Sd card real time data recorder
with harmonic measurement

3 PHASE
POWER ANALYZER

Model : DW-6195

Your purchase of this 3 phase POWER ANALYZER marks a step forward for you into the field of precision measurement. Although this METER is a complex and delicate instrument, its durable structure will allow many years of use if proper operating techniques are developed. Please read the following instructions carefully and always keep this manual within easy reach.
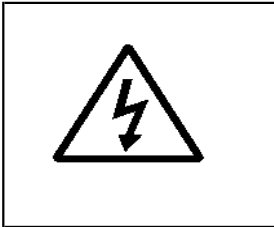
OPERATION MANUAL

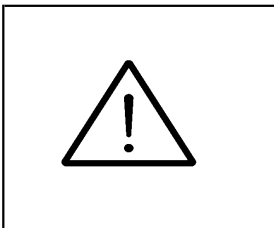**PLEASE READ THIS MANUAL CAREFULLY BEFORE OPERATION**

Caution Symbol

Caution :
* **Risk of electric shock !**
* **During the measurement, do not open the cabinet.**

Caution :
* **Do not apply the overload voltage, current to the input terminal !**
* **Remove test leads before open the battery cover !**
* **Cleaning - Only use the dry cloth to clean the plastic case !**

Environment Conditions

* Installation Categories III 600V.

* Pollution Degree 2.

* Altitude up to 2000 meters.

* Indoor use.

* Relative humidity 80% max.

TABLE OF CONTENTS

1. FEATURES

* TFT Display to easy reading measument result.
* Analysis for 3 phase multi-power system, 1P/2W, 1P/3W, 3P/3W, 3P/4W.
* Voltage and the Current are the True RMS value.
* 3 current probes (CP-1201) are included, if change the current probes, the calibration procedures are not necessary.
* Current probe input signal/ranges with selection :
  Input signal (ACV) :
  200 mV/300 mV/500 mV/1 V/2 V/3 V.
  Ranges (ACA) :
  20 A/200 A/2000 A (1200 A)/30 A/300A /3000 A
  60 A/600 A/6000 A.
* Meter can cooperate the universal current probes.
* Complete set with 4 PCs Test Leads, 4 PCs Alligator clips, 3 PCs Clamp Probe (CP 1201), AC to DC 9V adapter, 4 G SD memory card and Carrying bag.
* Measurement :
  V (phase-to-phase), V (phase-to-ground)
  A (phase-to-ground)
  KW (True Power)/ KVA / KVAR / PF (phase)
  KW (True Power)/ KVA / KVAR / PF (system)
  KWH / KVAH / KVARH / PFH (system)
  Phase angle
* Harmonics display (1-50th order).
* Simultaneous display of Harmonics and Waveform.
* Display of Waveform with Peak Values.
* Analysis of Total Harmonic Distortion (THD).
* Graphic Phase diagram with 3-Phase system parameters.
* 3 phase Voltage or Current Unbalanced Ratio (VUR, AUR) and Unbalanced Factor.
* Calculated Unbalanced Current through Neutral Line (An)
* Capture Transient events (including Dip, Swell and Outage) with programmable threshold (%).
* Programmable CT ratio (1 to 600) and PT ratio (1 to 1000)

* ACV input impedance is 10 Mega ohms.
* Safety Standard : IEC 1010, CAT III 600V.
* Built-in clock and Calendar, real time data record with SD memory card , sampling time set from 2 to 7200 seconds. Just slot in the SD card into the computer, it can down load the all the measured value with the time information (year, month, date, hour, minute, second) to the Excel directly, then user can make the further data analysis by themselves.
* Powered by AA (UM-3) DC 1.5 V X 8 batteries (Alkaline type) or DC 9V adapter.
* Computer data output, can cooperate with optional USB Cable/USB-01, RS232 cable/UPCB-02 and Data Acquisition software, SW-U811.
* Optional current probes : CP-1201, CP-2000, CP-200, CP-3000, detail specification.
* User can order the meter only (without the current probes) with the special request as intend to cooperate their own current probes.
* Patented.

2. SPECIFICATIONS

2-1 General Specifications:

Circuit	Custom one-chip of microprocessor LSI circuit
Display	* LCD Size : 81.4 X 54 mm (3.2 X 2.1 inch) * TFT LCD (320 X 240 pixels) with backlight.

Measurement	* V (phase-to-phase)
	* V (phase-to-ground)
	* A (phase-to-ground)
	* KW / KVA / KVAR / PF (phase)
	  KW / KVA / KVAR / PF (system)
	  KWH / KVAH / KVARH / PFH (system)
	* Power factor
	* Phase angle
	* Frequency
	* Harmonics display.

Wire connections	1P/2W, 1P/3W, 3P/3W, 3P/4W.
Voltage ranges	10 ACV to 600 ACV, auto range.

Current probe input signal and range	* Current probe input signal volage (ACV) :
	  200mV/300mV/500mV/1V/2V/3V.
	* Current probe input current range (ACA) :
	  20 A/200A/2000A (1200 A)/30A/300A/3000A
	  60 A/600 A/6000 A.
	* Meter can cooperate the universal current probe.

Safety standard	IEC1010 CAT III 600 V.
ACV input impedance	10 Mega ohms.
Range select	ACV	Auto range.
	ACA	Manual range.
Clamp frequency response	40 Hz to 1 KHz.
Spec. tested frequency	45 to 65 Hz.
Over load protection	ACV	720 ACV rms
	ACA	1300 ACA with clamp probe * For the Clamp ,CP-1201
Over Indicator	* LCD display show " OL ". * The data save into the SD card will show " 9999 " or " 999 " (overleap the decimal point).

Under Indicator	* The data save into the SD card will show " 9999 " or " 999 " (overleap the decimal point).
Data Hold	Freeze the display reading.
Data Record	SD Card Record.
Sampling Time	Approx. 1 second.
Power ON/OFF	Manual OFF by push button.
Real time data logger	* Real time data logger, saved the data into SD memory card and down load the all the measured value with the time information (year/month/date/ hour/minute/second) down load to the Excel.
	* Sampling time for data logger : 2 seconds to 7200 seconds, the during of setting step are 2 seconds.
	* Data error no. : ≦ 0.1% no. of total saved data typically.
Data Output USB/RS232 *　　*Computer* 　　*interface*	RS232 computer serial interface : * Connect the optional USB cable USB-01 will get the USB plug. * Connect the optional RS232 cable UPCB-02 will get the RS232 plug.
Operating Temperature	0 to 50℃ (32 to 122℉).
Operating Humidity	Less than 80% R.H..
Power Supply	* DC 1.5V, AA (UM-3) Battery X 8 PCs (Alkaline or heavy-duty battery). * AC to DC 9V power adapter.
Power Consumption	* Meter : 362 DCmA. * Clamp : 22 DCmA.
Clamp max. conductor Size	50 mm (2.0 inch) Dia. * *For the Clamp ,CP-1201*

