PC Software Users Manual

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1. Hardware and OS Requirements

Pentium 4 or better

128 Mbytes of Memory

Color Monitor with 1024 x 768 resolution

Keyboard

Mouse

Windows 98, XP, 2000, NT

2. Installation of Software

1. Insert CD
2. Select RUN
3. Enter D:setup

3. RS-232 Protocol

19200 baud rate

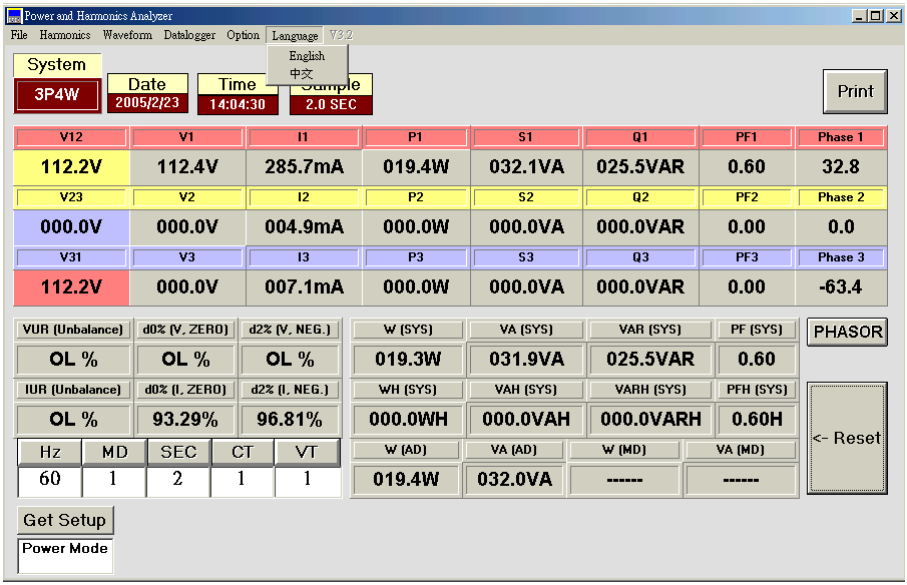
8 data bits

1 stop bit

No parity

4. Select Language

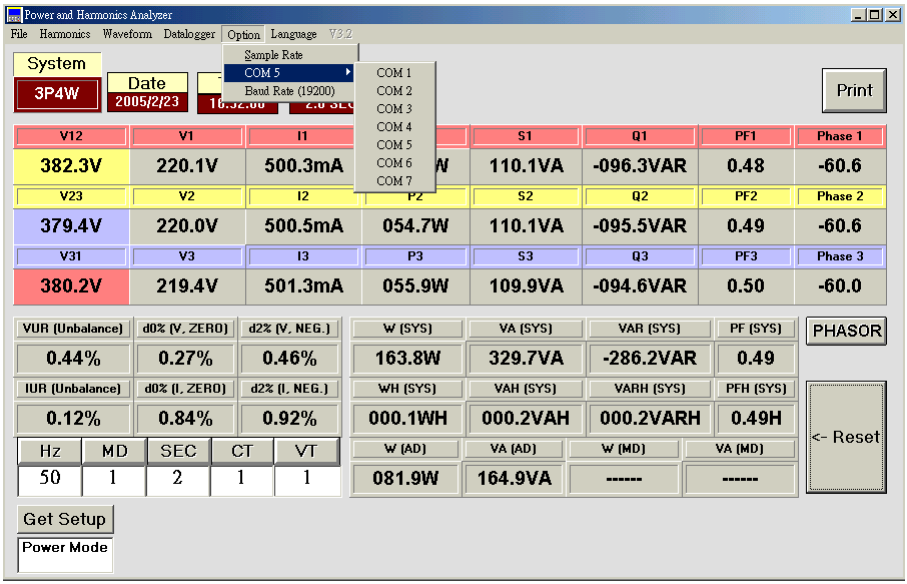
When the program is run, a window is shown as following:



Under the Language menu, users can select English or Chinese. Once selected, it will be used as default option until it is changed again.

5. Select COM port

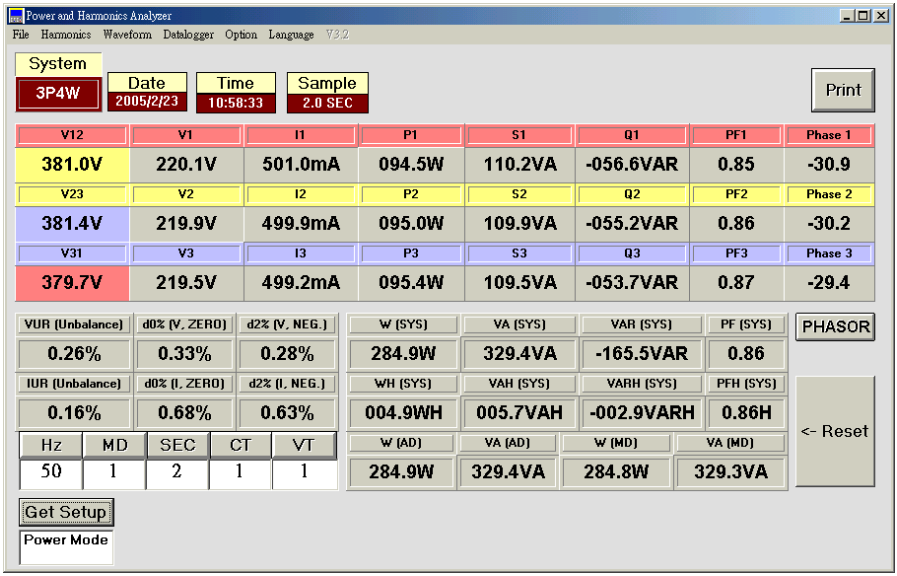
For the first time, users will be asked to select COM port from the “OPTION” menu. If users’ PC has RS-232 port, it is COM1 usually.



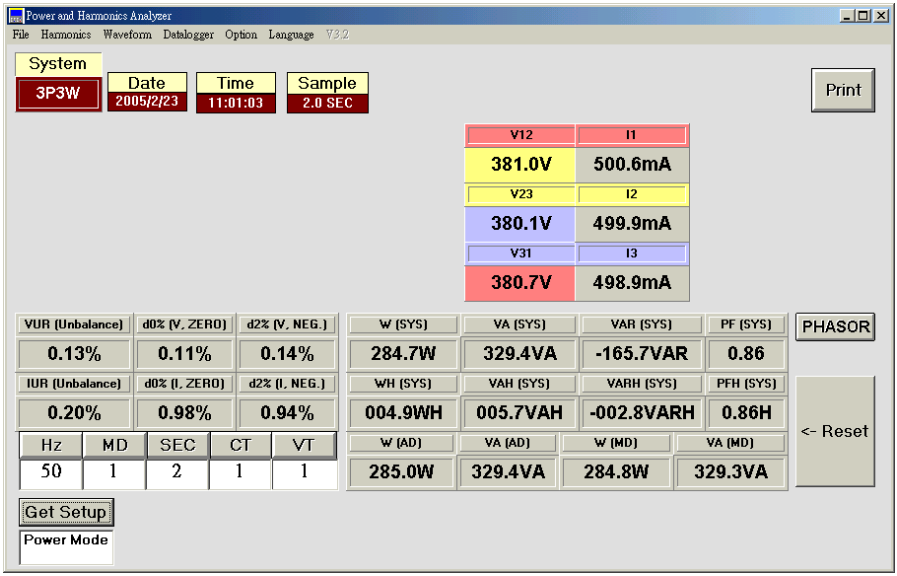
To reset selected COM port, users can delete the file “commport.dat” in the directory where program is installed (e.g. \program files\power harmonics analyzer).

6. Power Mode

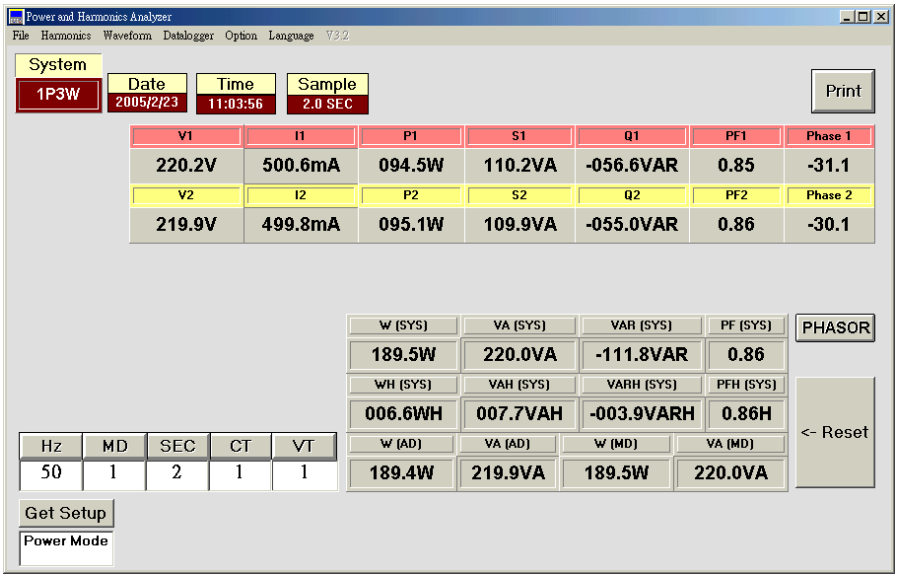
If the Power and Harmonics Analyzer is in power mode, the following window will be shown:



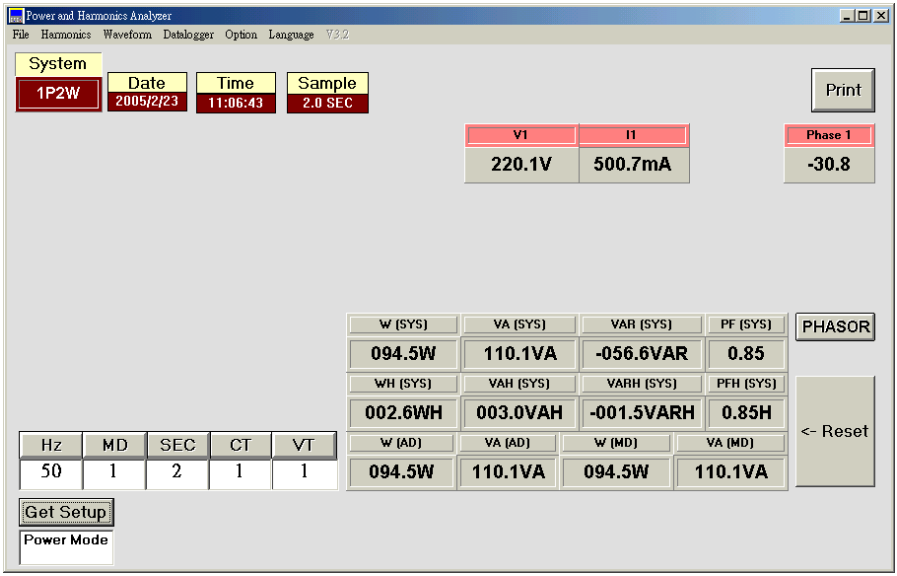
(Example of a 3P4W system)



