



**SOFTWARE FOR ELECTRICAL NETWORK  
ANALYSIS**  
(Code 775 351)

**USER'S GUIDE**  
(Code M 981 359 / 98 B)

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- **Please do not lose CIR-VISION original diskettes as they will be required in case of program uninstallation.**
- **Do not delete files CIRVIS.SYS & CIRVIS.000 from root directory, since CIR-VISION authorization would be lost.**

#### INSTALLATION PROCEDURE

Install the original CIR-VISION diskettes executing SETUP.EXE from the first diskette. Software authorization is loaded in the second diskette.

#### UPDATE

To update CIR-VISION just install the delivered updated version in the same directory where CIR-VISION is saved in.

Note: All previous data files will be kept in the directory

#### REMOVING CIR-VISION FROM A PC TO BE INSTALLED IN ANOTHER PC

To install CIR-VISION in another PC just proceed as follows:

- Uninstall CIR-VISION with the uninstall option of the SETUP.EXE program in the first original diskette of CIR-VISION.
- Install CIR-VISION in a new PC executing SETUP.EXE from the first diskette.
- Install last updated version whether you have any.

In case that you need to format the hard disk of your PC proceed as follows:

- Transfer the authorization from your hard disk into the CIR-VISION original diskette as for the first step when removing CIR-VISION.

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## **1. Introduction**

Welcome to CIR-VISION, the analysis software designed for working under Microsoft Windows 3.1 or Windows'95 environment. CIR-VISION has many features which will help you to obtain a quick and accurate analysis of any electrical network which has been measured by a CIRCUTOR's AR.4, AR.5, CVM-M, CAVA or MEMORY CLAMP analyzers.

The CIR-VISION program uses the last features incorporated to the Windows environment which allow the program being more powerful and easier to use.

## **2. CIR-VISION Contents**

CIR-VISION software is delivered in the following way:

- Two 3.5" double density diskettes containing the CIR-VISION program
- User's guide
- Registering card

### **3. Main features**

CIR-VISION is a program designed for processing and displaying the data obtained by a CIRCUTOR's AR.4 and AR.5 network analyzers or CVM-M memory peripheral.

Once data has been stored in the memory card, it can be downloaded to a computer (by means of the memory card reader MCS1) in order to obtain a complete analysis in a few seconds. Program uses *MDI* (Multiple Document Interface) system which allows simultaneously opening several windows, up to a maximum of 16, showing graphics, harmonic data or numerical charts for their comparison, etc.

The program permits to select the type of file to be analyzed, a graphical or numerical displaying mode, etc., by means of diverse intuitive menus. Depending on the selected file different menus will be available.

#### **Graphics**

- Ability to make zooms on any graphic and for any period.
- Access more than 40 graphics through different menus.
- Graphics are automatically scaled taking the max. and min. values of each graphic as the maximum and the minimum.
- At the bottom of each window you can read the instantaneous, maximum and minimum values, together with the starting and ending date of that measurement. The value at a determined point is shown moving the mouse over the graphic.
- All graphics can be copied into the clipboard to be exported to other applications. It is also possible to save a graphic with a bitmap file format (\*.bmp).
- All graphics are printed out with a headline previously written by the user.

## **4.0 Installation**

Before installing the program check that your system has the minimum requirements for a proper performance of the program. Once checked, run the SETUP.EXE file which is included in the installation diskette.

Firstly SETUP enables to choice what we want to do:

- If we choice to install CIR-VISION, the system will ask you in which subdirectory you want to install the program, once answered, it will complete the installation in the selected subdirectory. The installation will be ended moving the authorization to your hard disk.

- If we choice uninstall CIR-VISION the system will ask you in which subdirectory is the program installed and the authorization will return to the original diskette. So, you can install CIR-VISION in another PC.

■ **Keep installations diskettes since they are required for uninstalling CIR-VISION.**

■ **Second diskette has two authorizations loaded. Second one is to be used in case first one is lost**

■ If you try to install another time without saving the authorization back to the original diskette an error will appear and CIR-VISION will run in demo version.

■ If a demo version of the program is installed in the computer delete it before running installation program to avoid possible problems.

☐ Fill the registering card and send it back to CIRCUTOR. Once you've been registered as an user, you will receive information about products, updating versions and the help of our technical staff.

## **4.1 System requirements**

- ◆ IBM/PC or compatible computer 80386 or higher (486 is advisable)
- ◆ Minimum 8 MB of RAM
- ◆ 3.5" high density flexible disk drive
- ◆ Hard disk
- ◆ VGA colour monitor
- ◆ Mouse compatible with Windows.
- ◆ Operative system MS/DOS 5.0 or higher and Microsoft Windows 3.1 or higher.

The above configuration is flexible, any improvement in the equipment configuration will increase the program efficacy.

## 4.2 Protection key

The CIR-VISION program is protected against copy by means of a “software” system. Protection key is automatically saved in the root directory where CIR-VISION is installed.

CIR-VISION can also running with the old “hardware” protection key with no need of the new “software” protection.

☞ **Warning!** Do not delete nor copy ‘Software’ key from the root directory, since CIR-VISION authorization will be lost and program will run in demo mode. The key consists of files CIRVIS.SYS and CIRVIS.nnn, where nnn will depend on number of users in the network.

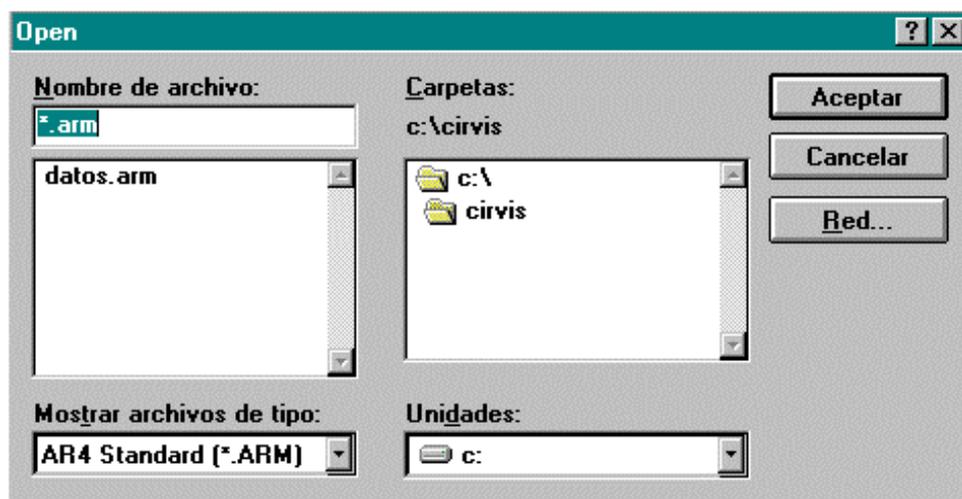
## 5. Run-time

This chapter explains the use of the different options in the program menus.

### 5.1 File

With this menu you can access to following options:

- **Open:** It allows to open a data file for its further analysis.



*Fig 1. Opening a file*

*Available file types:*

- \*.arm: Stores the main electrical parameters of the mains.
- \*.ari: Together with the main electrical parameters of the mains it also stores a waveform of each period for its later analysis in the PC.
- \*.ar4: This file contains data about harmonics.

- \*.arp: Stores the periods when the analyzer has been switched off or when a supply loss has occurred, together with the date when the energy meters have been reset to zero.
- \*.cvm: Stores the main electrical parameters of the mains, those are:

Phase-Neutral Voltage: L1, L2, L3 and III  
Max Phase-Neutral Voltage: L1, L2 and L3  
Min Phase-Neutral Voltage: L1, L2 and L3  
Current: L1, L2, L3 and III  
Max Current: L1, L2 and L3  
Min Current: L1, L2 and L3  
Active Power: L1, L2, L3 and III  
Inductive Power: L1, L2, L3 and III  
Capacitive Power: L1, L2, L3 and III  
Power Factor: L1, L2, L3 and III  
Active Energy  
Inductive Energy  
Capacitive Energy  
Frequency  
Channel A/D 1  
Channel A/D 2

The device also reads negative values if those occur.

- \*.cvt: Stores only the variables selected by the user. The device offers up to 180 different variables which are attached on the next list.