Weight	* Meter : 840g (meter only) * Clamp (included cable) : 500g
Dimension	*Meter :* 225 X 125 X 64 mm (8.86 X 4.92 X 2.52 inch)
	Clamp : 210 X 64 X 33mm (8.3 X 2.5 X 1.3 inch)
	Clamp Jaw : 86 mm (3.4 inch)- outside
Accessories Included	* Instruction manual................ 1 PC * Test Leads (TL88-4AT)........... 1 Set (4 PCs) * Alligator clips (TL88-4AC) 1 Set (4 PCs) * Clamp Probe (CP-1201)......... 3 PCs * AC to DC 9V adapter................. 1 PC * SD card (4 G).................... 1 PC * Carrying bag........................ 1 PC
Optional Accessories	* 200 Amp current probe, CP-200 * 2000 Amp current probe, CP-2000 * Flexible 3000 Amp current probe, CP-3000 * Flexible 3000 Amp current probe, CP-3001 * Flexible 3000 Amp current probe, CP-3002 * Flexible 6000 Amp current probe, CP-6001 * USB Cable , USB-01 * RS232 cable, UPCB-02 * Data Acquisition software, SW-U811 * EXCEL Data Acquisition software, SW-E802

2-2 Electrical Specifications (23±5 ℃)

ACV

Range	Resolution	Accuracy
10.0V to 600.0V * Phase to neutral line	0.1V	±(0.5%+0.5V)
10.0V to 600.0V * Phase to phase		

ACA

Range	Resolution		Accuracy	
20A	0.001A,	< 10 A	Meter + CP-1201	±(1 %+0.1A)
	0.01A,	≧ 10 A	Meter only	±(0.5 %+0.02A)
200A	0.01A,	< 100 A	Meter + CP-1201	±(1 %+0.5A)
	0.1A,	≧ 100 A	Meter only	±(0.5 %+0.2A)
1200A	0.1A,	< 1000 A	Meter + CP-1201	±(1 %+5A)
	1A,	≧ 1000 A	Meter only	±(0.5 %+2A)

Remark :

*   *When the Active power value (P1 to P3) and Apparent power value (S1 to S3) show " - " indicator, it means the current probe is under the reverse direction that compare with the real measuring current.*

Power factor

Range	Resolution	Accuracy
0.00 to 1.00	0.01	±0.04

Remark :
* PFH : Long term power factor
* PFΣ:
For 3Φ4W, 3Φ3W, 1Φ3W : PFΣ = PΣ/SΣ

For 1Φ2W : PF1 = P1/S1

Φ (Phase angle)

Range	Resolution	Accuracy	
-180° to 180°	0.1°	±1°	** COS (PF)*

Frequency

Range	Resolution	Accuracy
45 to 65 Hz	0.1 Hz	±0.1 Hz

Active (Real) Power

DW-6195 + CP1201

Range	Resolution	System Accuracy
0.000 to 9.999 KW	*0.001/0.01/0.1 KW	±(1.2%+0.008KW)
10.00 to 99.99 KW	*0.01/0.1 KW	±(1.2%+0.08KW)
100.0 to 999.9 KW	0.1 KW	±(1.2%+0.8KW)
1.000 to 9.999 MW	0.001 MW	±(1.2%+0.008MW)

The resolution is changed according the different ACA range.

Apparent Power

DW-6195 + CP1201

Range	Resolution	System Accuracy
0.000 to 9.999 KVA	*0.001/0.01/0.1KVA	±(1.2%+0.008KVA)
10.00 to 99.99 KVA	*0.01/0.1 KVA	±(1.2%+0.08KVA)
100.0 to 999.9 KVA	0.1 KVA	±(1.2%+0.8KVA)
1.000 to 9.999 MVA	0.001 MVA	±(1.2%+0.008MVA)

The resolution is changed according the different ACA range.

Reactive Power

DW-6195 + CP1201

Range	Resolution	System Accuracy
0.000 to 9.999 KVAR	*0.001/0.01/0.1KVAR	±(1.2%+0.008 KVAR)
10.00 to 99.99 KVAR	*0.01/0.1 KVAR	±(1.2%+0.08 KVAR)
100.0 to 999.9 KVAR	0.1 KVAR	±(1.2%+0.8 KVAR)
1.000 to 9.999 MVAR	0.001 MVAR	±(1.2%+0.008 MVAR)

The resolution is changed according the different ACA range.

Remark :
* *When the Reactive power value (Q1 to Q3) show " - " indicator, it means the " current phase " lag than the " voltage phase ", the load character is induction.*
* *When the Reactive power value (Q1 to Q3) do not show " - " indicator, it means the " current phase " lead than the " voltage phase ", the load character is capacitance.*

Watt Hour (Active Power Hour) : WH

DW-6195 + CP1201

Range	Resolution	System Accuracy
0.000 to 9.999 KWH	0.001 KWH	±(2%+0.008 KWH)
10.00 to 99.99 KWH	0.01 KWH	±(2%+0.08 KWH)
100.0 to 999.9 KWH	0.1 KWH	±(2%+0.8 KWH)
1.000 to 9.999 MWH	0.001 MWH	±(2%+0.008 MWH)

VA Hour (Apparent Power Hour) : SH

DW-6195 + CP1201

Range	Resolution	System Accuracy
0.000 to 9.999 KVAH	0.001 KVAH	±(2%+0.008 KVAH)
10.00 to 99.99 KVAH	0.01 KVAH	±(2%+0.08 KVAH)
100.0 to 999.9 KVAH	0.1 KVAH	±(2%+0.8 KVAH)
1.000 to 9.999 MVAH	0.001 MVAH	±(2%+0.008 MVAH)

VAR Hour (Reactive Power Hour) : QH

DW-6195 + CP1201

Range	Resolution	System Accuracy
0.000 to 9.999 KVARH	0.001 KVARH	±(2%+0.008 KVARH)
10.00 to 99.99 KVARH	0.01 KVARH	±(2%+0.08 KVARH)
100.0 to 999.9 KVARH	0.1 KVARH	±(2%+0.8 KVARH)
1.000 to 9.999 MVARH	0.001 MVARH	±(2%+0.008 MVARH)

Harmonics of AC voltage in Magnitude
 * Fundamental frequency 50 Hz, 60 Hz

DW-6195 + CP1201

Range	Resolution	System Accuracy
1 to 20th		± (2 % + 0.5 V)
21 to 30th	0.1 V	± (4 % + 0.5 V)
31 to 50th		reference

Harmonics of AC voltage in Percentage
 Fundamental frequency 50 Hz, 60 Hz

DW-6195 + CP1201

Range	Resolution	System Accuracy
1 to 20th		± (2 % + 10 d)
21 to 30th	0.1 %	± (4 % + 20 d)
31 to 50th		reference