(Example of a 3P3W system)



(Example of a 1P3W system)

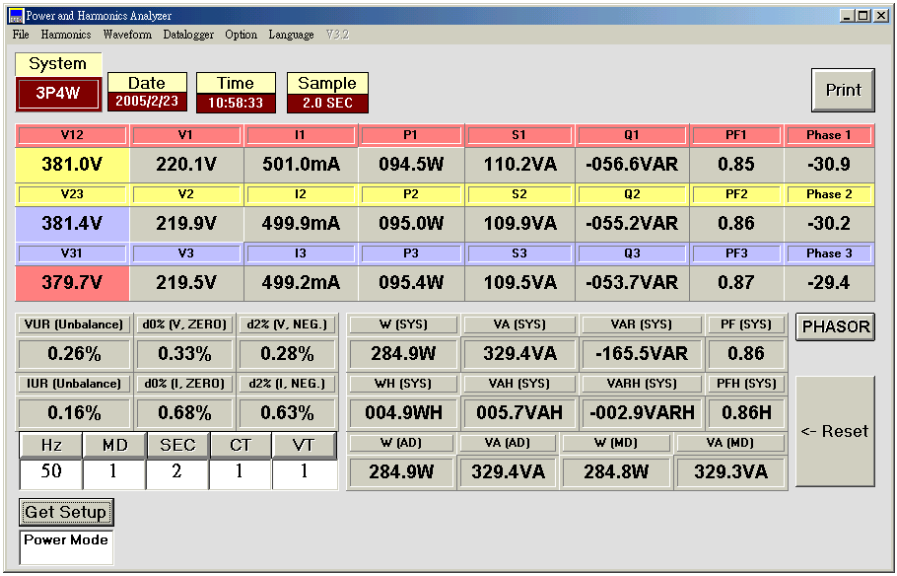


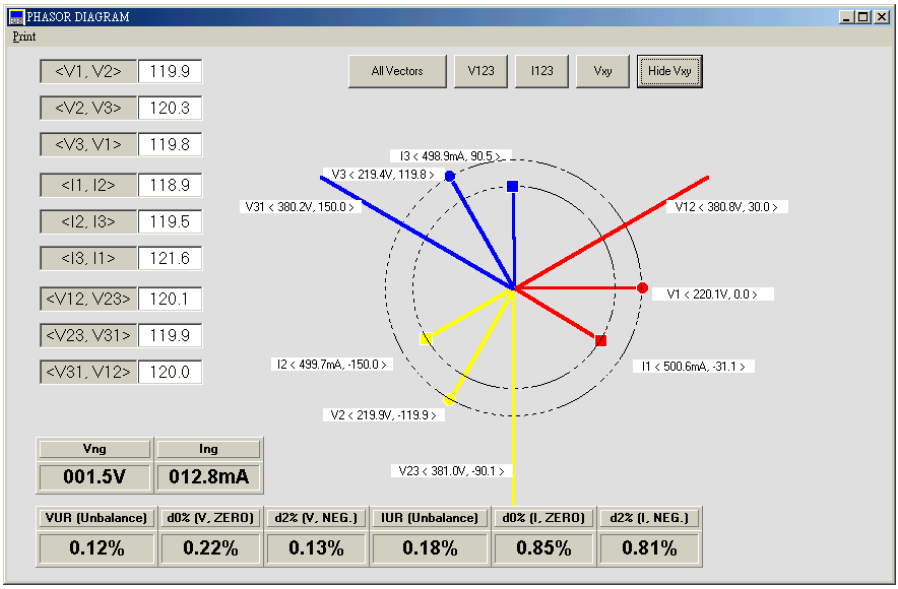
(Example of a 1P2W system)

NOTE: If users change the power system after program is run, press the UPDATE NOW button to get the updated setup from analyzer.

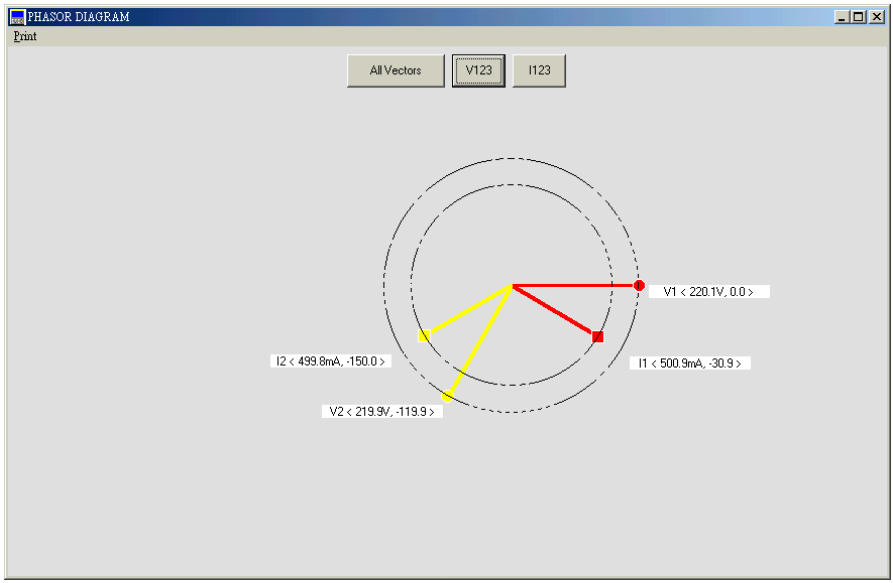
7. Phasor Diagram

If the Power and Harmonics Analyzer is in power mode, users can press the PHASOR button to display phasor diagram:

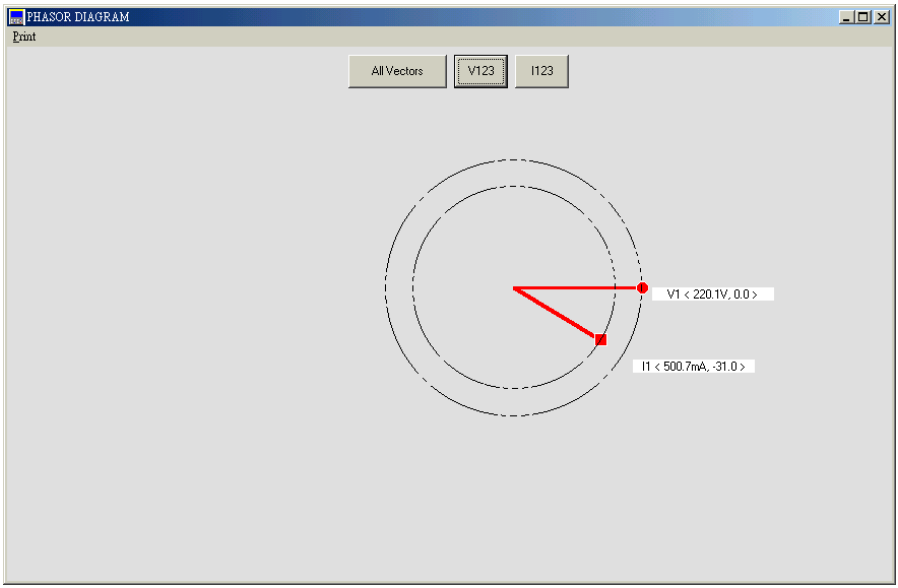




(Example of a 3P4W or 3P3W system)



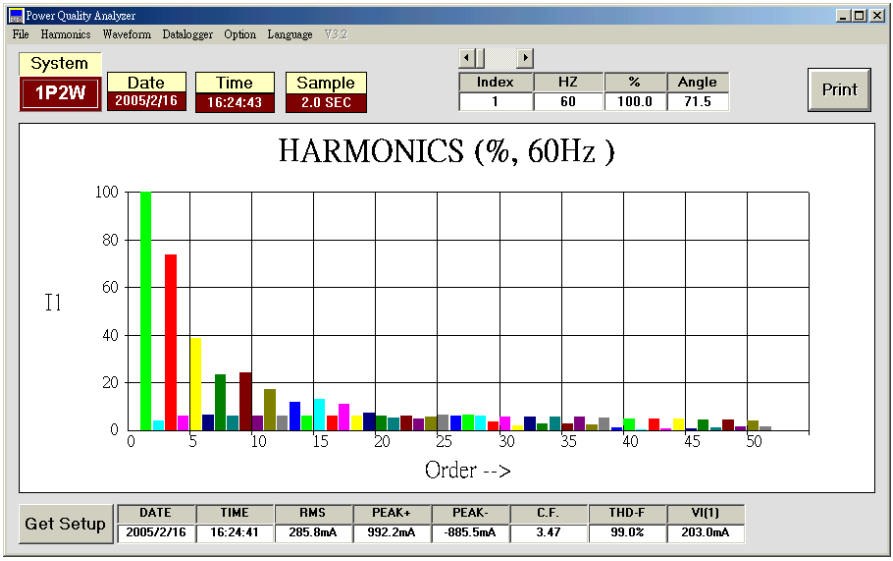
(Example of a 1P3W system)



(Example of a 1P2W system)

8. Harmonics Mode

If the Power and Harmonics Analyzer is in harmonics mode, the following window will be shown:



(Example of I1 input)

Users can move the horizontal scroll bar to select desired order of harmonics.

Index: selected order

Hz: Frequency of selected order

%: Percentage of selected order with respect to 1st harmonics

Angle: Phase angle of selected order of harmonics

Date: Current date

Time: Current time

RMS: the true RMS value of selected input

PEAK+: positive peak value of selected input

PEAK-: negative peak value of selected input.

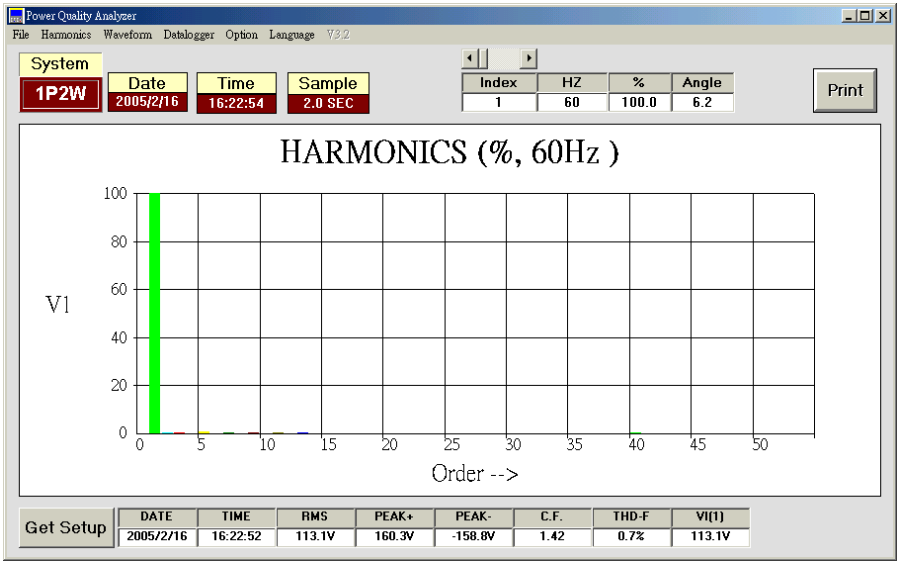
C.F.: Crest Factor

THD-F: Total Harmonic Distortion

VI(1): True RMS value of first harmonics of selected input.

