

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:

Power and Harmonics Analyzer

File Harmonics Waveform Datalogger Option Language Y32

System

3P4W Date 2005/2/23 Time 14:04:30 Sample 2.0 SEC Print

V12	V1	I1	P1	S1	Q1	PF1	Phase 1
112.2V	112.4V	285.7mA	019.4W	032.1VA	025.5VAR	0.60	32.8
V23	V2	I2	P2	S2	Q2	PF2	Phase 2
000.0V	000.0V	004.9mA	000.0W	000.0VA	000.0VAR	0.00	0.0
V31	V3	I3	P3	S3	Q3	PF3	Phase 3
112.2V	000.0V	007.1mA	000.0W	000.0VA	000.0VAR	0.00	-63.4

VUR (Unbalance) d0% (V, ZERO) d2% (V, NEG.) W (SYS) VA (SYS) VAR (SYS) PF (SYS) PHASOR

OL % OL % OL % 019.3W 031.9VA 025.5VAR 0.60

IUR (Unbalance) d0% (I, ZERO) d2% (I, NEG.) WH (SYS) VAH (SYS) VARH (SYS) PFH (SYS)

OL % 93.29% 96.81% 000.0WH 000.0VAH 000.0VARH 0.60H

Hz MD SEC CT VT W (AD) VA (AD) W (MD) VA (MD) <- Reset

60 1 2 1 1 019.4W 032.0VA -----

Get Setup

Power Mode

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.

The screenshot shows the 'Power and Harmonics Analyzer' software interface. The 'Option' menu is open, displaying a list of COM ports: COM 1, COM 2, COM 3, COM 4, COM 5 (selected), COM 6, and COM 7. The main display area contains several data tables and control buttons.

V12	V1	I1	W	S1	Q1	PF1	Phase 1
382.3V	220.1V	500.3mA	054.7W	110.1VA	-096.3VAR	0.48	-60.6
V23	V2	I2	P2	S2	Q2	PF2	Phase 2
379.4V	220.0V	500.5mA	054.7W	110.1VA	-095.5VAR	0.49	-60.6
V31	V3	I3	P3	S3	Q3	PF3	Phase 3
380.2V	219.4V	501.3mA	055.9W	109.9VA	-094.6VAR	0.50	-60.0

VUR (Unbalance)	d0% (V. ZERO)	d2% (V. NEG.)	W (SYS)	VA (SYS)	VAR (SYS)	PF (SYS)	PHASOR	
0.44%	0.27%	0.46%	163.8W	329.7VA	-286.2VAR	0.49		
IUR (Unbalance)	d0% (I. ZERO)	d2% (I. NEG.)	WH (SYS)	VAH (SYS)	VARH (SYS)	PFH (SYS)	-< Reset	
0.12%	0.84%	0.92%	000.1WH	000.2VAH	000.2VARH	0.49H		
Hz	MD	SEC	CT	VT	W (AD)	VA (AD)	W (MD)	VA (MD)
50	1	2	1	1	081.9W	164.9VA	-----	-----

Buttons: Print, PHASOR, <- Reset, Get Setup, Power Mode.

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:

The screenshot shows the 'Power and Harmonics Analyzer' software interface. The window title is 'Power and Harmonics Analyzer' and the menu bar includes 'File', 'Harmonics', 'Waveform', 'Debugger', 'Option', and 'Language'. The main display area shows system parameters, a three-phase data table, unbalance metrics, and power/energy values.

System Parameters:

System	Date	Time	Sample
3P4W	2005/2/23	10:58:33	2.0 SEC

Print

V12	V1	I1	P1	S1	Q1	PF1	Phase 1
381.0V	220.1V	501.0mA	094.5W	110.2VA	-056.6VAR	0.85	-30.9
V23	V2	I2	P2	S2	Q2	PF2	Phase 2
381.4V	219.9V	499.9mA	095.0W	109.9VA	-055.2VAR	0.86	-30.2
V31	V3	I3	P3	S3	Q3	PF3	Phase 3
379.7V	219.5V	499.2mA	095.4W	109.5VA	-053.7VAR	0.87	-29.4

Unbalance Metrics:

VUR (Unbalance)	d0% (V. ZERO)	d2% (V. NEG.)
0.26%	0.33%	0.28%
IUR (Unbalance)	d0% (I. ZERO)	d2% (I. NEG.)
0.16%	0.68%	0.63%

Power and Energy Values:

W (SYS)	VA (SYS)	VAR (SYS)	PF (SYS)
284.9W	329.4VA	-165.5VAR	0.86
WH (SYS)	VAH (SYS)	VARH (SYS)	PFH (SYS)
004.9WH	005.7VAH	-002.9VARH	0.86H
W (AD)	VA (AD)	W (MD)	VA (MD)
284.9W	329.4VA	284.8W	329.3VA

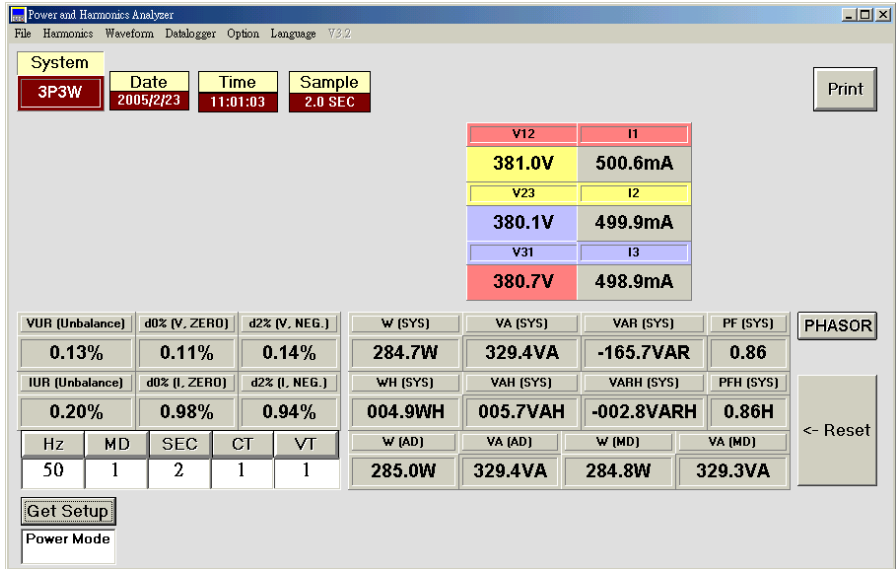
PHASOR

Get Setup

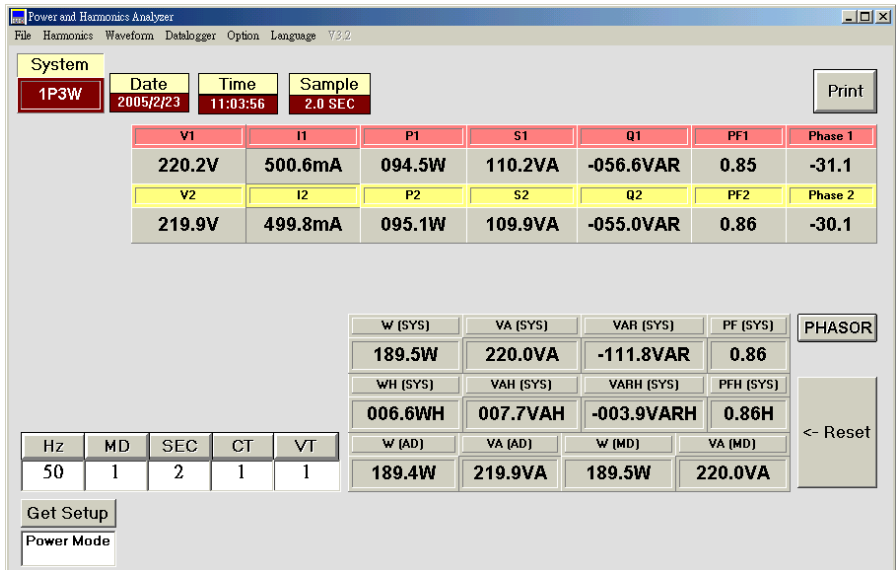
Power Mode

< Reset

(Example of a 3P4W system)



(Example of a 3P3W system)



(Example of a 1P3W system)

Power and Harmonics Analyzer

File Harmonics Waveform Debugger Option Language 122

System

1P2W	Date 2005/2/23	Time 11:06:43	Sample 2.0 SEC
-------------	--------------------------	-------------------------	--------------------------

Print

V1	I1	Phase 1
220.1V	500.7mA	-30.8

W (SYS)	VA (SYS)	VAR (SYS)	PF (SYS)	PHASOR
094.5W	110.1VA	-056.6VAR	0.85	
WH (SYS)	VAH (SYS)	VARH (SYS)	PFH (SYS)	< Reset
002.6WH	003.0VAH	-001.5VARH	0.85H	
W (AD)	VA (AD)	W (MD)	VA (MD)	
094.5W	110.1VA	094.5W	110.1VA	

Hz	MD	SEC	CT	VT
50	1	2	1	1

Get Setup

Power Mode

(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:

The screenshot shows the 'Power and Harmonics Analyzer' software interface. The main display area is titled 'System' and contains several data fields and tables.