Harmonics of AC current in Magnitude
 Fundamental frequency 50 Hz, 60 Hz

DW-6195 + CP1201

Range	Resolution	System Accuracy
1 to 20th		± (2 % + 0.5 A)
21 to 30th	0.001 A to 1 A	± (4 % + 0.5 A)
31 to 50th		reference

Harmonics of AC current in Percentage
 Fundamental frequency 50 Hz, 60 Hz

DW-6195 + CP1201

Range	Resolution	System Accuracy
1 to 20th		± (2 % + 10 d)
21 to 30th	0.1 %	± (4 % + 20 d)
31 to 50th		reference

Peak value of ACV or ACA

DW-6195 + CP1201

Range	Resolution	System Accuracy
ACV (Peak to Peak)	0.1 V to 1 V	± (5 % + 30 d)
ACA (Peak to Peak)	0.001 A to 1 A	

Crest Factor of ACV or ACA

DW-6195 + CP1201

Range	Resolution	System Accuracy
1.000 - 9.999	0.001	± (5 % + 0.3)

Total Harmonic Distortion

DW-6195 + CP1201

Range	Resolution	System Accuracy
0 to 20 %	0.1 %	± (2 % + 5 d)
20.1 to 100 %		± (6 % + 10 d)

3. FRONT PANEL DESCRIPTION
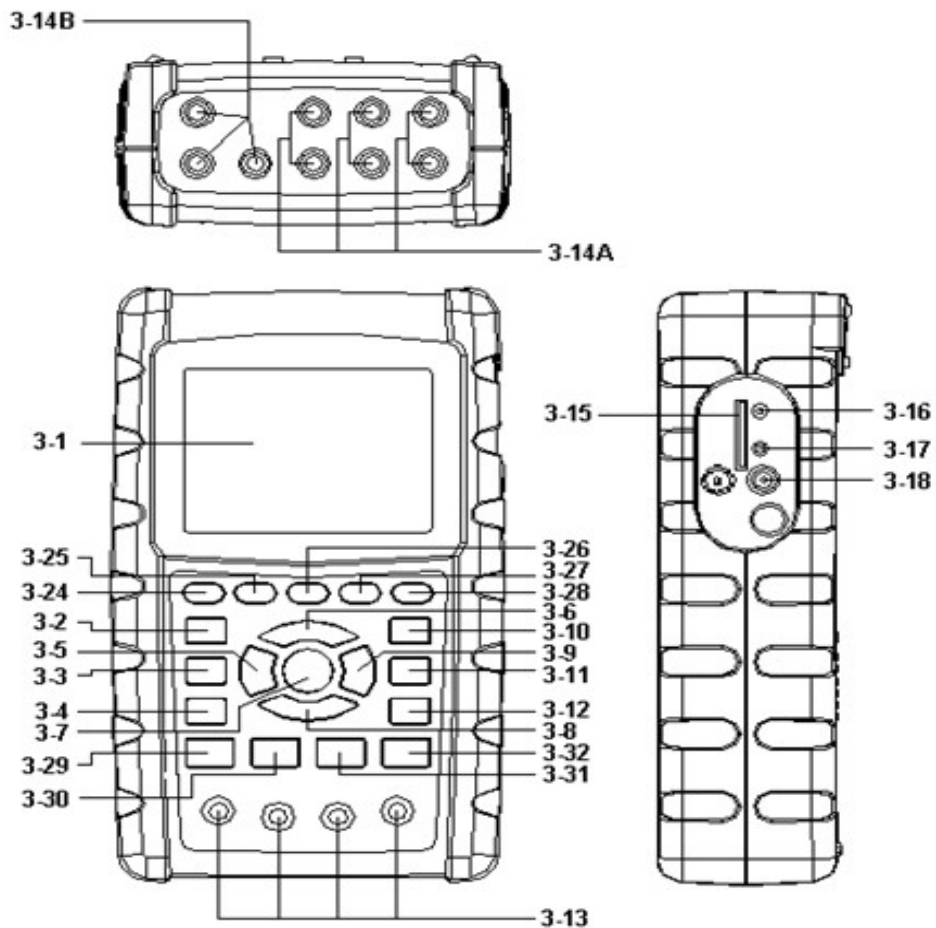
Fig. 1
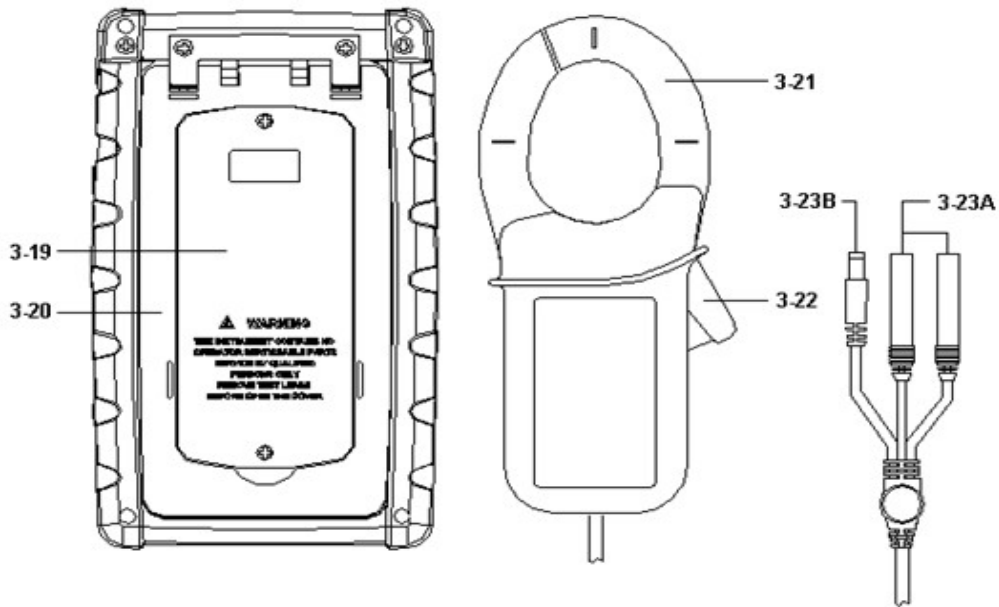
3-1 Display