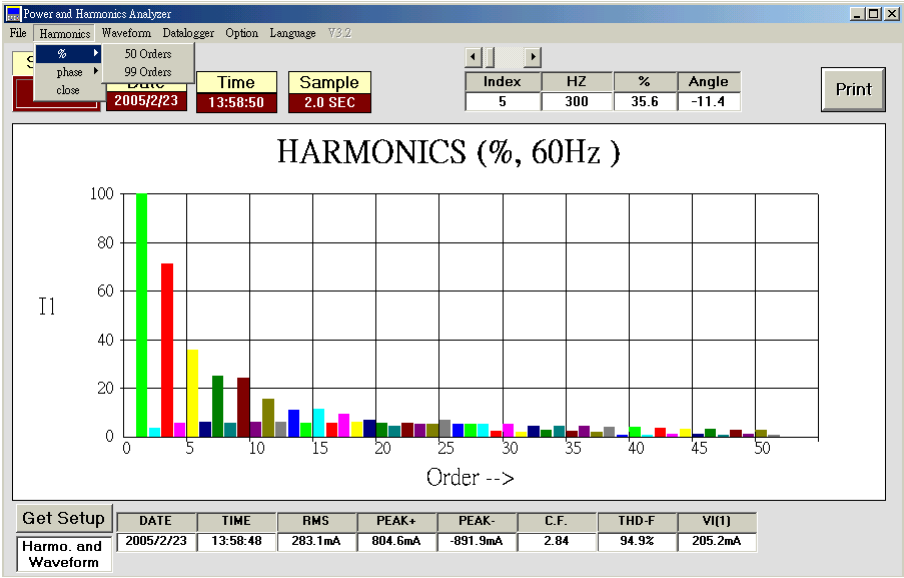
NOTE: To select desired input (V1, V2, V3, I1, I2, I3), users can press the button

from the Analyzer.



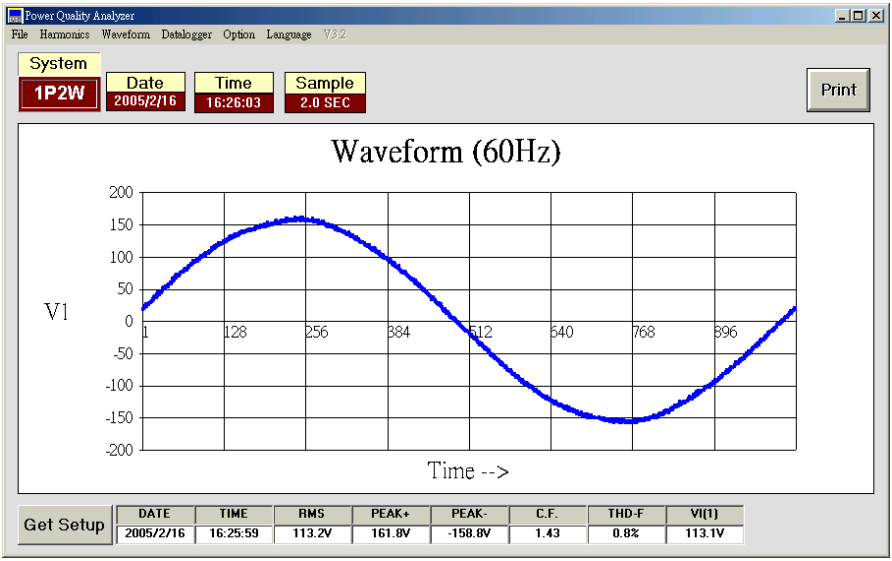
(Example of V1 input)

Users have the option to display % (percentage) or phase angle. And users can select 50 or 99 orders to be displayed.



9. Waveform Mode

If the Power and Harmonics Analyzer is in harmonics mode, users can select the waveform from the menu to display waveform:



(Example of V1 input)

Date: Current date

Time: Current time

RMS: the true RMS value of selected input

PEAK+: positive peak value of selected input

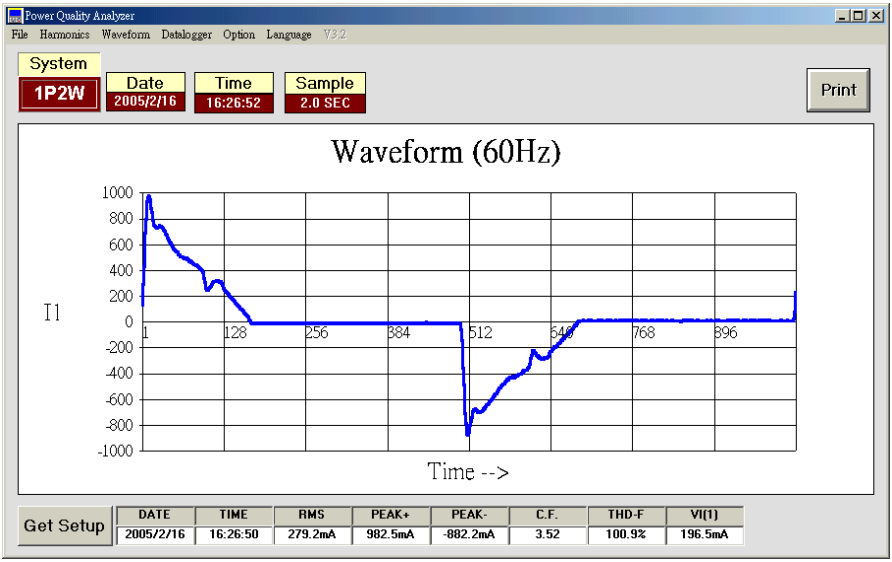
PEAK-: negative peak value of selected input.

C.F.: Crest Factor

THD-F: Total Harmonic Distortion

VI(1): True RMS value of first harmonics of selected input.

NOTE: To select desired input (V1, V2, V3, I1, I2, I3), users can press the VI 1▶2▶3 button from the Analyzer.



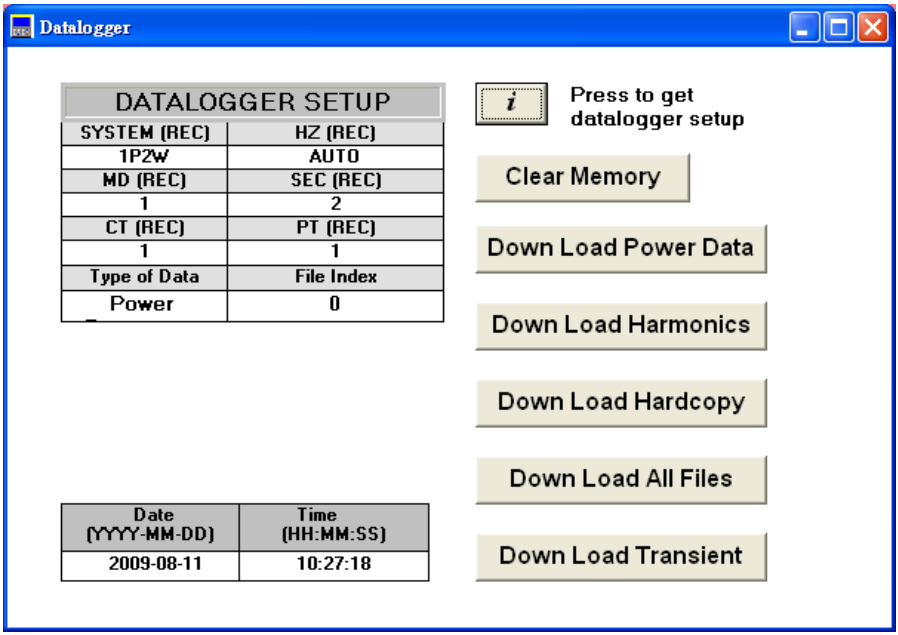
(Example of I1 input)

10. Data Logger

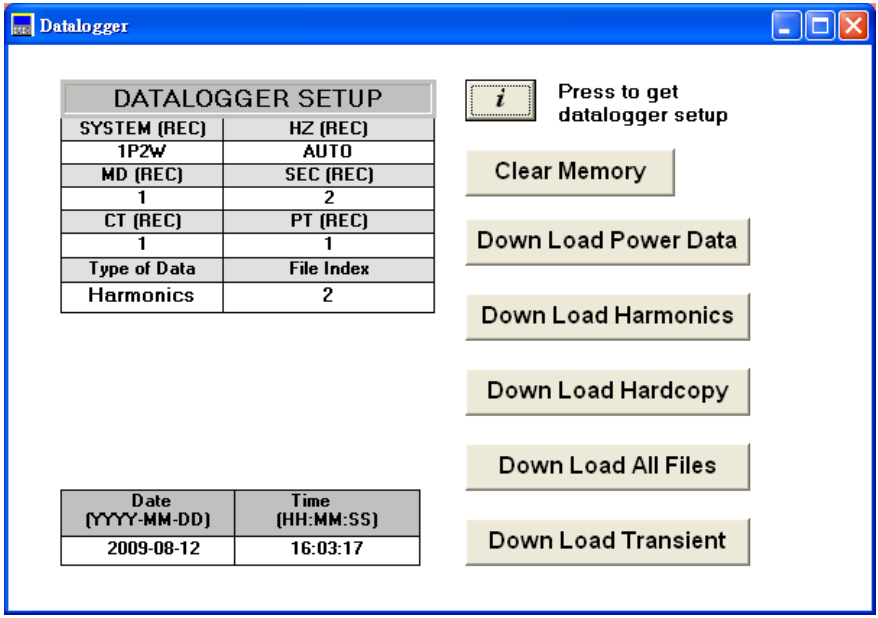
To down load data stored in the analyzer, select the datalogger menu. A data logger menu will be shown as following:

10-1 Get datalogger setup

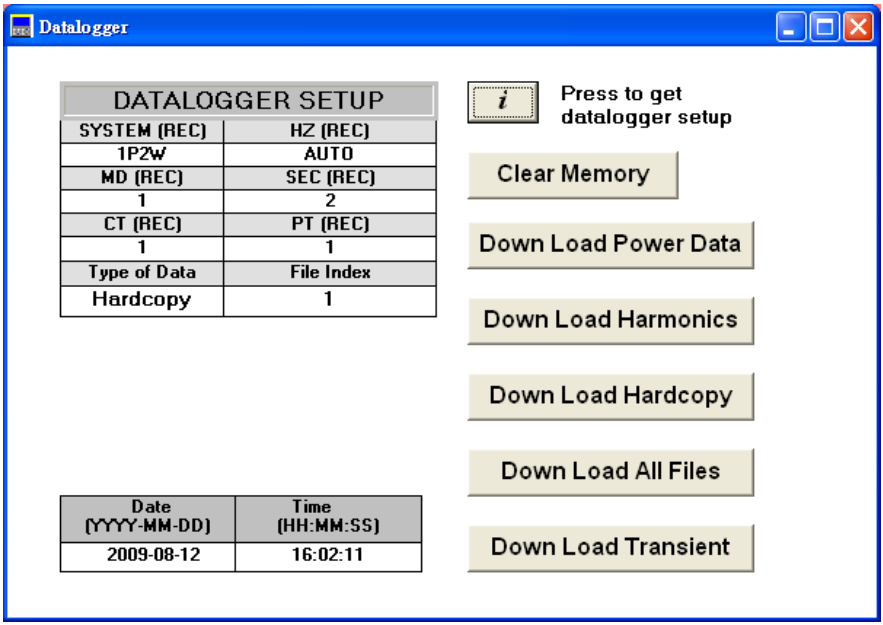
To find out what type of data (POWER or HARMONICS) data is stored in analyzer, press the [i] button.



