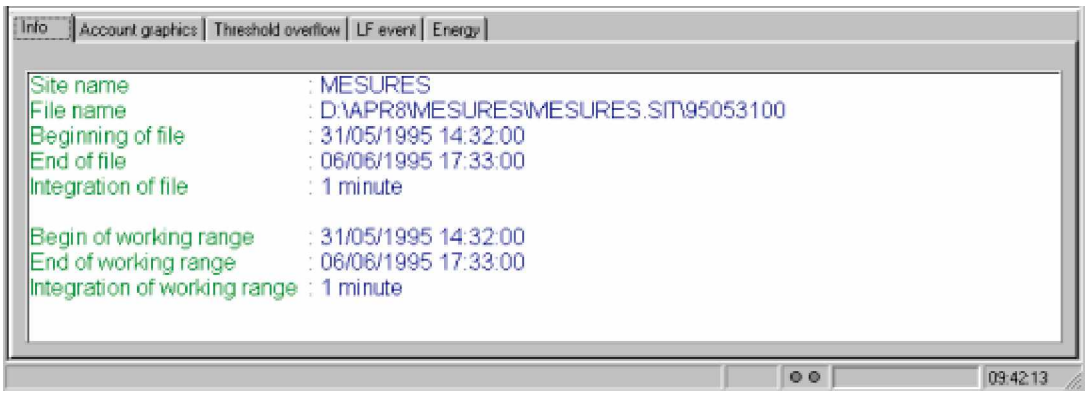
The bottom of the screen contains tabs which give access to the statistical tools (Account graphs, overthresholds, energy).



Trend measurements

Info

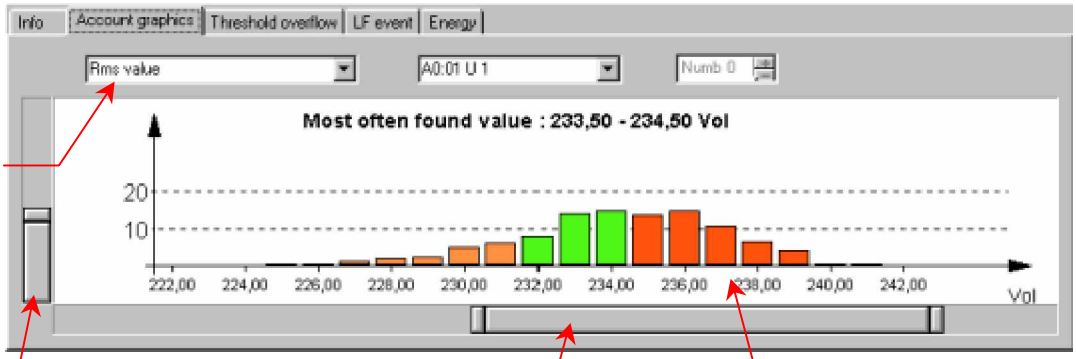
This tab gives the characteristics of the file and of the displayed cycle. The displayed cycle is selected in the *Setup/Trend working range* menu.



Statistic measurements (Account graphs)

The trend module of the APRWIN software allows to display the account graph of all the measured values (Vrms, Harmonic, Power …)

Measurements are regrouped in classes. For example, a class is the 220V-225V interval.



Example of voltage account graphs

Choice of the value to be drawn :
-Vrms
-Apparent power
-Active power
-Reactive power
-Harmonics
-Global harmonic

Modification of the curve scale

Modification of displaying of classes and centring of the graph on screen

Bar graphs are drawn with the colours defined in the "Thresholds overflow" tab

The account graphs are very useful to quickly judge the quality of an electricity network.

<u>Example</u>: To know if voltage is according to standard values and if it deviates from the standard values during a more or less large period. Sharper a graph is, better is the quality of the voltage.

Calculation of overthresholds

This window allows to calculate the number of overthresholds of measured values.

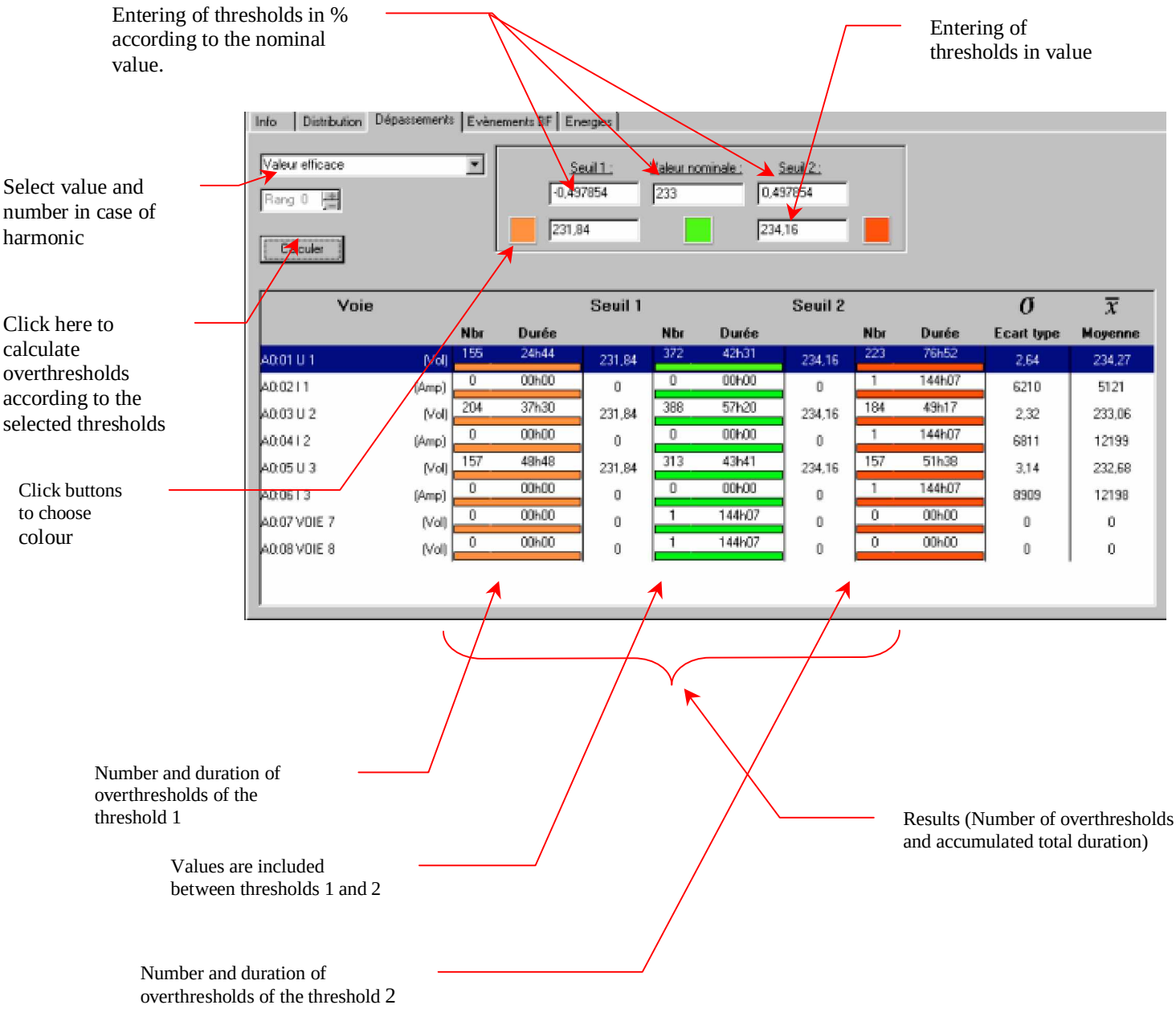
2 thresholds can be programmed (1 mini threshold and a maxi threshold). If measurement is lower or upper than the set value or between 2 thresholds, total accumulated duration of overthresholds is displayed.

The entered thresholds are saved for each site. Quality criteria can be defined and you can test that each measurement makes fit into the created template.

A colour can be allocated to each zone (Lower than the mini threshold, upper than the maxi threshold, and included between the two thresholds).

To modify thresholds, select one or several concerned lines.

You can enter thresholds either in % according to a nominal value, or directly in value.



The modification of thresholds and colours are done for the selected lines. Use multiselection (Shift and Ctrl) to change several lines simultaneously.

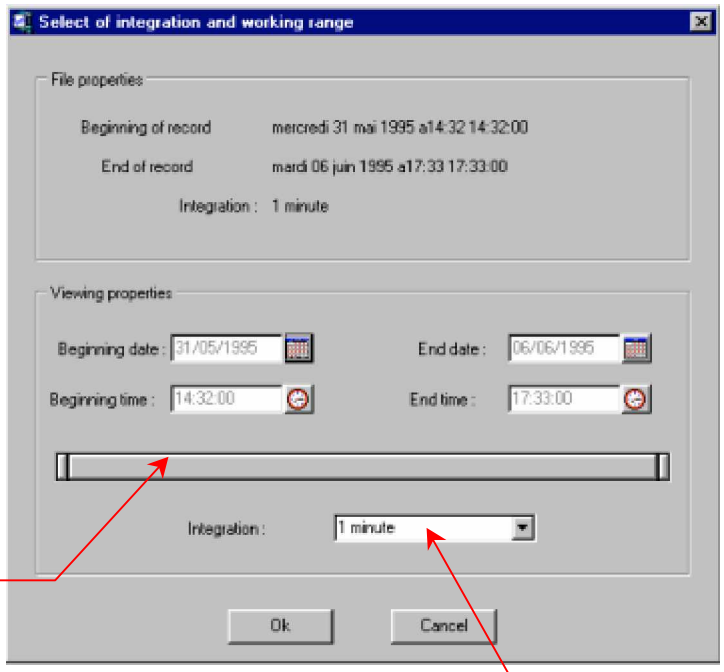
Contrary to the LF mode, thresholds in trend mode are defined a posteriori, that allows to realize as many simulations as you wish. For example, you can calculate power overthresholds by changing thresholds (for calculating the overthresholds of sub-scribed powers for example).

Modification of working range and integration

Sometimes, restricting the working interval and/or modifying the integration cycle can be interesting. This enables to isolate a day of measurements for example.

Click the  icon or use the *Setup/Trend working cycle* of the trend menu.

The modification concerns the drawing of curves, all the measurements (overthresholds, account graphs, energies, LF events) and export towards the clipboard.



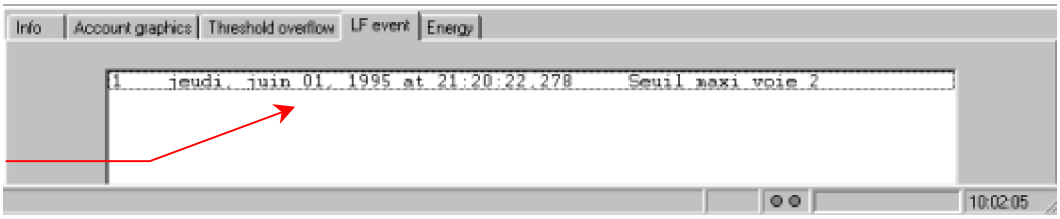
Working cycle can be modified by using the scrollbar or by clicking icons.

Choice of the working and integration cycle

The integration cycle can not be lower than the measured integration cycle mesurée.

LF events

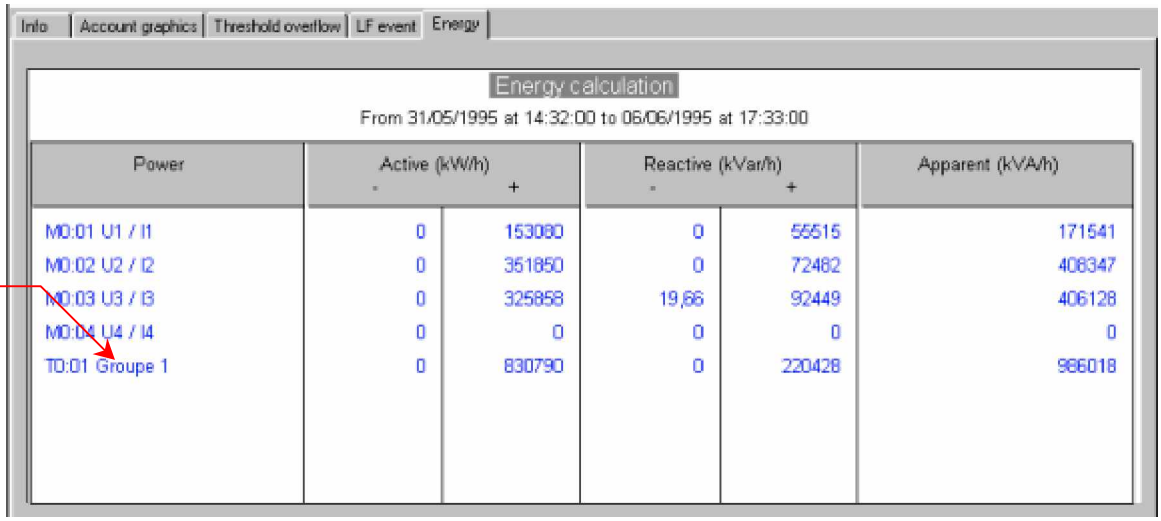
Lists of LF events corresponding to the selected cycle



If you double click a file, the corresponding LF window is displayed. If several LF files are present, click the icons to display the previous and following files. See the LF measurements page 83.

Energies

The group 1 corresponds to the triphased power U1/I1 U2/I2 and U3/I3



Power	Active (kW/h) -	Active (kW/h) +	Reactive (kVar/h) -	Reactive (kVar/h) +	Apparent (kVA/h)
M0:01 U1 / I1	0	153080	0	55515	171541
M0:02 U2 / I2	0	351850	0	72482	408347
M0:03 U3 / I3	0	325858	19,66	92449	406128
M0:04 U4 / I4	0	0	0	0	0
T0:01 Groupe 1	0	830790	0	220428	986018

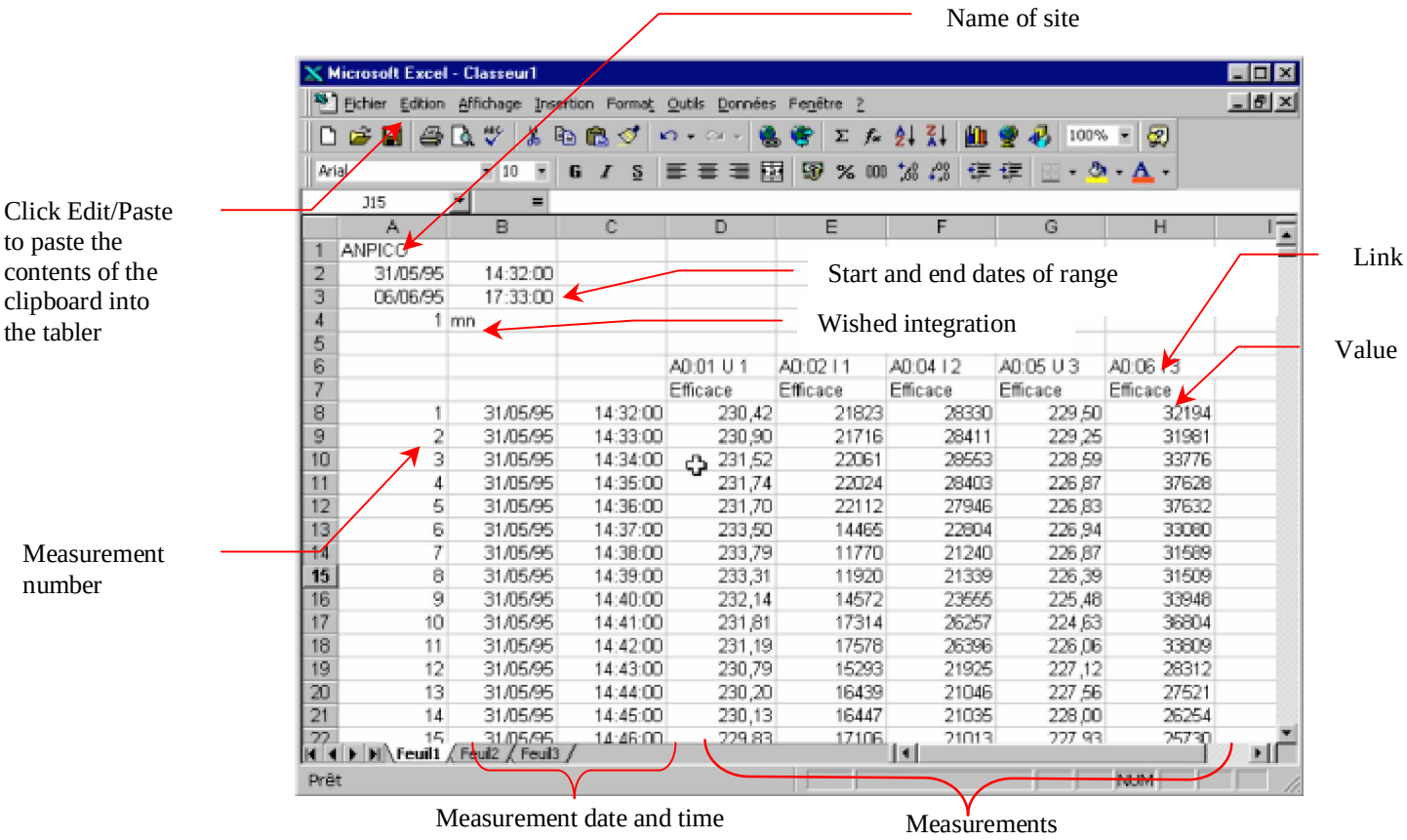
Active and reactive energies are split into 2 columns (positive and negative). This allows to realize the balance of energies on a site which is producer and consumer at the same moment.

Export/Copy

It is possible to export values drawn on the screen into the clipboard (*File/Copy* menu (Tabler format)). That allows to realize particular measurements. For example you will be able to copy out data into a spreadsheet (EXCEL for example) and program special calculations or curves.

Caution : Export is realized by using the selected curves and the characteristics of displaying (Integration, interval).

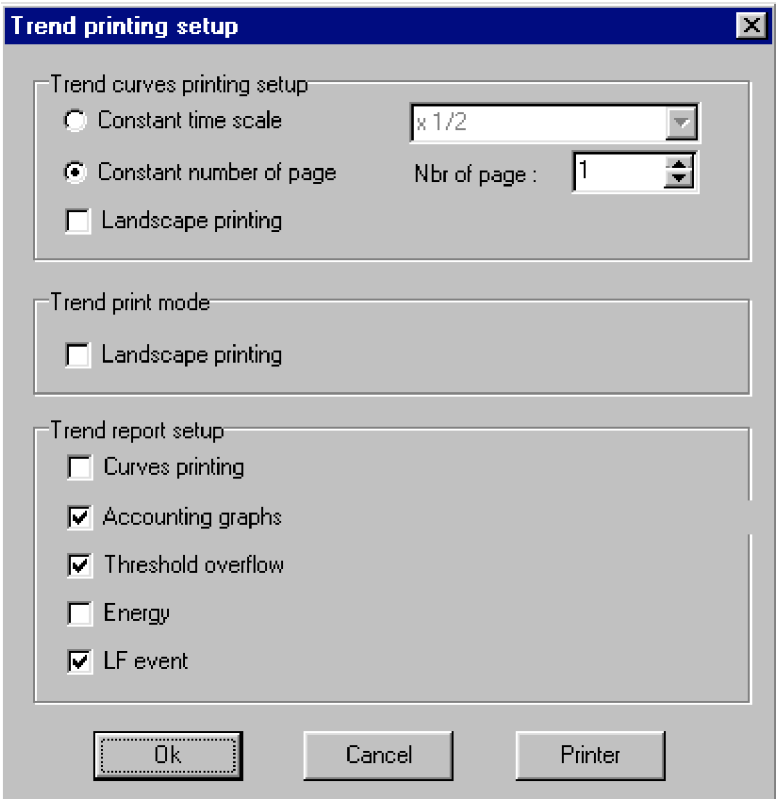
Example of data export :



Printing of trend measurements

Each part of the window can be printed (Curves, account graphs, overthresholds, and energies).

The printing setup appears thanks to the *File/Printing setup* menu or by clicking the  icon.



Printing setup

Click the following icons to print :

to print curves. The selected groups/channels are printed. If the number of channels is important, the first channels are printed only. Unselect the first groups/channels to print the others.

to print measurements (account graphs, overthresholds and energies). The contents of the active tab is printed.