System Information:

- System: 3P4W
- Date: 2005/2/23
- Time: 10:58:33
- Sample: 2.0 SEC

Print button is located to the right of the system information.

Phase Data Table:

V12	V1	I1	P1	S1	Q1	PF1	Phase 1
381.0V	220.1V	501.0mA	094.5W	110.2VA	-056.6VAR	0.85	-30.9
V23	V2	I2	P2	S2	Q2	PF2	Phase 2
381.4V	219.9V	499.9mA	095.0W	109.9VA	-055.2VAR	0.86	-30.2
V31	V3	I3	P3	S3	Q3	PF3	Phase 3
379.7V	219.5V	499.2mA	095.4W	109.5VA	-053.7VAR	0.87	-29.4

Unbalance and Power Factor Data:

VUR (Unbalance)	d0% (V. ZERO)	d2% (V. NEG.)	W (SYS)	VA (SYS)	VAR (SYS)	PF (SYS)
0.26%	0.33%	0.28%	284.9W	329.4VA	-165.5VAR	0.86
IUR (Unbalance)	d0% (I. ZERO)	d2% (I. NEG.)	WH (SYS)	VAH (SYS)	VARH (SYS)	PFH (SYS)
0.16%	0.68%	0.63%	004.9WH	005.7VAH	-002.9VARH	0.86H

PHASOR button is located to the right of the unbalance data.

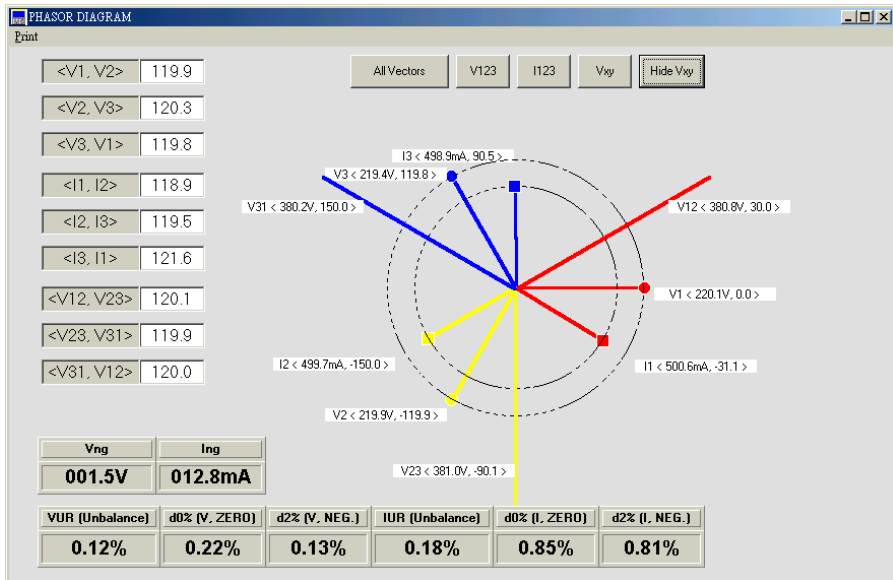
Frequency and Time Constants Table:

Hz	MD	SEC	CT	VT	W (AD)	VA (AD)	W (MD)	VA (MD)
50	1	2	1	1	284.9W	329.4VA	284.8W	329.3VA

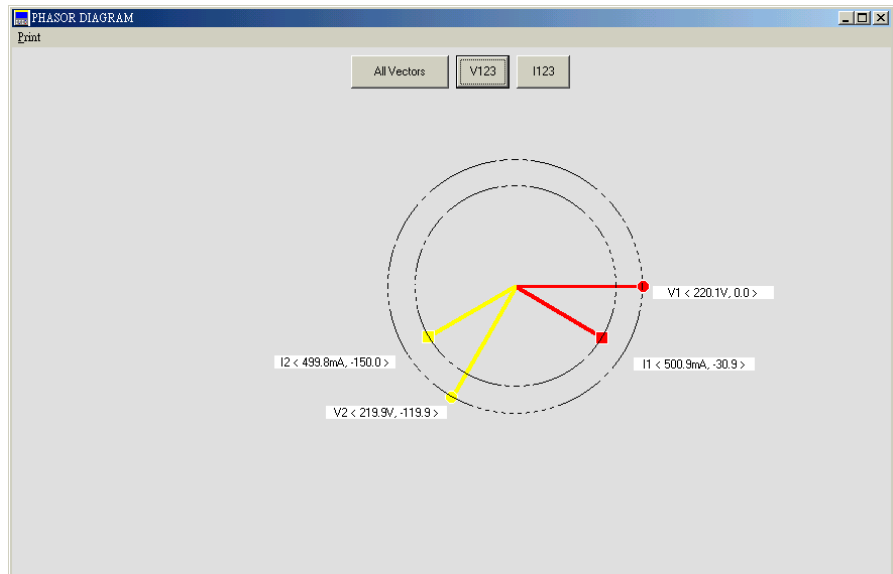
Get Setup button is located below the frequency table.

Power Mode is indicated at the bottom left.

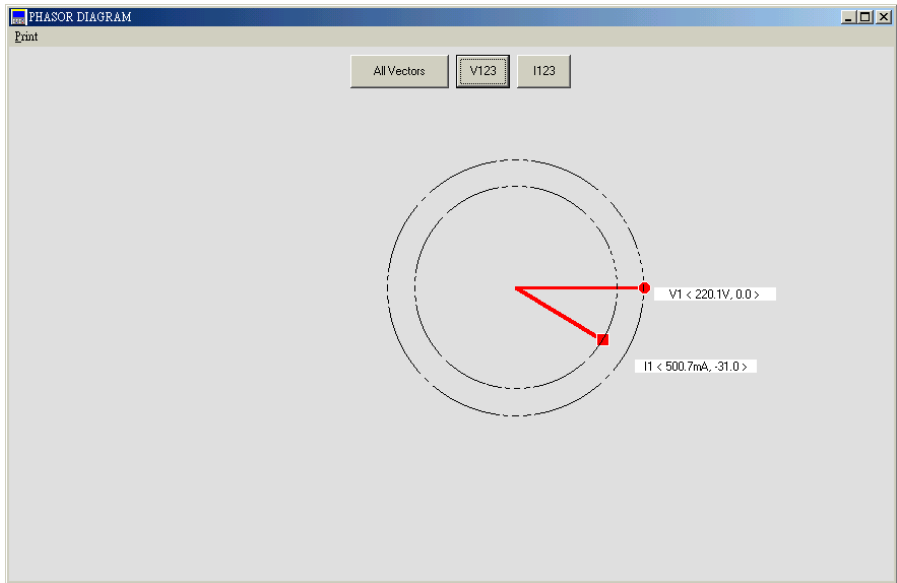
< Reset button is located on the right side of the interface.