(Example of Power Data Stored)



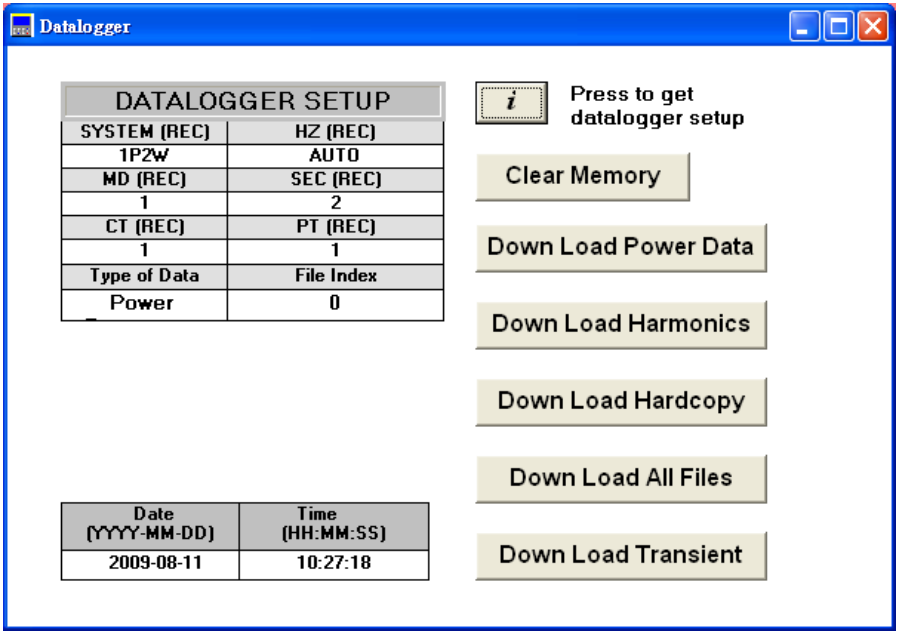
(Example of Harmonics Data Stored)



(Example of Hardcopy Data Stored)

10-2 Down Load Power Data

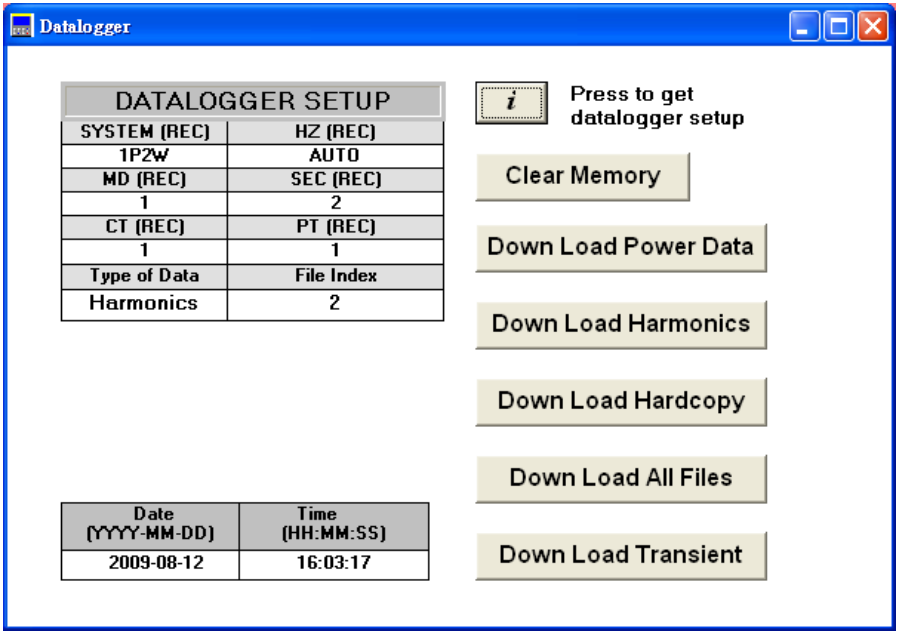
If the data stored is power data, press the Down Load Power Data button.



Once the button is pressed, users will be asked to enter file name for storing power data.

10-3 Down Load Harmonics Data

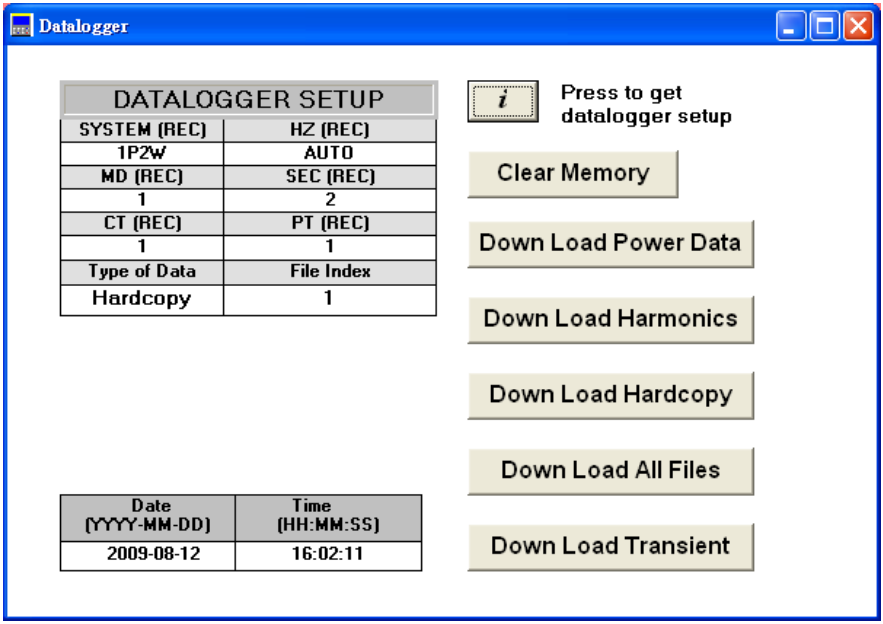
If the data stored is harmonics data, press the Down Load Harmonics button.



Once the button is pressed, users will be asked to enter file name for storing harmonics data.

10-4 Down Load Hardcopy Data

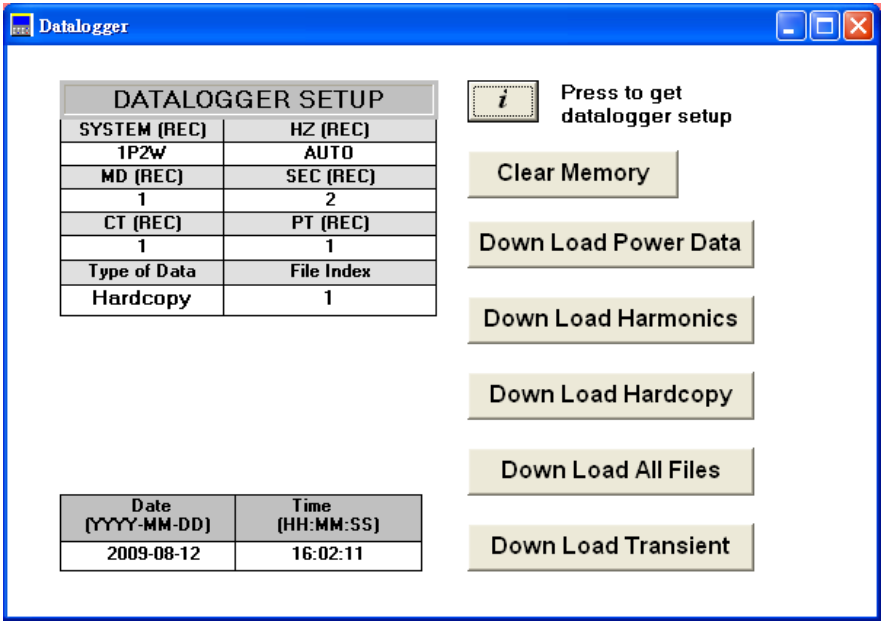
If the data stored is harmonics data, press the Down Load Hardcopy button.



Once the button is pressed, users will be asked to enter file name for storing harmonics data.

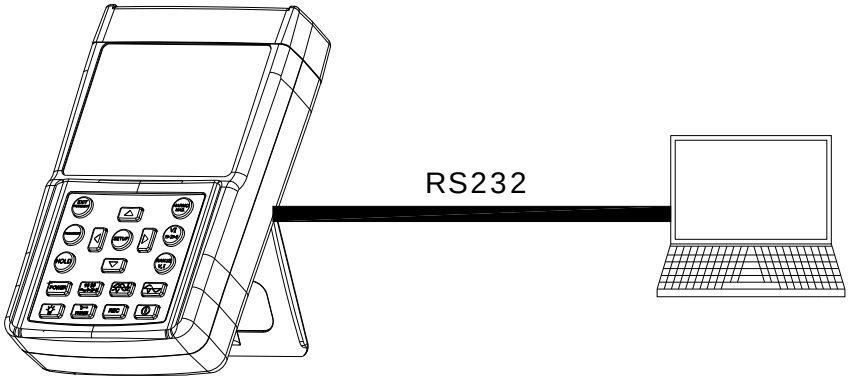
10-5 Down Load All Files

If the data stored is harmonics data, press the Down Load All Files button.



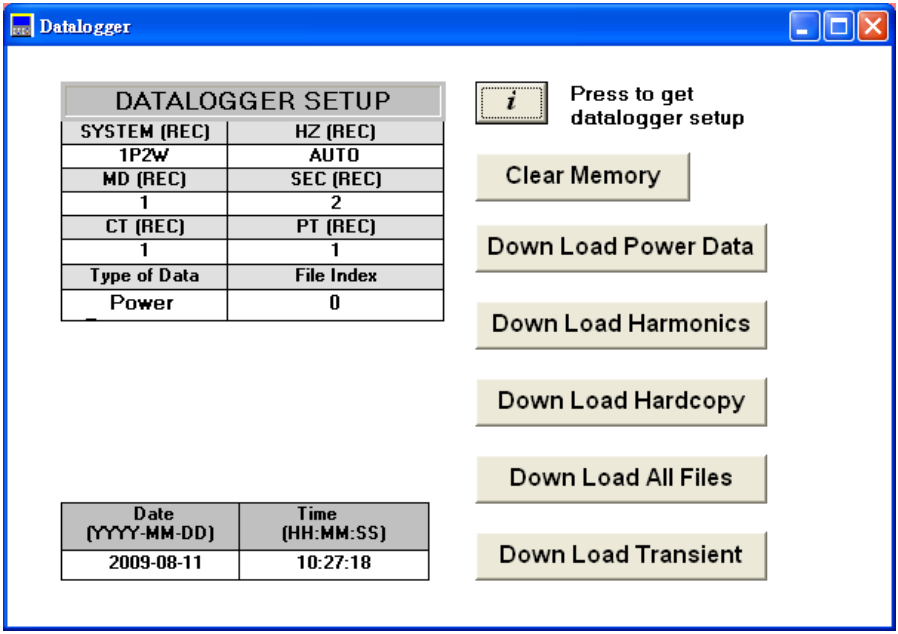
Once the button is pressed, all the files will be downloaded. And file names will be created automatically with the date, time and file type (P: power, H: Harmonics, and C: Hardcopy) of data logging. For example: 20090930142000P is used for power data. 20090930142501H is used for harmonics data. 20090930143002C is used for hardcopy data.