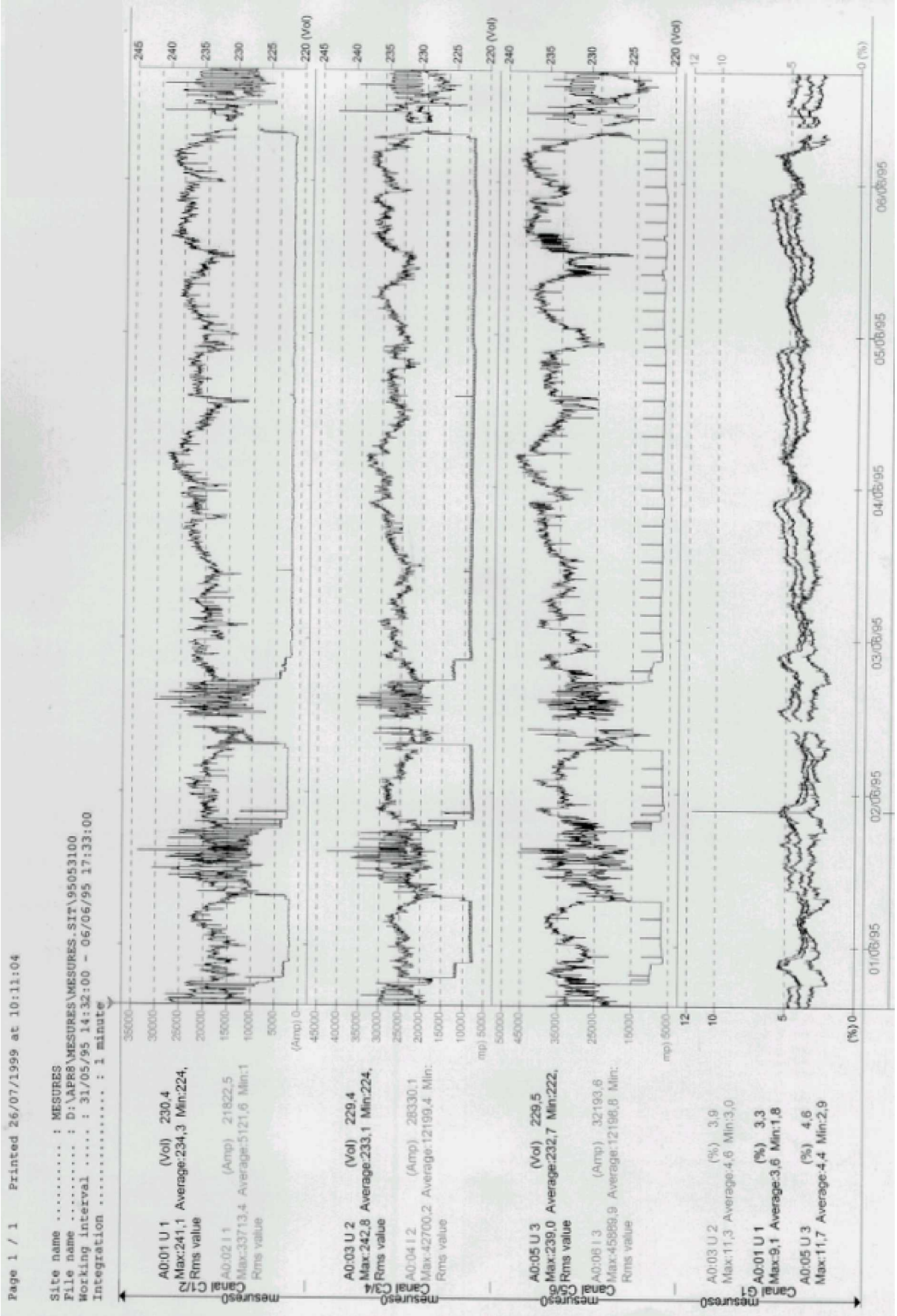
to print the report (The setup of the report is accessible by the *Printing setup* menu, see previous page).

to copy curves into the clipboard.

to copy measurements into the clipboard (the contents of the active tab is copied in the clipboard).

Examples of restitutions are shown in the following pages.

Printing of curves



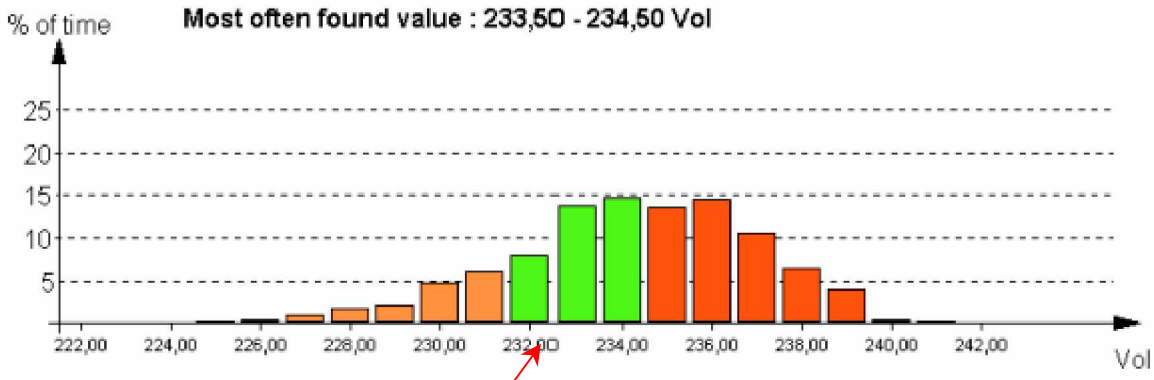
Printing of account graphs

```
Printed 26/07/1999 at 10:13:05     APRWin

                                  Accounting graph


Site name ............... : MESURES
File name ............... : D:\APR8\MESURES\MESURES.SIT\95053100
Beginning of file ........... : 31/05/1995 14:32:00
End of file ............ : 06/06/1995 17:33:00
Integration of file .. : 1 minute

Beginning of work range .... : 31/05/1995 14:32:00
End of work range ....... : 06/06/1995 17:33:00
Integration of work range : 1 minute
Name of channel ................ : A0:01 U 1
Value ................................ : Rms value
```



Graph uses colours selected in the overthreshold calculation window .

- Lower than the threshold1
- Included between thresholds 1 and 2
- Upper than the threshold 2

Printing of the overthreshold table

Printed 07/09/1999 at 08:10:20 APRWin

Threshold overflow table

Site name ..... : AMIENS
File name ..... : D:\APR8\MESURES\AMIENS.SIT\98080400
Beginning of file ..... : 04/08/1998 13:50:00
End of file ..... : 11/08/1998 11:12:00
Integration of file ..... : 2 minutes

Beginning of work range ..... : 04/08/1998 13:50:00
End of work range ..... : 11/08/1998 11:12:00
Integration of work range : 2 minutes
Value ..... : Rms value

Channel		Nbr	Duration	Thres. 1	Nbr	Duration	Thres. 2	Nbr	Duration	σ Std. dev.	$\bar{x}$ Average
AO:01 U1	(V)	1	00h10	227,70	132	107h14	232,30	131	55h42	6,77	231,44
AO:02 I1	(A)	0	00h00	0	1	00h08	0	2	162h58	38,77	31,28
AO:03 U2	(V)	0	00h00	0	1	00h08	0	2	162h58	6,76	231,19
AO:04 I2	(A)	0	00h00	0	1	00h08	0	2	162h58	38,11	30,83
AO:05 U3	(V)	0	00h00	0	1	00h08	0	2	162h58	6,76	231,06
AO:06 I3	(A)	0	00h00	0	1	00h08	0	2	162h58	37,45	29,92
AO:07 UDEFAUT	(V)	0	00h00	0	1	138h34	0	1	24h32	82,89	34,88

Number of overthresholds (lower than the threshold 1)

Accumulated total duration of overthresholds

Printing of the energy table

Printed 26/07/1999 at 10:16:38 APRWin

Energy table

Site name ..... : MESURES
File name ..... : D:\APR8\MESURES\MESURES.SIT\95053100
Beginning of file ..... : 31/05/1995 14:32:00
End of file ..... : 06/06/1995 17:33:00
Integration of the file ..... : 1 minute

Begin of working range ... : 31/05/1995 14:32:00
End of working range ..... : 06/06/1995 17:33:00
Integration of working range : 1 minute

Power	Active (kW/h)		Reactive (kVar/h)		Apparent (kVA/h)
	-	+	-	+	
M0:01 U1 / I1	0	153080	0	55515	171541
M0:02 U2 / I2	0	351850	0	72482	408347
M0:03 U3 / I3	0	325858	19,66	92449	406128
M0:04 U4 / I4	0	0	0	0	0
T0:01 Groupe 1	0	830790	0	220428	986018

Transmitted active energy

Received active energy

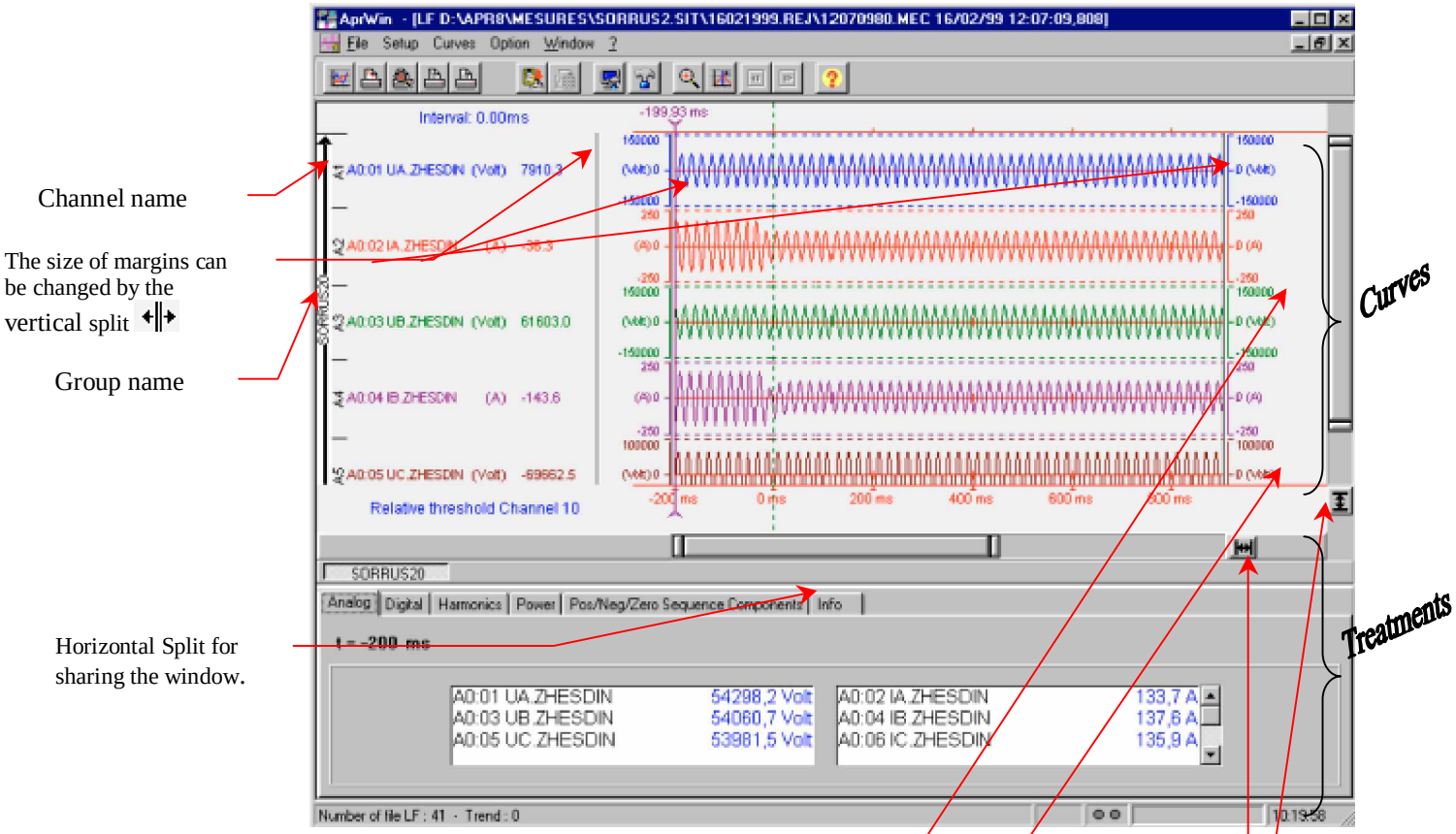
The group 1 represents the triphased group
- U1/I1
- U2/I2
- U3/I3

LF measurements

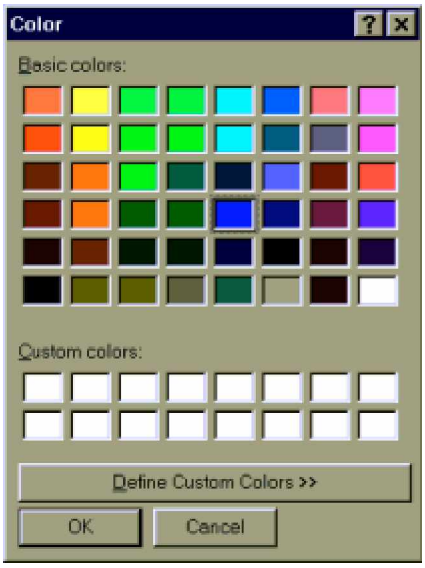
Information about LF measurements

The window is divided into 2 zones, upper zone which contains curves and lower zone which contains values (RMS values, digital channels, powers, harmonics …) . The one or another one of the parts can be enlarged or reduced thanks to the horizontal *Split* .

The displaying of RMS values, digital channels, powers ... is according to the position of the active cursor in the "curves" window.



Use the menu *Curves/Colours* to change the background colour of the window.



Description of the icon bar :

Printing setup

Printing of the curves

Printing of the selected measurements

Printing of the report

Copy of the curves into the clipboard

Copy of the measurements into the clipboard

Help

Processing of the next LF file

Processing of the previous LF file

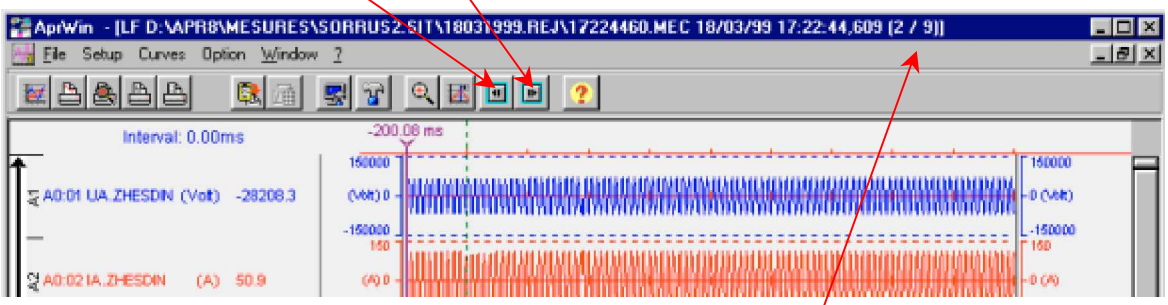
Displaying mode (Vrms or point to point)

Zoom between the two cursors

Displaying of the parameters

Displaying of the screen parameters

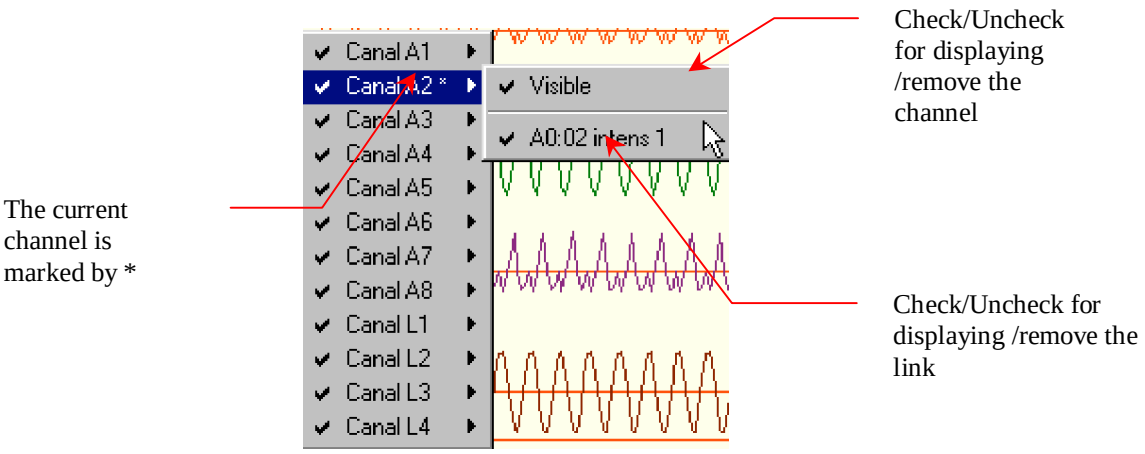
Use *Previous* and *Next* icons to display the other files when several LF files were selected in the site manager.



Displaying of the 2-nd file among the 9 selected files choisis.

Click the right button of the mouse to delete or to add a link or a channel. Then, a menu containing all channels of the group appears and channels and links can be selected/unselected.

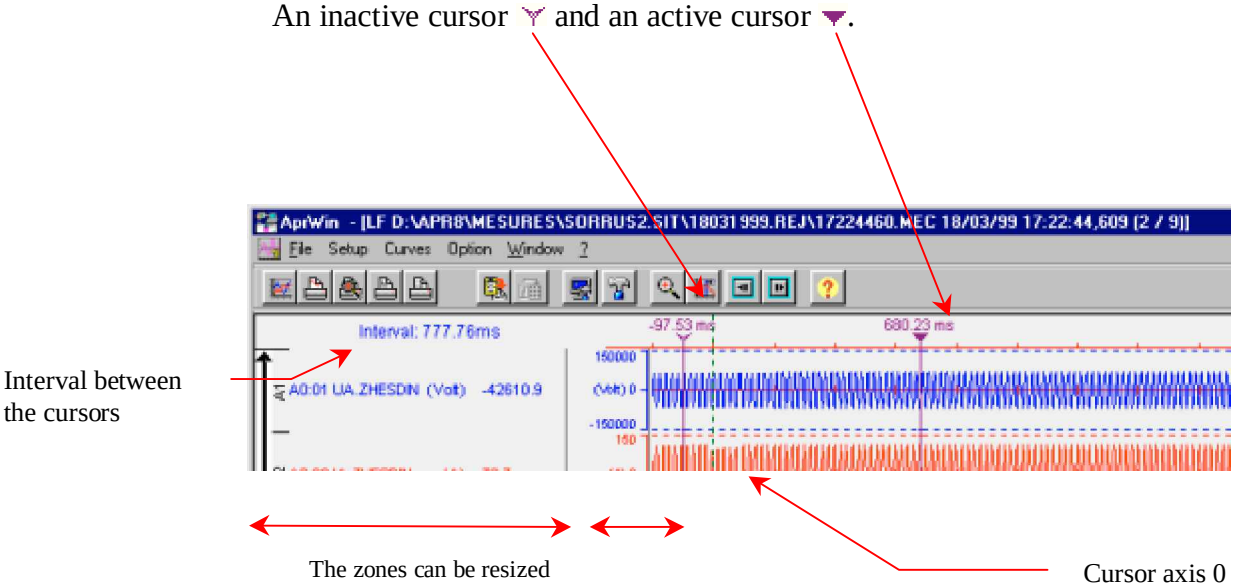
The menu lists the links/channels of the selected group (defined where you have clicked).



Selection of links/channels

<u>Two cursors are set on screen</u> :

An inactive cursor and an active cursor .