(Example of a 3P4W or 3P3W system)



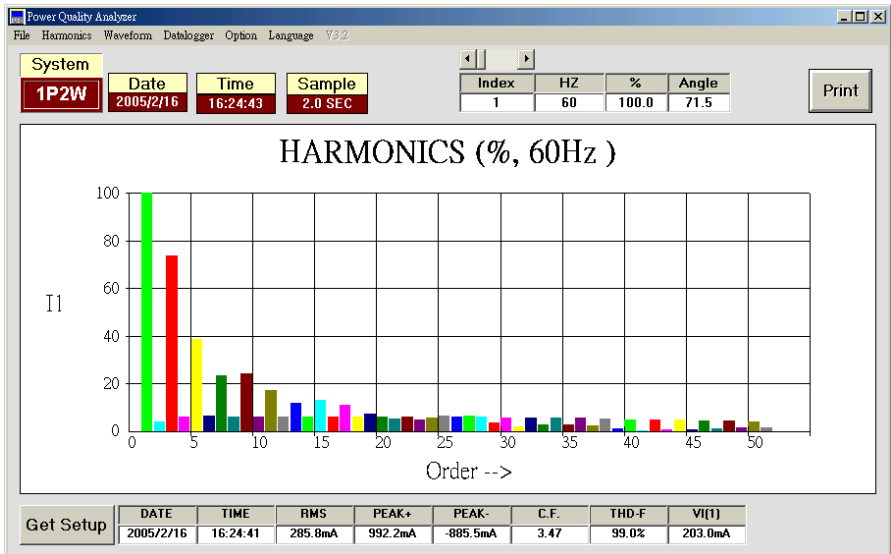
(Example of a 1P3W system)



(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

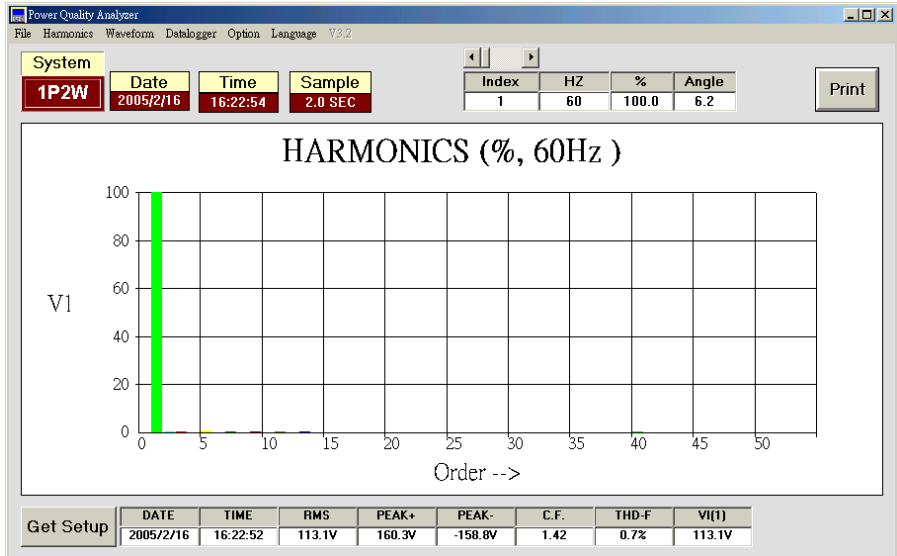
PEAK-: negative peak value of selected input.

C.F.: Crest Factor

THD-F: Total Harmonic Distortion

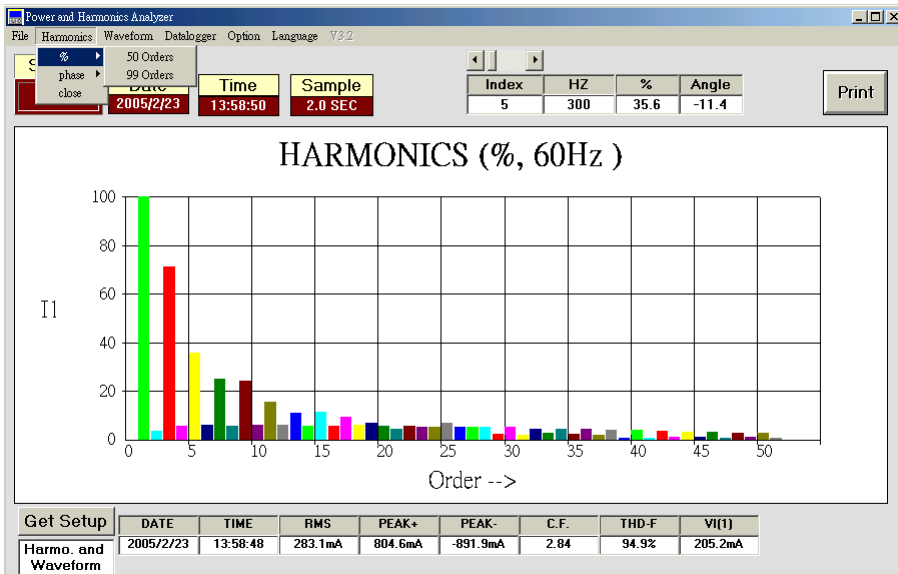
VI(1): True RMS value of first harmonics of selected input.

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



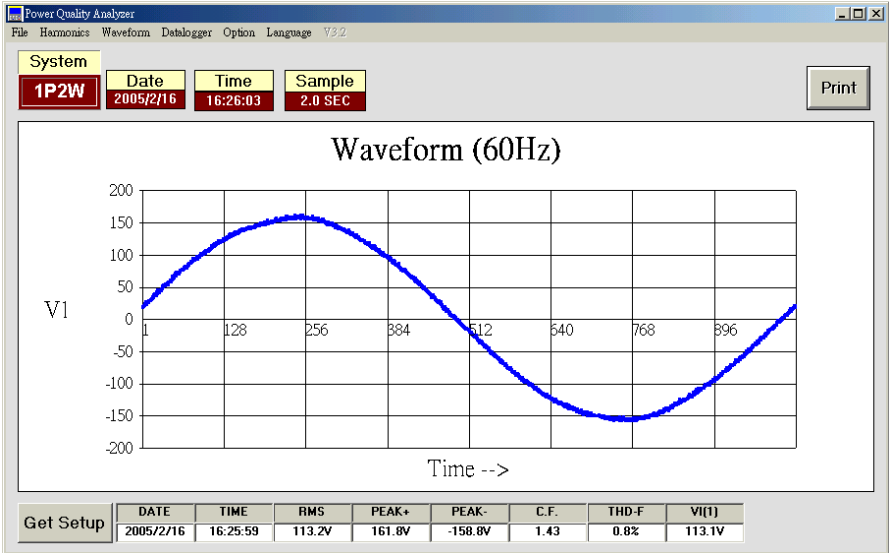
(Example of V1 input)

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

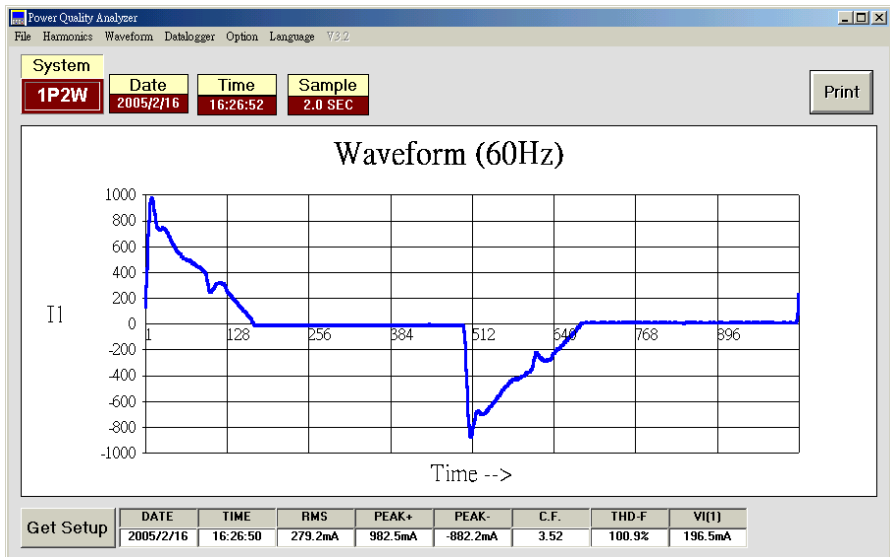
PEAK-: negative peak value of selected input.