10-6 Down Load Transients



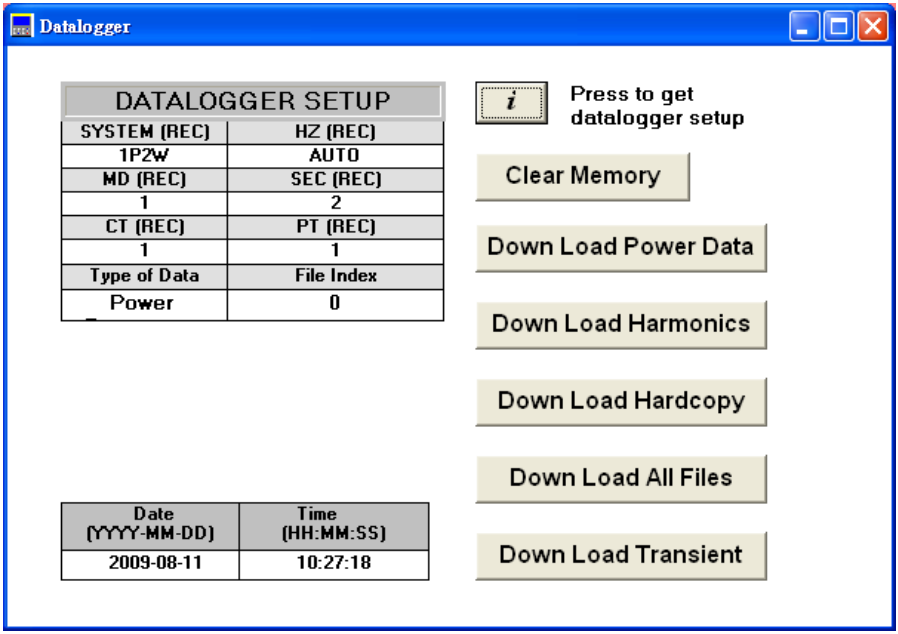
The power and harmonics analyzer will send transient data out through RS-232 interface when the TRANSIENT button is pressed to read events in the TRANSIENT mode.

1. So users should **first** connect the RS-232 cable between analyzer and PC.
2. Then run the application software and select datalogger menu.
3. Press the Down Load Transient button in the window. Users will be asked to enter file name for storing transient data. Then the program will wait for data transferred from analyzer for 10 seconds.
4. Press the TRANSIENT button at the analyzer panel. Then the transient data will be transferred to PC.


Datalogger
DATALOGGER SETUP
SYSTEM (REC)
HZ (REC)
1P2W
AUTO
MD (REC)
SEC (REC)
1
2
CT (REC)
PT (REC)
1
1
Type of Data
File Index
Power
0
Date (YYYY-MM-DD)
Time (HH:MM:SS)
2009-08-11
10:27:18
Press to get datalogger setup
Clear Memory
Down Load Power Data
Down Load Harmonics
Down Load Hardcopy
Down Load All Files
Down Load Transient

10-7 Clear Memory

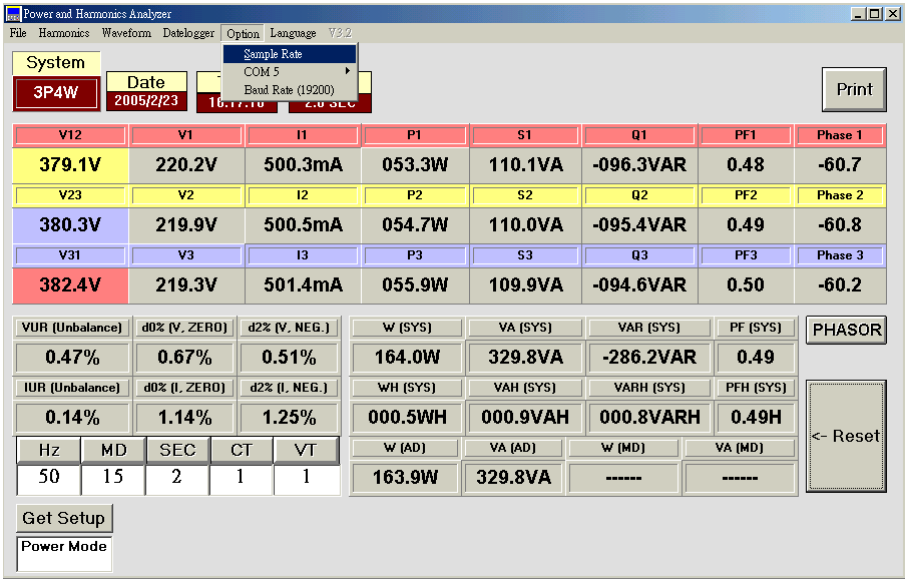
To clear data stored in analyzer, press the Clear Memory button in the Window. Two beeps will be heard if analyzer has cleared memory.



11. Data Logging by PC

11-1 Enter sampling time

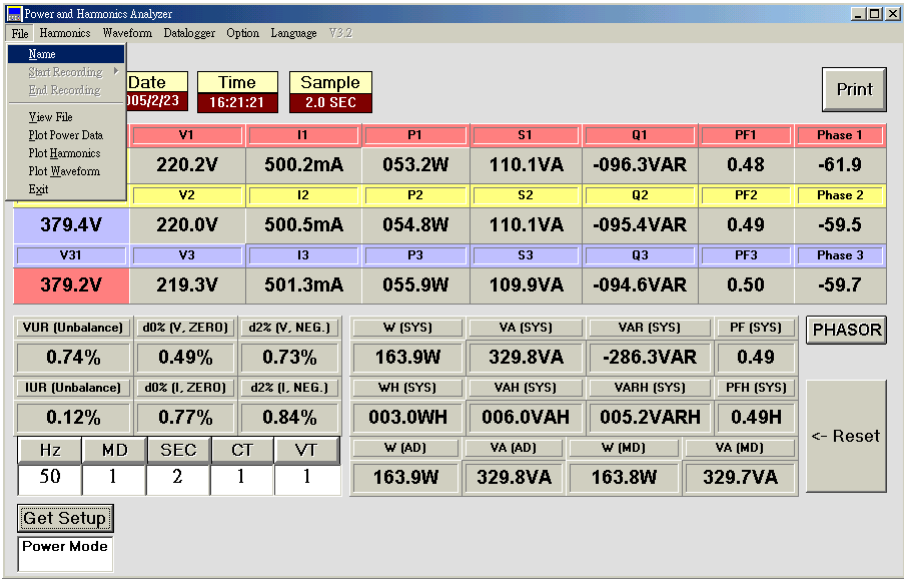
Open the “OPTION” menu; Select Sample Rate to enter sampling time in seconds. The minimum sampling time is 2 seconds for power and harmonics data. The minimum sampling time is 4 seconds for waveform data.



NOTE: If the power data is displayed, then the power data is stored in file. If harmonic bar graph is displayed, then the harmonic data is stored in file. If waveform is displayed, then the waveform data is stored in file.

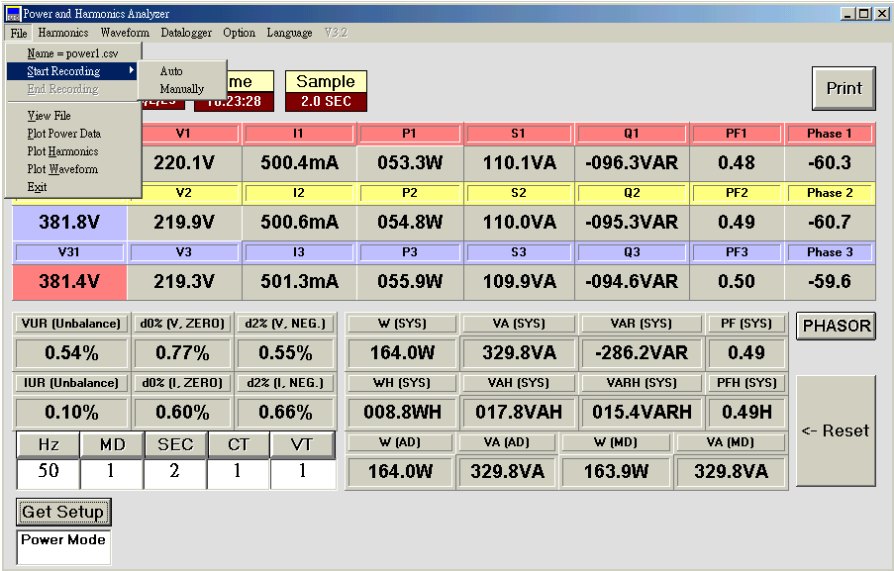
11-2 Enter file name

Open the “File” menu; select Name to enter file name.

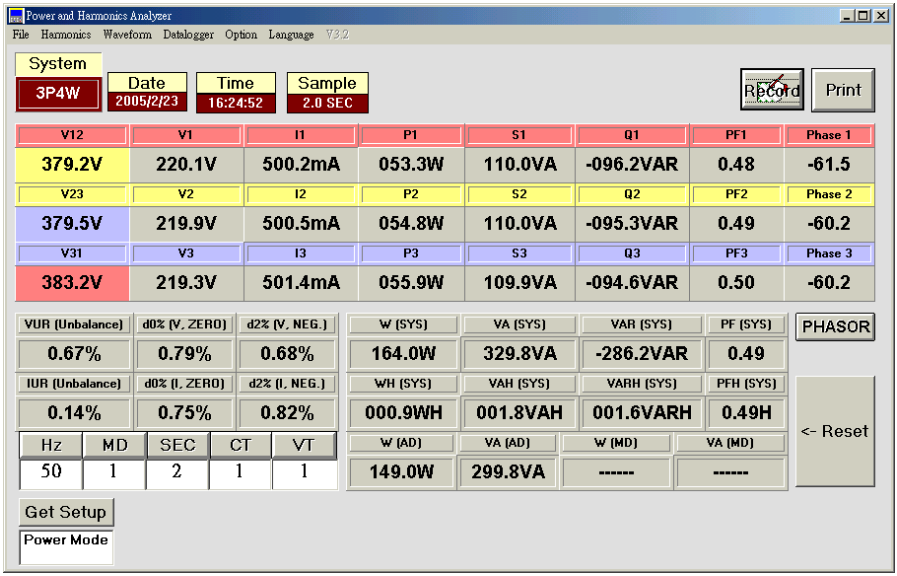


11-3 Start Recording

Open the “File” menu, and select **Start Recording.** If Auto is selected, data will be recorded every sampling time.