CVM-M DEVICE VARIABLES

Nº	VARIABLE	Nº	VARIABLE	Nº	VARIABLE
0	V1	60	V31mx	120	- kW1mn
1	A1	61	Vav III mx	121	- kvar L1mn
2	kw1	62	DC1mx	122	- kvar C1mn
3	kvar L1	63	DC2mx	123	- kW2mn
4	kvar C1	64	V1mn	124	- kvar L2mn
5	PF 1	65	A1mn	125	- kvar C2mn
6	V2	66	KW1mn	126	- kW3mn
7	A2	67	Kvar L1mn	127	- kvar L3mn
8	kW2	68	Kvar C1mn	128	- kvar C3mn
9	kvar L2	69	PF 1mn	129	- kWIII mn
10	kvar C2	70	V2mn	130	- kvar LIII mn
11	PF2	71	A2mn	131	- kvar CIII mn
12	V3	72	KW2mn	132	Kwh-1
13	A3	73	kvar L2mn	133	kwh/1000-1
14	kW3	74	kvar C2mn	134	kvarLh-1
15	kvar L3	75	PF2mn	135	kvarLh/1000-1
16	kvar C3	76	V3mn	136	kvarCh-1
17	PF3	77	A3mn	137	kvarCh/1000-1
18	Vav III N	78	kW3mn	138	- kwh-1
19	Aav III	79	kvar L3mn	139	- kwh/1000-1
20	k WIII	80	kvar C3mn	140	- kvarLh-1
21	kvar LIII	81	PF3mn	141	- kvarLh/1000-1
22	kvar CIII	82	Vav III Nmn	142	- kvarCh-1
23	PF III	83	Aav III mn	143	- kvarCh/1000-1
24	Hz	84	k WIII mn	144	kwh-2
25	kVA III	85	kvar LIII mn	145	kwh/1000-2
26	V21	86	kvar CIII mn	146	kvarLh-2
27	V23	87	PF III mn	147	kvarLh/1000-2
28	V31	88	Hzmn	148	kvarCh-2
29	Vav III	89	kVA III mn	149	kvarCh/1000-2
30	DC1	90	V12mn	150	- kwh-2
31	DC2	91	V23mn	151	- kwh/1000-2
32	V1mx	92	V31mn	152	- kvarLh-2
33	A1mx	93	Vav III mn	153	- kvarLh/1000-2
34	kW1mx	94	DC1mn	154	- kvarCh-2
35	kvar L1mx	95	DC2mn	155	- kvarCh/1000-2
36	kvar C1mx	96	- kW1	156	kwh-3
37	PF 1mx	97	- kvar L1	157	kwh/1000-3
38	V2mx	98	- kvar C1	158	kvarLh-3
39	A2mx	99	- kW2	159	kvarLh/1000-3
40	kW2mx	100	- kvar L2	160	kvarCh-3
41	kvar L2mx	101	- kvar C2	161	kvarCh/1000-3
42	kvar C2mx	102	- kW3	162	- kwh-3
43	PF2mx	103	- kvar L3	163	- kwh/1000-3
44	V3mx	104	- kvar C3	164	- kvarLh-3
45	A3mx	105	- kWIII	165	- kvarLh/1000-3
46	kW3mx	106	- kvar LIII	166	- kvarCh-3
47	kvar L3mx	107	- kvar CIII	167	- kvarCh/1000-3
48	kvar C3mx	108	- kW1mx	168	- PF 1
49	PF3mx	109	- kvar L1mx	169	- PF 2
50	Vav III Nmx	110	- kvar C1mx	170	- PF 3
51	Aav III mx	111	- kW2mx	171	- PF III
52	kWIII mx	112	- kvar L2mx	172	- PF 1 mx
53	kvar LIII mx	113	- kvar C2mx	173	- PF 2 mx
54	kvar CIII mx	114	- kW3mx	174	- PF 3 mx
55	PF III mx	115	- kvar L3mx	175	- PF III mx
56	Hzmx	116	- kvar C3mx	176	- PF 1 mn
57	kVA III mx	117	- kWIII mx	177	- PF 2 mn
58	V12mx	118	- kvar LIII mx	178	- PF 3 mn
59	V23mx	119	- kvar CIII mx	179	- PF III mn

- \*.cvx: Stores the daily Maximum Power Demand records. Whether the CVM is provided with a Red-Max board the three tariffs would be also saved in.
- \*.cvp: Stores the power supply loss events in the device, so recording the date and time those occurred.
- \*.cve: Stores the state changes in the inputs and outputs for both the CVM-M and CVM-R10 devices. The date and time of each change are also shown.
- \*.arc: This is a special file type, useful for the motor starting analysis. Each register is a time cycle.
- \*.mos: This is a file generated by the AR4 Disturb device. It saves the waveform.
- \*.mop: This is a file generated by the AR4 Disturb device. It saves the date and time of the incidences.
- \*.clp: This is a file generated by the MEMORY CLAMP device. It saves the data measured.
- \*.cav: This is a file generated by the CAVA device. It saves the data measured.
- \*.cap: This is a file generated by the CAVA device. It saves the date and time of the incidences.
- \*.a5m: Stores the main electrical parameters of the mains, those are:
  - Phase-Neutral Voltage: L1, L2, L3 and III
  - Max Phase-Neutral Voltage: L1, L2 and L3
  - Min Phase-Neutral Voltage: L1, L2 and L3
  - Current: L1, L2, L3 and III
  - Max Current: L1, L2 and L3
  - Min Current: L1, L2 and L3
  - Active Power: L1, L2, L3 and III
  - Inductive Power: L1, L2, L3 and III
  - Capacitive Power: L1, L2, L3 and III
  - Power Factor: L1, L2, L3 and III
  - Active Energy
  - Inductive Energy
  - Capacitive Energy
  - Frequency

The device also reads negative values if those occur.

- \*.a5t: Stores only the variables selected by the user. The device offers up to 144 different variables which are attached on the next list.

#### AR.5 DEVICE VARIABLES

Nº	VARIABLE	Nº	VARIABLE	Nº	VARIABLE
0	Vp-p 1	100	Vp-p 1 max	200	Vp-p 1 min
1	Vp-p 2	101	Vp-p 2 max	201	Vp-p 2 min
2	Vp-p 3	102	Vp-p 3 max	202	Vp-p 3 min
3	Vp-p III	103	Vp-p III max	203	Vp-p III min
4	Vp-n 1	104	Vp-n 1 max	204	Vp-n 1 min
5	Vp-n 2	105	Vp-n 2 max	205	Vp-n 2 min
6	Vp-n 3	106	Vp-n 3 max	206	Vp-n 3 min
7	Vp-n III	107	Vp-n III max	207	Vp-n III min
8	A 1	108	A 1 max	208	A 1 min
9	A 2	109	A 2 max	209	A 2 min
10	A 3	110	A 3 max	210	A 3 min
11	A III	111	A III max	211	A III min
12	kW 1	112	KW 1 max	212	kW 1 min
13	- kW 1	113	- kW 1 max	213	- kW 1 min
14	kW 2	114	KW 2 max	214	kW 2 min
15	- kW 2	115	- kW 2 max	215	- kW 2 min
16	kW 3	116	KW 3 max	216	kW 3 min
17	- kW 3	117	- kW 3 max	217	- kW 3 min
18	kW III	118	KW III max	218	kW III min
19	- kW III	119	- kW III max	219	- kW III min
20	kvarL 1	120	KvarL 1 max	220	kvarL 1 min
21	- kvarL 1	121	- kvarL 1 max	221	- kvarL 1 min
22	kvarL 2	122	KvarL 2 max	222	kvarL 2 min
23	- kvarL 2	123	- kvarL 2 max	223	- kvarL 2 min
24	kvarL 3	124	KvarL 3 max	224	kvarL 3 min
25	- kvarL 3	125	- kvarL 3 max	225	- kvarL 3 min
26	kvarL III	126	KvarL III max	226	kvarL III min
27	- kvarL III	127	- kvarL III max	227	- kvarL III min
28	kvarC 1	128	KvarC 1 max	228	kvarC 1 min
29	- kvarC 1	129	- kvarC 1 max	229	- kvarC 1 min
30	kvarC 2	130	KvarC 2 max	230	kvarC 2 min
31	- kvarC 2	131	- kvarC 2 max	231	- kvarC 2 min
32	kvarC 3	132	KvarC 3 max	232	kvarC 3 min
33	- kvarC 3	133	- kvarC 3 max	233	- kvarC 3 min
34	kvarC III	134	KvarC III max	234	kvarC III min
35	- kvarC III	135	- kvarC III max	235	- kvarC III min
36	PF 1	136	PF 1 max	236	PF 1 min
37	- PF 1	137	- PF 1 max	237	- PF 1 min
38	PF 2	138	PF 2 max	238	PF 2 min
39	- PF 2	139	- PF2 max	239	- PF2 min
40	PF 3	140	PF 3 max	240	PF 3 min
41	- PF 3	141	- PF 3 max	241	- PF 3 min
42	PF III	142	PF III max	242	PF III min
43	- PF III	143	- PF III max	243	- PF III min
44	Hz	144	Hz max	244	Hz min
45	k VA	145	KVA max	245	kVA min
46	k Wh				
47	- kWh				
48	k varhL				
49	- kvarhL				
50	k varhC				
51	- kvarhC				