Fig. 2

3-2 1Φ 3Φ (Phase/wire) key button

3-3 ▲ key button

3-4 ▼ key button

3-5 Hold key button

3-6 Backlight key button

3-7 Power key button

3-8 Exit key button

3-9 REC key button

3-10 A (current) range key button

3-11 Shift key button

3-12 Setup key button

3-13 Voltage input terminals

3-14A Current probe signal input sockets

3-14B Current probe power sockets

3-15 SD card socket

3-16 RS232 socket

3-17 Reset button

3-18 DC 9V power adapter socket

3-19 Battery Cover/Battery compartment

3-20 Stand

3-21 Current Sense Jaw

3-22 Trigger

3-23A Current probe signal plugs

3-23B Current probe power plug

3-24 Harmonic Analysis Left Key

3-25 Harmonic Key

3-26 Harmonic Analysis Right Key

3-27 Harmonic Analysis V1,V2,V3, A1,A2,A3
    Select Key

3-28 Harmonic Function Voltage or Current
    Input Range

3-29 Power Measurement Key

3-30 Phase Diagram Key

3-31 Waveform of Voltage and Current Key

3-32 Transient Key

4. MEASURING PREPARATION

4-1 The original screen

Power Analyzer

Initializing   *Please Wait...*

. . . .
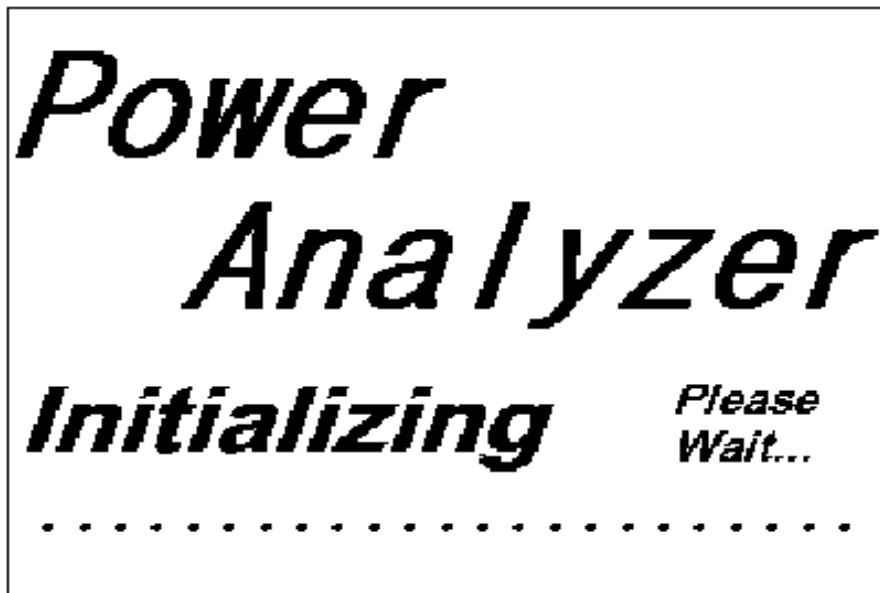
4-2 Entry the measurement Screen

1) The bottom right display of screen 1 will show as " SD Check " along with blinking while inserting SD CARD then disappears after several seconds that indicates the data from SD CARD has been read completed.

2) The bottom right display of screen 2 will show as " NO DISK " along with blinking when SD CARD is not inserted.

screen 1 (4-2)

V12:	0.0 V	V1:	0.0 V	A1:	0.00 A
V23:	0.0 V	V2:	0.0 V	A2:	0.00 A
V31:	0.0 V	V3:	0.0 V	A3:	0.00 A

P1:	-0.000 KW	S1:	0.000KVA	Q1:	-0.000 KVAR
P2:	-0.000 KW	S2:	0.000KVA	Q2:	-0.000 KVAR
P3:	-0.000 KW	S3:	0.000KVA	Q3:	-0.000 KVAR

PΣ:	-0.000 KW	SΣ:	0.000KVA	QΣ:	-0.000 KVAR
PF1:	-0.00	PF 2:	-0.00	PF 3:	-0.00
PFΣ:	0.00	PF H:	0.00		
Φ1:	- 0.0°	Φ2:	- 0.0°	Φ3:	- 0.0°

WH:	0.000 KWH	SH:	0.000KVAH
QH:	0.000 KVARH	FREQ:	0.0 Hz

CP1201						SD
20A	3Φ4W	SEC: 2	CT: 1	PT: 1		Check	←

screen 2 (4-2)

V12:	0.0 V	V1:	0.0 V	A1:	0.00 A
V23:	0.0 V	V2:	0.0 V	A2:	0.00 A
V31:	0.0 V	V3:	0.0 V	A3:	0.00 A

P1:	-0.000 KW	S1:	0.000KVA	Q1:	-0.000 KVAR
P2:	-0.000 KW	S2:	0.000KVA	Q2:	-0.000 KVAR
P3:	-0.000 KW	S3:	0.000KVA	Q3:	-0.000 KVAR

PΣ:	-0.000 KW	SΣ:	0.000KVA	QΣ:	-0.000 KVAR
PF1:	-0.00	PF 2:	-0.00	PF 3:	-0.00
PFΣ:	0.00	PF H:	0.00		
Φ1:	- 0.0°	Φ2:	- 0.0°	Φ3:	- 0.0°

WH:	0.000 KWH	SH:	0.000KVAH
QH:	0.000 KVARH	FREQ:	0.0 Hz

CP1201						NO
20A	3Φ4W	SEC: 2	CT: 1	PT: 1		DISK	←

14

4-3 The summary description of keyboard

1) POWER KEY (3-7, Fig. 1) :
   Press the key to turn the instrument ON/OFF.
2) 1Φ 3Φ (phase/wire) KEY (3-2, Fig. 1) :
   Press the key to select
   (1P/2W、1P/3W、3P/3W、3P/4W) measurement
   function mode.
3) A (current) RANGE KEY (3-10, Fig. 1) :
   Press the key to change the current range quickly.
4) REC KEY (3-9, Fig. 1) :
   The data record key for SD CARD.
5) HOLD KEY (3-5, Fig. 1) :
   Press the key to freeze the display reading.
6) BACKLIGHT KEY (3-6, Fig. 1) :
   Press the key to switch Third-order brightness selection.
7) SETUP KEY (3-12, Fig. 1) :
   Press the key to setup the function before measuring.
8) EXIT KEY (3-8, Fig. 1) :
   Press the key to exit setting screen.
9) SHIFT KEY (3-11, Fig. 1)
   Press the key to set the different functions in setting screen.
10) UP (▲) KEY (3-3, Fig. 1) :
    Press the key to move the cursor up in setting screen.
11) DOWN (▼) KEY (3-4, Fig. 1) :
    Press the key to move the cursor down in setting screen.
12) Harmonic Analysis Left Key (3-24, Fig. 1)
13) Harmonic Key (3-25, Fig. 1)
14) Harmonic Analysis Right Key (3-26 , Fig. 1)
15) Harmonic Analysis V1,V2,V3, A1,A2,A3
    Select Key (3-27, Fig. 1)
16) Harmonic Function Voltage or Current
    Input Range Select Key (3-28, Fig. 1)
17) Power Measurement Key (3-29, Fig. 1)
18) Phase Diagram Key (3-30, Fig. 1)
19) Waveform of Voltage and Current Key (3-31, Fig. 1)
20) Transient Key (3-32, Fig. 1)

4-4 SETUP KEY description:

4-4-1 SHIFT KEY

* SHIFT 1 : When the symbols " SETUP " and " SHIFT 1 " are appeared on up right display of screen 1 in the meantime, and then use the ▲ or ▼ to select the expect item.
* SHIFT 2 : When the symbols " SETUP " and " SHIFT 2 " are appeared on up right display of screen 2 in the meantime, and then use the ▲ or ▼ to select (1P/2W、 1P/3W、3P/3W、3P/4W) in File Name function.

screen 1 (4-4)

Folder Name:	WTA01			**SETUP**
File Name:	3P401001.XLS			**SHIFT 1** ←
REC Date:	2008-11-28 00:03:17			
Sampling Time:	2	Trans Ref :		220.0 V
Delet File:	0 %	SDVP :	10%	
SD Format:	0 %	Decimal:	Basic	
Use Size:	388 KB	Clamp Type:		CP1201
Free Size:	1946 MB	A	Range:	200A
Total Size:	1946 MB	V	Range:	200mV
		RS232 Out Sel:		
PT:	1 : 1	V1	I1	P1
CT:	1 : 1	S1	Q1	PF1
Beep:	ON	Φ1	FREQ	

Year	Month	Date	Minute	Second
2010	11	13	37	25

screen 2 (4-4)

Folder Name:	WTA01			**SETUP**
File Name:	3P401001.XLS			**SHIFT 2** ←
REC Date:	2008-11-28 00:03:17			
Sampling Time:	2	Trans Ref :		220.0 V
Delet File:	0 %	SDVP :	10%	
SD Format:	0 %	Decimal:	Basic	
Use Size:	388 KB	Clamp Type:		CP1201
Free Size:	1946 MB	A	Range:	200A
Total Size:	1946 MB	V	Range:	200mV
		RS232 Out Sel:		
PT:	1 : 1	V1	I1	P1
CT:	1 : 1	S1	Q1	PF1
Beep:	ON	Φ1	FREQ	

Year	Month	Date	Hour	Minute	Second
2010	11	13	14	37	25

* Folder Name : Set the expect folder name for SD CARD,
   the range is between WTA01 and WTA10.
* File Name: Set the file name for SD CARD, It allows setting
   50 filenames in this function.
* REC Date: Show the recorded time of existing files
   (Year/Month/Date, Hour/Min./Sec.)
* Sampling Time : Set the sampling time from 2 to 7200 seconds.
* Delete File : To delete the existing data from SD CARD.
* SD Format : to Format SD CARD fast.
* PT : Set the potential transformer from 1 to 1000.
* CT : Set the current transformer from 1 to 600.
* Beep : Set to ON/OFF for buzzer.
* Clamp Type : Select the Clamp Type to CP-200, CP-1201,
   CP-2000, CP-2011, CP-3000, CP-3001, CP-6001 or Other Type.
* RS232 out Sel. : Set RS232 output function, maximum up
   to nine items can be selected to output. screen 1 screen 2.
* Year : Set the year.
* Month : Set the month.
* Date : Set the date.
* Hour : Set the hour.
* Minute : Set the minute.
* Second : Set the second.

4-5 Setting function description before measuring

Press SETUP KEY to enter setting function screen, the
selected item will be displayed in highlight.

4-5-1 Folder Name: Set the folder name for SD

screen 1 (4-5-1)

Folder Name:	WTA01				**SETUP**
File Name:	3P401001.XLS				
REC Date:	2017-11-28 00:03:17				
Sampling Time:	2		Trans Ref :		220.0 V
Delet File:	0 %		SDVP :	10%	
SD Format:	0 %		Decimal:	Basic	
Use Size:	388 KB		Clamp Type:		CP1201
Free Size:	1946 MB		A	Range:	200A
Total Size:	1946 MB		V	Range:	200mV
			RS232 Out Sel:		
PT:	1 : 1		V1	I1	P1
CT:	1 : 1		S1	Q1	PF1
Beep:	ON		Φ1	FREQ	

Year	Month	Date	Hour	Minute	Second
2010	12	05	11	14	49

screen 2 (4-5-1)

Folder Name:	WTA01				**SETUP**
File Name:	3P401001.XLS				**SHIFT 1**
REC Date:	2017-11-28 00:03:17				
Sampling Time:	2		Trans Ref :		220.0 V
Delet File:	0 %		SDVP :	10%	
SD Format:	0 %		Decimal:	Basic	
Use Size:	388 KB		Clamp Type:		CP1201
Free Size:	1946 MB		A	Range:	200A
Total Size:	1946 MB		V	Range:	200mV
			RS232 Out Sel:		
PT:	1 : 1		V1	I1	P1
CT:	1 : 1		S1	Q1	PF1
Beep:	ON		Φ1	FREQ	

Year	Month	Date	Hour	Minute	Second
2010	12	05	11	14	34

A : Folder Name range: WTA01 to WTA10.

B : Press ▲ or ▼ to select the expect folder number, the number consists of " 01 to 10 " (as screen 1).

C : Press ▲ or ▼ continuously at least two seconds can skip the numbers faster.

D : Press SHIFT KEY once, the symbol " SHIFT1" will appear on up right display, and then press ▼ to entry next setting function as screen 2 (Folder Name → File Name).

4-5-2 File Name: Set the file name for SD

A : The screen will show " NO File " indicator in REC Date option when the selected file is new (as screen 1).

B : The screen will show recording date and time in REC Date option when the selected file has been recorded as screen 2.

screen 1 (4-5-2)

Folder Name:		WTA03			**SETUP**
File Name:		3P401001.XLS			
→ REC Date:	NO File				
Sampling Time:	2		Trans Ref :		220.0 V
Delet File:	0 %		SDVP :		10%
SD Format:	0 %		Decimal:		Basic
Use Size:	388 KB		Clamp Type:		CP1201
Free Size:	1946 MB		A	Range:	200A
Total Size:	1946 MB		V	Range:	200mV
			RS232 Out Sel:		
PT:	1 : 1		V1	I1	P1
CT:	1 : 1		S1	Q1	PF1
Beep:	ON		Φ˙Φ1	FREQ	
Year	Month	Date	Hour	Minute	Second
2010	11	13	14	37	25

screen 2 (4-5-2)

```
┌─────────────────────────────────────────────────────────┐
│ Folder Name:          WTA03              ┌─────────┐     │
│ File Name:            3P401001.XLS        │ SETUP   │     │
│ REC Date:    NO File                      └─────────┘     │
│ Sampling Time:        2        Trans Ref :     220.0 V    │
│ Delet File:           0   %    SDVP :          10%        │
│ SD Format:            0   %    Decimal:        Basic      │
│ Use Size:         388  KB      Clamp Type:     CP1201     │
│ Free Size:        1946 MB      A        Range:    200A    │
│ Total Size:       1946 MB      V        Range:   200mV    │
│                                RS232 Out Sel:             │
│ PT:               1 : 1        V1        I1       P1      │
│ CT:               1 : 1        S1        Q1       PF1     │
│ Beep:       ON                 Φ·Φ1      FREQ             │
│                                                           │
│ Year      Month     Date     Hour     Minute     Second  │
│ 2010      11        13       14       37         25       │
└─────────────────────────────────────────────────────────┘
```