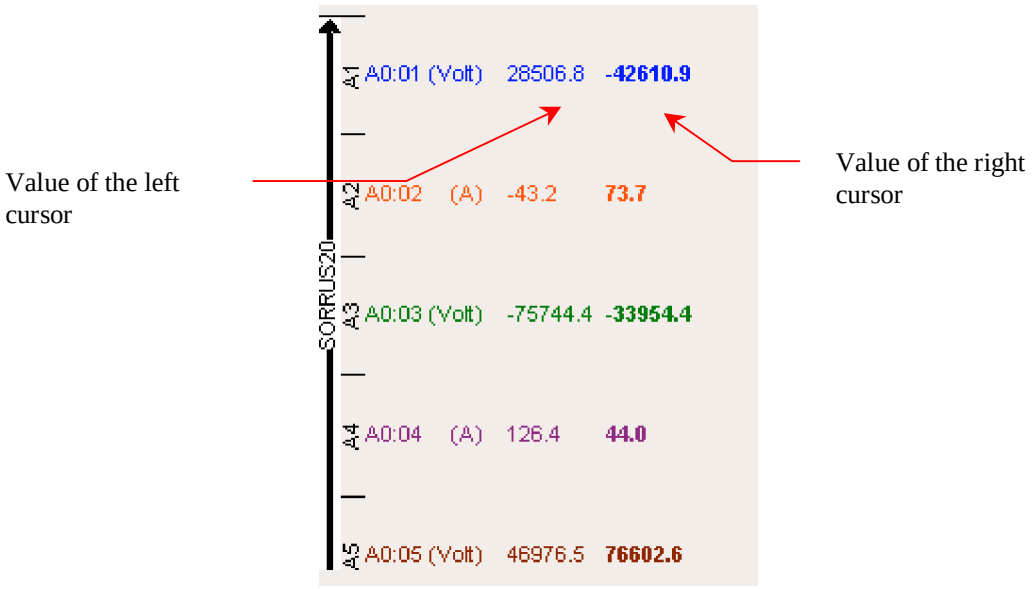


The axis 0 (in dotted line) corresponds to the trigger time.

If the cursor is not visible, click at the top of the window to move it where the mouse is.

To display the screen parameters of a special curve, double click on this curve, the screen parameters appears then (see page 59) .

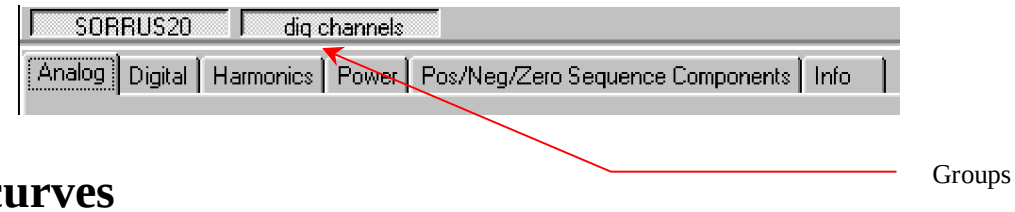
Left margin allows to display either the name of the link or the values of cursors (active / inactive) and channels. Click in the margin to change the display mode.



Example of margin

Values displayed in the margin correspond to the value of the curve at the intersection with the cursor (Peak value if sin waves is displayed or Rms values if this mode is selected).

The bottom of the screen displays all the groups which were defined in the screen parameters. By clicking buttons, you can valid/unvalid the displaying of a complete group. To reverse the displaying order of the groups, drag and drop to the wished place.



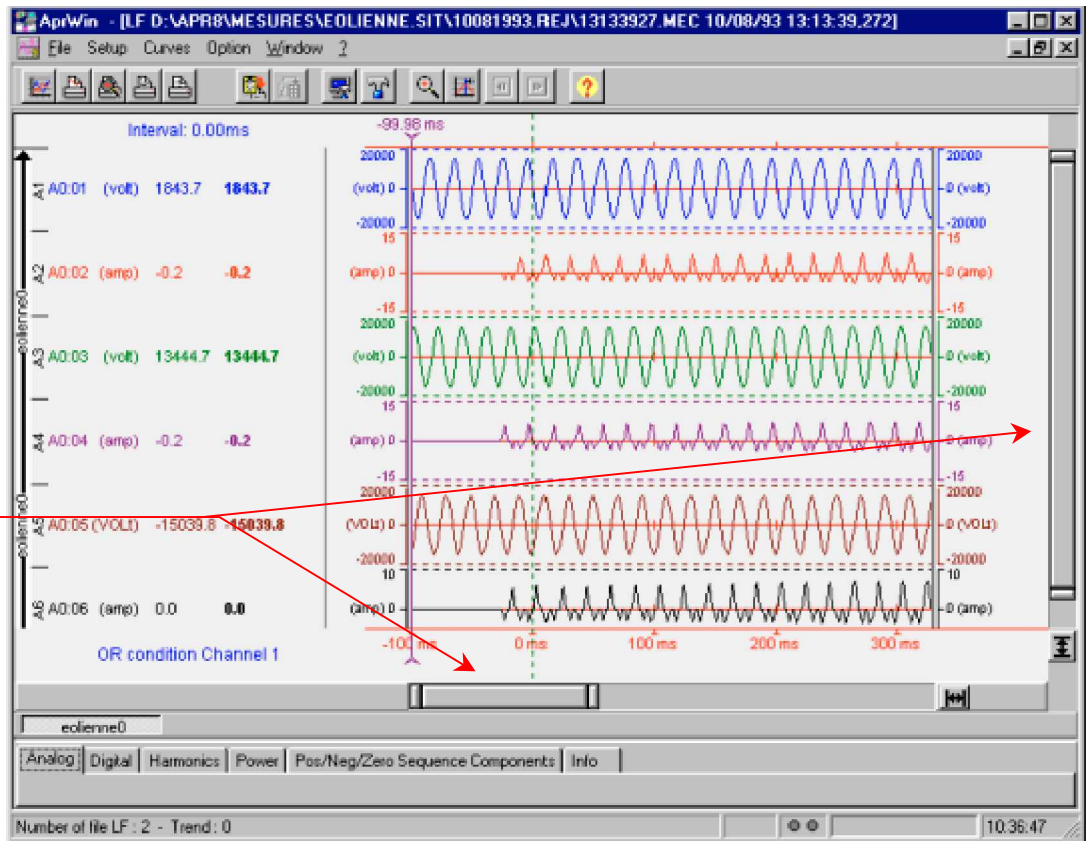
Displaying of curves

Select one or several LF measurement files in the site manager and select the displaying.

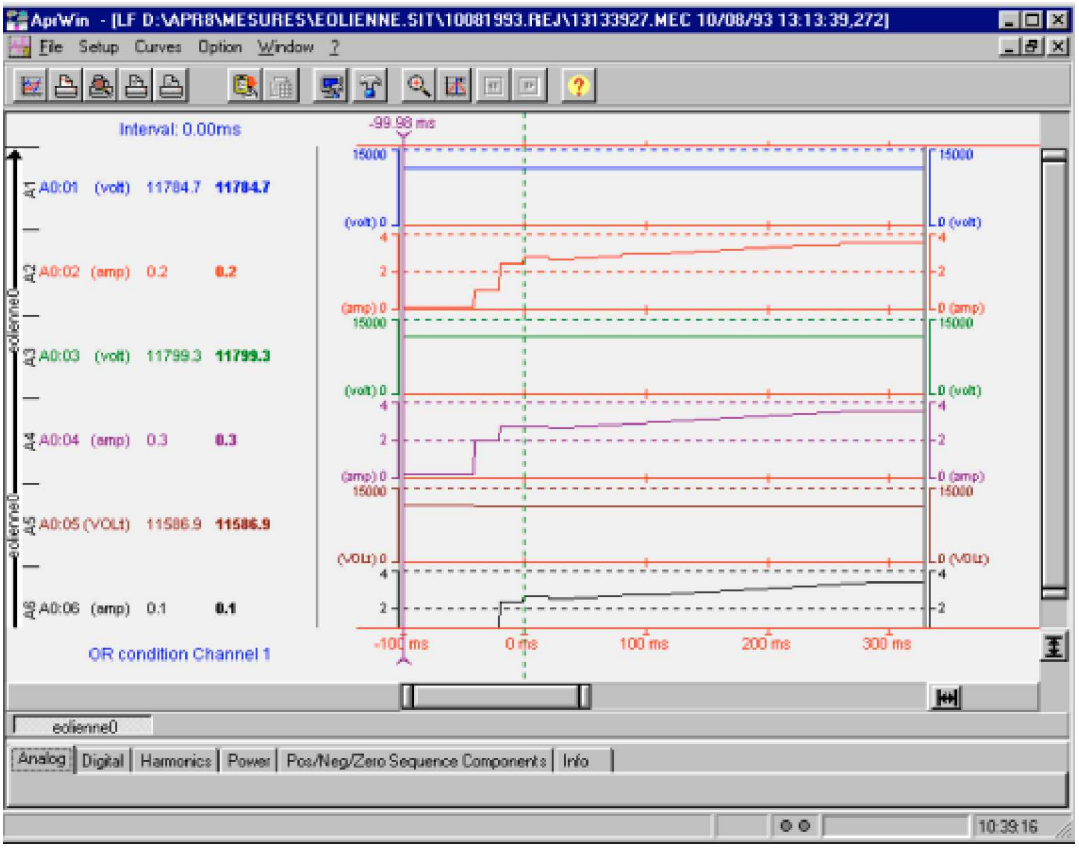
Curves will be displayed with the current screen parameters (defined in the site manager (*Parameters/Screen* branch).

The  icon allows to display curves in Rms values.

Use the scroll bar to move the displaying



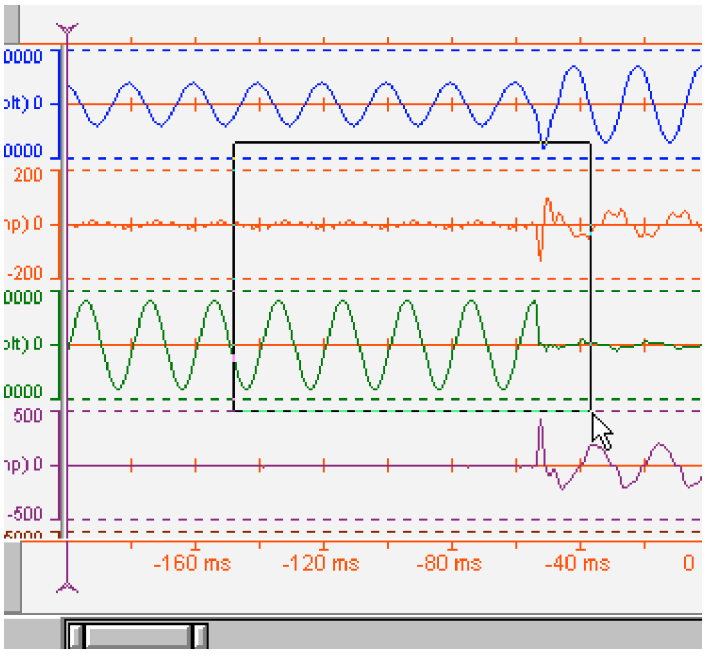
Curves displayed in point by point mode



Curves displayed in Vrms mode (Rms value or envelope)

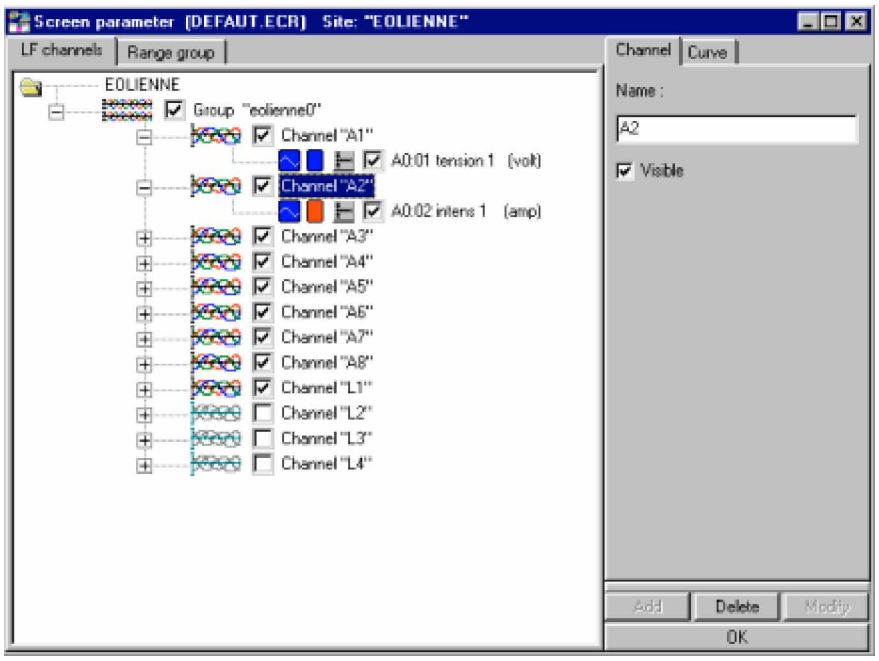
The icon allows to zoom between the cursors.

For zooming on a part of the screen, drag the beginning of the zone and drop to the end of the zone. As soon as the mouse button is released, the selected zone is redrawn.



Zoom on a part of the curves

The icon allows to display the screen parameters (groups, links, colours, scales) (see page 59) . You can also display the screen parameters by double clicking a channel (in that case, displaying stops on the selected channel).

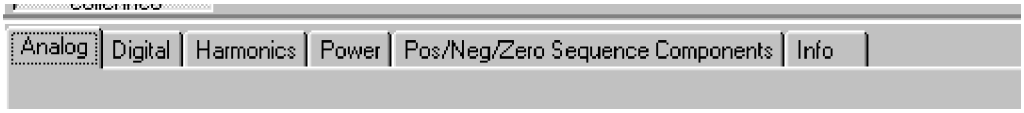


Screen parameters

After modification of the parameters, press *OK* to redraw the screen.

Displaying of values (Vrms, Harmonics, Powers …)

Half bottom of the window displays several tabs which one contains a different type of measurements.

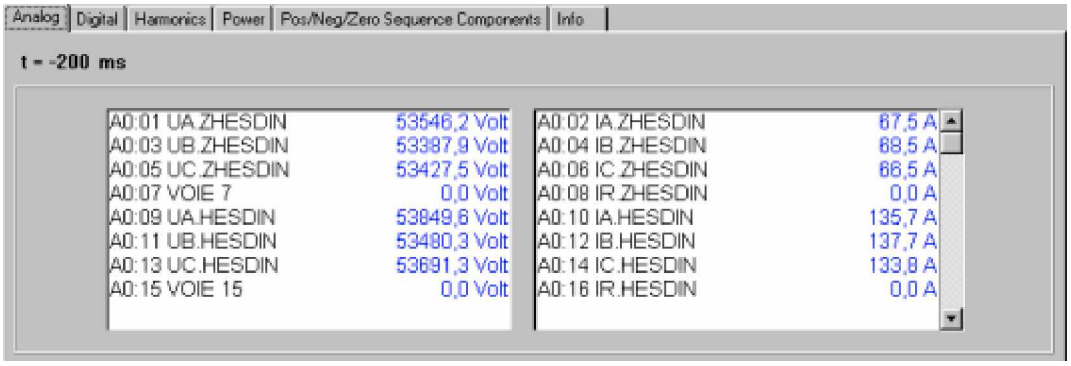


Measurements are displayed at the time indicated by the active cursor ▼. Move the active cursor by means of the mouse to display all the measurements.

Analog channels

This window displays the Rms values of analog channels at the time corresponding to the active cursor.

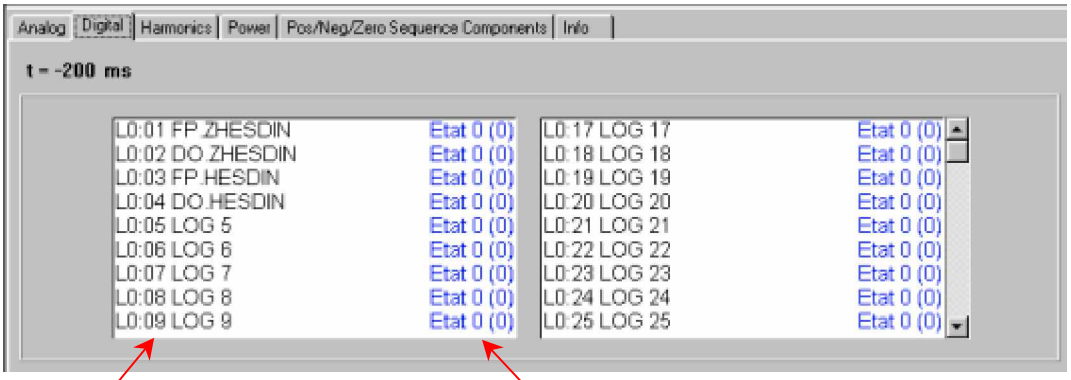
Time is calculated over the corresponding cycle (50Hz = multiple of 20ms)



Displaying of the Rms values of the analog links

If there is a lot of analog channels (composed site), use the scroll bar to display the other channels.

Digital channels



Displaying of the states of the digital channels

Name of the digital channels

State of the digital channels
0 : low status
1 : high status

If there is a great number of digital channels (composed site), use the scroll bar to display the other channels.

Harmonics (numerical and graphic)

Click here to display the graph

Click here to display in % or in value

Choice of the link to be displayed

Rms value

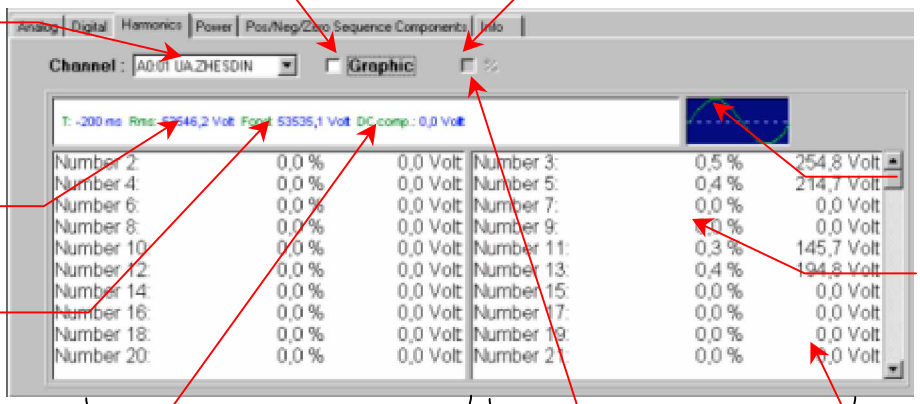
Value of the fundamental

Continous component

Curve of the measured range

Value in % of the fundamental

Use the scroll bar to display the rest of numbers.



Harmonics in numerical mode

Even numbers

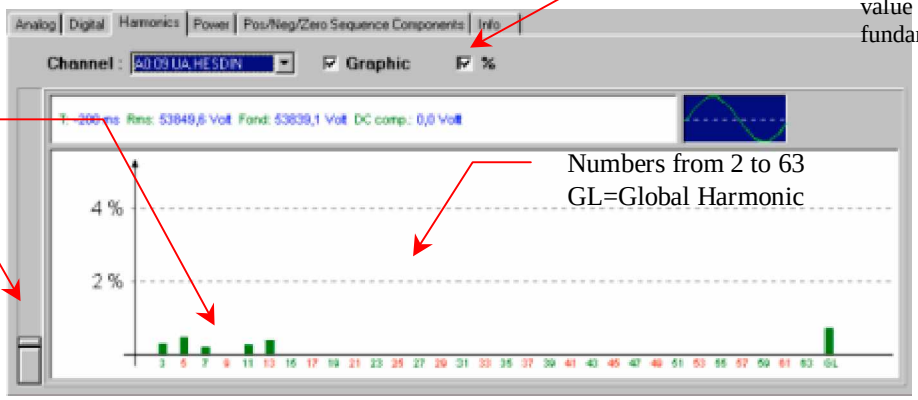
Odd numbers

Displaying in % according to the value of the fundamental.