### AVAILABLE MEMORY ACCORDING DEVICES AND FILES

TIPOS	128k	256k	384k	512k	1M
*.ARM 200 bytes	640 rec.	X	X	X	
*.ARI 1000 bytes	128 rec.	X	X	X	
*.ARP 6 bytes	21333 rec.	X	X	X	
*.CVM 200 bytes	600 rec.	1200 rec.	1800 rec.	2400 rec.	
*.A5M 200 bytes		1200 rec.			5000 rec.
*.CVT 4*n° var+10 bytes	$\frac{120000 - 192}{4 * n^{\circ} \text{ var} + 10}$ rec.	$\frac{240000 - 192}{4 * n^{\circ} \text{ var} + 10}$ rec.	$\frac{360000 - 192}{4 * n^{\circ} \text{ var} + 10}$ rec.	$\frac{480000 - 192}{4 * n^{\circ} \text{ var} + 10}$ rec.	
*.A5T 4*n° var+10 bytes		$\frac{256000 - 192}{4 * n^{\circ} \text{ var} + 10}$ rec.			$\frac{1000000 - 192}{4 * n^{\circ} \text{ var} + 10}$ rec.
*.CVP 6 bytes	40 rec.	80 rec.	120 rec.	160 rec.	
*.CVX 10 bytes	40 rec.	80 rec.	120 rec.	160 rec.	
*.CVE 9 bytes	200 rec.	400 rec.	600 rec.	800 rec.	

Note: The memory capability for the AR.4 analyzers can be increased if a memory card is plugged into the device.

- **Save:** Permits to save a graphic with a bitmap file format (.bmp) to be further managed with an image editor such as PaintBrush
- **MCS1:** Operations with the memory card reader: read the card, delete a file, format the card and set the communications up.

Communication port parameters are COMx (where x is the communication port where the MCS-1 is plugged to), 9600, 8, E (even), 1.

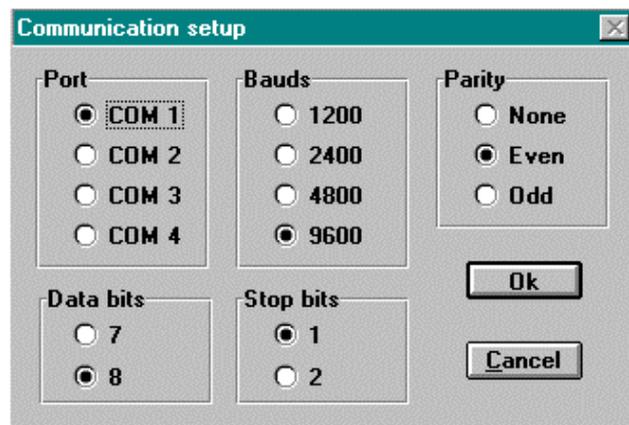


Fig. 2 Set-up of the MCS-1 communication port.

- **Clamp:** Operations with the Memory Clamp. To download data captured by the clamp, set the clamp up, and data monitoring, i.e., data visualization in real time. Communication port parameters are COMx (where x is the communication port where the clamp is plugged to), 19200, 8, N (none), 1.

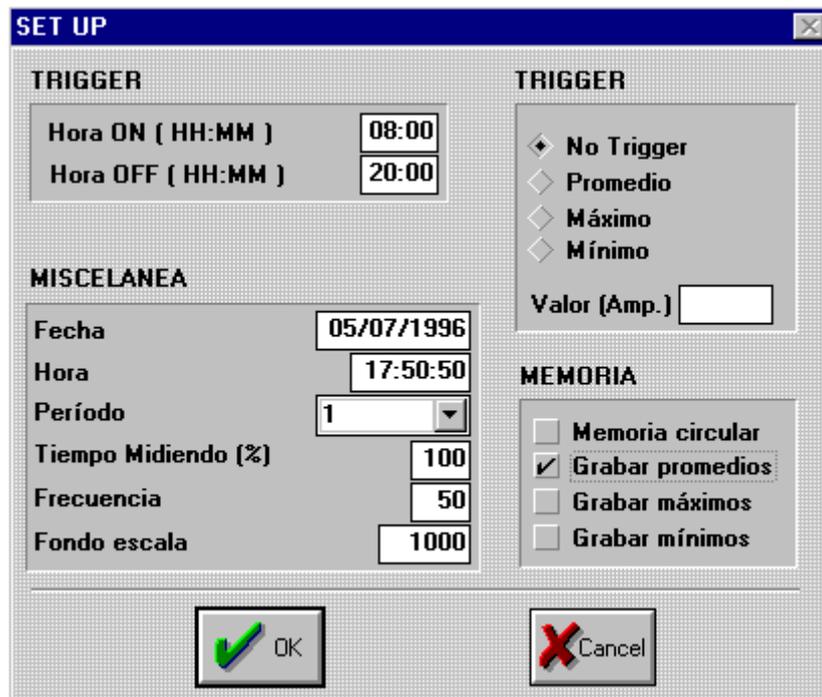


Fig.3 Clamp setup (Memory Clamp)

- **CAVA:** To download data from CAVA-250, setup actions, and real time data monitoring.

When selecting option “Read CAVA”, the name of the file and the directory to save data from CAVA-250 in will be inquired. Data will be saved in the file with an extension CAV, an also, another file with extension CAP will be created to store Power ON/Power OFF data from CAVA-250.

The option “CAVA Setup” permits the user to modify CAVA-250 parameters, such as date, time, period (in seconds), frequency, variable (voltage or current) and memory type (rotary memory and average flicker).

With the “Monitoring” option, voltage or current data can be real time visualized. See (Fig.4).

Communication port parameters are COMx (where x is the communication port where the CAVA-250 is plugged to), 19200, N (none), 1.



Fig.4 CAVA-250 Monitoring option

- **Network Analyzer:** This option allows the user to select the AR.4-RS232 analyzer or the AR.5 analyzer.

#### AR.4 Analyzer (RS-232)

When selecting option *AR.4 Analyzer (RS-232)* an screen for the port configuration and downloading of data in the AR.4 will be shown up. The option *Read AR.4* permits to read ARI/ARM or ARP type files. Once the type of file to be read is selected, a name for the file and the directory to save it in can are to be chosen by the user before data transferring process starts.

#### AR.5 Analyzer

The option *AR.5 Analyzer* permits the user to transfer data saved in the AR.5. Clicking this option an screen for the port configuration and downloading of data in the AR.4 will be shown up.

Before data transferring, check that the programmed communication parameters coincide with the AR.5's ones, as well as, that the AR5 meter is not at any setup menu.

Click the option *Read AR5* to select the file to be read, and then *Read* to start data downloading process through Z-MODEM protocol.