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 button from the Analyzer.




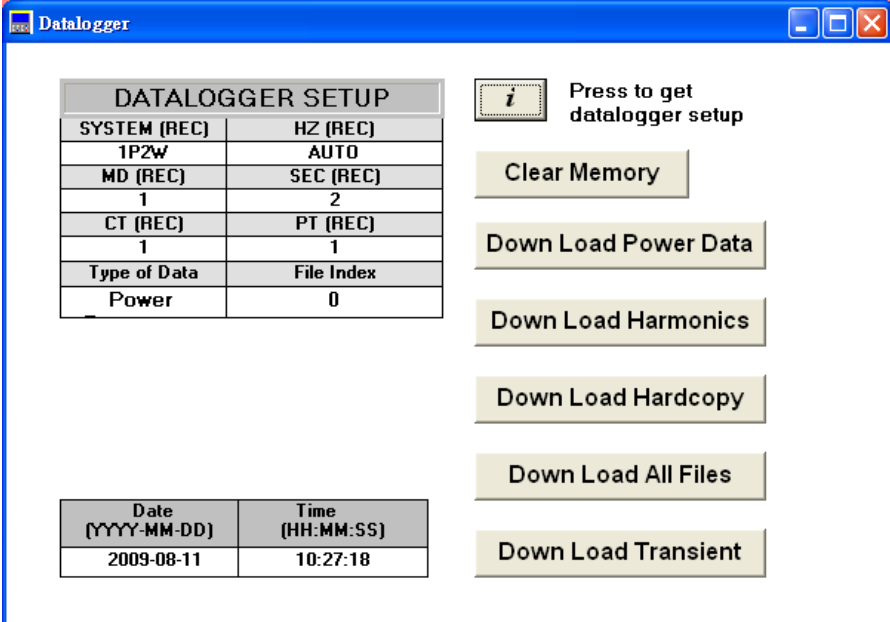
(Example of I1 input)

10. Data Logger

To download 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  button.



The screenshot shows the 'Datalogger' software window. It features a 'DATALOGGER SETUP' table, an information button with the text 'Press to get datalogger setup', and several action buttons: 'Clear Memory', 'Down Load Power Data', 'Down Load Harmonics', 'Down Load Hardcopy', 'Down Load All Files', and 'Down Load Transient'. At the bottom left, there is a table showing the current date and time.

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

 Press to get datalogger setup

Clear Memory

Down Load Power Data

Down Load Harmonics

Down Load Hardcopy

Down Load All Files

Down Load Transient

Date (YYYY-MM-DD)	Time (HH:MM:SS)
2009-08-11	10:27:18

(Example of Power Data Stored)

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
Harmonics	2

Press to get datalogger setup

Clear Memory

Down Load Power Data

Down Load Harmonics

Down Load Hardcopy

Down Load All Files

Down Load Transient

Date (YYYY-MM-DD)	Time (HH:MM:SS)
2009-08-12	16:03:17

(Example of Harmonics Data Stored)

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
Hardcopy	1

Press to get datalogger setup

Clear Memory

Down Load Power Data

Down Load Harmonics

Down Load Hardcopy

Down Load All Files

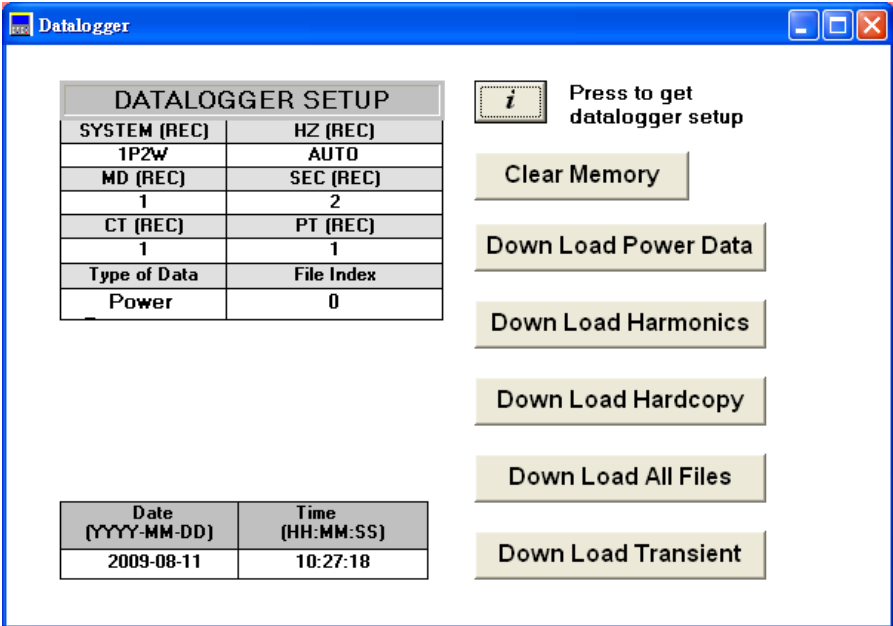
Down Load Transient

Date (YYYY-MM-DD)	Time (HH:MM:SS)
2009-08-12	16:02:11

(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.



The screenshot shows the 'Datalogger' software window. It features a 'DATALOGGER SETUP' table, a date/time table, and a vertical stack of buttons for data management.

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

i Press to get datalogger setup

Clear Memory

Down Load Power Data

Down Load Harmonics

Down Load Hardcopy

Down Load All Files

Down Load Transient

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.

The screenshot shows the 'Datalogger' software window. It features a 'DATALOGGER SETUP' table, a status table, and a vertical list of buttons for data management.

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
Harmonics	2

Date (YYYY-MM-DD)	Time (HH:MM:SS)
2009-08-12	16:03:17

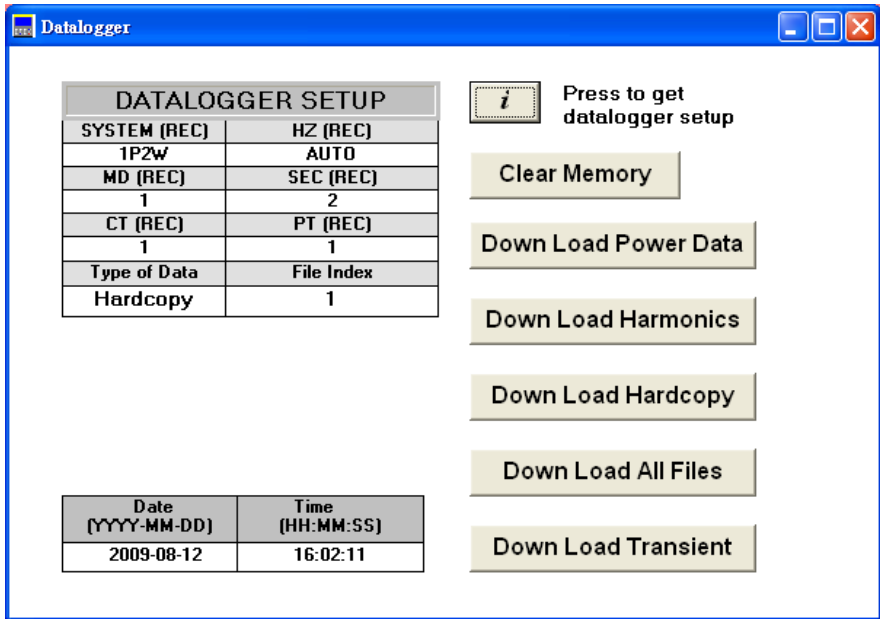
Buttons on the right side of the window:

- Press to get datalogger setup (with an 'i' icon)
- Clear Memory
- Down Load Power Data
- Down Load Harmonics
- Down Load Hardcopy
- Down Load All Files
- Down Load Transient

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.



The screenshot shows the 'Datalogger' software window. It features a 'DATALOGGER SETUP' table, a date and time display, and a vertical stack of buttons for data management.