C : File Name description : press ▲ or ▼ in screen 2 to
     select expect file number from 001 to 050.
          *Remark : When press ▲ or ▼ > 2 sec, the setting
          no. will change fast.*
     * 1P201001 : 1P2 means one phase by two wires.
     * 1P301001: 1P3 means one phase by three wires,
     * 3P301001 : 3P3 means three phases by three wires.
     * 3P401001 : 3P4 means three phases by four wires.
     * HAR01001 : HAR means harmonic measurement.
     * PHA01001 : PHA means phasor measurement.
     * TRA01001 : TRA means transient measurement.
          Remark :
          Above file description, 01 means folder number,
          001 means file number.
D : The up right display will show " SHIFT1 " symbol
     while pressing SHIFT KEY once in screen 2, and then
     press ▼ to enter next setting function as screen 3
     (File Name → Sampling Time).

E : The up right display will show " SHIFT2 " symbol
while pressing SHIFT KEY again in screen 4, at this time
press ▲ or ▼ to select 1P/2W(1P2) 、 1P/3W(1P3) 、
3P/3W(3P3) and 3P/4W(3P4) as screen 4.
F: One by one to press SHIFT KEY to select different
functions circularly.

screen 3 (4-5-2)

Folder Name:		WTA01			**SETUP**
File Name:		3P401001.XLS			**SHIFT 1**
REC Date:	2017-11-28 00:03:17				
Sampling Time:		2	Trans Ref :	220.0 V	
Delet File:		0 %	SDVP :	10%	
SD Format:		0 %	Decimal:	Basic	
Use Size:		388 KB	Clamp Type:		CP1201
Free Size:		1946 MB	A	Range:	200A
Total Size:		1946 MB	V	Range:	200mV
			RS232 Out Sel:		
PT:		1 : 1	V1	I1	P1
CT:		1 : 1	S1	Q1	PF1
Beep:	ON		Φ1	FREQ	
Year	Month	Date	Hour	Minute	Second
2010	11	13	14	37	25

screen 4 (4-5-2)

Folder Name:		WTA01			**SETUP**
File Name:		3P401001.XLS			**SHIFT 2**
REC Date:	2017-11-28 00:03:17				
Sampling Time:		2	Trans Ref :	220.0 V	
Delet File:		0 %	SDVP :	10%	
SD Format:		0 %	Decimal:	Basic	
Use Size:		388 KB	Clamp Type:		CP1201
Free Size:		1946 MB	A	Range:	200A
Total Size:		1946 MB	V	Range:	200mV
			RS232 Out Sel:		
PT:		1 : 1	V1	I1	P1
CT:		1 : 1	S1	Q1	PF1
Beep:	ON		Φ1	FREQ	
Year	Month	Date	Hour	Minute	Second
2010	11	13	14	37	25

4-5-3 Sampling time: Set the data logger sampling time for SD

A : When press SHIFT KEY once, the symbol " SHIFT1 "
will disappear on up right display, at this time press
▲ or ▼ to adjust expect sampling time as screen 2,
adjusting numbers are from 2 to 7200 seconds.

Remark : When press ▲ or ▼ > 2 sec, the setting no. will change fast.

B : The up right display will show " SHIFT1 " symbol
while pressing SHIFT KEY again, and then press ▼ to
enter next setting function (Sampling Time → Delete File)

screen 1 (4-5-3)

Folder Name:	WTA01			**SETUP**	
File Name:	3P401001.XLS			**SHIFT 1**	←
REC Date:	2008-11-28 00:03:17				
Sampling Time:	2	Trans Ref :	220.0 V		
Delet File:	0 %	SDVP :	10%		
SD Format:	0 %	Decimal:	Basic		
Use Size:	388 KB	Clamp Type:	CP1201		
Free Size:	1946 MB	A	Range:	200A	
Total Size:	1946 MB	V	Range:	200mV	
		RS232 Out Sel:			
PT:	1 : 1	V1	I1	P1	
CT:	1 : 1	S1	Q1	PF1	
Beep:	ON	Φ1	FREQ		
Year	Month Date	Hour	Minute	Second	
2010	11 13	14	37	25	

screen 2 (4-5-3)

Folder Name:	WTA01			**SETUP**	
File Name:	3P401001.XLS				←
REC Date:	2008-11-28 00:03:17				
Sampling Time:	2	Trans Ref :	220.0 V		
Delet File:	0 %	SDVP :	10%		
SD Format:	0 %	Decimal:	Basic		
Use Size:	388 KB	Clamp Type:	CP1201		
Free Size:	1946 MB	A	Range:	200A	
Total Size:	1946 MB	V	Range:	200mV	
		RS232 Out Sel:			
PT:	1 : 1	V1	I1	P1	
CT:	1 : 1	S1	Q1	PF1	
Beep:	ON	Φ1	FREQ		
Year	Month Date	Hour	Minute	Second	
2010	11 13	14	37	25	

4-5-4 Delete File: Delete the files for SD

A : The indicator " Y or N " will appear on right side
    display of the option while pressing SHIFT KEY
    continuously at least two seconds, and now press ▲
    the display will show " Y " in highlight as screen 2,
    press SETUP KEY again to confirm, the selected file (ex:
    3P401001.XLS) will be erased then return to screen 1,
    or else press SETUP KEY in " N " option to return
    to screen 1.
B : Press ▼ in screen 1 to enter next setting function
   (Delete File → SD Format)

screen 1 (4-5-4)

Folder Name:	WTA01	**SETUP**
File Name:	3P401001.XLS	**SHIFT 1**
REC Date:	2008-11-28 00:03:17	
Sampling Time: 2	Trans Ref :	220.0 V
Delete File: 0 %	SDVP :	10%
SD Format: 0 %	Decimal:	Basic
Use Size: 388 KB	Clamp Type:	CP1201
Free Size: 1946 MB	A Range:	200A
Total Size: 1946 MB	V Range:	200mV
	RS232 Out Sel:	
PT: 1 : 1	V1 I1	P1
CT: 1 : 1	S1 Q1	PF1
Beep: ON	Φ1 FREQ	

Year	Month	Date	Hour	Minute	Second
2010	11	13	14	37	25

screen 2 (4-5-4)