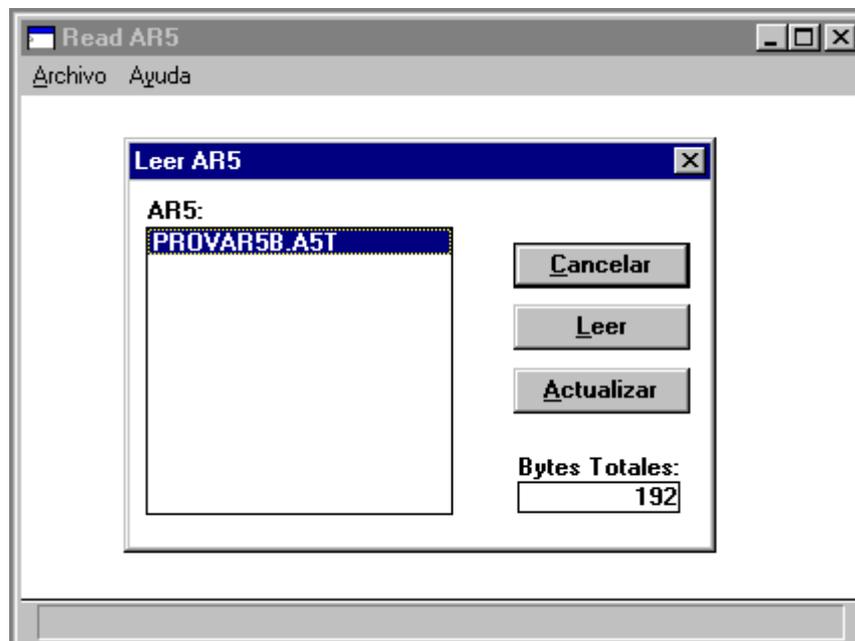


Fig.5 AR.5 data transferring process

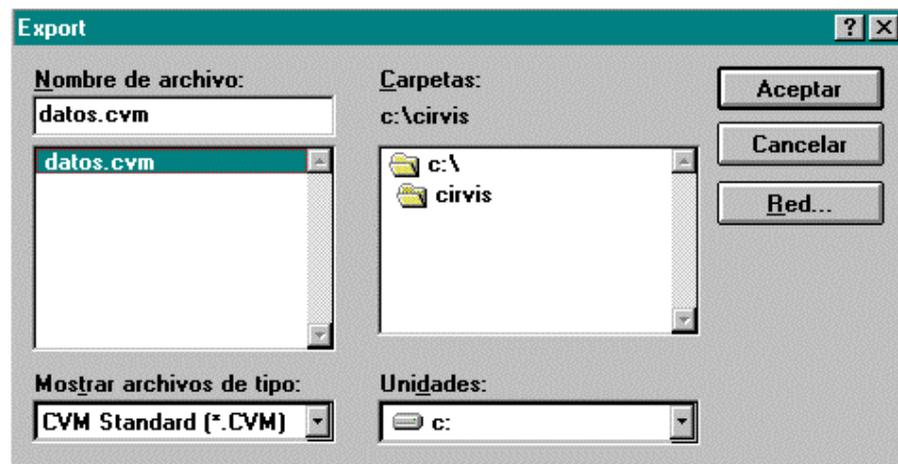
- **Export:** Permits to export a file to ASCII format. A step-by-step example to export a file to Microsoft EXCEL 5.0 is following attached:

1- Click the option *Export* in the File menu:



*Fig. 6 Export command*

2- The next window is then shown up in order to select the file to be exported. A window requesting for the name that the exported file will take also appears:



*Fig. 7 Export Window*

3- Then, the next window is shown up, where the separators for exporting the file can be chosen.  
 If the export process is done with Excel spreadsheet do not modify the separators.

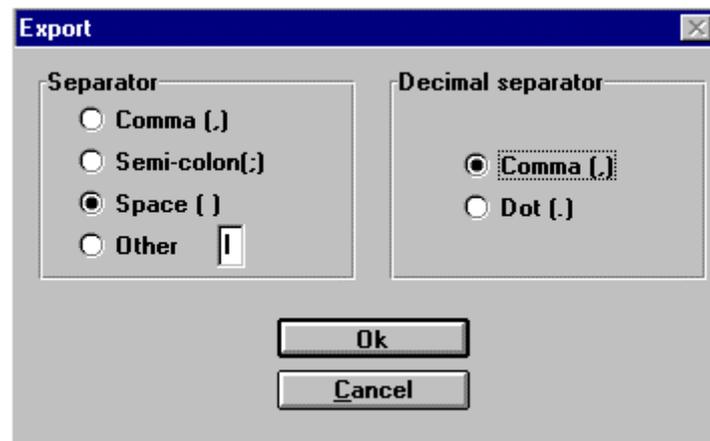


Fig. 8 Export Window

4- Run *Excel* and click *open* in the File menu. In the import assistant select '**Delimited**' for the file type and click 'Next', mark option 'Space' and click 'End'; the file is already imported.

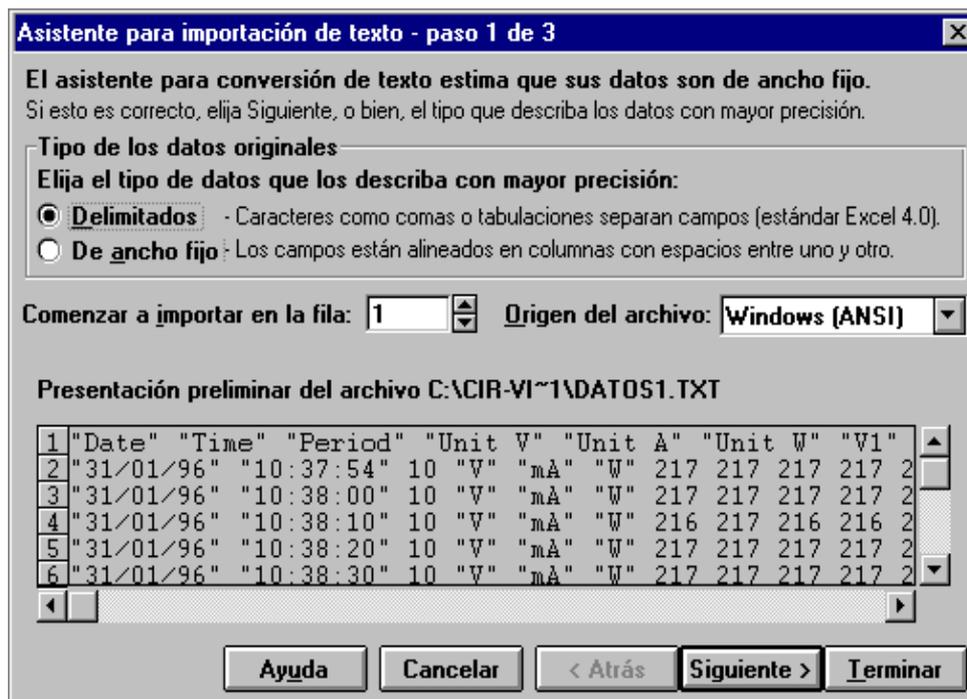
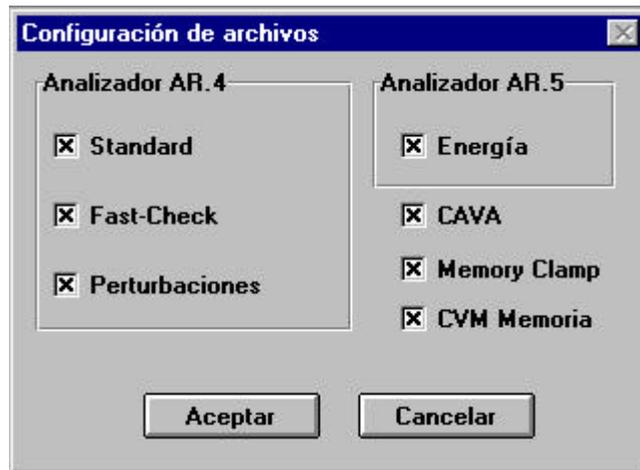


Fig. 9 Microsoft EXCEL 5.0. import assistant

Note: To export harmonics from an ARI type file select the file with extension AR4. This file is created when any option from the Harmonic menu is used.

- **Print:** Asks for a headline and sends it to the printer together with the contents of the active window. If the active window has a chart, then the parameters to be printed are asked, in addition with the desired time period.

- **Setup print:** Allows selecting the printer to be used.
- **Files Setup:** Use this option to select the drivers to perform an analysis of their files. The installation program load by default all drivers. During program operation those most interesting for the user can be selected. (see Fig.10).