Click a number to know the value

Modification of scale

Numbers from 2 to 63
GL=Global Harmonic



Harmonics in graphic mode

VRms : Rms value

Fund : Value of the fundamental

DC Comp : DC component

Global : Global harmonic (Rate of harmonic distortion)

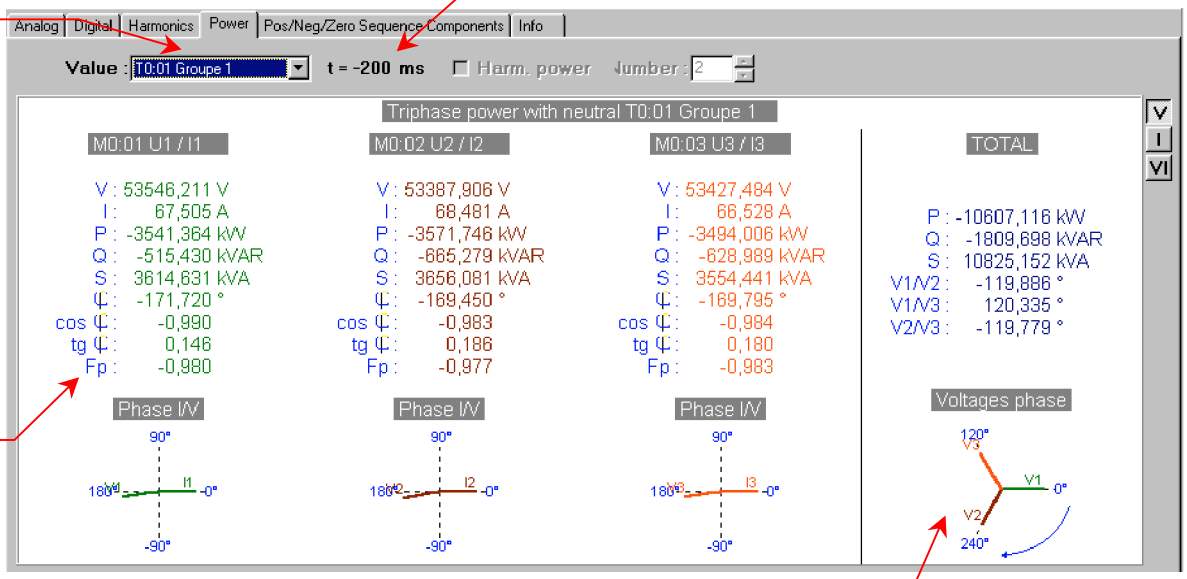
Powers

Multiple of the range (20ms here)

Choice of the triphased group (U1/I1 U2/I2 U3/I3)

Choice of the singlephased couple (U1xI1 U2xI2 U3xI3 U4xI4)

Fp = Factor of power

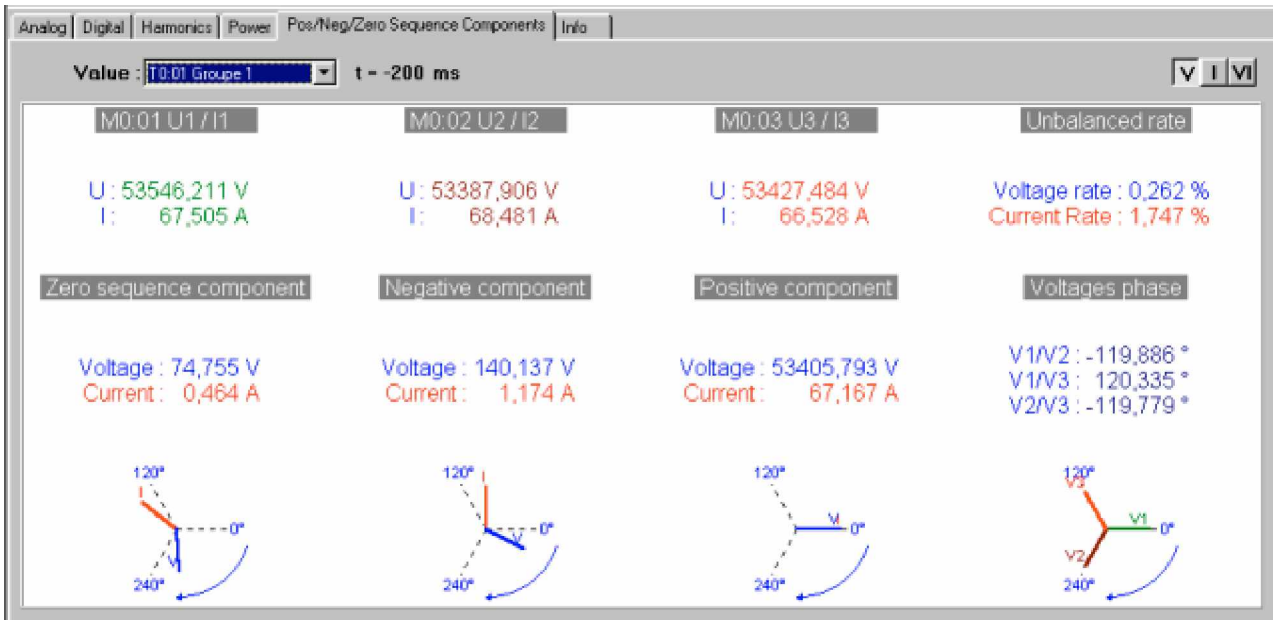


V = Voltages
I = Currents
VI = Voltages + Current

Triphased graph can be drawn as 3 different ways. Click icons below to change the drawing mode.

<u>Note</u> : the axis 0 is always current

Pos/Neg/Zero sequence components

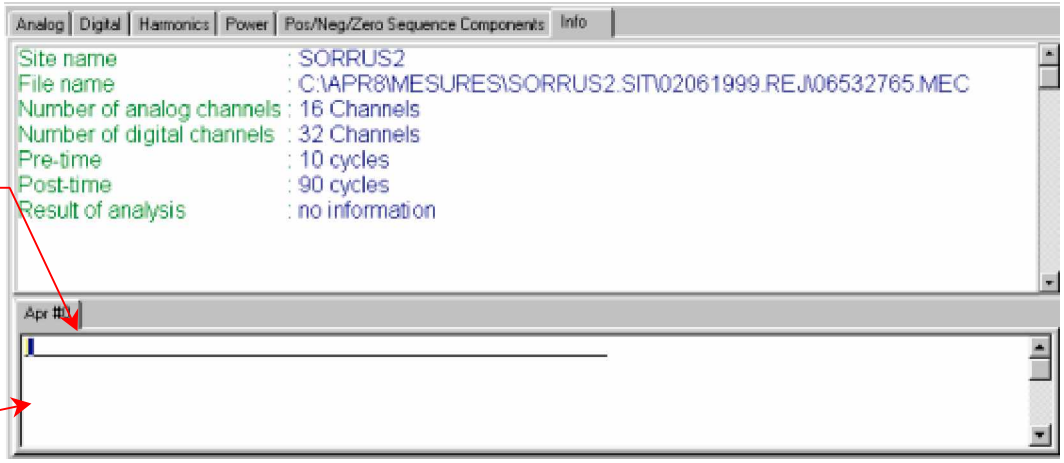


$$\text{Rate of unbalance} = \frac{\textit{Positive voltage}}{\textit{Negative voltage}} \times 100$$

Info

Tabs enable to display the comments of each APR

A comment can be typed in this field

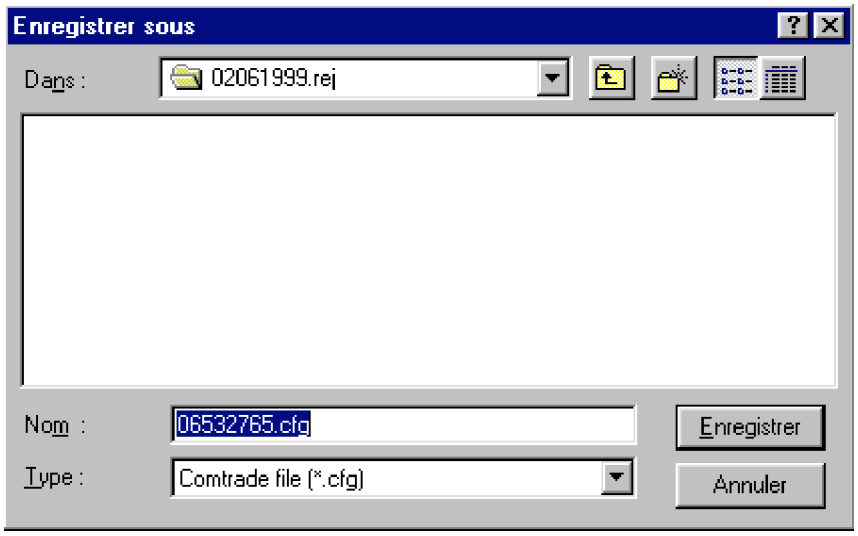


The result of analysis is displayed only if the SANDRA software is used and run an analysis of the default.

Export to COMTRADE format (Optionnal)

Use the *Option/COMTRADE* menu to export the LF file displayed in COMTRADE format. Then a window asks for the file name and for the place of destination. Click "Save" to confirm conversion.

By default, COMTRADE files are stored in the same place that the origin LF file.



Export to COMTRADE format

<u>Example</u> :

C:\APR8\MESURES\ESSAI.SIT\13011997.REJ\13020511.MEC (LF file)

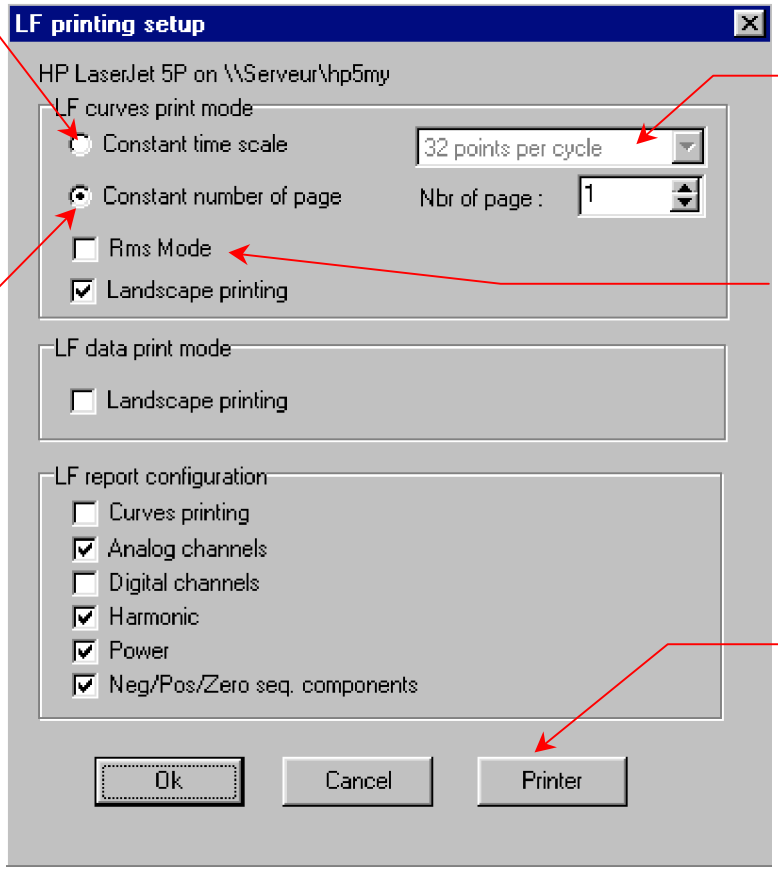
C:\APR8\MESURES\ESSAI.SIT\13011997.REJ\13020511.CFG
C:\APR8\MESURES\ESSAI.SIT\13011997.REJ\13020511.DAT
C:\APR8\MESURES\ESSAI.SIT\13011997.REJ\13020511.HDR
} (COMTRADE files)

Printing of curves and values

Click icon to setup the printing parameters of curves, of values, of the report and select the printer.

The constant time scale allows to always get a graph with a identical time scale (the number of pages can vary)

Restitution always depends on a constant number of pages (but the time scale can be enlarged or decreased)



For 40 seconds, select 3 pages or 8 points by cycle

Drawings of curves in rms value

Selection and setup of printing

Setup of printing

Note : In case of a printing in constant number of pages, comparing restitutions of two different recordings can be impossible because the time scale can be different. If you wish to compare restitutions of several recordings, select "Constant time scale" mode.

Click the icon to print all the curves. The printing setup depends on the displaying (colours, channels, scales).

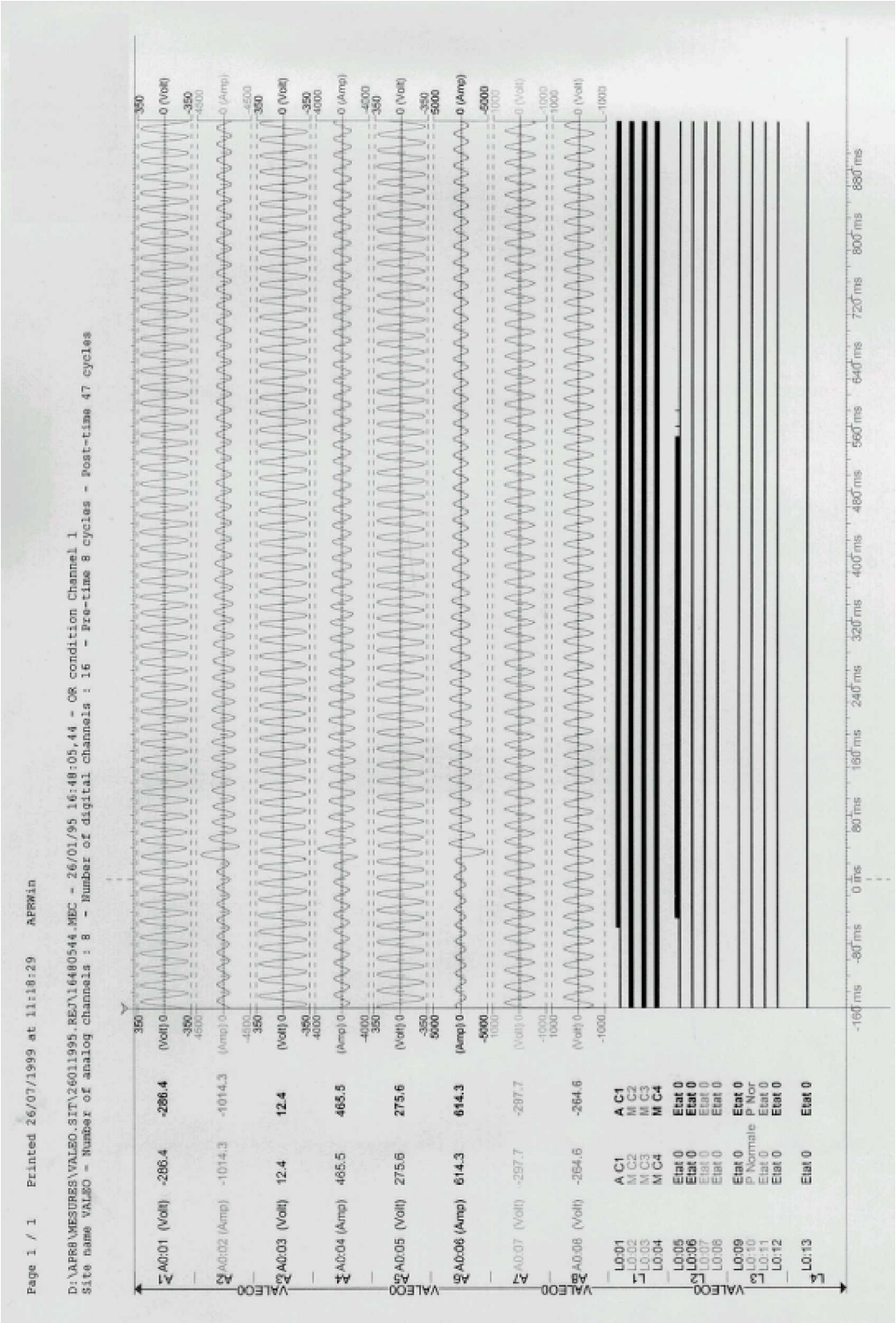
Click the icon to print curves displayed on screen (zoom).

Click the icon to print the measurement contained in the selected tab (Vrms, digital links, harmonics, powers …).

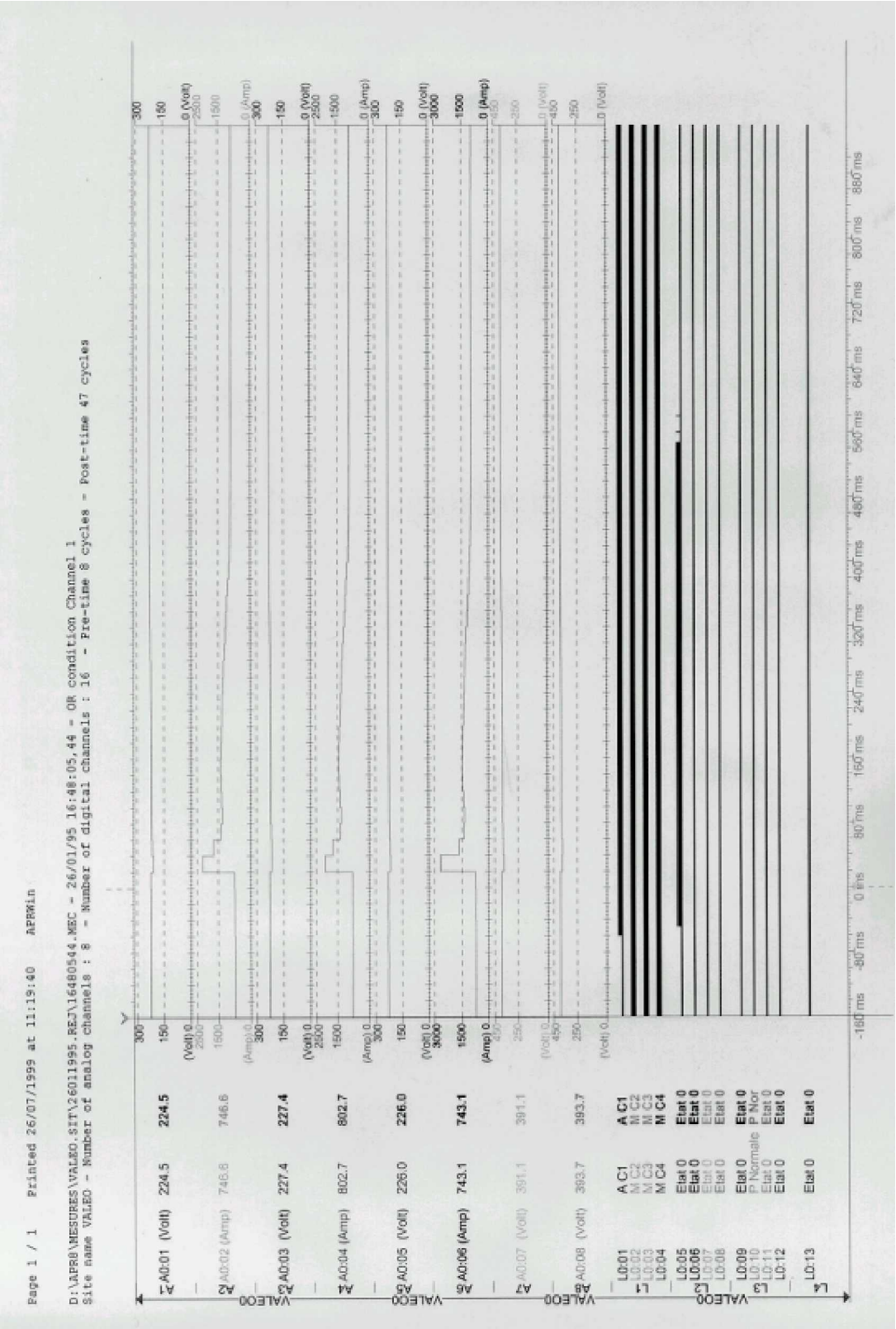
Click the icon to print the report (Curves and measurements).

The following pages shows examples of restitutions (Curves and values).