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
Hardcopy	1

i Press to get datalogger setup

Clear Memory

Down Load Power Data

Down Load Harmonics

Down Load Hardcopy

Down Load All Files

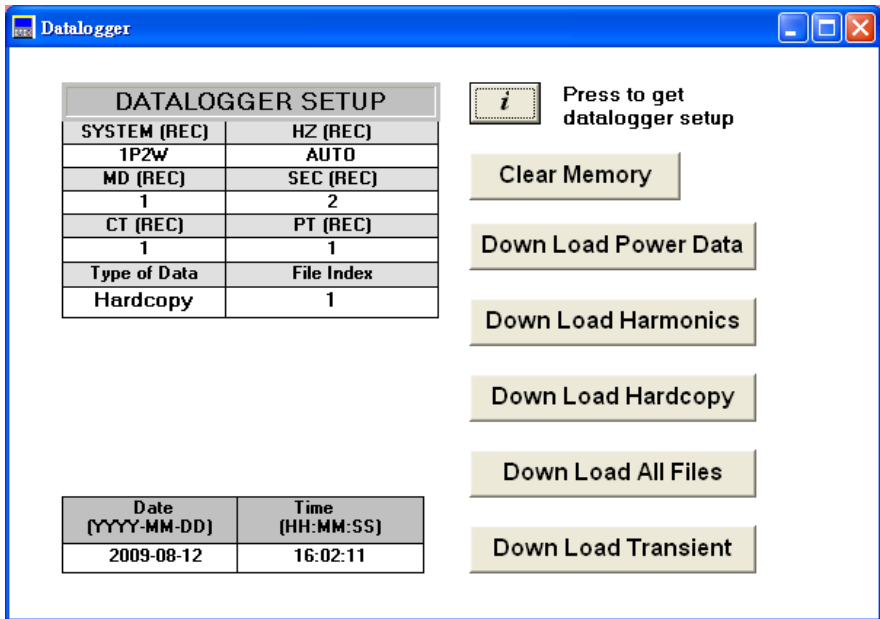
Down Load Transient

Date (YYYY-MM-DD)	Time (HH:MM:SS)
2009-08-12	16:02:11

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

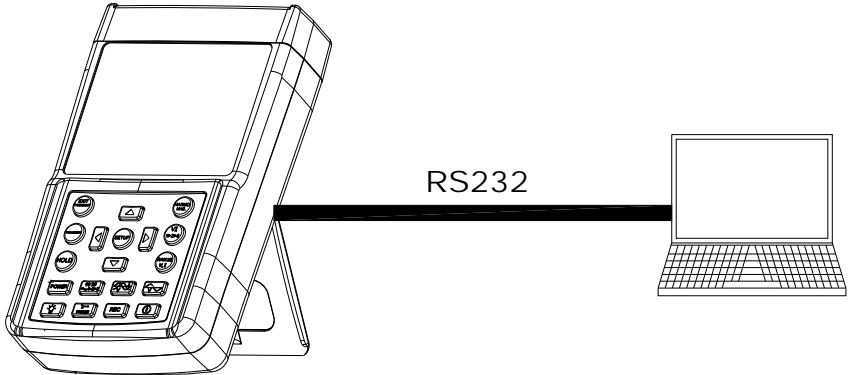
10-5 Down Load All Files

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

i Press to get datalogger setup

Clear Memory

Down Load Power Data

Down Load Harmonics

Down Load Hardcopy

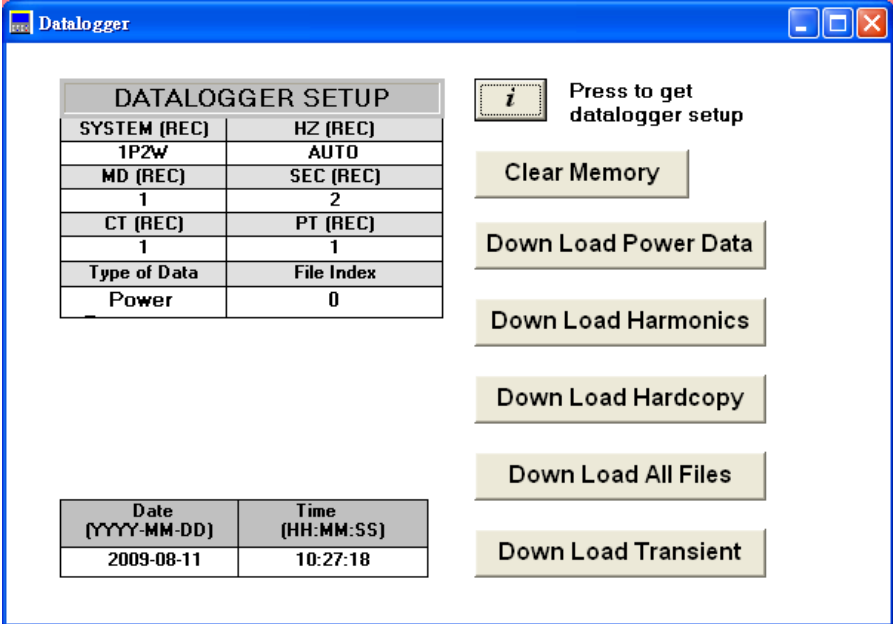
Down Load All Files

Down Load Transient

Date (YYYY-MM-DD)	Time (HH:MM:SS)
2009-08-11	10:27:18

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.



The screenshot shows the Datalogger software window. The title bar reads "Datalogger". The main area contains a "DATALOGGER SETUP" table, a date/time table, and a vertical stack of buttons. An information icon (i) is next to the text "Press to get datalogger setup".

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

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.

The screenshot shows the 'Power and Harmonics Analyzer' software interface. The 'Option' menu is open, showing 'Sample Rate' set to 'COM 5' and 'Baud Rate (19200)'. The main display area contains a table of power and harmonic data for three phases. Below the table are various summary statistics and settings.

V12	V1	I1	P1	S1	Q1	PF1	Phase 1
379.1V	220.2V	500.3mA	053.3W	110.1VA	-096.3VAR	0.48	-60.7
V23	V2	I2	P2	S2	Q2	PF2	Phase 2
380.3V	219.9V	500.5mA	054.7W	110.0VA	-095.4VAR	0.49	-60.8
V31	V3	I3	P3	S3	Q3	PF3	Phase 3
382.4V	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)	PHASOR	
0.47%	0.67%	0.51%	164.0W	329.8VA	-286.2VAR	0.49		
IUR (Unbalance)	d0% (I. ZERO)	d2% (I. NEG.)	WH (SYS)	VAH (SYS)	VARH (SYS)	PFH (SYS)	<- Reset	
0.14%	1.14%	1.25%	000.5WH	000.9VAH	000.8VARH	0.49H		
Hz	MD	SEC	CT	VT	W (AD)	VA (AD)	W (MD)	VA (MD)
50	15	2	1	1	163.9W	329.8VA	-----	-----

Get Setup
Power Mode

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.

Power and Harmonics Analyzer

File Harmonics Waveform Datalogger Option Language V3.2

Name

Start Recording
End Recording

Date: 10/5/2/23 Time: 16:21:21 Sample: 2.0 SEC

Print

View File
Plot Power Data
Plot Harmonics
Plot Waveform
Exit

V1	I1	P1	S1	Q1	PF1	Phase 1	
220.2V	500.2mA	053.2W	110.1VA	-096.3VAR	0.48	-61.9	
V2	I2	P2	S2	Q2	PF2	Phase 2	
379.4V	220.0V	500.5mA	054.8W	110.1VA	-095.4VAR	0.49	-59.5
V31	V3	I3	P3	S3	Q3	PF3	Phase 3
379.2V	219.3V	501.3mA	055.9W	109.9VA	-094.6VAR	0.50	-59.7

VUR (Unbalance)	d0% (V. ZERO)	d2% (V. NEG.)	W (SYS)	VA (SYS)	VAR (SYS)	PF (SYS)	PHASOR		
0.74%	0.49%	0.73%	163.9W	329.8VA	-286.3VAR	0.49			
IUR (Unbalance)	d0% (I. ZERO)	d2% (I. NEG.)	WH (SYS)	VAH (SYS)	VARH (SYS)	PFH (SYS)			
0.12%	0.77%	0.84%	003.0WH	006.0VAH	005.2VARH	0.49H	<- Reset		
Hz	MD	SEC	CT	VT	W (AD)	VA (AD)		W (MD)	VA (MD)
50	1	2	1	1	163.9W	329.8VA		163.8W	329.7VA

Get Setup

Power Mode

11-3 Start Recording

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

The screenshot shows the 'Power and Harmonics Analyzer' software interface. The 'File' menu is open, and 'Start Recording' is selected. A sub-menu is visible with 'Auto' and 'Manually' options. The 'Auto' option is selected, and the 'Sample' time is set to '2.0 SEC'. The main display shows a table of power and harmonic data for three phases. Below the table are various summary statistics and a 'PHASOR' button.