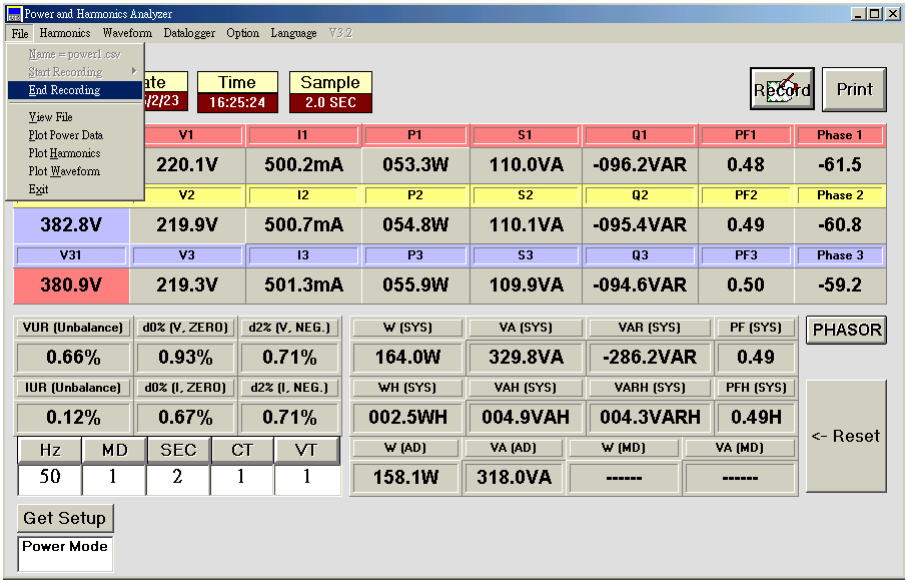


If **Manually** is selected, a **Record** button will be shown in the window. Data is recorded once when the button is pressed.


Power and Harmonics Analyzer
File Harmonics Waveform Datalogger Option Language V3.2
System
3P4W
Date
2005/2/23
Time
16:24:52
Sample
2.0 SEC
Record
Print
V12 V1 I1 P1 S1 Q1 PF1 Phase 1
379.2V 220.1V 500.2mA 053.3W 110.0VA -096.2VAR 0.48 -61.5
V23 V2 I2 P2 S2 Q2 PF2 Phase 2
379.5V 219.9V 500.5mA 054.8W 110.0VA -095.3VAR 0.49 -60.2
V31 V3 I3 P3 S3 Q3 PF3 Phase 3
383.2V 219.3V 501.4mA 055.9W 109.9VA -094.6VAR 0.50 -60.2
VUR (Unbalance) d0% (V, ZERO) d2% (V, NEG.) W (SYS) VA (SYS) VAR (SYS) PF (SYS)
0.67% 0.79% 0.68% 164.0W 329.8VA -286.2VAR 0.49
IUR (Unbalance) d0% (I, ZERO) d2% (I, NEG.) WH (SYS) VAH (SYS) VARH (SYS) PFH (SYS)
0.14% 0.75% 0.82% 000.9WH 001.8VAH 001.6VARH 0.49H
Hz MD SEC CT VT
50 1 2 1 1
W (AD) VA (AD) W (MD) VA (MD)
149.0W 299.8VA ------ ------
PHASOR
<- Reset
Get Setup
Power Mode

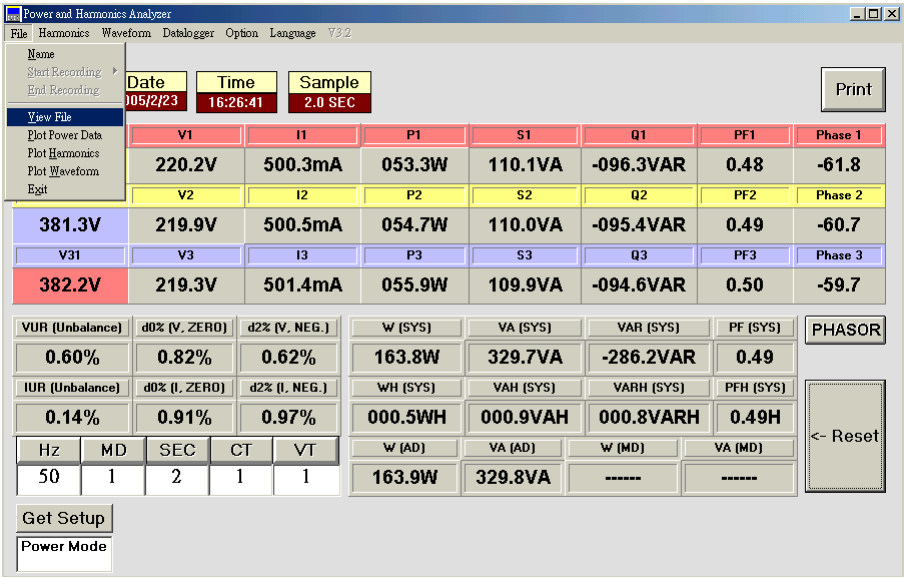
11-4 End Recording

To end recording, open “File” menu and select **End Recording**.

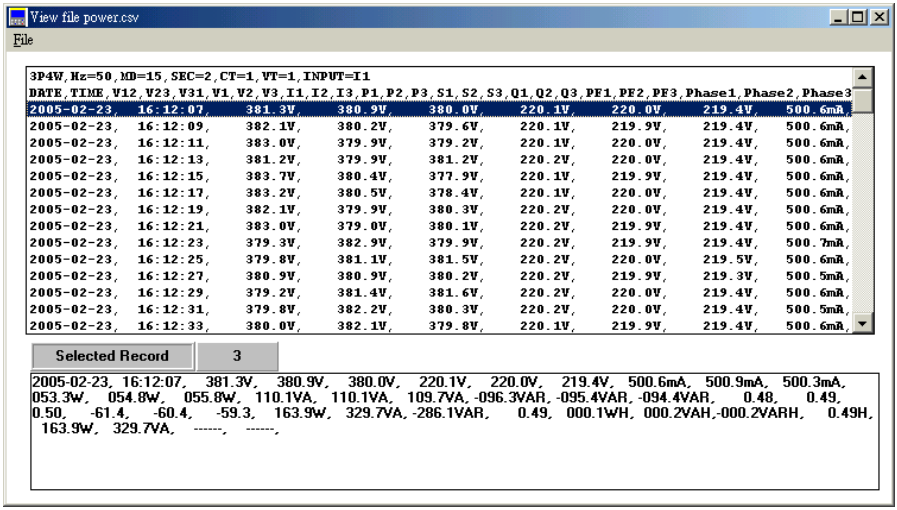


12. View File

All the data are stored in text format. Any text editor can open the data file. Users can review the file by opening the “File” menu, and select **View File**



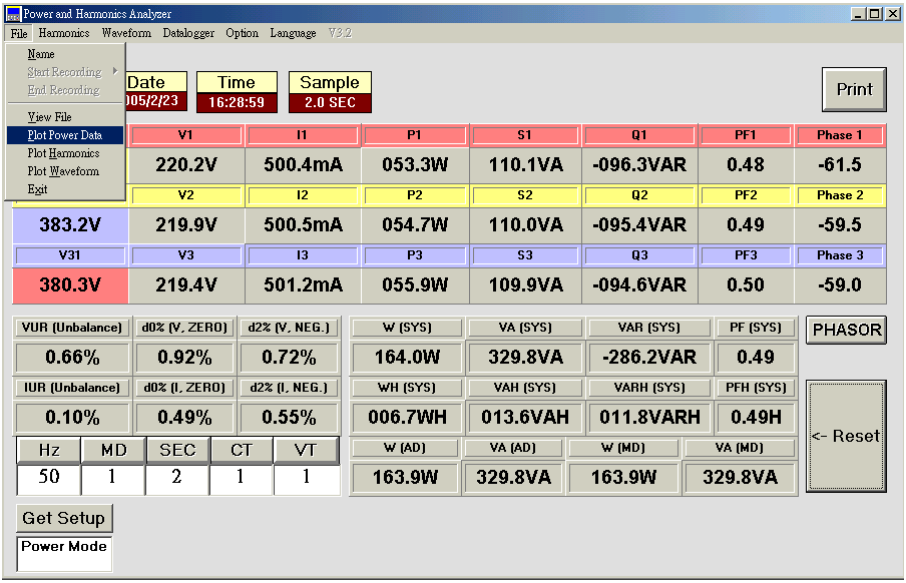
Users can enter the file name by opening the “File” menu. Data file will be opened as in the following window:


View file power.csv
File
3P4W,Hz=50,MD=15,SEC=2,CT=1,VT=1,INPUT=I1
DATE,TIME,V12,V23,V31,V1,V2,V3,I1,I2,I3,P1,P2,P3,S1,S2,S3,Q1,Q2,Q3,PF1,PF2,PF3,Phase1,Phase2,Phase3
2005-02-23, 16:12:07, 381.3V, 380.9V, 380.0V, 220.1V, 220.0V, 219.4V, 500.6mA,
2005-02-23, 16:12:09, 382.1V, 380.2V, 379.6V, 220.1V, 219.9V, 219.4V, 500.6mA,
2005-02-23, 16:12:11, 383.0V, 379.9V, 379.2V, 220.1V, 220.0V, 219.4V, 500.6mA,
2005-02-23, 16:12:13, 381.2V, 379.9V, 381.2V, 220.2V, 220.0V, 219.4V, 500.6mA,
2005-02-23, 16:12:15, 383.7V, 380.4V, 377.9V, 220.1V, 219.9V, 219.4V, 500.6mA,
2005-02-23, 16:12:17, 383.2V, 380.5V, 378.4V, 220.1V, 220.0V, 219.4V, 500.6mA,
2005-02-23, 16:12:19, 382.1V, 379.9V, 380.3V, 220.2V, 220.0V, 219.4V, 500.6mA,
2005-02-23, 16:12:21, 383.0V, 379.0V, 380.1V, 220.2V, 219.9V, 219.4V, 500.6mA,
2005-02-23, 16:12:23, 379.3V, 382.9V, 379.9V, 220.2V, 219.9V, 219.4V, 500.7mA,
2005-02-23, 16:12:25, 379.8V, 381.1V, 381.5V, 220.2V, 220.0V, 219.5V, 500.6mA,
2005-02-23, 16:12:27, 380.9V, 380.9V, 380.2V, 220.2V, 219.9V, 219.3V, 500.5mA,
2005-02-23, 16:12:29, 379.2V, 381.4V, 381.6V, 220.2V, 220.0V, 219.4V, 500.6mA,
2005-02-23, 16:12:31, 379.8V, 382.2V, 380.3V, 220.2V, 220.0V, 219.4V, 500.5mA,
2005-02-23, 16:12:33, 380.0V, 382.1V, 379.8V, 220.1V, 219.9V, 219.4V, 500.6mA,
Selected Record
3
2005-02-23, 16:12:07, 381.3V, 380.9V, 380.0V, 220.1V, 220.0V, 219.4V, 500.6mA, 500.9mA, 500.3mA,
053.3W, 054.8W, 055.8W, 110.1VA, 110.1VA, 109.7VA, -096.3VAR, -095.4VAR, -094.4VAR, 0.48, 0.49,
0.50, -61.4, -60.4, -59.3, 163.9W, 329.7VA, -286.1VAR, 0.49, 000.1WH, 000.2VAH, -000.2VARH, 0.49H,
163.9W, 329.7VA, ------, ------,