Folder Name: WTA01	**SETUP**
File Name: 3P401001.XLS	**SHIFT 1**

REC Date: 2008-11-28 00:03:17
Sampling Time: 2   Trans Ref :   220.0 V
→ **Delete File:** Y OR N   SDVP :   10%
SD Format: 0   %   Decimal: Basic
Use Size: 388   KB   Clamp Type: CP1201
Free Size: 1946 MB   A   Range: 200A
Total Size: 1946 MB   V   Range: 200mV
                                   RS232 Out Sel:
PT: 1 : 1   V1   I1   P1
CT: 1 : 1   S1   Q1   PF1
Beep: ON   Φ1 Φ1   FREQ

Year	Month	Date	Hour	Minute	Second
2010	11	13	14	37	25

4-5-5 SD Format : Formatting function for SD CARD

A : The indicator " Y or N " will appear on right side
    display of the option while pressing SHIFT KEY
    continuously at least two seconds, and press ▲ the
    display will show " Y " in highlight as screen 2,
    press SETUP KEY again to confirm to format SD CARD
    then return to screen 1, or else press SETUP KEY in
    " N " option return to screen 1.
B : Press ▼ in screen 1 to enter next setting function (SD
    Format → PT).

screen 1 (4-5-5)

Folder Name:		WTA01			**SETUP**
File Name:		3P401001.XLS			**SHIFT 1**
REC Date:	2008-11-28 00:03:17				
Sampling Time:	2		Trans Ref :		220.0 V
Delete File:	0 %		SDVP :	10%	
SD Format:	0 %		Decimal:	Basic	
Use Size:	388 KB		Clamp Type:		CP1201
Free Size:	1946 MB		A	Range:	200A
Total Size:	1946 MB		V	Range:	200mV
			RS232 Out Sel:		
PT:	1 : 1		V1	I1	P1
CT:	1 : 1		S1	Q1	PF1
Beep:	ON		Φ1	FREQ	

Year	Month	Date	Hour	Minute	Second
2010	11	13	14	37	25

screen 2 (4-5-5)

Folder Name:		WTA01			**SETUP**
File Name:		3P401001.XLS			**SHIFT 1**
REC Date:	2017-11-28 00:03:17				
Sampling Time:	2		Trans Ref :		220.0 V
Delete File:	0 %		SDVP :	10%	
SD Format:	Y OR N		Decimal:	Basic	
Use Size:	388 KB		Clamp Type:		CP1201
Free Size:	1946 MB		A	Range:	200A
Total Size:	1946 MB		V	Range:	200mV
			RS232 Out Sel:		
PT:	1 : 1		V1	I1	P1
CT:	1 : 1		S1	Q1	PF1
Beep:	ON		Φ Φ1	FREQ	

Year	Month	Date	Hour	Minute	Second
2010	11	13	14	37	25

4-5-6 PT: Set the Potential Transformer

A : When press SHIFT KEY once, the symbol " SHIFT1 "
    will disappear as screen 2 at this time press ▲ or ▼ can
    adjust to expect PT values, the adjusting numbers are
    from 1 to 1000.
    Remark : When press ▲ or ▼ > 2 sec, the setting
    no. will change fast.
B : Press SHIFT KEY once again will return to screen 1
    then press ▼ to enter next setting function (PT → CT).

screen 1 (4-5-6)

Folder Name:		WTA01			**SETUP**
File Name:		3P401001.XLS			**SHIFT 1**
REC Date:	2017-11-28	00:03:17			
Sampling Time:	2	Trans Ref :	220.0 V		
Delete File:	0 %	SDVP :	10%		
SD Format:	0 %	Decimal:	Basic		
Use Size:	388 KB	Clamp Type:	CP1201		
Free Size:	1946 MB	A Range:	200A		
Total Size:	1946 MB	V Range:	200mV		
			RS232 Out Sel:		
PT:	1 : 1	V1	I1	P1	
CT:	1 : 1	S1	Q1	PF1	
Beep:	ON	Φ1	FREQ		

Year	Month	Date	Hour	Minute	Second
2010	11	13	14	37	25

screen 2 (4-5-6)

Folder Name:		WTA01			**SETUP**

Folder Name: WTA01   **SETUP**
File Name: 3P401001.XLS
REC Date: 2017-11-28 00:03:17
Sampling Time: 2   Trans Ref :   220.0 V
Delete File: 0   %   SDVP :   10%
SD Format: 0   %   Decimal: Basic
Use Size: 388   KB   Clamp Type: CP1201
Free Size: 1946 MB   A   Range: 200A
Total Size: 1946 MB   V   Range: 200mV
                                        RS232 Out Sel:
PT: 1 : 1   V1   I1   P1
CT: 1 : 1   S1   Q1   PF1
Beep: ON   Φ1   FREQ

Year	Month	Date	Hour	Minute	Second
2010	11	13	14	37	25

4-5-7 CT: Set the Current Transformer

A : When press SHIFT KEY once, the symbol " SHIFT1 "
       will disappear as screen 2 at this time press ▲ or ▼ can
       adjust to expect CT values, the adjusting numbers are
       from 1 to 600.
       Remark : When press ▲ or ▼ > 2 sec, the setting
       no. will change fast.
B : Press SHIFT KEY once again will return to screen 1
       then press ▼ to enter next setting function (CT →
       BEEP).

screen 1 (4-5-7)

```
┌─────────────────────────────────────────────────────────┐
│ Folder Name:          WTA01              ███SETUP███     │
│ File Name:          3P401001.XLS         ███SHIFT 1██    │
│ REC Date:    2017-11-28  00:03:17                        │
│ Sampling Time:    2         Trans Ref :      220.0 V     │
│ Delete File:      0   %        SDVP :       10%          │
│ SD Format:        0   %        Decimal:    Basic         │
│ Use Size:       388   KB        Clamp Type:     CP1201   │
│ Free Size:     1946 MB        A      Range:     200A     │
│ Total Size:    1946 MB        V      Range:   200mV      │
│                              RS232 Out Sel:              │
│ PT:           1 : 1          V1        I1        P1      │
│ ██CT:██       1 : 1          S1        Q1        PF1     │
│ Beep:     ON                 Φ1        FREQ             │
│                                                          │
│ Year   Month      Date     Hour      Minute      Second  │
│ 2010   11         13       14        37          25      │
└─────────────────────────────────────────────────────────┘
```

screen 2 (4-5-7)

```
┌─────────────────────────────────────────────────────────┐
│ Folder Name:          WTA01              ███SETUP███     │
│ File Name:          3P401001.XLS                         │
│ REC Date:    2017-11-28  00:03:17                        │
│ Sampling Time:    2         Trans Ref :      220.0 V     │
│ Delete File:      0   %        SDVP :       10%          │
│ SD Format:        0   %        Decimal:    Basic         │
│ Use Size:       388   KB        Clamp Type:     CP1201   │
│ Free Size:     1946 MB        A      Range:     200A     │
│ Total Size:    1946 MB        V      Range:   200mV      │
│                              RS232 Out Sel:              │
│ PT:           1 : 1          V1        I1        P1      │
│ ██CT:██       1 : 1          S1        Q1        PF1     │
│ Beep:     ON                 Φ1        FREQ             │
│                                                          │
│ Year   Month      Date     Hour      Minute      Second  │
│ 2010   11         13       14        37          25      │
└─────────────────────────────────────────────────────────┘
```

4-5-8 Beep: Control the buzzer to ON/OFF

A : When press SHIFT KEY once the symbol " SHIFT1 " will
    disappear as screen 2, at this time press ▲ or ▼ to
    control the buzzer to ON/OFF.