Examples of printing



Curve point to point



Example of curve in rms value

Printed 23/07/1999 at 13:29:22 APRWin

Analog channels

t = -200 ms

Site name ..... : MIGNALOU
File name ..... : D:\APR8\MESURES\MIGNALOU.SIT\01071995.REJ\05433754.MEC
Number of analog channels : 16
Number of digital channels : 32
Pre-time ..... : 10 cycles
Post-time ..... : 55 cycles

A0:01 U1 TR411	0,0 Volt	A0:02 I1 ARR T411	0,0 AMP
A0:03 U2 TR411	0,0 Volt	A0:04 I2 ARR T411	0,0 AMP
A0:05 U3 TR411	0,0 Volt	A0:06 I3 ARR T411	47,5 AMP
A0:07 In T411	0,0 AMP	A0:08 Ih ARR T411	1,3 AMP
A0:09 U1 TR412	14992,7 Volt	A0:10 I1 ARR T412	213,5 AMP
A0:11 U2 TR412	16831,1 Volt	A0:12 I2 ARR T412	199,8 AMP
A0:13 U3 TR412	5896,0 Volt	A0:14 I3 ARR T412	334,7 AMP
A0:15 In T412	142,3 AMP	A0:16 Ih ARR T412	47,4 AMP

Printing of the rms value on the analog links

Printed 23/07/1999 at 13:32:02 APRWin

Digital channels

t = -200 ms

Site name ..... : MIGNALOU
File name ..... : D:\APR8\MESURES\MIGNALOU.SIT\01071995.REJ\05433754.MEC
Number of analog channels : 16
Number of digital channels : 32
Pre-time ..... : 10 cycles
Post-time ..... : 55 cycles

L0:01 AUTO RAPIDE	HORS SERVI	(0)	L0:17 PROT ASLONN	Etat 0	(0)
L0:02 SHUN POLE A	OUVERT	(0)	L0:18 ETAT ASLONN	Etat 0	(0)
L0:03 SHUN POLE B	OUVERT	(0)	L0:19 PROT SMARVE	Etat 0	(0)
L0:04 SHUN POLE C	FERME	(1)	L0:20 ETAT SMARVE	Etat 0	(0)
L0:05 PROT TR411	Etat 0	(0)	L0:21 PROT BIGNOU	Etat 0	(0)
L0:06 ETAT AR 411	Etat 1	(1)	L0:22 ETAT BIGNOU	Etat 0	(0)
L0:07 PROT TR412	Etat 1	(1)	L0:23 PROT CE EQU	Etat 0	(0)
L0:08 ETAT AR 412	Etat 0	(0)	L0:24 ETAT CE EQU	Etat 0	(0)
L0:09 PROT GrORME	Etat 0	(0)	L0:25 PROT VILLED	Etat 1	(1)
L0:10 ETAT GrORME	Etat 0	(0)	L0:26 ETAT VILLED	Etat 0	(0)
L0:11 PROT DIENNE	Etat 0	(0)	L0:27 PROT SAVIGN	Etat 0	(0)
L0:12 ETAT DIENNE	Etat 0	(0)	L0:28 ETAT SAVIGN	Etat 0	(0)
L0:13 PROT CHANTE	Etat 0	(0)	L0:29 PROT RESERV	Etat 0	(0)
L0:14 ETAT CHANTE	Etat 0	(0)	L0:30 ETAT RESERV	Etat 0	(0)

Printing of the state of the digital links

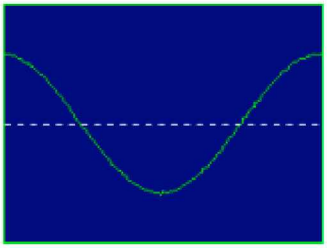
Printed 23/07/1999 at 13:37:07 APRWin

Harmonics : A0:09 U1 TR412

t = -200 ms

Site name ..... : MIGNALOU
File name ..... : D:\APR8\MESURES\MIGNALOU.SIT\01071995.REJ\05433754.MEC
Number of analog channels : 16
Number of digital channels : 32
Pre-time ..... : 10 cycles
Post-time ..... : 55 cycles

T: -140 ms Rms: 11997,1 Volt Fond: 11948,0 Volt DC comp.: 58,6 Volt



Number 2:	0,1 %	10,4 Volt	Number 3:	0,0 %	0,0 Volt
Number 4:	0,1 %	7,3 Volt	Number 5:	0,3 %	30,2 Volt
Number 6:	0,0 %	0,0 Volt	Number 7:	0,2 %	22,0 Volt
Number 8:	0,1 %	7,3 Volt	Number 9:	0,3 %	36,6 Volt
Number 10:	0,0 %	0,0 Volt	Number 11:	0,0 %	0,0 Volt
Number 12:	0,0 %	0,0 Volt	Number 13:	0,0 %	0,0 Volt
Number 14:	0,0 %	0,0 Volt	Number 15:	0,0 %	0,0 Volt
Number 16:	0,0 %	0,0 Volt	Number 17:	0,0 %	0,0 Volt
Number 18:	0,0 %	0,0 Volt	Number 19:	0,0 %	0,0 Volt
Number 20:	0,3 %	32,8 Volt	Number 21:	0,0 %	0,0 Volt
Number 22:	0,0 %	0,0 Volt	Number 23:	0,0 %	0,0 Volt
Number 24:	0,0 %	0,0 Volt	Number 25:	0,0 %	0,0 Volt
Number 26:	0,0 %	0,0 Volt	Number 27:	0,0 %	0,0 Volt
Number 28:	0,0 %	0,0 Volt	Number 29:	0,0 %	0,0 Volt
Number 30:	0,0 %	0,0 Volt	Number 31:	0,0 %	0,0 Volt
Number 32:	0,0 %	0,0 Volt	Number 33:	0,0 %	0,0 Volt
Number 34:	0,0 %	0,0 Volt	Number 35:	0,0 %	0,0 Volt
Number 36:	0,0 %	0,0 Volt	Number 37:	0,0 %	0,0 Volt
Number 38:	0,0 %	0,0 Volt	Number 39:	0,0 %	0,0 Volt
Number 40:	0,5 %	59,0 Volt	Number 41:	0,0 %	0,0 Volt
Number 42:	0,0 %	0,0 Volt	Number 43:	0,0 %	0,0 Volt
Number 44:	0,0 %	0,0 Volt	Number 45:	0,0 %	0,0 Volt
Number 46:	0,0 %	0,0 Volt	Number 47:	0,0 %	0,0 Volt
Number 48:	0,1 %	16,4 Volt	Number 49:	0,6 %	76,5 Volt
Number 50:	0,2 %	26,4 Volt	Number 51:	0,0 %	0,0 Volt
Number 52:	0,0 %	0,0 Volt	Number 53:	0,0 %	0,0 Volt
Number 54:	0,0 %	0,0 Volt	Number 55:	0,0 %	0,0 Volt
Number 56:	0,0 %	0,0 Volt	Number 57:	0,0 %	0,0 Volt
Number 58:	0,0 %	0,0 Volt	Number 59:	0,4 %	46,3 Volt
Number 60:	0,0 %	0,0 Volt	Number 61:	0,0 %	0,0 Volt
Number 62:	0,0 %	0,0 Volt	Number 63:	0,0 %	0,0 Volt

Printing of harmonics (in numerical mode)

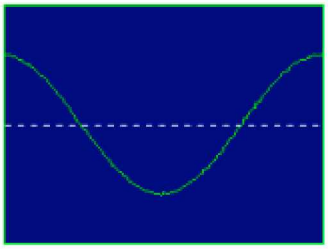
Printed 23/07/1999 at 13:39:28 APRWin

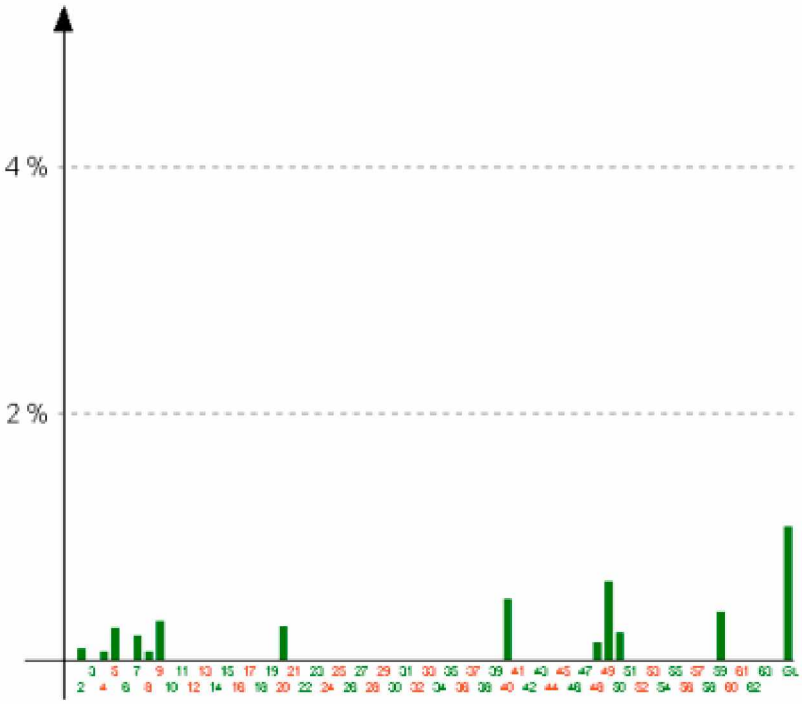
Harmonics : A0:09 U1 TR412

t = -200 ms

Site name ..... : MIGNALOU
File name ..... : D:\APR8\MESURES\MIGNALOU.SIT\01071995.REJ\05433754.MEC
Number of analog channels : 16
Number of digital channels : 32
Pre-time ..... : 10 cycles
Post-time ..... : 55 cycles

T: -140 ms Rms: 11997,1 Volt Fond: 11948,0 Volt DC comp.: 58,6 Volt





Printing of harmonics (in graphic mode)

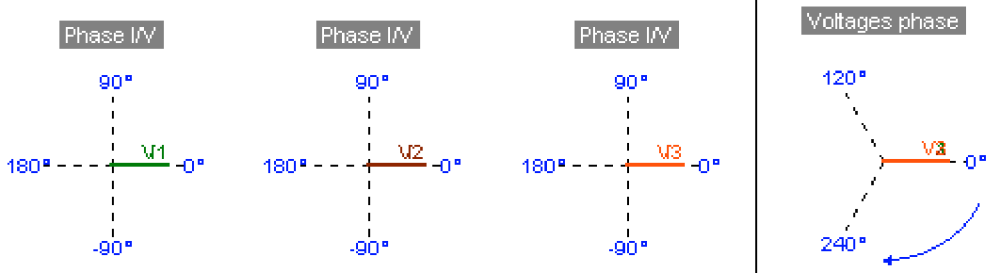
Printed 23/07/1999 at 13:40:29 APRWin

Triphase power with neutral

t = -200 ms

Site name ..... : MIGNALOU
File name ..... : D:\APR8\MESURES\MIGNALOU.SIT\01071995.REJ\05433754.MEC
Number of analog channels : 16
Number of digital channels : 32
Pre-time ..... : 10 cycles
Post-time ..... : 55 cycles

M0:01 U1 / I1	M0:02 U2 / I2	M0:03 U3 / I3	TOTAL
V : 0,000 V	V : 0,000 V	V : 0,000 V	
I : 0,000 A	I : 0,000 A	I : 47,744 A	
P : 0,000 kW	P : 0,000 kW	P : 0,000 kW	P : 0,000 kW
Q : 0,000 kVAR	Q : 0,000 kVAR	Q : 0,000 kVAR	Q : 0,000 kVAR
S : 0,000 kVA	S : 0,000 kVA	S : 0,000 kVA	S : 0,000 kVA
φ : 0,000 °	φ : 0,000 °	φ : 0,000 °	V1/V2 : 0,000 °
cos φ : 1,000	cos φ : 1,000	cos φ : 1,000	V1/V3 : 0,000 °
tg φ : 0,000	tg φ : 0,000	tg φ : 0,000	V2/V3 : 0,000 °
Fp : 0,000	Fp : 0,000	Fp : 0,000	



Printing of the power

```
Printed 23/07/1999 at 13:44:10    APRWin
```

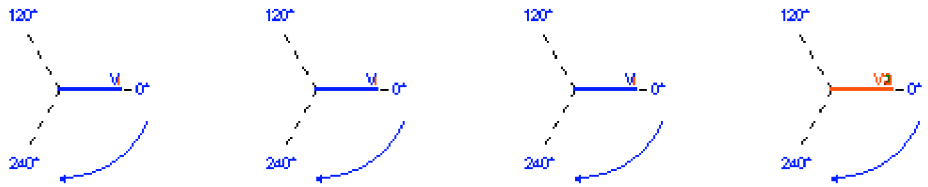
Pos./Neg./Zero Sequence Components

```
t = -200 ms

Site name ........... : MIGNALOU
File name ........... : D:\APR8\MESURES\MIGNALOU.SIT\01071995.REJ\05433754.MEC
Number of analog channels : 16
Number of digital channels : 32
Pre-time ..................... : 10 cycles
Post-time .................... : 55 cycles
```

M0:01 U1 / I1	M0:02 U2 / I2	M0:03 U3 / I3	Unbalanced rate
U : 0,000 V I : 0,000 A	U : 0,000 V I : 0,000 A	U : 0,000 V I : 47,744 A	Voltage rate : 0,000 % Current Rate : 0,000 %

Zero sequence component	Negative component	Positive component	Voltages phase
Voltage : 0,000 V Current : 0,000 A	Voltage : 0,000 V Current : 0,000 A	Voltage : 0,000 V Current : 0,000 A	V1/V2 : 0,000 ° V1/V3 : 0,000 ° V2/V3 : 0,000 °

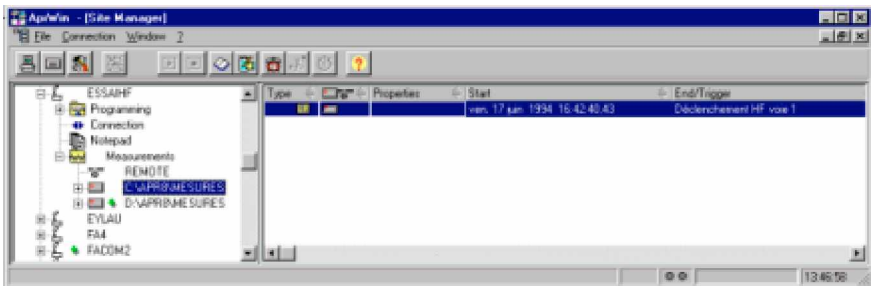


Printing of Pos/Neg/Zero sequence components

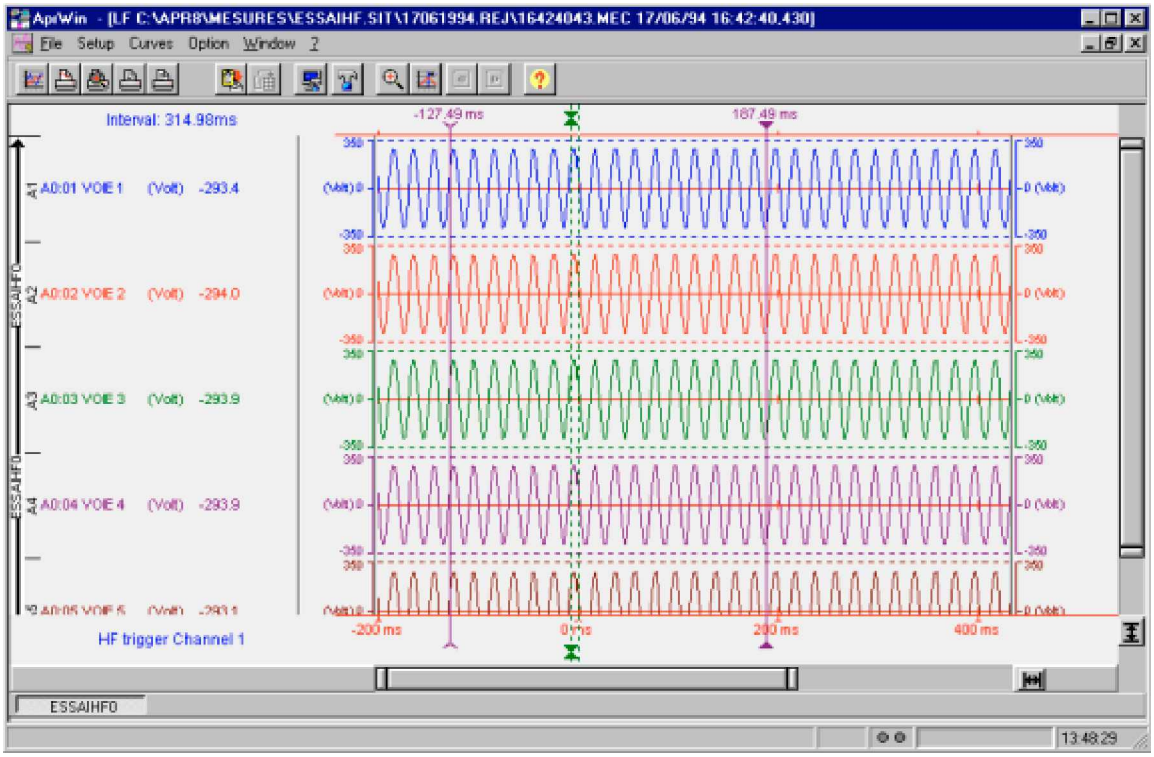
HF measurements

Information about HF measurements

An HF event always depends on an LF event. Select an associated LF event in the site manager to process an HF event (Double click to display it).



Choice of measurements in the site manager



Displaying of LF measurements

Click the icon to display HF event.

Active cursor

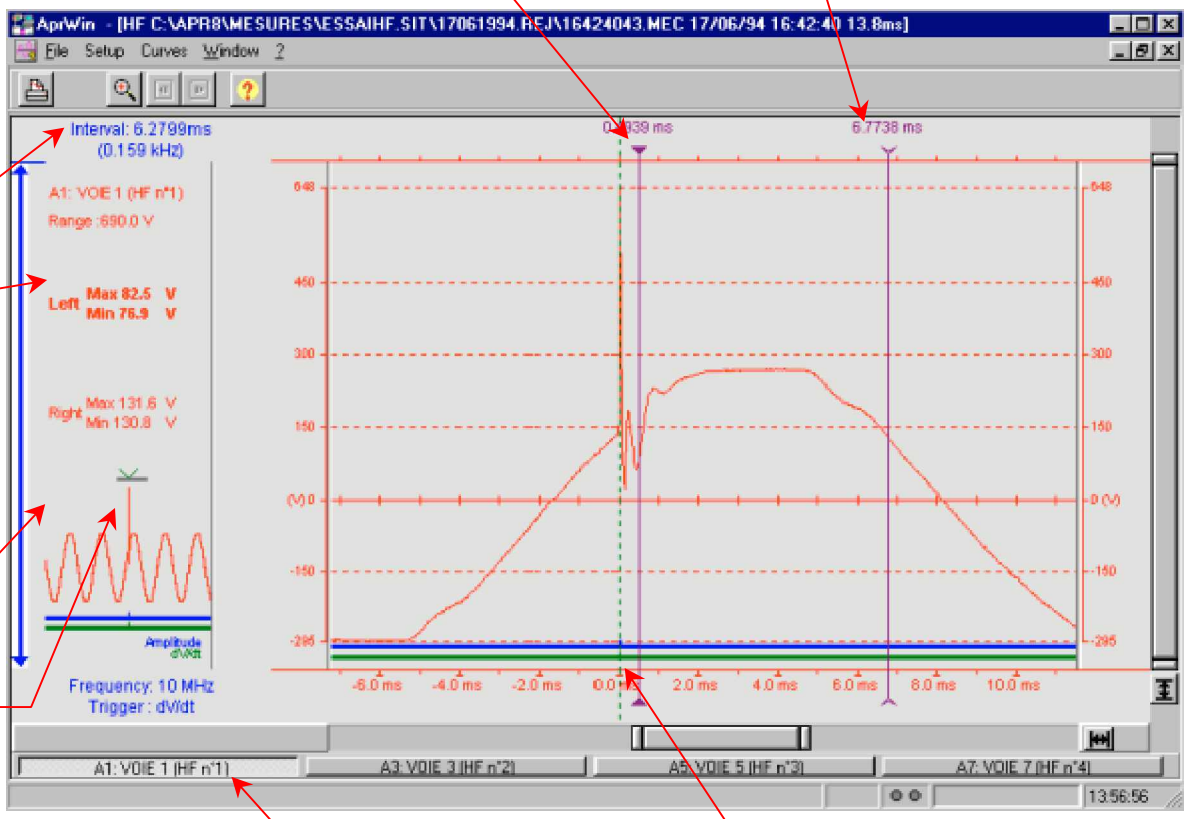
Inactive cursor

Interval between cursors

Measurement of the Maxi/Mini left cursor. (An excursion can be measured)

Windows that displays the complete signal

Click the graph to set displaying at the good place.