*Fig.10 Driver selection*

- **Exit:** Ends program execution and exits to Windows.

## **5.2 Edit**

This option allows copying an active window into the Windows clipboard for later attaching it to any text editor, etc.

For more information about the Windows clipboard utility consult the *Microsoft Windows user's guide*.

### 5.3 Numerical

This option shows a table in a numerical form where all the values of each register can be displayed. It is possible to get all the registers by means of a horizontal moving bar placed at the bottom of the window.

Date: 21/07/94 11:15:15		Period: 0:15:00			
	11	12	13	14	
Voltage (V)	233	234	234	233	
Max. Voltage (V)	236	235	235		
Min. Voltage (V)	211	211	212		
Current (A)	482	436	391	436	
Max. Current (A)	595	535	489		
Min. Current (A)	417	311	361		
Power (kW)	100	94	85	279	
Induc. Power (kvar)	51	40	33	124	
Cap. Power (kvar)	0	0	0	0	
Power factor	0.88	0.91	0.93	0.91	
Energy	Active (kWh)	Reactive L (kvarh)	Reactive C (kvarh)		
	69.900	11.400	0.000		
Frequency (Hz)	50.00	DC 1	11	DC 2	5

Fig.11 Numerical chart

### 5.4 Graphics

When selecting this option, a menu allowing to choose one of the available electrical parameters to be analyzed will be shown up. For a CVT type file (Special) or A5T type file (AR.5 analyzer special) the parameters that are not included in the file will be disabled.

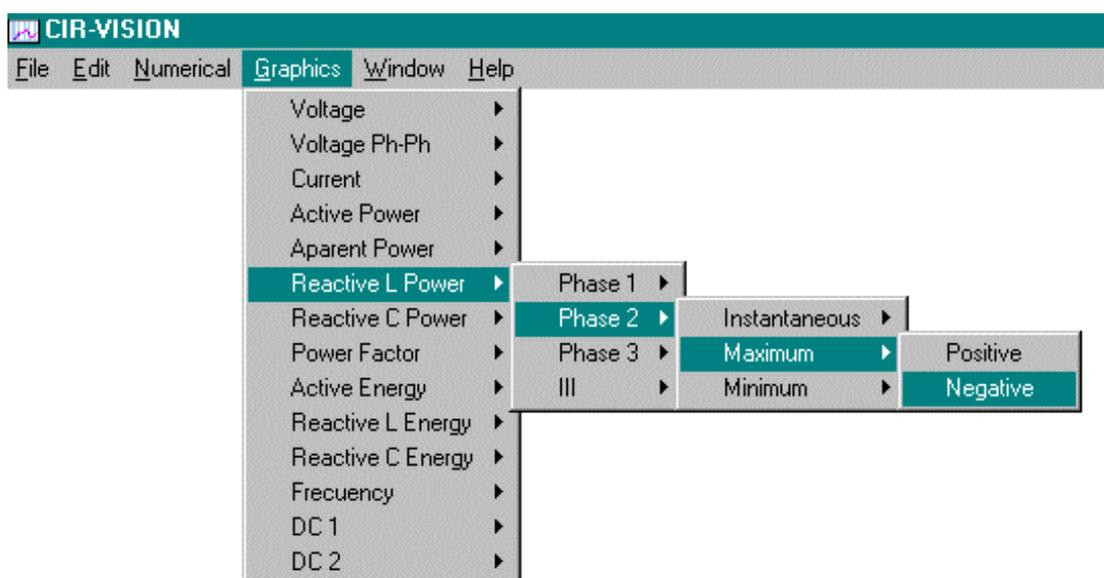


Fig.12 Graphics menu

Once the parameter has been selected, depending on its nature the program will ask or not the phase to be analyzed and will show a sub-window with the graphical representation of the selected parameter.

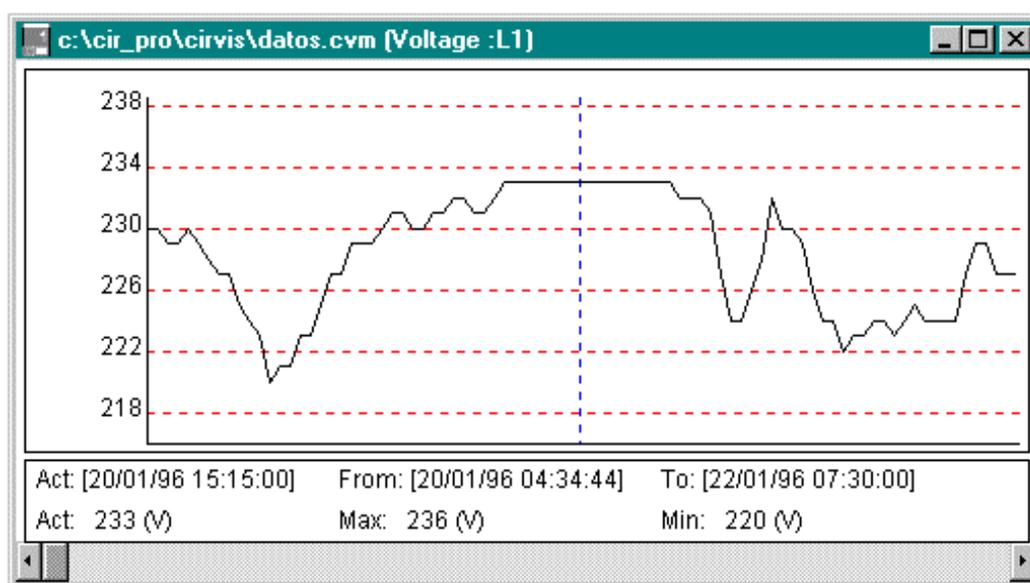


Fig.13 Voltage graphic

Three fields are shown at the bottom of the window which indicate:

1. Current date and value of the data at the point where the cursor is placed.
2. Minimum value for all the measuring and when it occurred.
3. Same as above but for the maximum value.

In case that there is more than one minimum and maximum value, the minimum value indicated will correspond to the firstly one found, and the maximum to the last one found.

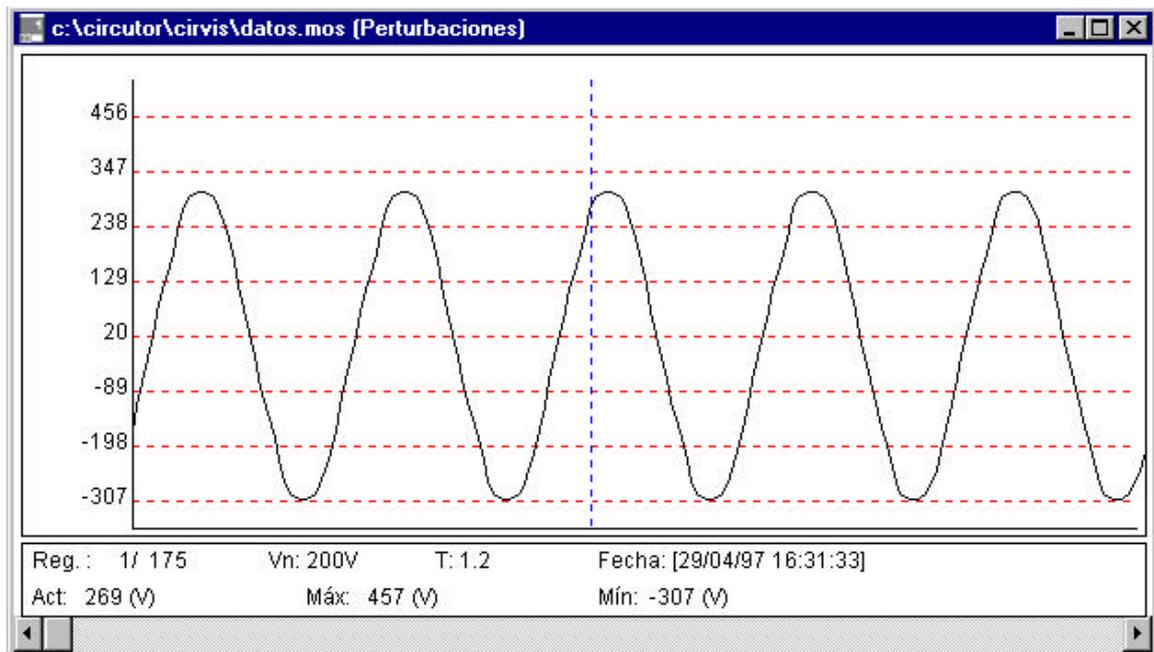
In case that the data file is too long to display all data on only one screen, the graphic could be moved to show all data by means of the horizontal moving bar placed at the bottom of the window.