V1	I1	P1	S1	Q1	PF1	Phase 1	
220.1V	500.4mA	053.3W	110.1VA	-096.3VAR	0.48	-60.3	
V2	I2	P2	S2	Q2	PF2	Phase 2	
381.8V	219.9V	500.6mA	054.8W	110.0VA	-095.3VAR	0.49	-60.7
V31	V3	I3	P3	S3	Q3	PF3	Phase 3
381.4V	219.3V	501.3mA	055.9W	109.9VA	-094.6VAR	0.50	-59.6

VUR (Unbalance)	d0% (V. ZERO)	d2% (V. NEG.)	W (SYS)	VA (SYS)	VAR (SYS)	PF (SYS)	PHASOR -< Reset	
0.54%	0.77%	0.55%	164.0W	329.8VA	-286.2VAR	0.49		
IUR (Unbalance)	d0% (I. ZERO)	d2% (I. NEG.)	WH (SYS)	VAH (SYS)	VARH (SYS)	PFH (SYS)		
0.10%	0.60%	0.66%	008.8WH	017.8VAH	015.4VARH	0.49H		
Hz	MD	SEC	CT	VT	W (AD)	VA (AD)	W (MD)	VA (MD)
50	1	2	1	1	164.0W	329.8VA	163.9W	329.8VA

Get Setup
Power Mode

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 Debugger Option Language 122

System
3P4W Date: **2005/2/23** Time: **16:24:52** Sample: **2.0 SEC**

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)	<input type="button" value="PHASOR"/> <input type="button" value="< Reset"/>	
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	W (AD)	VA (AD)	W (MD)	VA (MD)
50	1	2	1	1	149.0W	299.8VA	-----	-----

11-4 End Recording

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

The screenshot shows the 'Power and Harmonics Analyzer' software interface. The 'File' menu is open, and 'End Recording' is selected. The main display area shows a data table with columns for Voltage (V), Current (I), Power (P), and Power Factor (PF) for three phases. The table is color-coded by phase: Phase 1 (red), Phase 2 (yellow), and Phase 3 (blue). Below the table are various measurement parameters and a 'PHASOR' button.

Date		Time		Sample					
12/23		16:25:24		2.0 SEC					
V1	I1	P1	S1	Q1	PF1	Phase 1			
220.1V	500.2mA	053.3W	110.0VA	-096.2VAR	0.48	-61.5			
V2	I2	P2	S2	Q2	PF2	Phase 2			
382.8V	219.9V	500.7mA	054.8W	110.1VA	-095.4VAR	0.49	-60.8		
V31	V3	I3	P3	S3	Q3	PF3	Phase 3		
380.9V	219.3V	501.3mA	055.9W	109.9VA	-094.6VAR	0.50	-59.2		
VUR (Unbalance)		d0% (V, ZERO)	d2% (V, NEG.)	W (SYS)	VA (SYS)	VAR (SYS)	PF (SYS)	PHASOR	
0.66%		0.93%	0.71%	164.0W	329.8VA	-286.2VAR	0.49		
IUR (Unbalance)		d0% (I, ZERO)	d2% (I, NEG.)	WH (SYS)	VAH (SYS)	VARH (SYS)	PFH (SYS)		
0.12%		0.67%	0.71%	002.5WH	004.9VAH	004.3VARH	0.49H	<- Reset	
Hz	MD	SEC	CT	VT	W (AD)	VA (AD)	W (MD)		VA (MD)
50	1	2	1	1	158.1W	318.0VA	-----		-----
Get Setup									
Power Mode									

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**

The screenshot shows the 'Power and Harmonics Analyzer' software interface. The main window displays a table of power and harmonic data. The table has columns for various parameters and rows for different phases and measurements.

Name	Date	Time	Sample					Print
Start Recording	10/5/2/23	16:26:41	2.0 SEC					
End Recording								
View File								
Plot Power Data	V1	I1	P1	S1	Q1	PF1	Phase 1	
Plot Harmonics	220.2V	500.3mA	053.3W	110.1VA	-096.3VAR	0.48	-61.8	
Plot Waveform	V2	I2	P2	S2	Q2	PF2	Phase 2	
Egit	381.3V	219.9V	500.5mA	054.7W	110.0VA	-095.4VAR	0.49	-60.7
	V31	V3	I3	P3	S3	Q3	PF3	Phase 3
	382.2V	219.3V	501.4mA	055.9W	109.9VA	-094.6VAR	0.50	-59.7
VUR (Unbalance)	d0% (V. ZERO)	d2% (V. NEG.)	W (SYS)	VA (SYS)	VAR (SYS)	PF (SYS)	PHASOR	
0.60%	0.82%	0.62%	163.8W	329.7VA	-286.2VAR	0.49		
IUR (Unbalance)	d0% (I. ZERO)	d2% (I. NEG.)	WH (SYS)	VAH (SYS)	VARH (SYS)	PFH (SYS)		
0.14%	0.91%	0.97%	000.5WH	000.9VAH	000.8VARH	0.49H		
Hz	MD	SEC	CT	VT	W (AD)	VA (AD)	W (MD)	VA (MD)
50	1	2	1	1	163.9W	329.8VA	-----	-----
Get Setup								
Power Mode								

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

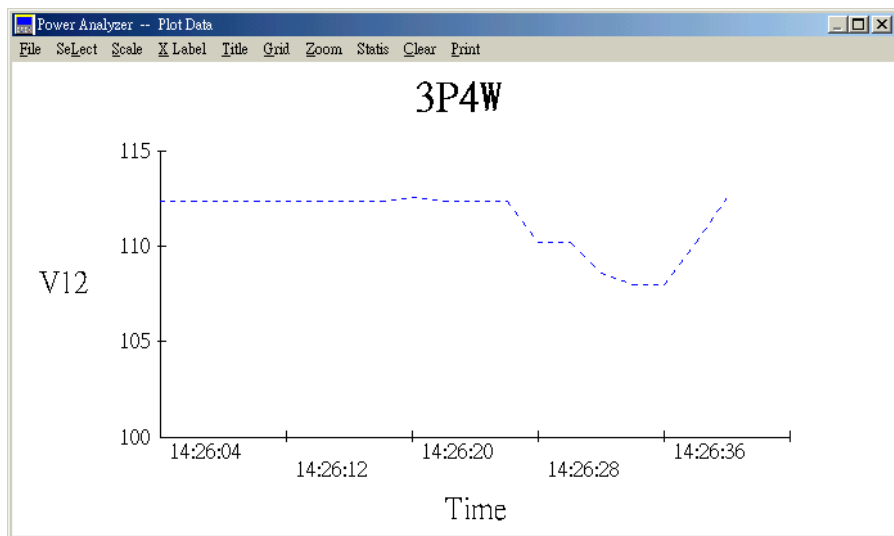
The screenshot displays the 'Power and Harmonics Analyzer' software interface. The main window shows a menu on the left with 'Plot Power Data' selected. The central area contains several data tables and summary statistics.