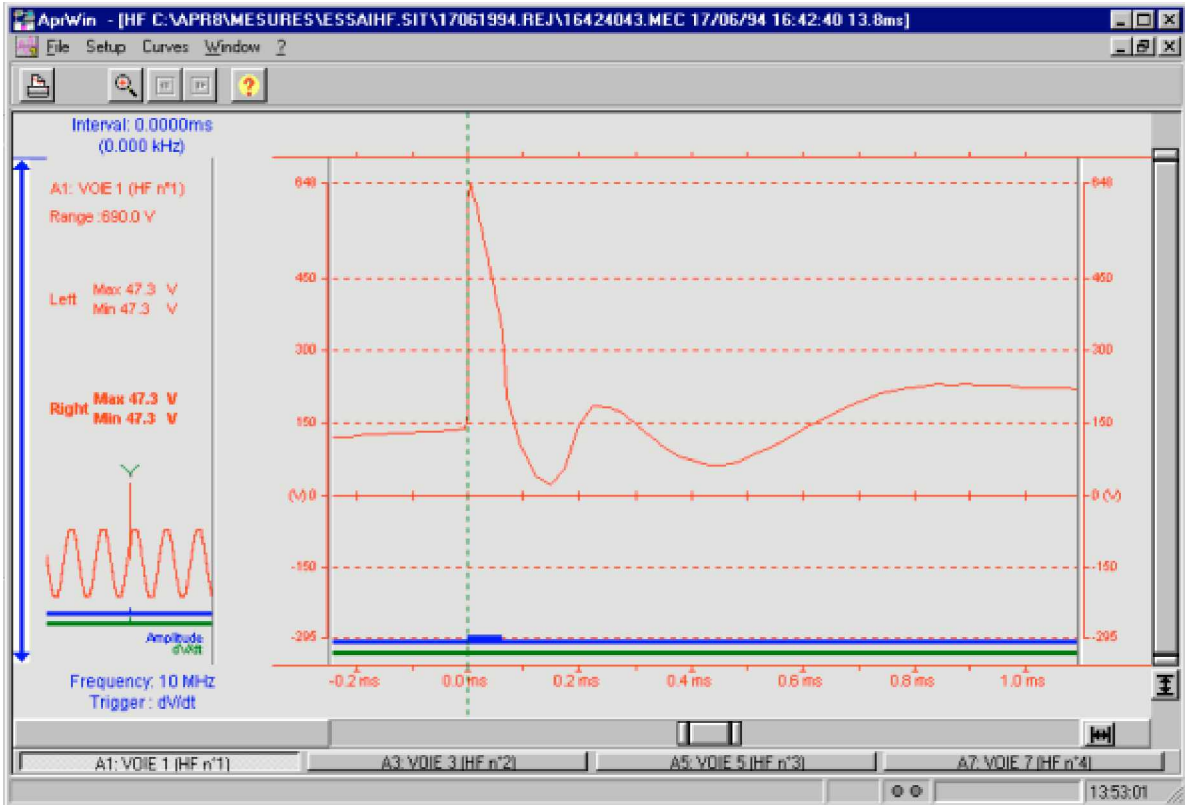


Displaying of the HF event

Activation / unactivation of channels

Lines that represents triggers (Amplitude and dv / dt)

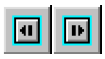
You can zoom the signal by using the mouse (Drag and drop).



Zoom on the HF curve

Click the  icon to print curves.

Click the  icon for zooming between cursors.

Click the  icon to display the previous or next file.

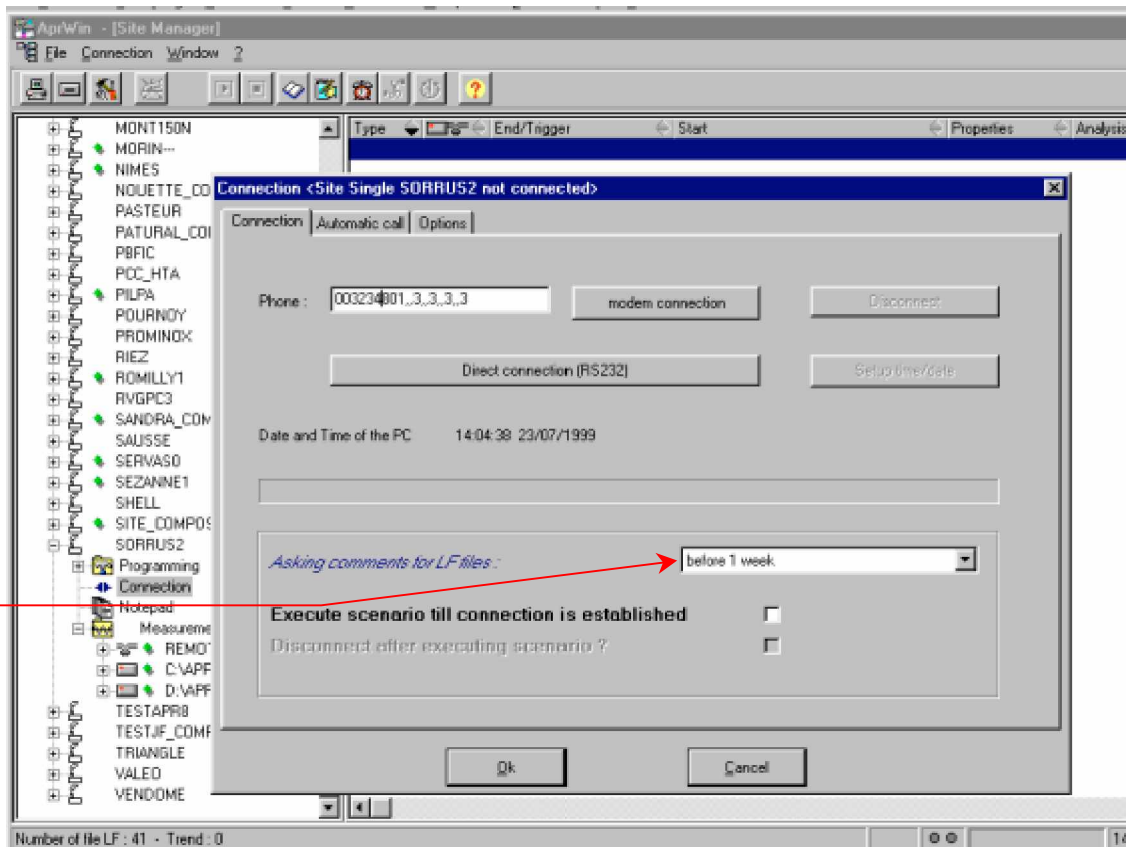
Transmission with a site

Manual transmission

Manual transmission is run by the user. Click the *connection* branch of the site for connecting.

Note : Connection is not possible if the site is not correctly created (For example, if the APR n° are missing).

To accelerate transmission, do not ask the comments of LF events (ask them the last week, for example)



Manual connection to a site

Click *OK* to quit the window and save the parameters (Phone N°, options), and *Cancel* to quit without saving.

To dialog by serial link (direct connection), click the *Direct connection* button. To dialog by modem, enter the phone number and click the *Modem connection* button.

Caution : Do not confuse direct connection and INTERLNK connection (see page 124).

Direct connection allows to completely drive the APR remotely. INTERLNK connection just allows to transfer files.

The number can contain special characters :

W : Wait of tone : used to go out from an autoswitch

(Example : 0W2021222324)

, : Waiting of 1 second between 2 figures (Example: 2023242526,,,, 4 to number the 2023242526 and switch on the channel 4 of a phone switch) .

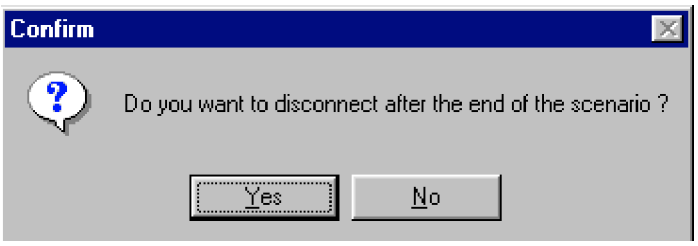
The following message is displayed in case of connection between two different sites :

Notes :

- The first connection between PC and APR could be long a bit because the PC is going to restore all the contents of the site directory.

- In case of complete APR setup, you have to create the site, create parameters and select it to be exported.

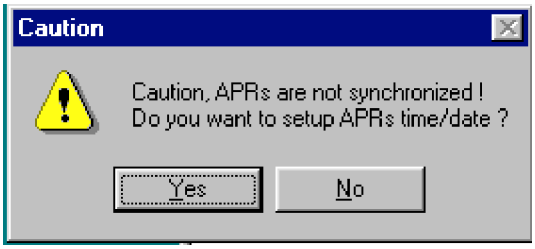
If you ask to run the manual scenario , the software asks if you wish to disconnect at the end of its scenario :



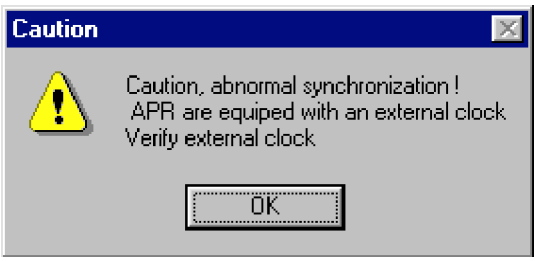
Confirmation before disconnecting

Note : When a LF file is imported on PC, the associated HF files are automatically imported.

During a connection in a composed site, if internal clock of the APRs are not synchronous, a warning message is displayed (If the APR is not synchronized by an external clock).



If the APR are connected to an external clock (SCLE, ACEB, MOUSECLOCK) and if synchro is wrong, another warning message is displayed :

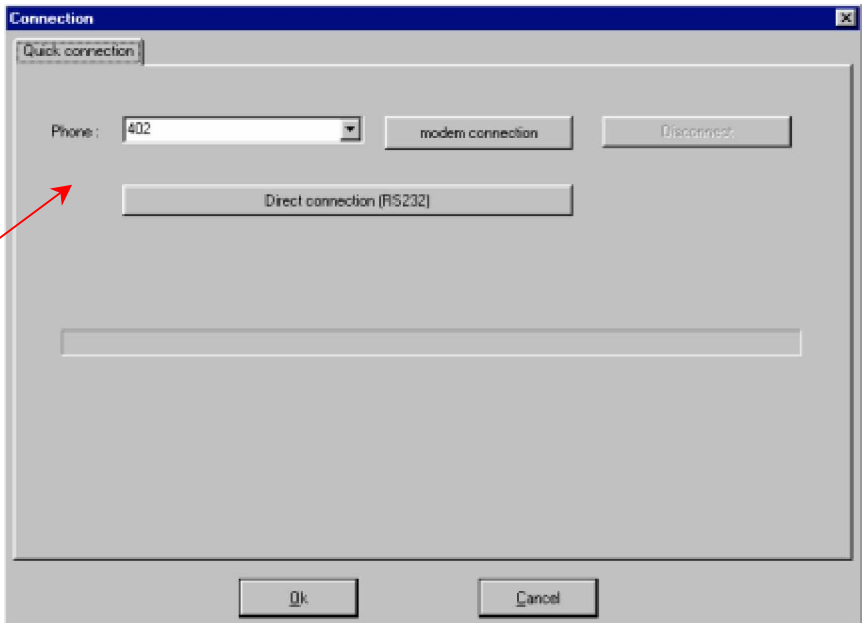


Quick connexion

If you wish to connect you to a single APR without creating the site first, you can use the menu in the branch automatic connection of the site manager.

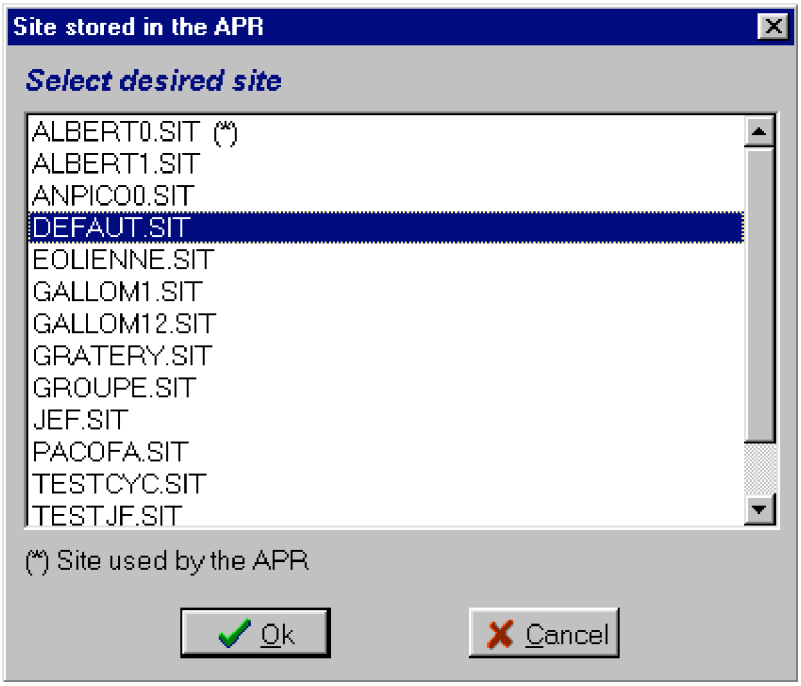
Phone number of the site

Note: The last used numbers are saved and available in the listbox



Establishment of a quick connection

In that case, the PC establishes connection and displays the list of the sites available on the APR. Then, select the site on which you want to work.

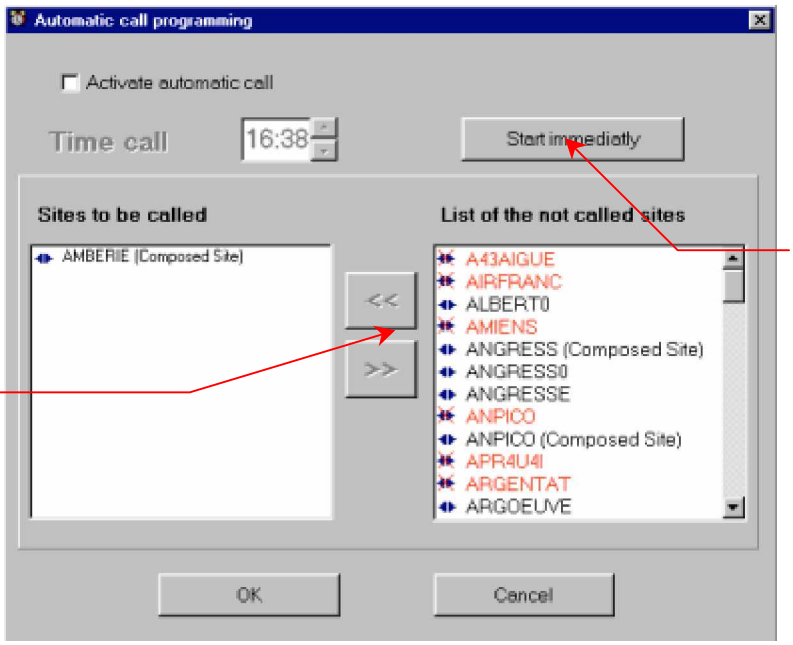


List of sites saved on the APR

If the site was not created in the site manager, it is automatically created.

Automatic transmission

Automatic transmission starts as soon as the call time is reached and if the PC is on (APRWIN software in running). The transmission can also be manually run by pressing the " Start immediatly " button.



Click here to "force" call

Select one or several sites to be called and use arrows to add or delete them from the list.

The icon before the site means that the phone n° did not correctly enter into the site (connection branch). See parameters of the connection in the site manager (see page 10).

Sites described in the *Automatic call programming* menu are called one after the others and the scenari which concern them are run.

Scenari is defined in the "connection" window of the site (see page 10).

Example of scenario :

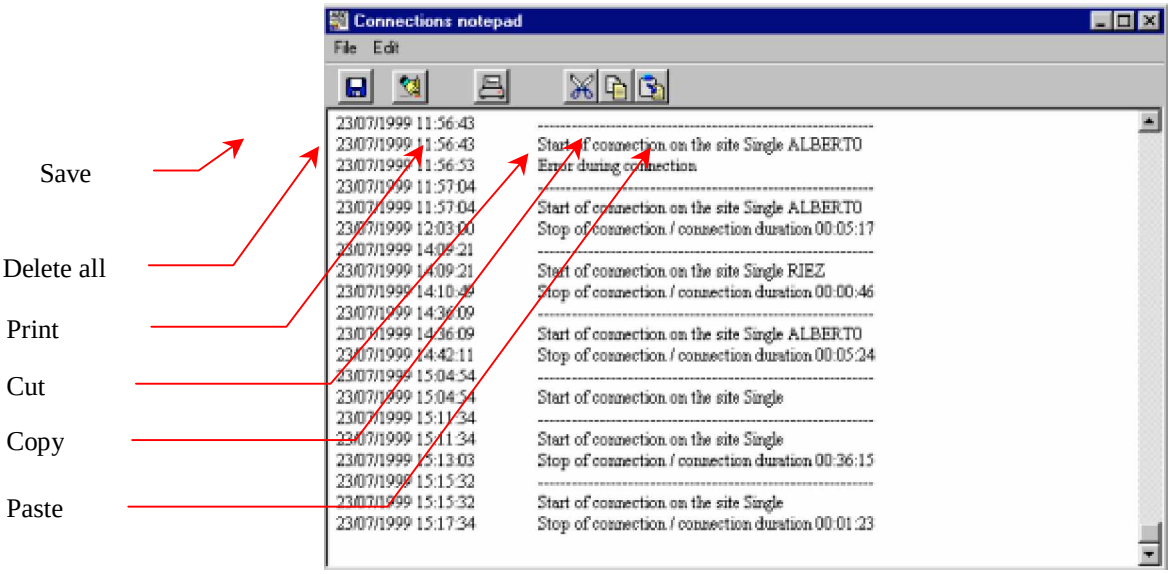
- Import of LF files dating of more than 1 week,
- Deletion of LF files dating of more than 24H
- Import of the trend files dating of more than 1 week
- Deletion of the trend files dating of more than 1 month
- Export of some GIS mapping files GDO towards the APR (For SANDRA's use)

The "result" of the automatic call is stored in the "transmission notepad".

Connection notepad

Display the connection notepad of all the sites. All the commands of "start/stop connection" are notified in this notepad. So, the notepad can be likened to a black box. Think of emptying regularly the connection notepad.

To erase a part of the connection notepad, select the part to be erased and *Edit/Cut* or use the  icon.

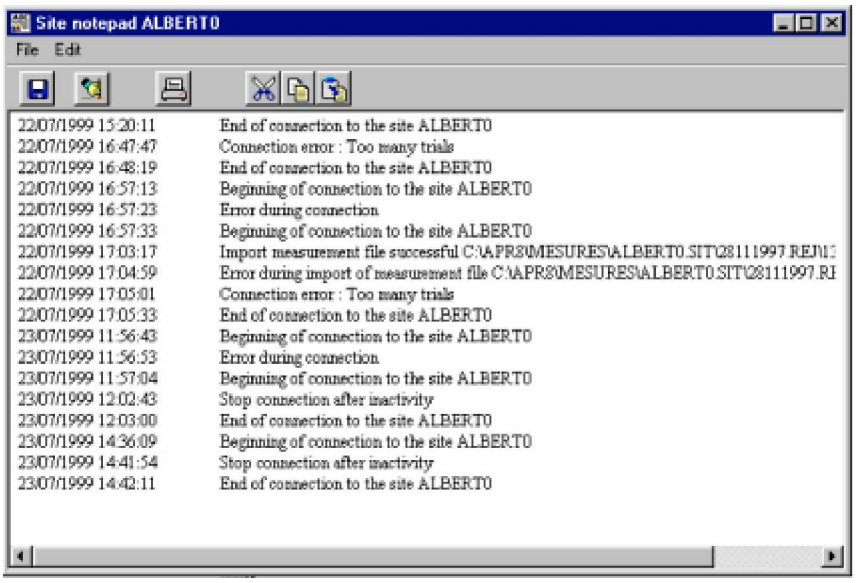


Example of connection notepad

Site notepad

All the commands of transmission which concern this site are notified in this notepad. The site notepad can so be likened to a black box. Think of emptying regularly the notepad.