Note: Holding the mouse left button pressed, the cursor can be moved along the window but the value would not be updated.

Exception: In graphics of MOS type files (Disturbances), the horizontal moving bar permits to pass from one disturbance to another along all the file, so each screen shows one disturbance (Fig.14).

Following values are shown in the lower part of the window:

1. Record (disturbance in the file), date and present value of point where the cursor is placed.
2. Maximum and minimum value for all the measurement.
3. Nominal value of voltage ( $V_n$ ) for the measurement.
4. Trigger factor value (T) for the measurement (consult the user's guide of the AR.4 performing as a disturbance analyzer).



*Fig.14 Disturbance Graphic (MOS)*

### **Application of the zoom on a graphic**

The mouse right button permits to fix the starting and ending points of a zone to get a zoom from it. A green point-line indicates the beginning of the zoom zone. The zoom procedure is as follows:

Note: The zoom of a zoom window can be done provided the original screen of the graphic is open.

All the samples inside the marked period are divided in 57 blocks and the maximum and minimum value for each block is selected, thus a window-sized graphic is got to enable the display of all the samples in just one screen. The option of an increasing zoom is also delivered by means of the automatic scaling when a shorter period is selected.

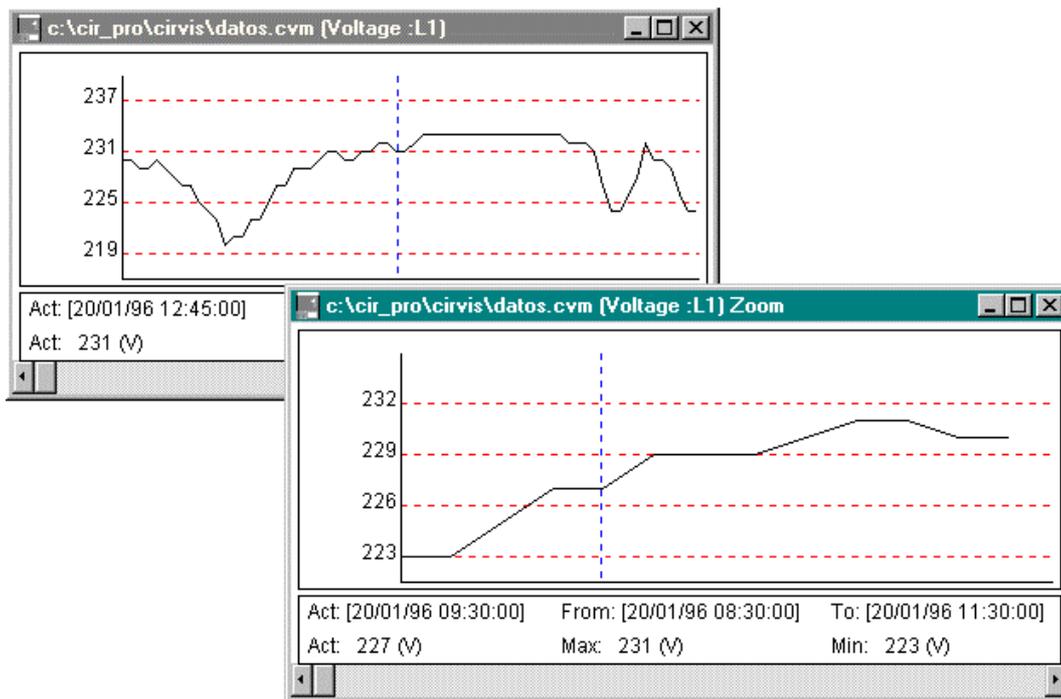


Fig. 15 Example of a Zoom In.

Exceptions: In graphics of MOS type files (Disturbances), a zoom between records is not possible, only the zoom of the visualized record can be done. Within a zoom window, all values of the record can be displayed using the horizontal moving bar

### ***Joint graphics application***

The option '*Joint graphics*' in the pull-down Window menu permits to concurrently display 2 or 3 graphics on a same window. That way, CIR-VISION takes the three latest opened windows from the same file, disregarding either the *Zoom* or *Joint graphics* ones.

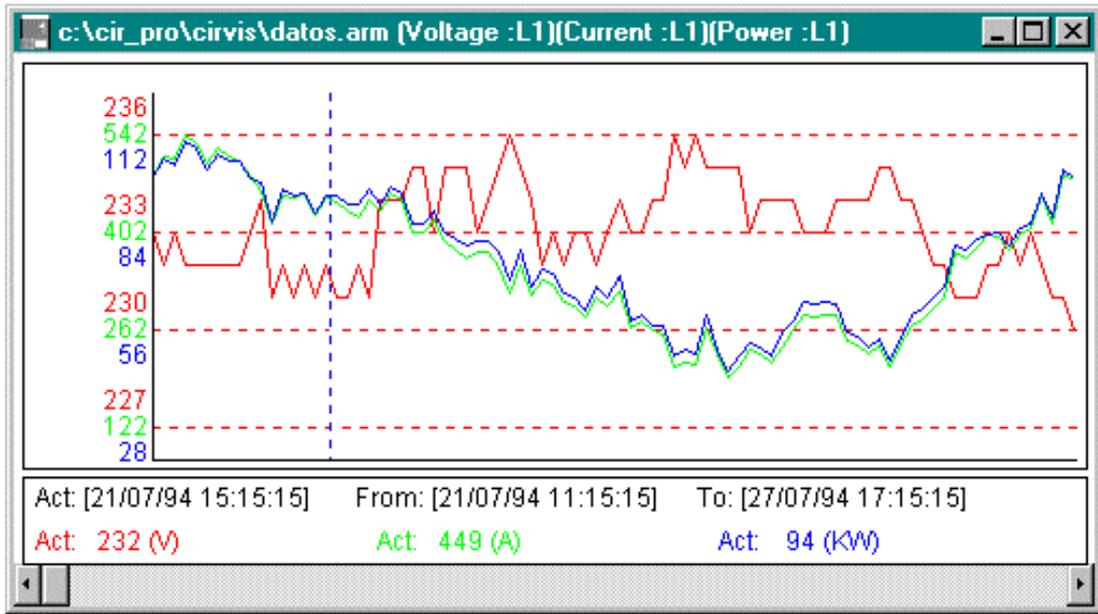


Fig. 16 Example for joint graphics

## 5.5 Harmonics

For the .ARI files provided by the AR.4 analyzer, the *Harmonic* option is available. Its pull-down menu has five options that permit a complete analysis of the voltage and current harmonics up to the 15th one.

This analysis can be done for all the file or just for a certain number of blocks in order to reduce the analysis delay time.

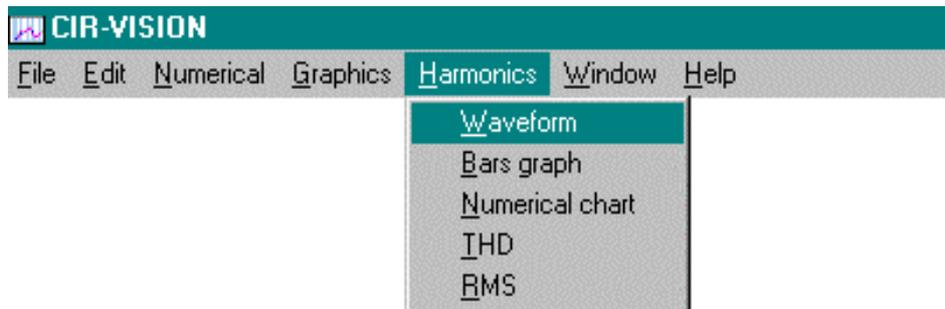


Fig.17 Harmonics pull-down menu

## Waveform

When selecting this option, it will ask whether the user wants a complete analysis of all the file or just some blocks. Once chosen, the program will start the calculation process, showing a window indicating the delay time for that process, with the possibility of stopping it just clicking the *Cancel* button.