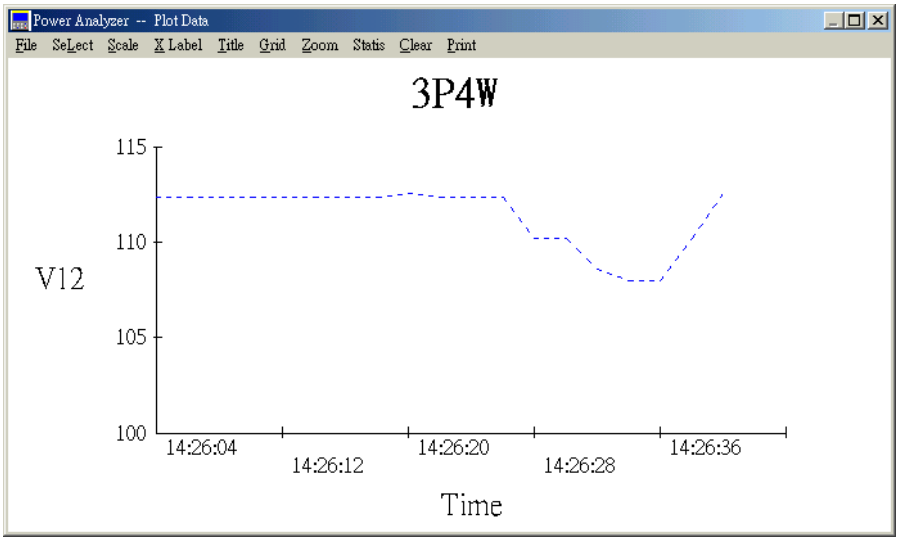
13. Plot Power Data

13-1 Plot one parameter from the power data menu

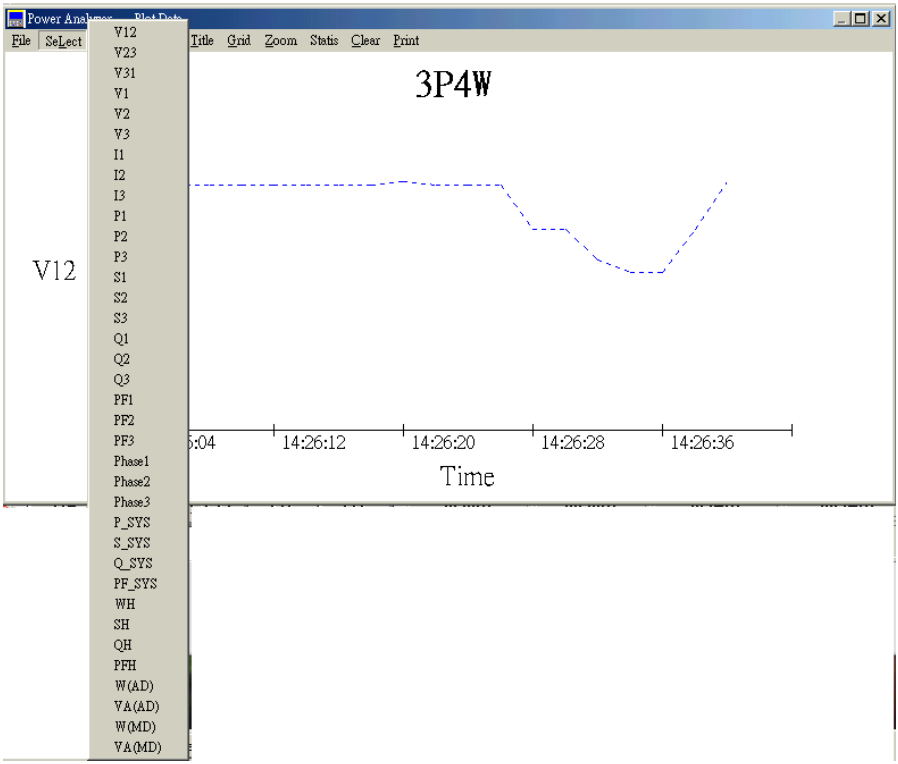
the Power data stored by PC or down loaded from analyzer can be plot by selecting **Plot Power Data** under “File” menu



It will first plot V12 as default as following:

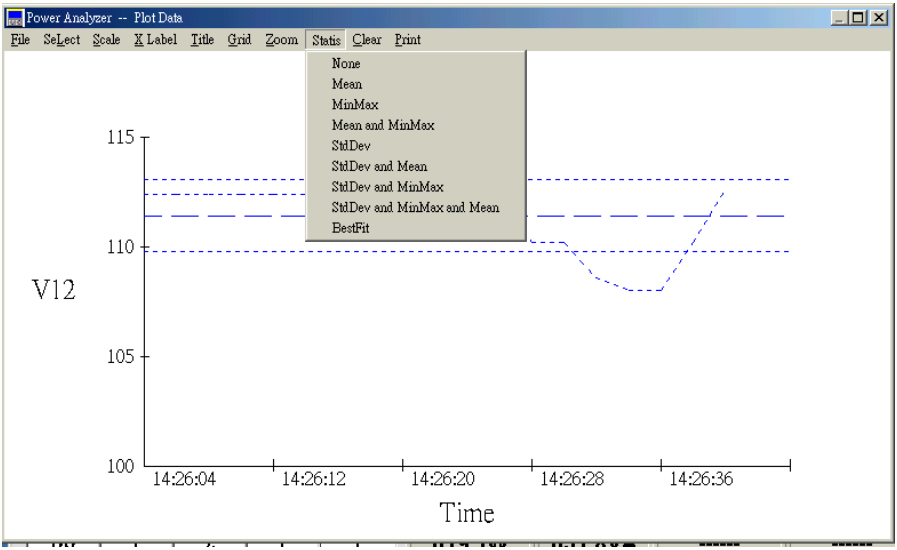

Power Analyzer -- Plot Data
File SeLect Scale X Label Title Grid Zoom Statis Clear Print
3P4W
115
110
105
100
V12
14:26:04
14:26:12
14:26:20
14:26:28
14:26:36
Time

To plot other power parameters, users can open the “Select” menu, and select one desired parameter.



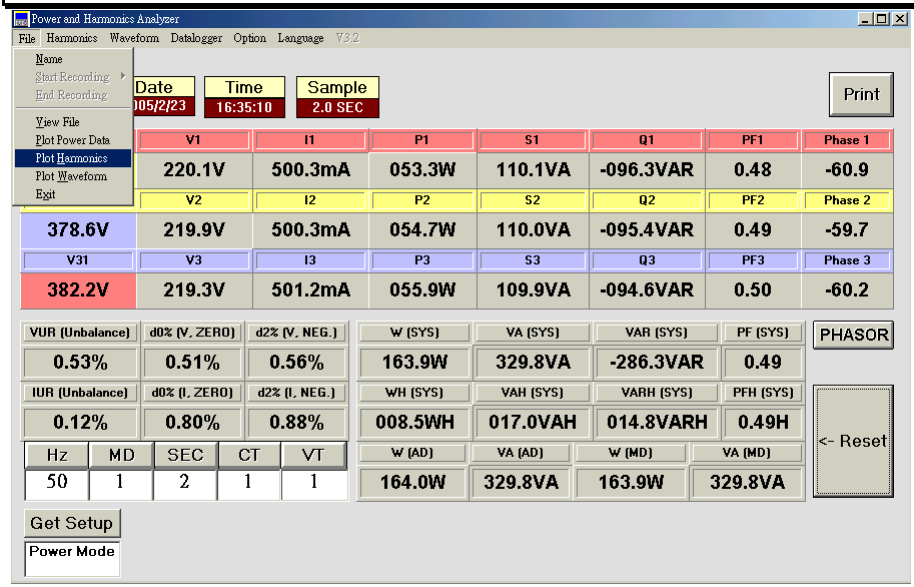
13-2 Statistic Data

Program can also plot statistic data such as Max, Min, Mean, and Standard Deviation.

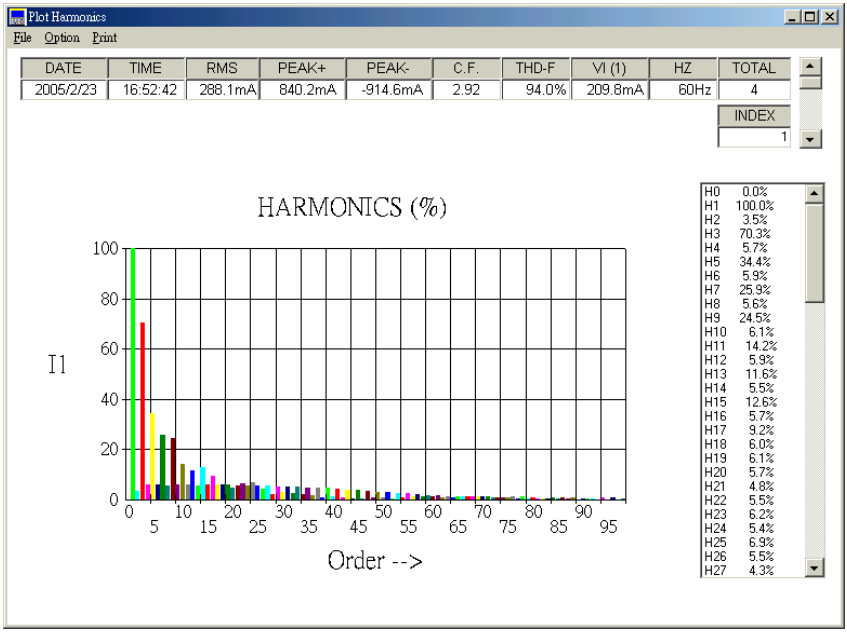


Note: If there are more than 3600 data, the statistic data will be disabled. Standard deviation and mean values are not calculated.