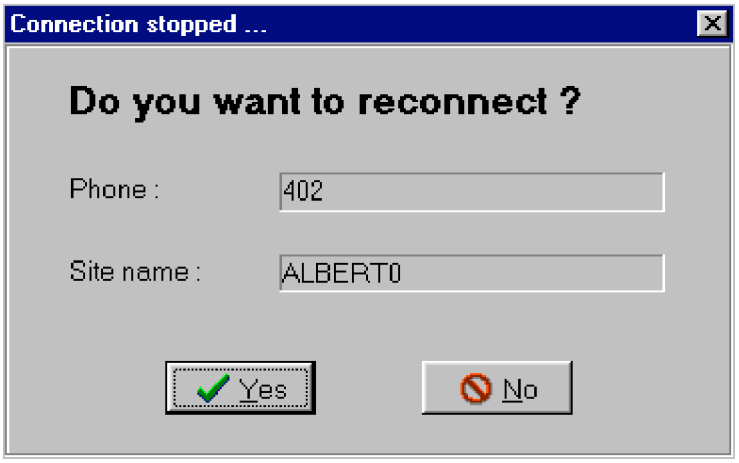
To erase a part of the connection notepad, select the part to be erased and *Edit/Cut* or use the  icon.



Example of site notepad

End of connection

If connection is cut during a transmission by modem between the PC and the APR (in manual mode), the following window appears.



Click *Yes* to restart or *No* to abort.

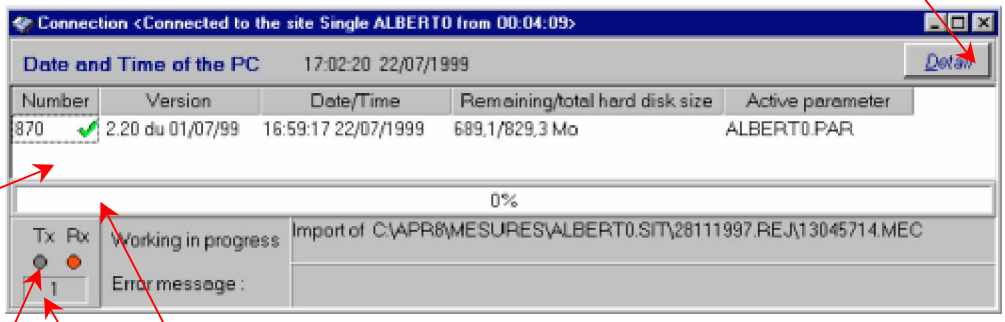
If transmission is regularly cut, it will be necessary to check the state of your telephone line. Check or replace the protection devices (lightning arresters and BHRD) located in the APR substation.

Transmission screen (Telemaintenance)

A screen allows to check if one or several APR are correctly connected to the PC and allows to receive information (Serial n°, version, date/time, capacity of the hard disk and options)

A red mark ✘ indicates a problem on the APR (BFOP not connected for example or APR does not answer)

Click the Detail button to get the list of realized commands and to be realized



The ✔ icon shows a good operating of the APR

When the PC dialog with the APR, Receive (Rx) and Transmit (Tx) leds has to light on

The progress bar represents the % of files transfered. % is correct only if the APR is equipped with a version **V2.20**

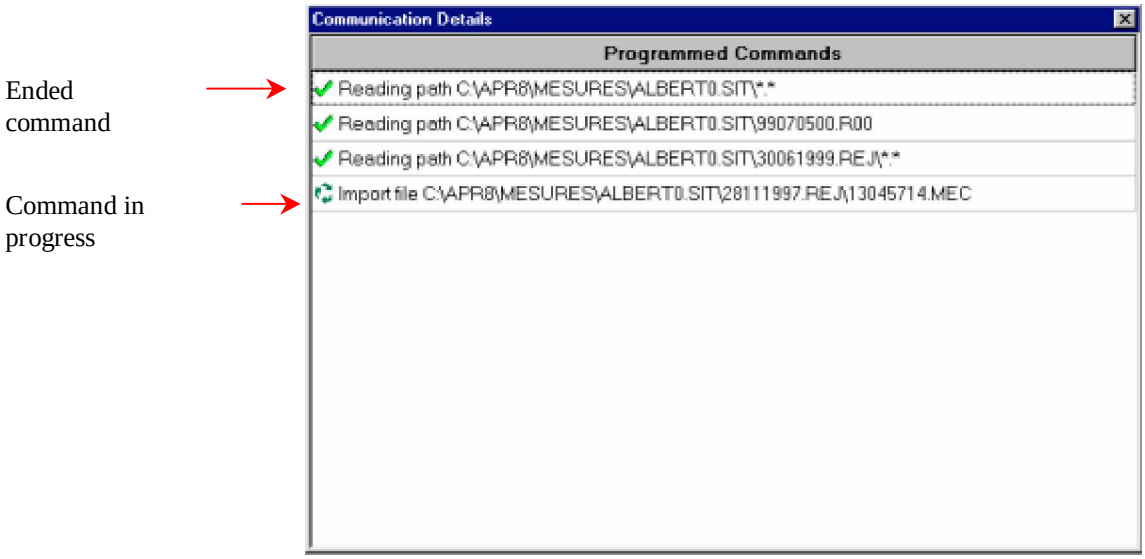
Number of commands to be run

Use the icon to cut connection. Click the icon to update.

Click the icon to import the characteristics of one or all remote APR (Use this command when modifications has been done on the site to update the PC data base).

<u>Note</u>: The characteristics of the remote APR are automatically restored during the first site connection.

Click the Detail button to get the list of ended commands and commands to be run. (Caution : this window must be closed after using).



Detail of ended commands and commands to be run

Inactivity of the phone line

In case of inactivity of the phone line (no more transfers), and after duration set in the setup, the software displays the following window :

Click *Yes* to continue. If nothing is done, connection cuts after the set duration.

The inactivity duration by default is set to 10 minutes.

In case of trouble

The serial port of the modem link must be free for transmission.

Example: in case of an OLITEC modem/fax, the monitor/fax must be inactive.

First transmission to a site could be long because the program must update the "remote" data base.

Measures in real time

Information about measures in real time

When connection between the PC and the site is established, the measurements of the APR can be displayed in real time.

Use the *Real-time* menu or the  icon.

Then, the following measurements can be displayed :

- Rms values (Voltage and currents)
- State of the digital channels
- Harmonics under numerical mode (Value of the numbers from 2 to 63 + global rate)
- Harmonics under graphic mode
- Singlephased powers (active / reactive / apparent)
- Triphased powers (active / reactive / apparent)
- Harmonic power.
- Pos/Neg/Zero sequence components
- Info

Data are regularly refreshed. The interval of refreshment is according to the transmission speed (Average of about 10 seconds).

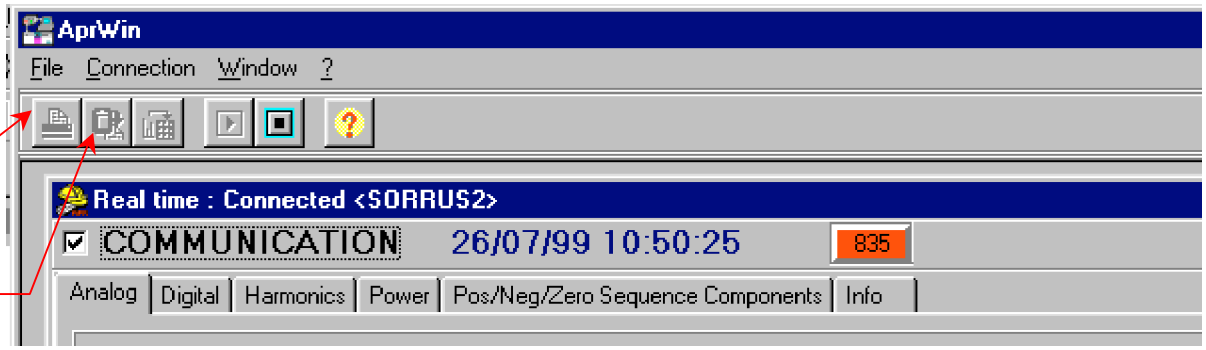
The red square 

indicates the APR in course of polling (n° 870 here). The displayed time is the APR time (the master PC in case of composed site).

To stop real time, uncheck the *Communication* box or click the STOP icon. To start real time, check the *Communication* box or click the START icon.

Printing of the selected measurement

Copy of the selected measurement into the clipboard



Example of real-time window

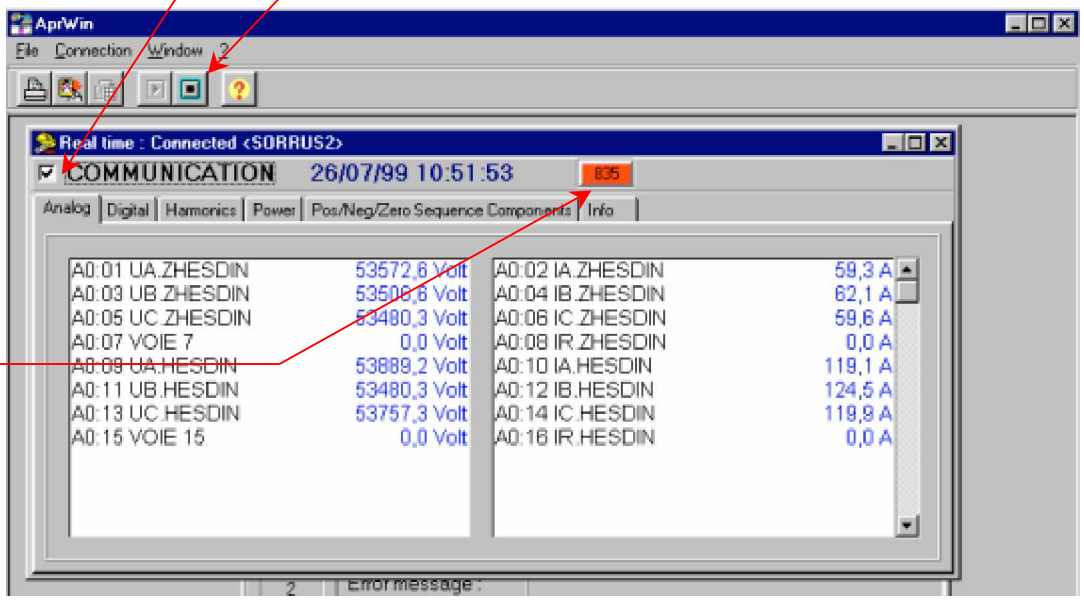
Click the icon to stop connection.

Rms values

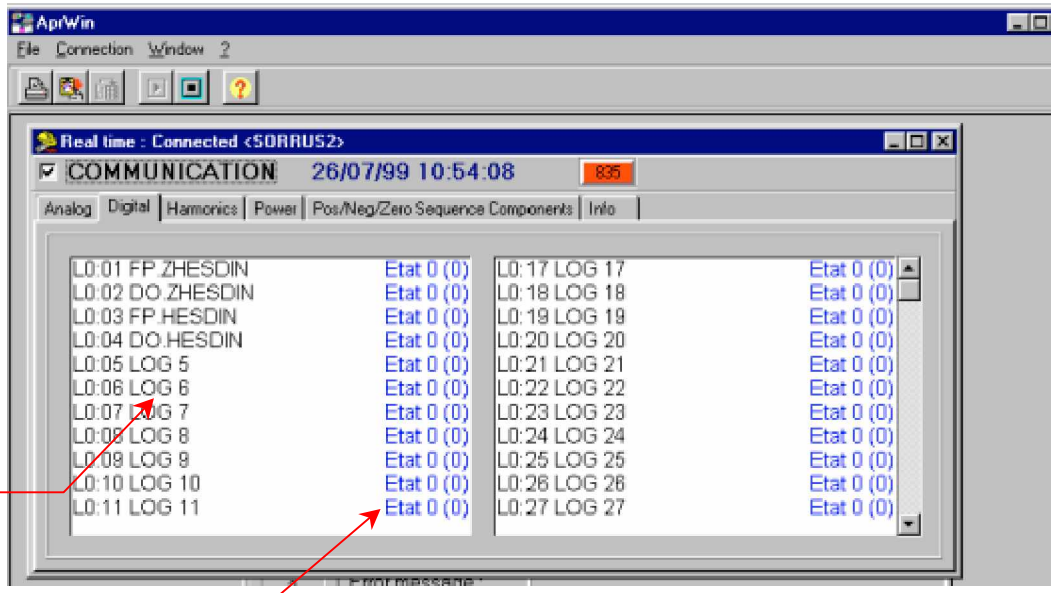
Stop the requirement of measurements

Stop the connection

N° of the poll APR



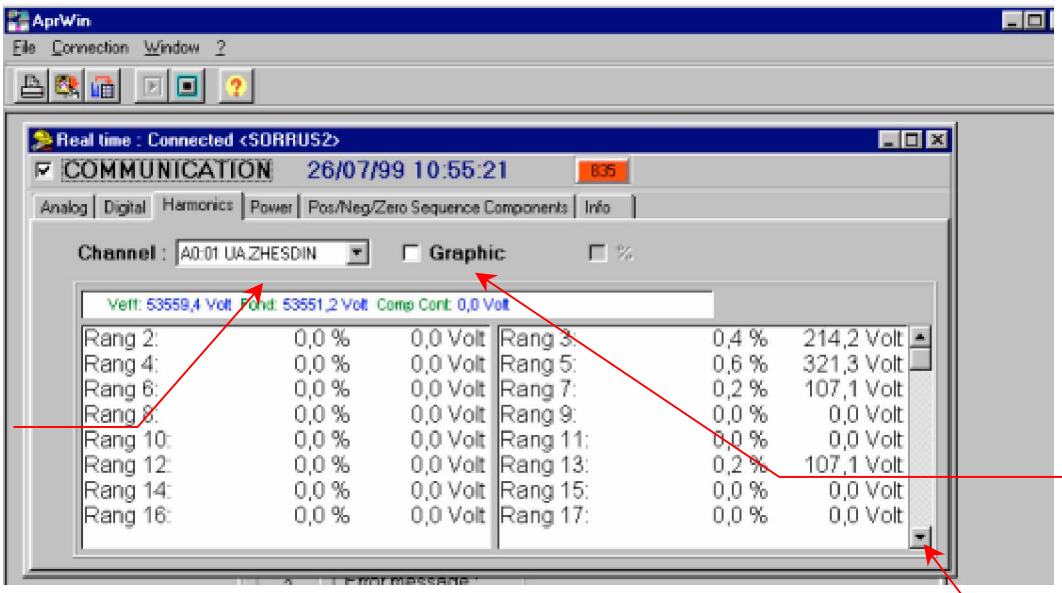
Digital channels



Name of the channel

State of the channel
0 : Low status
1 : High status

Harmonics

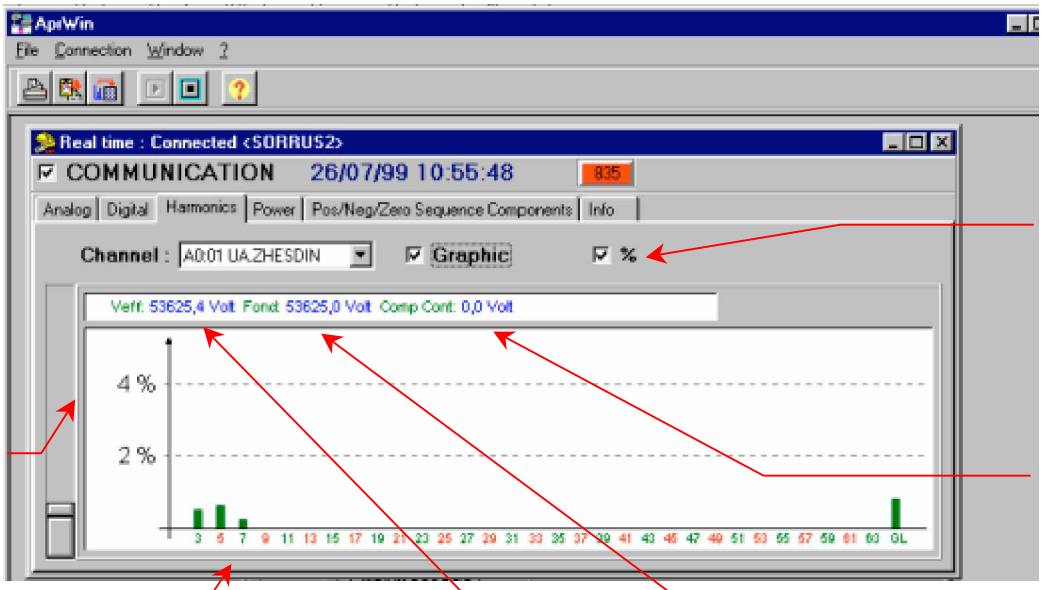


Choice of the channel to be displayed

Click here to display the graph

Harmonics in numerical mode

Use scroll bar to display the next numbers.



Displaying in % or in value

Use the scroll bar to change the displaying scale of harmonics

DC component

Harmonics in graphic mode

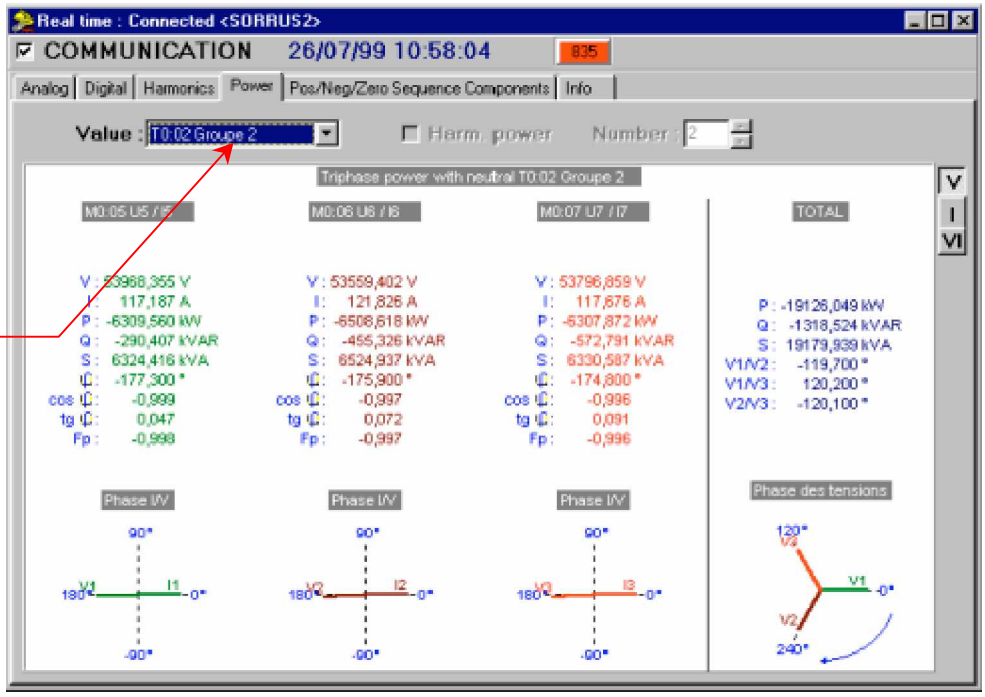
Fundamental

Click a number to know its value

Rms value

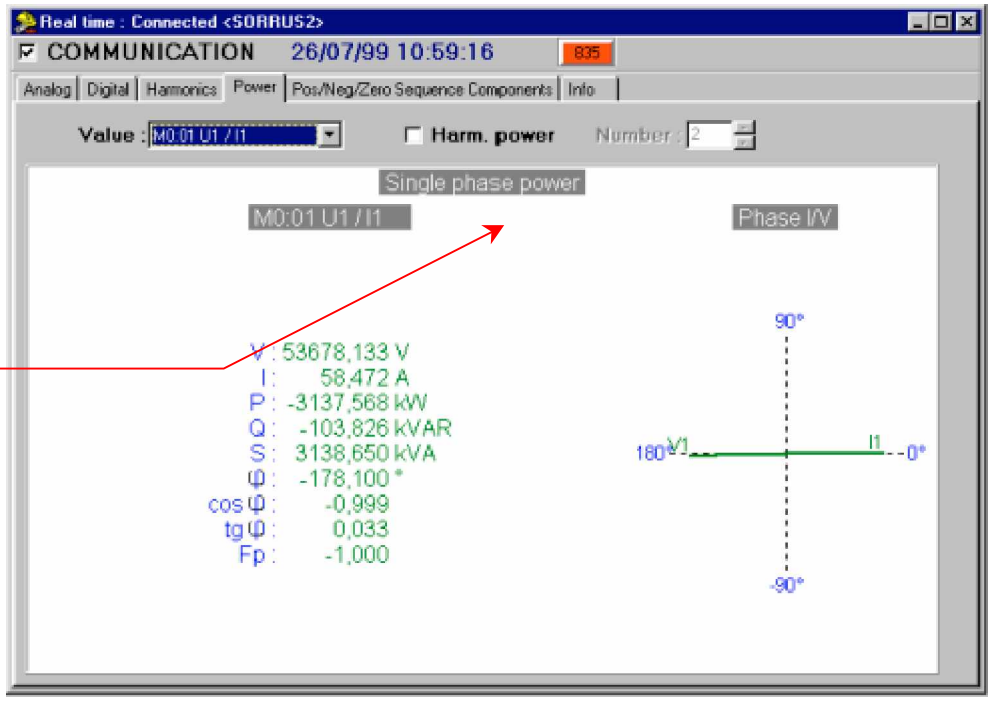
Powers (Triphased, Singlephased, Harmonic)