Name	Date	Time	Sample					Print
Start Recording	10/5/2/23	16:28:59	2.0 SEC					
End Recording								
View File								
Plot Power Data	V1	I1	P1	S1	Q1	PF1	Phase 1	
Plot Harmonics	220.2V	500.4mA	053.3W	110.1VA	-096.3VAR	0.48	-61.5	
Plot Waveform	V2	I2	P2	S2	Q2	PF2	Phase 2	
Egit	383.2V	219.9V	500.5mA	054.7W	110.0VA	-095.4VAR	0.49	-59.5
	V31	V3	I3	P3	S3	Q3	PF3	Phase 3
	380.3V	219.4V	501.2mA	055.9W	109.9VA	-094.6VAR	0.50	-59.0

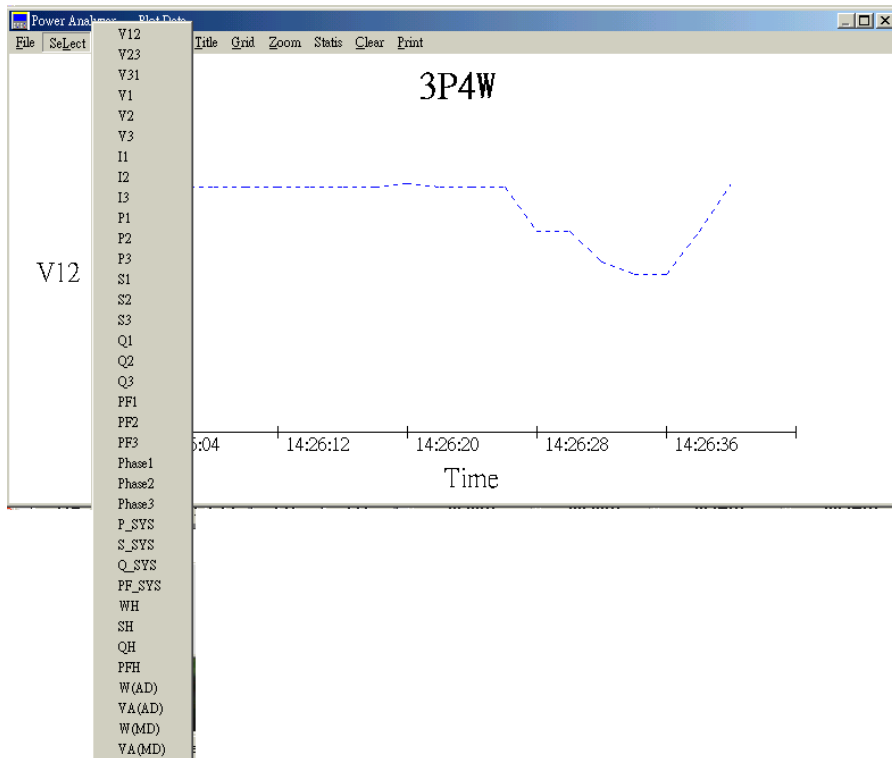
VUR (Unbalance)	d0% (V. ZERO)	d2% (V. NEG.)	W (SYS)	VA (SYS)	VAR (SYS)	PF (SYS)	PHASOR	
0.66%	0.92%	0.72%	164.0W	329.8VA	-286.2VAR	0.49		
IUR (Unbalance)	d0% (I. ZERO)	d2% (I. NEG.)	WH (SYS)	VAH (SYS)	VARH (SYS)	PFH (SYS)	Reset	
0.10%	0.49%	0.55%	006.7WH	013.6VAH	011.8VARH	0.49H		
Hz	MD	SEC	CT	VT	W (AD)	VA (AD)	W (MD)	VA (MD)
50	1	2	1	1	163.9W	329.8VA	163.9W	329.8VA

Get Setup
Power Mode

It will first plot V12 as default as following:

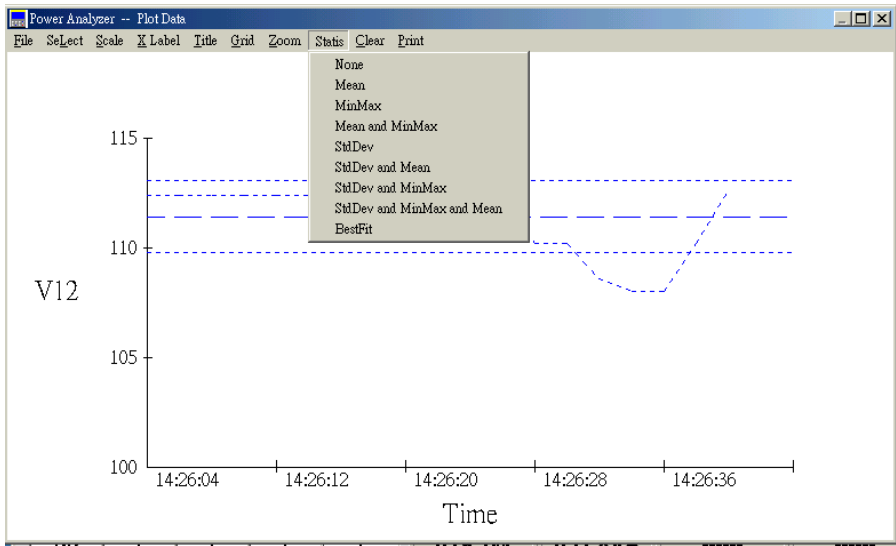


To plot other power parameters, users can open the “Select” menu, and select one desired parameter.



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

Power and Harmonics Analyzer

File: Harmonics Waveform Datalogger Option Language V3.2

Name: _____

Start Recording: _____ End Recording: _____

Date: 05/2/23 Time: 16:35:10 Sample: 2.0 SEC

Print

View File

Plot Power Data

Plot Harmonics

Plot Waveform

Exit

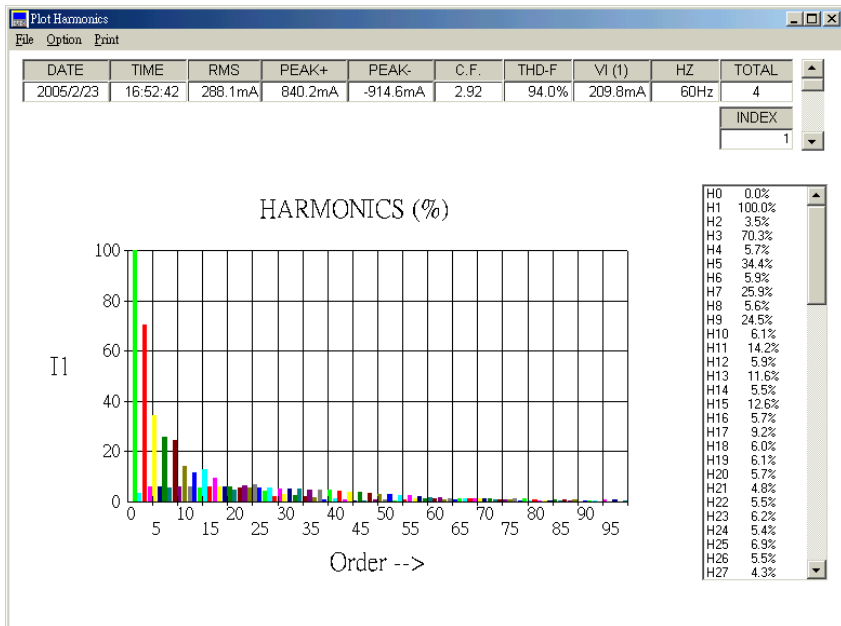
V1	I1	P1	S1	Q1	PF1	Phase 1	
220.1V	500.3mA	053.3W	110.1VA	-096.3VAR	0.48	-60.9	
V2	I2	P2	S2	Q2	PF2	Phase 2	
378.6V	219.9V	500.3mA	054.7W	110.0VA	-095.4VAR	0.49	-59.7
V31	V3	I3	P3	S3	Q3	PF3	Phase 3
382.2V	219.3V	501.2mA	055.9W	109.9VA	-094.6VAR	0.50	-60.2