14. Plot Harmonics

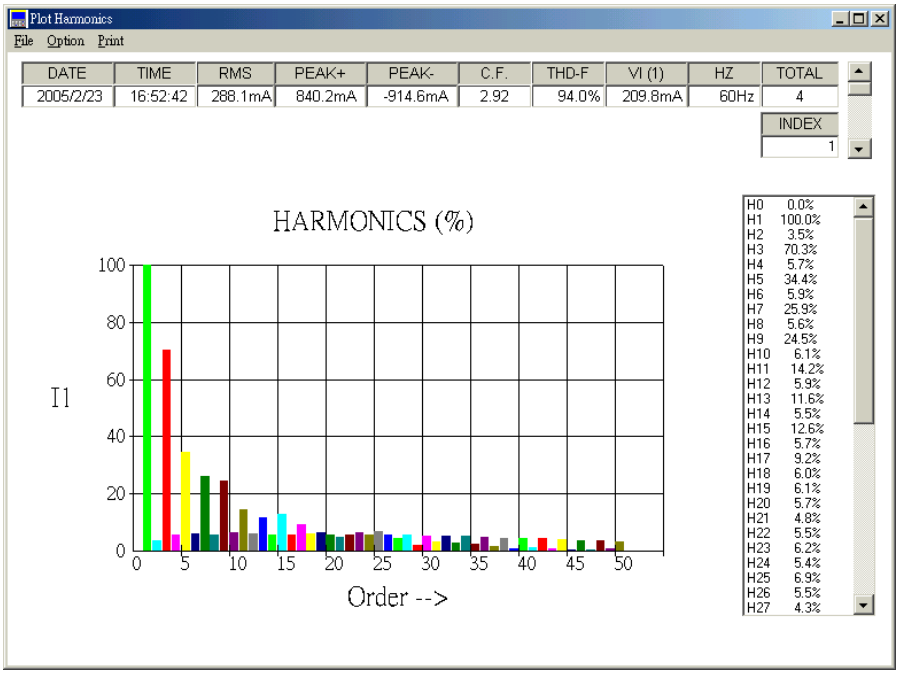


Once **Plot Harmonics** is selected, users will be asked to enter file name of harmonics data. Then the following bar graph will be plotted.

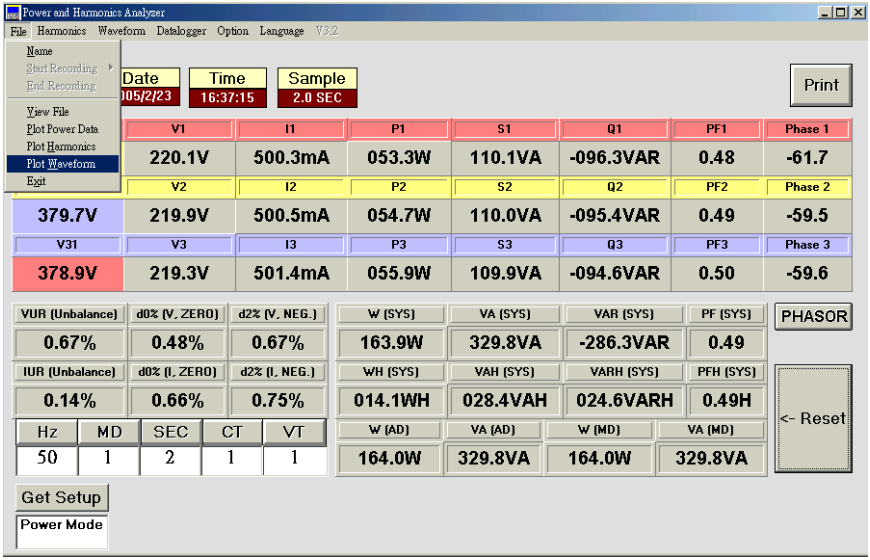


The number under **TOTAL** label indicates the set number of harmonics data stored in file. User can move the vertical scroll bar to plot specific set of harmonics data.

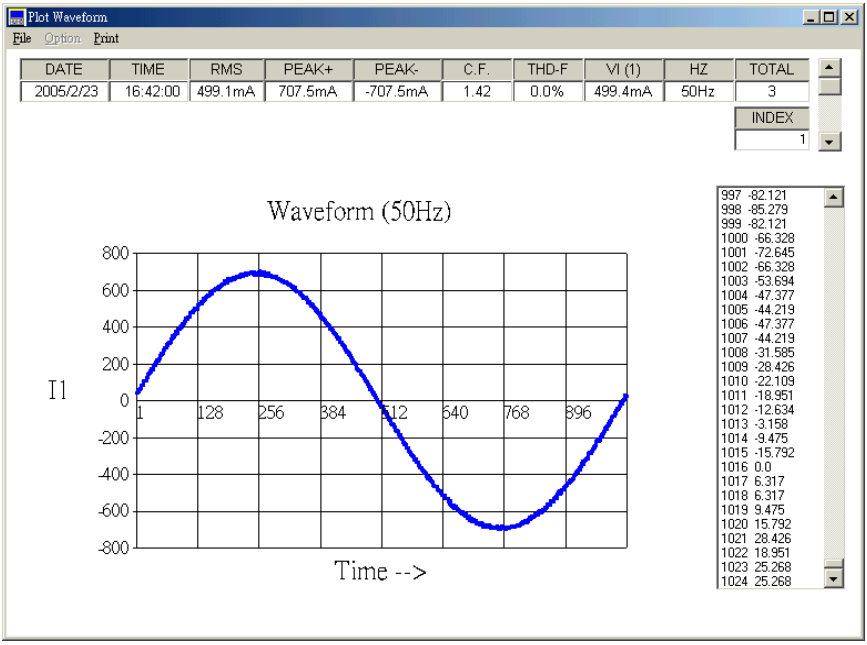
To see the percentage (%) of specific order, users can move the other vertical scroll bar.


Plot Harmonics
File Option Print
DATE TIME RMS PEAK+ PEAK- C.F. THD-F VI (1) HZ TOTAL
2005/2/23 16:52:42 288.1mA 840.2mA -914.6mA 2.92 94.0% 209.8mA 60Hz 4
INDEX
1
HARMONICS (%)
I1
100
80
60
40
20
0
0 5 10 15 20 25 30 35 40 45 50
Order -->
H0 0.0%
H1 100.0%
H2 3.5%
H3 70.3%
H4 5.7%
H5 34.4%
H6 5.9%
H7 25.9%
H8 5.6%
H9 24.5%
H10 6.1%
H11 14.2%
H12 5.9%
H13 11.6%
H14 5.5%
H15 12.6%
H16 5.7%
H17 9.2%
H18 6.0%
H19 6.1%
H20 5.7%
H21 4.8%
H22 5.5%
H23 6.2%
H24 5.4%
H25 6.9%
H26 5.5%
H27 4.3%

15. Plot Waveform



Once **Plot Waveform** is selected, users will be asked to enter file name of waveform data. Then the following curve will be plotted.

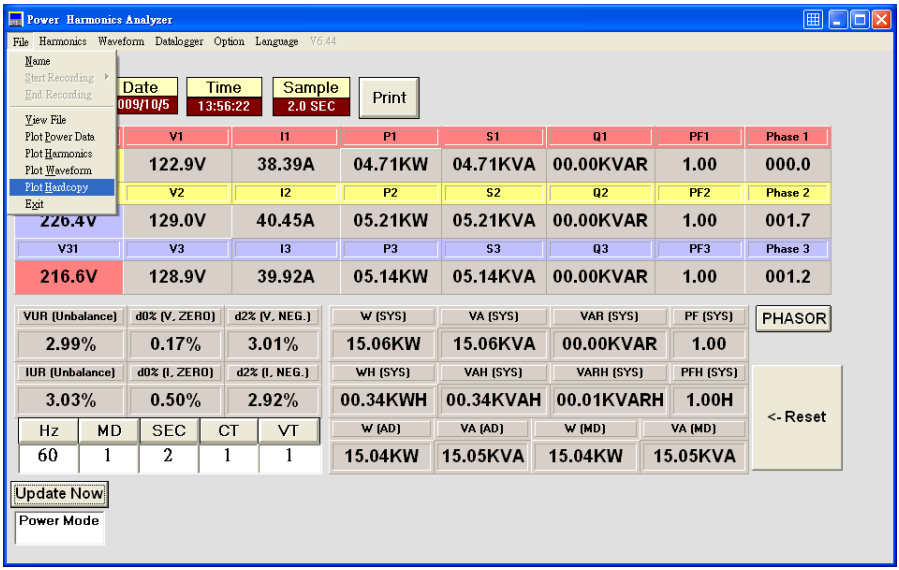


The number under **TOTAL** label indicates the set number of waveform data stored in file. User can move the vertical scroll bar to plot specific set of waveform data.

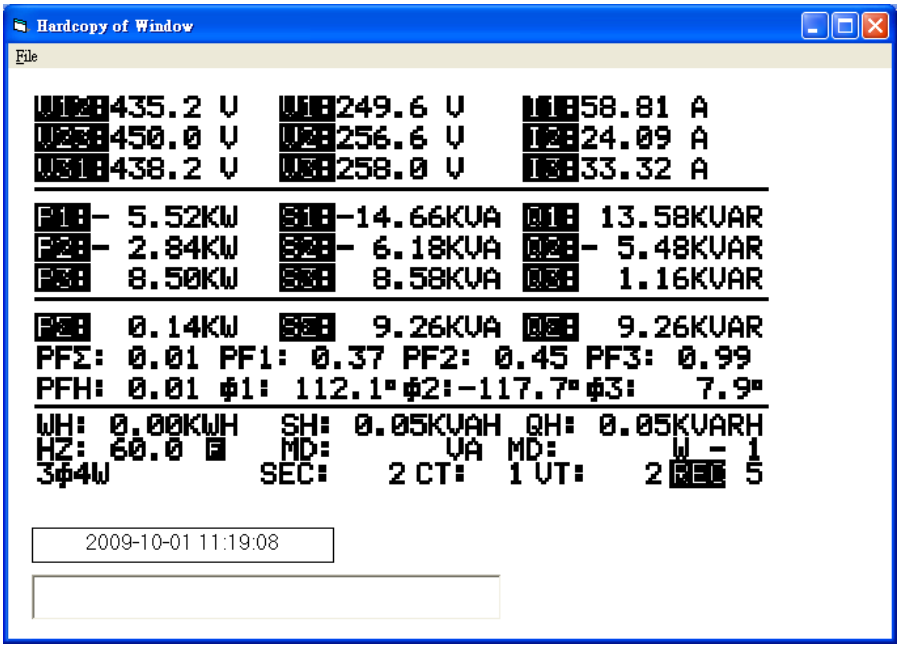
Each waveform consists of 1024 points of data. To see the value of specific point, users can move the other vertical scroll bar.

NOTE: <u>The values of all 1024 data are used for reference only.</u> They are not calibrated to the specified accuracy as that of RMS value.

16. Plot Hardcopy



Once **Plot Hardcopy** is selected, users will be asked to enter file name of hardcopy data. Then the following display will be plotted.


Hardcopy of Window
File
V12: 435.2 V
V23: 450.0 V
V31: 438.2 V
V1: 249.6 V
V2: 256.6 V
V3: 258.0 V
I1: 58.81 A
I2: 24.09 A
I3: 33.32 A
P1: - 5.52KW
P2: - 2.84KW
P3: 8.50KW
S1: -14.66KVA
S2: - 6.18KVA
S3: 8.58KVA
Q1: 13.58KVAR
Q2: - 5.48KVAR
Q3: 1.16KVAR
PΣ: 0.14KW
SΣ: 9.26KVA
QΣ: 9.26KVAR
PFΣ: 0.01 PF1: 0.37 PF2: 0.45 PF3: 0.99
PFH: 0.01 φ1: 112.1° φ2: -117.7° φ3: 7.9°
WH: 0.00KWH SH: 0.05KVAH QH: 0.05KVARH
HZ: 60.0 F MD: VA MD: W - 1
3φ4W SEC: 2 CT: 1 VT: 2 REG 5
2009-10-01 11:19:08