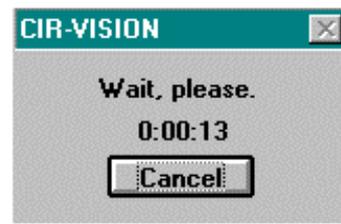


Fig.18 Delay window

Once the calculation has been done, a graphic with six waveforms, three for the voltage and three for the current, will be shown up, indicating the % of the total harmonic distortion for each waveform.

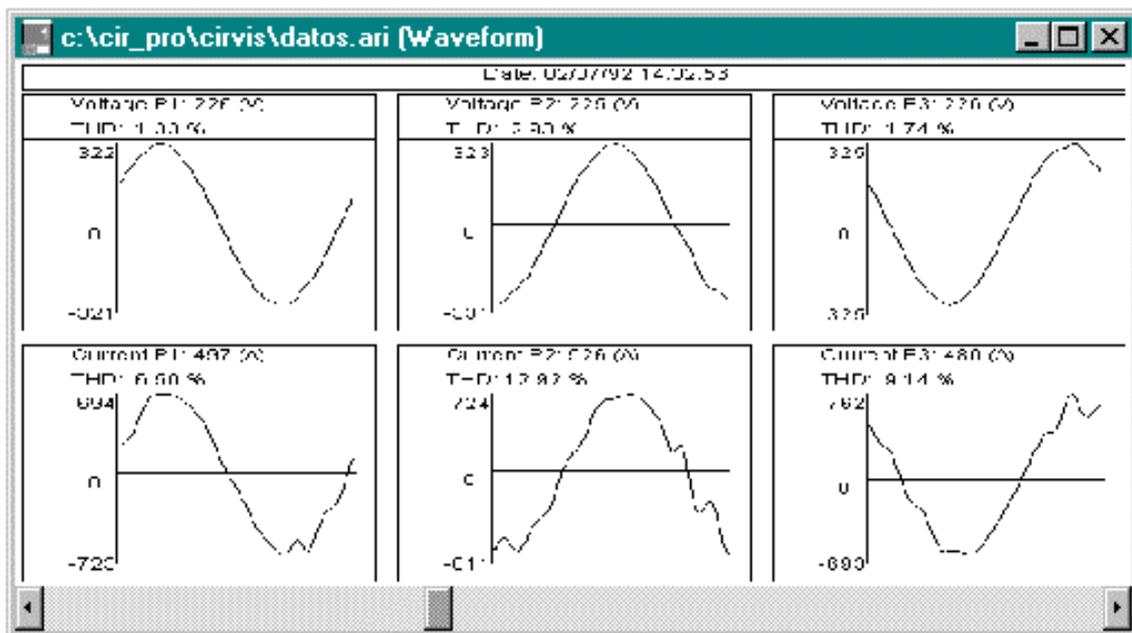


Fig.19 Waveform

The horizontal moving bar allows to reach all the waveforms of the file.

## Bars graph

This options allows a bars-graphic representation of the % harmonic distortion of each harmonic (2-15) both for the voltage and the current.

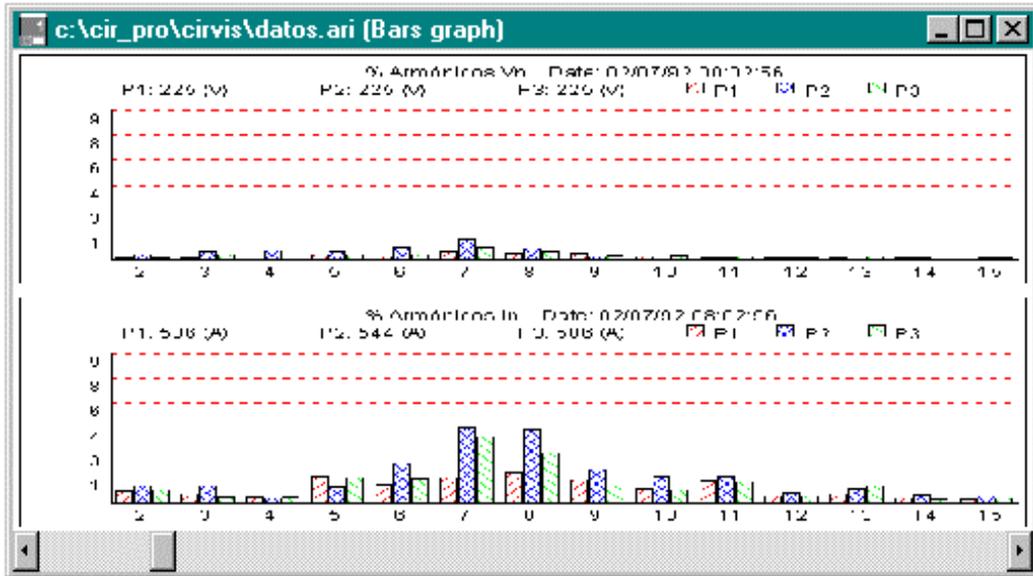


Fig.20 THD% for each harmonic

## Numerical chart

This option displays on screen a window with six numerical tables, three for the voltage phases and three for the current phases.

Like the former two options, before the display of the calculation results, a window with the possibility of choosing a complete or partial analysis of the file will be shown up.

Once selected, it will calculate the THD and display the results (see below figure).

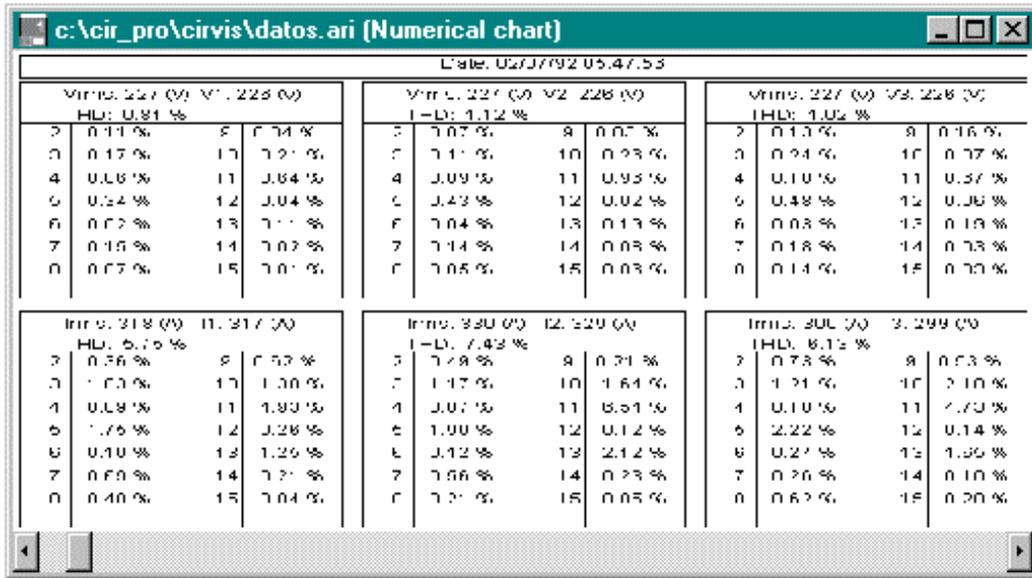


Fig.21 THD% numerical chart

The moving bar allows to reach all the waveforms of the file.

### THD (Total Harmonic Distortion)

You can display the time evolution of the total harmonic distortion for the voltage and the current. This allows us to see the time which corresponds to the higher harmonic distortion or just to know the average THD.