VUR (Unbalance)	d0% (V, ZERO)	d2% (V, NEG.)	W (SYS)	VA (SYS)	VAR (SYS)	PF (SYS)	PHASOR	
0.53%	0.51%	0.56%	163.9W	329.8VA	-286.3VAR	0.49		
IUR (Unbalance)	d0% (I, ZERO)	d2% (I, NEG.)	WH (SYS)	VAH (SYS)	VARH (SYS)	PFH (SYS)		
0.12%	0.80%	0.88%	008.5WH	017.0VAH	014.8VARH	0.49H	<- Reset	
Hz	MD	SEC	CT	VT	W (AD)	VA (AD)		W (MD)
50	1	2	1	1	164.0W	329.8VA	163.9W	329.8VA

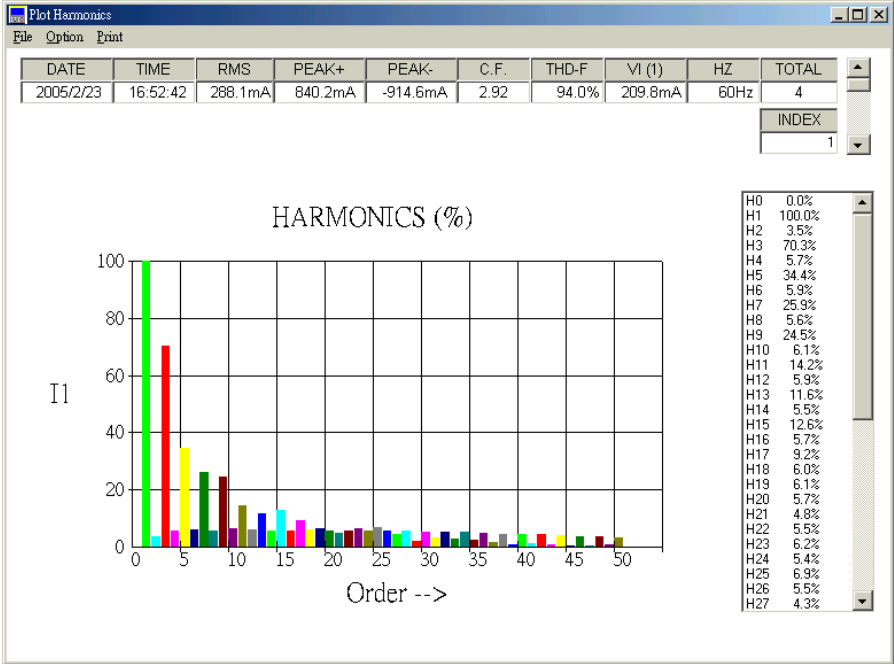
Get Setup

Power Mode

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.

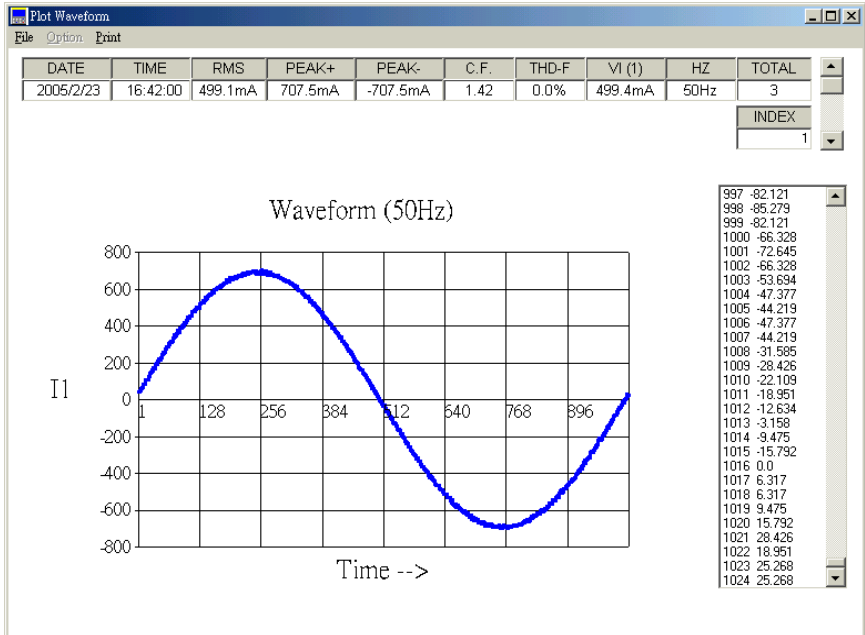


15. Plot Waveform

The screenshot shows the 'Power and Harmonics Analyzer' software interface. The 'Plot Waveform' option is selected in the left-hand menu. The main display area contains a summary table of power and harmonic data, organized into several sections.

Name			Date					Time		Sample		Print
Start Recording			10/5/2/23					16:37:15		2.0 SEC		
View File			V1	I1	P1	S1	Q1	PF1	Phase 1			
Plot Power Data			220.1V	500.3mA	053.3W	110.1VA	-096.3VAR	0.48	-61.7			
Plot Harmonics												
Plot Waveform			V2	I2	P2	S2	Q2	PF2	Phase 2			
Exit			379.7V	219.9V	500.5mA	054.7W	110.0VA	-095.4VAR	0.49	-59.5		
			V31	V3	I3	P3	S3	Q3	PF3	Phase 3		
			378.9V	219.3V	501.4mA	055.9W	109.9VA	-094.6VAR	0.50	-59.6		
VUR (Unbalance)			d0% (V. ZERO)		d2% (V. NEG.)		W (SYS)	VA (SYS)	VAR (SYS)	PF (SYS)	PHASOR	
0.67%			0.48%		0.67%		163.9W	329.8VA	-286.3VAR	0.49		
IUR (Unbalance)			d0% (I. ZERO)		d2% (I. NEG.)		WH (SYS)	VAH (SYS)	VARH (SYS)	PFH (SYS)	-< Reset	
0.14%			0.66%		0.75%		014.1WH	028.4VAH	024.6VARH	0.49H		
Hz	MD	SEC	CT	VT	W (AD)		VA (AD)	W (MD)		VA (MD)		
50	1	2	1	1	164.0W		329.8VA	164.0W		329.8VA		
Get Setup												
Power Mode												

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

16. Plot Hardcopy

The screenshot shows the 'Power Harmonics Analyzer' software interface. The 'Plot Hardcopy' menu option is selected, and the software displays a data table with the following values:

Date	Time	Sample						Print
009/10/5	13:56:22	2.0 SEC						
V1	I1	P1	S1	Q1	PF1	Phase 1		
122.9V	38.39A	04.71KW	04.71KVA	00.00KVAR	1.00	000.0		
V2	I2	P2	S2	Q2	PF2	Phase 2		
226.4V	129.0V	40.45A	05.21KW	05.21KVA	00.00KVAR	1.00	001.7	
V31	V3	I3	P3	S3	Q3	PF3	Phase 3	
216.6V	128.9V	39.92A	05.14KW	05.14KVA	00.00KVAR	1.00	001.2	
VUR (Unbalance)	d0% (V. ZERO)	d2% (V. NEG.)	W (SYS)	VA (SYS)	VAR (SYS)	PF (SYS)	PHASOR	
2.99%	0.17%	3.01%	15.06KW	15.06KVA	00.00KVAR	1.00		
IUR (Unbalance)	d0% (I. ZERO)	d2% (I. NEG.)	WH (SYS)	VAH (SYS)	VARH (SYS)	PFH (SYS)	<- Reset	
3.03%	0.50%	2.92%	00.34KWH	00.34KVAH	00.01KVARH	1.00H		
Hz	MD	SEC	CT	VT	W (AD)	VA (AD)		W (MD)
60	1	2	1	1	15.04KW	15.05KVA	15.04KW	15.05KVA

Buttons: Update Now, Power Mode

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



File

U1:	435.2 V	U2:	249.6 V	U3:	58.81 A
U2:	450.0 V	U2:	256.6 V	I2:	24.09 A
U3:	438.2 V	U3:	258.0 V	I3:	33.32 A

P1:	- 5.52KW	S1:	-14.66KVA	Q1:	13.58KVAR
P2:	- 2.84KW	S2:	- 6.18KVA	Q2:	- 5.48KVAR
P3:	8.50KW	S3:	8.58KVA	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	MD:	VA	MD:	W - 1
3φ4W		SEC:	2 CT:	1 UT:	2 REC 5

2009-10-01 11:19:08