Choice of the group or the channel

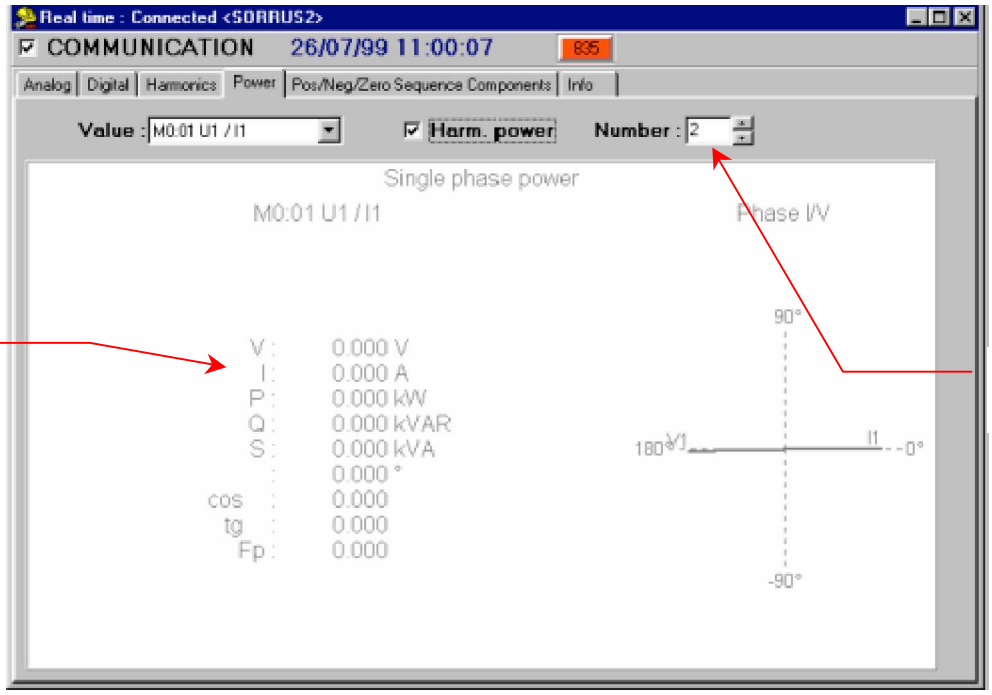


Triphased power

Click here to display the harmonic power



Singlephased power



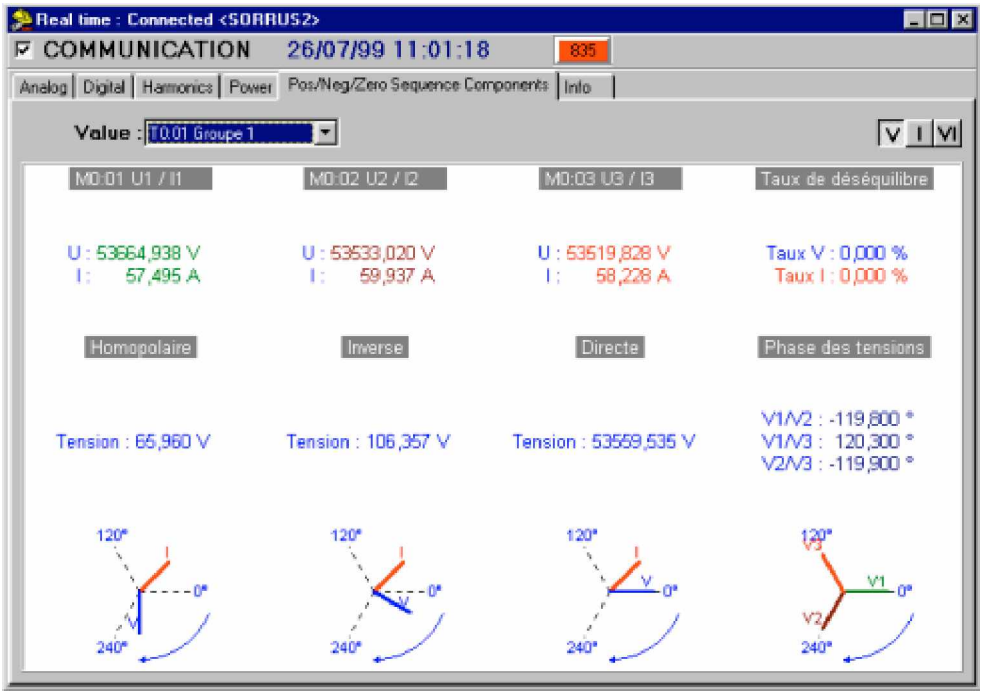
Voltage/current harmonic of the selected number.

Selection of the number

Harmonic power

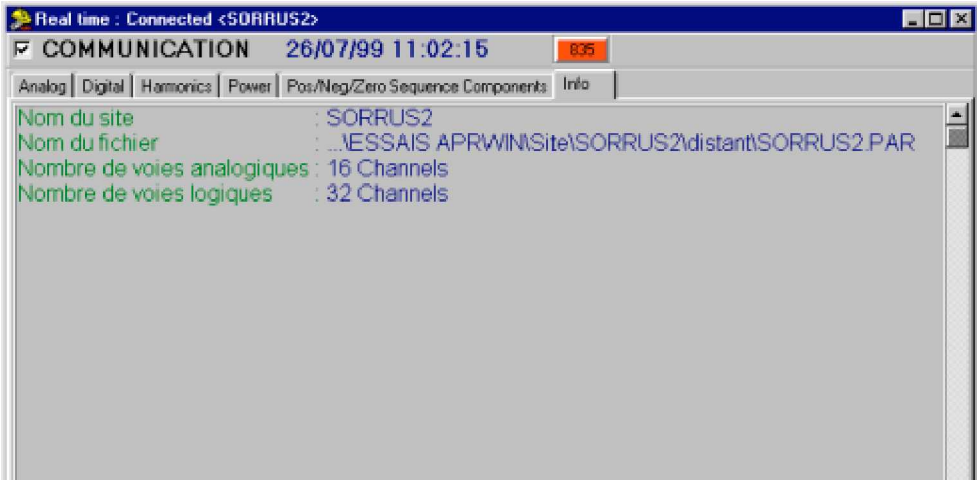
Note : The measurements of harmonics and of harmonic powers are valid only if the APR sampling frequency is synchronized on the analyzed network frequency.

Pos/Neg/Zero sequence components



$$\text{Rate of unbalance} = \frac{\textit{Positive voltage}}{\textit{Negative voltage}} \times 100$$

Miscellaneous information



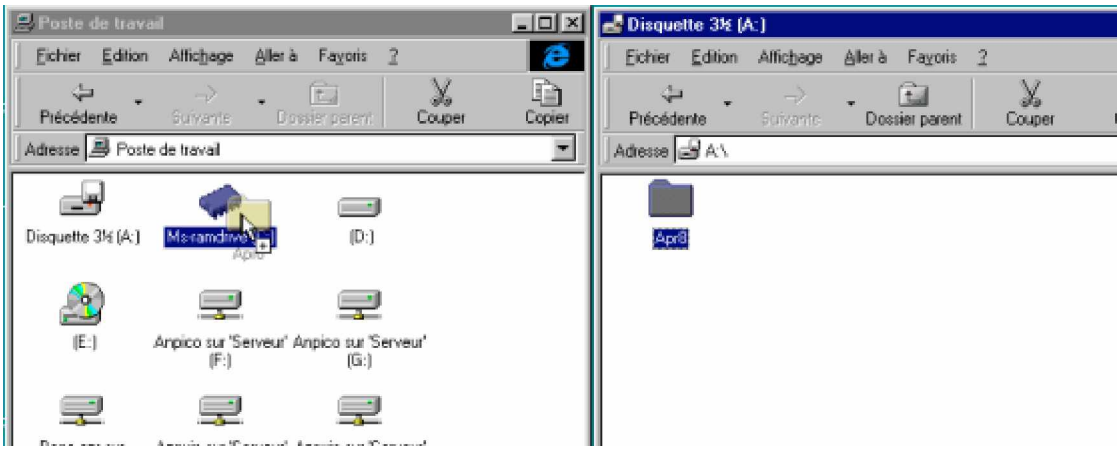
Printing of measurements in real time

Click the icon to print the displayed measurements.

Click the icon to copy the displayed measurements into the clipboard.

Copy from floppy disk or ZIP

The measurements which were copied on floppy disks or on ZIP directly on the APR can be restored into the PC by the following way :



Open the "working station", open the "floppy disk" (A:) or ZIP.

Re-open the working station.

Click APR8 (the floppy disk or the ZIP) and drag and drop towards the target unit (the unit C: here).

The system will ask you if you wish to delete the APR8 directory, answer YES.

Notes :

- The target unit must be defined in the paths of the APRWIN software.
- If saving needs several floppy disks, proceed in the same way for each floppy disk.
- If the APRWIN software is already running, it will be necessary to update the data base (and displaying) by pressing F5 key in the site manager.
- Create the site if it is not created in the site manager (see page 23)

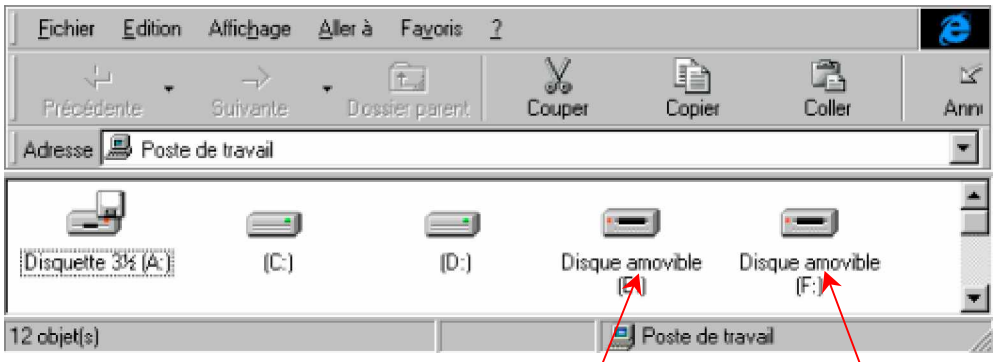
Connection of the APR by Interlnk

This connection allows to link the PC and the APR to restore recorded measurements.

The CONFIG.SYS file of the PC should contain the following line :

devicehigh=c:\windows\interlnk.exe /auto /v

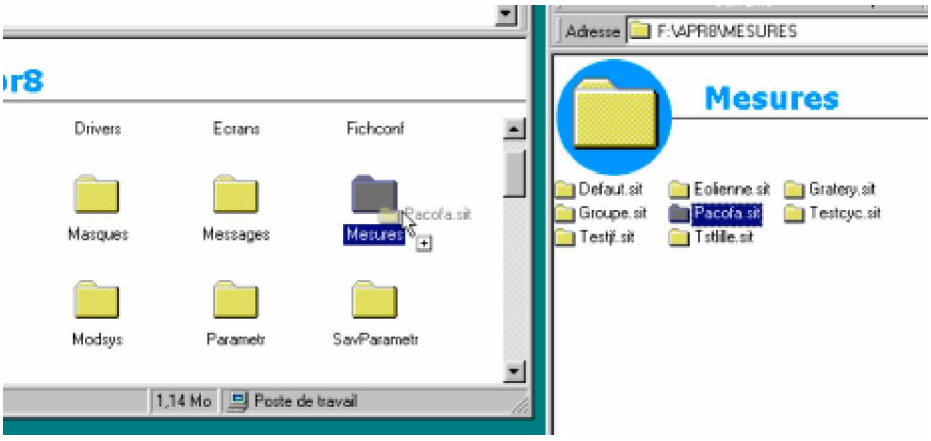
If the PC is equipped with disks A: C: and D:, the floppy disk unit of the APR will be considered to be E: and the hard disk to be F:.



APR floppy disk unit

APR hard disk

To run a copy, you will have just to copy the files from the unit F: towards the unit C:



Note : For the trend files, copy only files R00, R01 … R14.

For more information about this command, refer to the APR user's manual or a MSDOS manual.

Note You can also restore data from the APR by using another software (LAPLINK for example)

GDO files

To install GDO files into the system, use Sandra to convert the DES files to GDO files.

GDO is the SANDRA GIS mapping format.

Reminder about various formats :

Retina80 : Rename the file to INGOING.DES and import into SANDRA

Retina 2000 : Rename the file to INGOING.DES and import into SANDRA

PRAO : Rename the file XXXXX.GDO to XXXXXX.ASC and import into SANDRA

GDO files must be stored in the following path :

\APR8\MESURES*SITE*.SIT

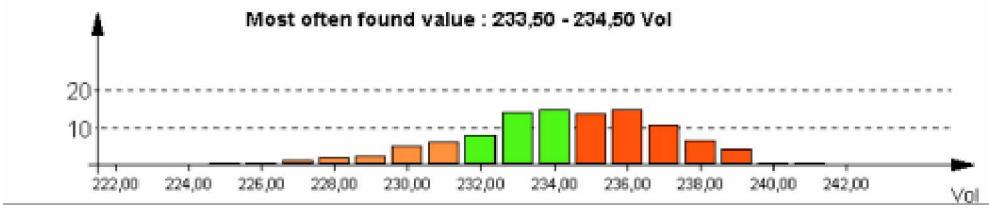
Note : You can copy GDO files into the site manager by using DRAG & DROP command.

Glossary

Account graphs

Graph which displays the dispatching of measurements according to time (Value according to the time percentage).

The account graphs are available in trend mode.



Active cursor

Cursor displayed by the ▼ icon.

Active power

$$P = U \times I \times \cos \Phi$$

Apparent power

$$S = U \times I$$

APR

Network Disturbance Analyzer (**A**nalyseur de **P**erturbations **R**éseaux). Our company develops a complete range of analyzers (APR8 / APR4u4i) and disturbance recorders (APR16).

APR16

Disturbance recorder equipped with 16 analog channels and with 32 digital channels. APR16 is intended to be installed into a 19" cabinet.

There is several models of APR16 :

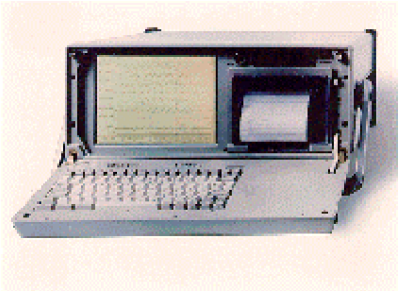
- Normal input by block
- Inputs by optical fiber by using BFOP units.

APR4u4i

Network analyzer designed to measure up to 3 different voltages and 5 different currents.

APR8

Network analyzer designed to measure up to 8 analog channels and 16 digital channels (current and voltage). This analyzer can be optional equipped with 8 extra analog channels and 16 extra digital channels or a HF card which allows to sample up to 10MHz.



Autorun

The Autorun mode will automatically start an executed program on PC when a CDROM is inserted.

BFOP

Optical fiber unit for APR (**B**oîtier **F**ibre **OP**tique pour APR). This unit allows to transmit the analog measurements from APR.

Note : The BFOP is set by a supplied DSPDEP software.

BHRD

Abbreviation of "High Resistance Dielectric Unit" ("**B**oîtier **H**aute **R**ésistance **D**iélectrique").

"BHRD" units are installed in source locals to protect telephone lines.

Comtrade

International format of data exchange.

Global harmonic distortion

Global harmonic calculated by the following formula :

$$\text{Distortion global ratio} = 100 \times \sqrt{\frac{\sum_{i=2}^{64} h_i^2}{h_1^2}} \text{ (result in \%)}$$

GDO

Abbreviation of "management of works" ("**G**estion **D**es **O**uvrages")

The GDO files contain the network GIS mapping and the information about works and lines. There are several formats of files GDO (PRAO, Retina 80, Retina 2000).

Harmonic

Multiple of a basic frequency

Example :

The harmonic 2 of a 50Hz signal is a 100Hz signal.

The harmonic 3 of a 50Hz signal is a 150Hz signal.

3 % of harmonic 5 of the 50Hz signal means that a 250Hz signal of which value is 3 % of the fundamental (50Hz) is over the 50Hz signal.

HF

High **F**requency. Measurements realized by the APR with a very fast sampling frequency (1MHz, 2MHz, 5MHz, 10MHz).

Hysteresis

Shift-out between up and down the threshold. On the APR8 / APR16 the hysteresis is 2 % of nominal value. On the APR4u4i the hysteresis is 1 % of nominal value.

Import

Transfer measurements or programs from the APR towards the PC.

Inactive cursor

Cursor displayed by the icon.

Inhibition

Minimal duration of the default before triggering of a recording sequence and a creation of a file. The inhibition duration allows to avoid transient phenomena.

Interlnk

Interlink Microsoft software which allows to exchange data between 2 PC. The disks of the "slave" PC are considered network readers from the "master" PC.

LF

Low Frequency. Acquisition measurements run by APR with a sampling frequency of 6400Hz on a 50Hz network.

Link notepad

The link notepad contains all the links and commands which were detected on all sites. It can be compared with a black box.

MOUSECLOCK

Time receiver which allows to receive time from FRANKFORT transmitter (Norme DCF77).

The MOUSECLOCK receiver must be connected on the RS 232 serial link n°3 of the APR8 / APR16 and serial link n°1 of the APR4u4i.

Path

One path is a path in which measurements are stored. The use of paths allows to store measurements onto various disks or onto various net workstation.

Example of path : C:\APR8\MESURES\, \\SERVEUR\APR8\ …

Post-time

Duration redorded after T0 time of the LF default (Trigger).

The post-time can go up 5 seconds (250 periods in 50Hz) or 40 seconds (2000 periods in 50Hz) with the starting up option.

PRAO

Format of GIS mapping file.

Pre-time

Duration recorded before the LF default. The maximum pre-time is 200ms on the APR.

RACKAPR

Extension rack which allows to simplify the cabling of the APR in a composed site. The RACKAPR allows :

- to link up to 8 APR on a site and dialog together.
- to dispatch a synchro-time towards 8 equipments.
- to link 4 relay outputs of the APR.
- to integrate a modem.
- to run SANDRA with several APR.

Reactive power

$$Q = U \times I \times \sin \Phi$$

Relative threshold

If a signal increases or decreases more than a defined value during a pre-set time, the APR records the event.

Example : Rough increase of the current of xxA on a duration of 3 periods while the maximum threshold is not crossed.

SANDRA

Analysis system of Automatic Network Default (**S**ystème d'**AN**alyse des **D**éfaut des **R**éseaux **A**utomatique).

Scaner

The software scans all the paths which were set and suggest inserting found sites into its data base.

Scenario

Suite of programmed commands. Example : Delete the XXX file, import the YYY file ...

Site

Area where measurements were recorded. The software creates a different directory for each site to classify measurements.

A site can be single or composed.

A single site is consisted of a single APR.

A composed site is consisted of several APR.

Example : The software considers a single virtual APR consisted by 32 analog channels and by 64 digital channels on a site consisted by 2 APR (16 analog channels and 32 digital channels).

Split

Allows to resize windows.

There are horizontal  and vertical  splits.

Trend

Integrated measurements run by the APR (Average on 1 , 2 , 5, 10 minutes)

Trigger

Trigger device which runs a LF or HF recording.

Unbalance ratio

$$Unbalanced\ rate = \frac{Negative\ voltage}{Positive\ voltage} \text{ x } 100$$

ZIP

100Mo driver unit (ZIP is a product of the IOMEGA trademark)