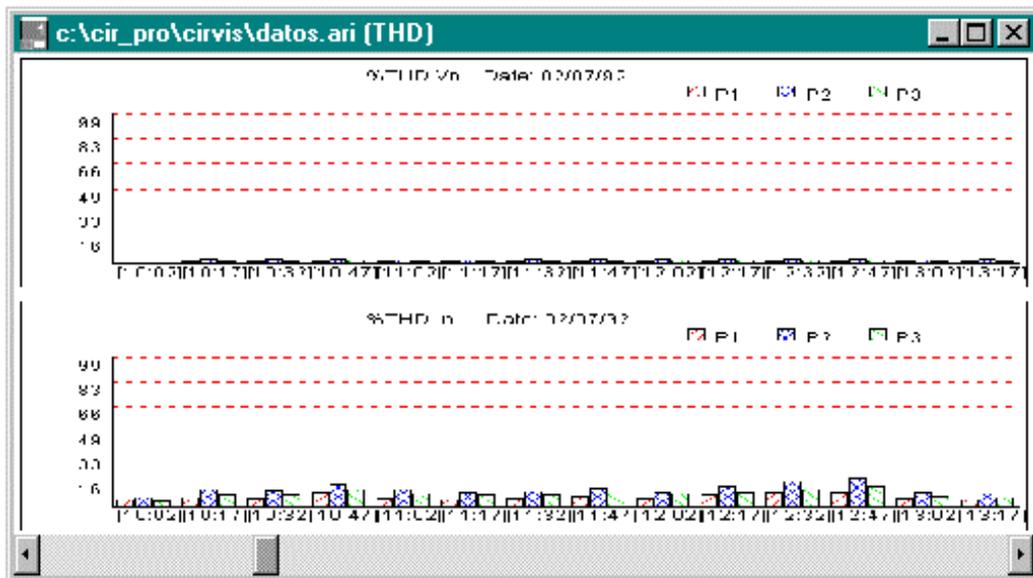


Fig.22 Evolution graphic of the THD%

## RMS

This option allows displaying the time evolution of the R.M.S. voltages and currents calculated from the stored waveforms.

This time evolution is represented in a bars-graphic form where each phase has a different identifier colour.

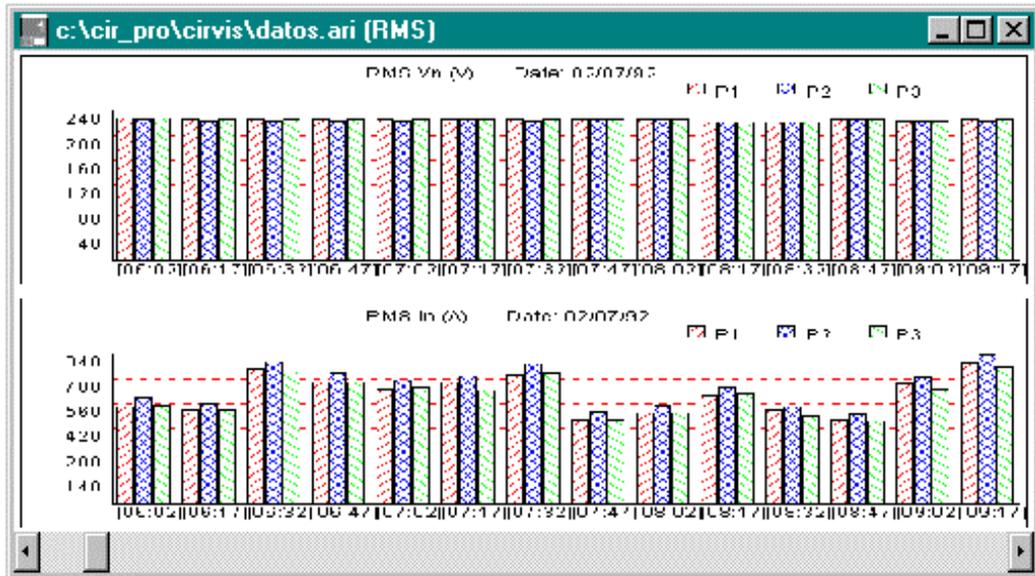


Fig.23 Evolution of voltages and currents

## 5.6 Setup

The configuration menu allows the units initiation of graphics and tables display only for current and power.

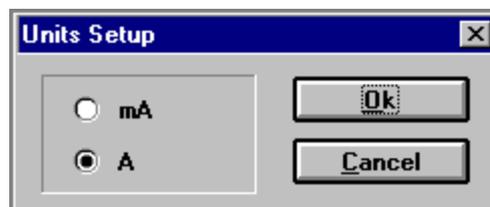


Fig.24 Unit configuration

When the table or graphic is on display, the configured parameter will be shown in the selected units.

Exception: The units will not change when units lower than the configured one in the file are selected. For example: A graphic in mA or A could be visualized when the file is configured in mA. When the file is configured in A it could only be visualized in A.

## **5.7 Window**

The window menu provides the following options:

- *Cascade*: The cascade command superposes the windows in the way that the headlines can be concurrently read. Use this presentation to see the windows which can be hidden or to arrange the windows of the screen.
- *Tile*: Arranges the windows in a mosaic format.
- *Arrange icons*: If some applications are being executed in an icon form, those can be uniformly arranged at the bottom of the screen with this command.
- *Close all*: It closes all the windows of the application.

## **5.8 Help**

This option shows help information to the user either about the program performance or about its own specifications.

The following two options are available:

- *Index*: Launches a help program about the program, where the user will find information about its performance. If you are not used to working with this kind of help, press F1 key to obtain an explanation about the operation of helps in Windows.
- *About*: It shows information about the CIR-VISION software that is installed in the computer, including the version number, the serial number of the program and the copyright.

## **6. Advanced concepts**

This chapter describes technical aspects about the program, the different kind of files that it uses, in addition with several concepts which, although are not essential for the program running, might help the user to optimize the program performance.

### **Files**

There are two files that cannot be deleted, they are in the root directory of your HD and they are called CIRVIS.SYS and CIRVIS.000

For the \*.ari files provided by a CIRCUTOR's AR.4 analyzer, the own program creates files with \*.ar4 extension where stores the information obtained from the harmonic calculation by means of the use of the FFT (FAST FOURIER TRANSFORM). Each time that an .ari file is analyzed, the program will check whether this file was already previously calculated, searching the name of this file with the .ar4 extension, and in case that it doesn't find it, it calculates it and creates the file.

This system has been designed to reduce the delay time in operations that involve a substantial quantity of calculations, as it is the case of the harmonic calculation from the waveform.

\*.ar4 files can be deleted from the disk at any moment. They just will be again created when that file is again analyzed.

### **Alternative ways for printing graphics out**

CIR-VISION is a real Windows application that allows transferring graphics between applications, either copying a window in the clipboard, by pressing the "Prt. Scr." key, or saving a graphic in bitmap format (\*.bmp). Once one of these operations has been done, you can go to a Windows application like Paintbrush, Write, etc. and modify and print the graphic.

One of the advantages of this method is that it offers the possibility of creating documents with several graphics, combining them as you wish, although this method would not then allow to see the horizontal axis scales, like are seeing when you get a print-out from CIR-VISION.

### **Simultaneous display of several windows**

In order to compare several graphic types, the program allows the simultaneous opening of up to 16 windows which can be either from the same file or different ones. Depending on the size and resolution of the monitor, graphics will be more or less clearly displayed on screen.

The windows arrange, like at any window application provided with MDI, can be either manual or automatically done by means of the different options in the *Window* menu.

## **7. Operations on files**

		Graphics	Numerical	Export	Print-out	Unit setting	Harmonics
AR.4 Standard	*.ARM	X	X	X	X	X	
	*.ARI	X	X	X	X	X	X
	*.ARP		X	X	X		
	*.AR4			X			
AR.4 Fast-Check	*.ARC	X	X	X	X	X	
	*.ARP		X	X	X		
AR.4 Disturbances	*.MOS	X			X		
	*.MOP	X	X	X	X		
AR.5 Energy	*.A5M	X	X	X	X	X	
	*.A5T	X	X	X	X	X	
CAVA-250	*.CAV	X		X	X		
	*.CAP		X	X	X		
Memory Clamp	*.CLP	X		X	X		
CVM Memory	*.CVM	X	X	X	X	X	
	*.CVT	X	X	X	X	X	
	*.CVX		X	X	X		
	*.CVE		X	X	X		

## **8. RS-232 Communications**

	Directly COMx (RS-232)	Through card reader (MCS-1)
AR.4-M (RS-232)	X	
AR.5	X	
MCS-1	X	
Memory Clamp	X	
CAVA-250	X	
CVM Memory		X

*Notes*

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