B : Press SHIFT KEY once again will return to screen 1 then
    press ▼ to enter next setting function（BEEP → Trans Ref
    type）

screen 1（4-5-8）

Folder Name:	WTA01	**SETUP**
File Name:	3P401001.XLS	**SHIFT 1**
REC Date:	2008-11-28 00:03:17	

Sampling Time:	2	Trans Ref :	220.0 V	
Delete File:	0 %	SDVP :	10%	
SD Format:	0 %	Decimal:	Basic	
Use Size:	388 KB	Clamp Type:		CP1201
Free Size:	1946 MB	A	Range:	200A
Total Size:	1946 MB	V	Range:	200mV
		RS232 Out Sel:		
PT:	1 : 1	V1	I1	P1
CT:	1 : 1	S1	Q1	PF1
Beep: ON		Φ1	FREQ	

Year	Month	Date	Hour	Minute	Second
2010	11	13	14	37	25

screen 2 (4-5-8)

Folder Name:		WTA01			**SETUP**
File Name:		3P401001.XLS			
REC Date:	2017-11-28 00:03:17				
Sampling Time:	2	Trans Ref :	220.0 V		
Delete File:	0 %	SDVP :	10%		
SD Format:	0 %	Decimal:	Basic		
Use Size:	388 KB	Clamp Type:	CP1201		
Free Size:	1946 MB	A Range:	200A		
Total Size:	1946 MB	V Range:	200mV		
		RS232 Out Sel:			
PT:	1 : 1	V1	I1	P1	
CT:	1 : 1	S1	Q1	PF1	
Beep: ON		Φ1	FREQ		
Year	Month	Date	Hour	Minute	Second
2010	11	13	14	37	25

4-5-9 Trans Ref: Nominal voltage for
transient detection reference

A : When press SHIFT KEY once will disappear as screen 2,
at this time press ▲ or ▼ to adjust the voltage level
to 50.0 V to 850.0 V.

B : Press SHIFT KEY once again will return to screen 1 then
press ▼ to enter next setting function (Trans Ref →
SDVP).

screen 1 (4-5-9)

Folder Name:	WTA01		**SETUP**
File Name:	3P401001.XLS		**SHIFT 1**

REC Date: NO File

Sampling Time:	2	**Trans Ref :**	220.0 V
Delete File:	0 %	SDVP :	10%
SD Format:	0 %	Decimal: Basic	
Use Size:	23 MB	Clamp Type:	CP1201
Free Size:	1904 MB	A Range:	200A
Total Size:	1927 MB	V Range:	200mV
		RS232 Out Sel:	
PT:	1 : 1	V1 I1	P1
CT:	1 : 1	S1 Q1	PF1
Beep: ON		Φ1 FREQ	

Year	Month	Date	Hour	Minute	Second
2010	12	14	09	22	41

screen 2 (4-5-9)

Folder Name:	WTA01		**SETUP**
File Name:	3P401001.XLS		

REC Date: NO File

Sampling Time:	2	**Trans Ref :**	220.0 V
Delete File:	0 %	SDVP :	10%
SD Format:	0 %	Decimal: Basic	
Use Size:	23 MB	Clamp Type:	CP1201
Free Size:	1904 MB	A Range:	200A
Total Size:	1927 MB	V Range:	200mV
		RS232 Out Sel:	
PT:	1 : 1	V1 I1	P1
CT:	1 : 1	S1 Q1	PF1
Beep: ON		Φ1 FREQ	

Year	Month	Date	Hour	Minute	Second
2010	12	14	09	22	41

4-5-10 SDVP: Set up upper and low limits
        % of transient voltage detection

A : When press SHIFT KEY once will disappear as screen 2, at this time press ▲ or ▼ to adjust the voltage % value to 1% to 100%.

B : Press SHIFT KEY once again will return to screen 1 then press ▼ to enter next setting function (SDVP → Decimal).

screen 1 (4-5-10)

Folder Name:	WTA01			**SETUP**
File Name:	3P401026.XLS			**SHIFT 1**
REC Date:	NO File			
Sampling Time:	2	Trans Ref :	220.0 V	
Delete File:	0 %	**SDVP :**	10%	
SD Format:	0 %	Decimal:	Basic	
Use Size:	23 MB	Clamp Type:	CP1201	
Free Size:	1904 MB	A Range:	200A	
Total Size:	1927 MB	V Range:	200mV	
		RS232 Out Sel:		
PT:	1 : 1	V1	I1	P1
CT:	1 : 1	S1	Q1	PF1
Beep: ON		Φ1	FREQ	
Year Month	Date	Hour	Minute	Second
2010 12	14	09	22	41

screen 2 (4-5-10)

Folder Name:		WTA01			**SETUP**

```
Folder Name:              WTA01                    SETUP
File Name:                3P401026.XLS
REC Date:     NO File
Sampling Time:            2        Trans Ref  :    220.0 V
Delete File:         0   %    SDVP :           10%
SD Format:           0   %    Decimal:      Basic
Use Size:            23 MB     Clamp Type:          CP1201
Free Size:          1904 MB    A       Range:       200A
Total Size:         1927 MB    V       Range:    200mV
                              RS232 Out Sel:
PT:                 1 : 1      V1          I1          P1
CT:                 1 : 1      S1          Q1          PF1
Beep:   ON                     Φ1          FREQ


Year    Month      Date      Hour        Minute        Second
2010    12         14        09          22            41
```

4-5-11 Decimal Type: set the Decimal type to
Basic (.) or Euro (,)
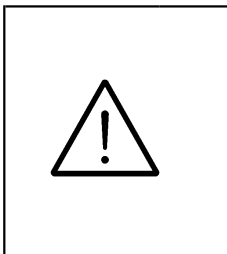
**The numerical data structure of SD card
is default used the " . " as the decimal,
for example "20.6" "1000.53" . But in
certain countries   (Europe ...) is used
the " , " as the decimal point, for
example " 20,6 " "1000,53". Under such
situation, it should change the Decimal
character at first.**

A : When press SHIFT KEY once the symbol " SHIFT1 " will
disappear as screen 2, at this time press ▲ or ▼ to select
the Decimal type to " Basic " or " Euro ".

* Basic type :
    The numerical data structure of SD card
    is default used the " . " as the decimal,
    for example "20.6" "1000.53" .
* Euro type :
    The numerical data structure of SD card
    is default used the " , " as the decimal,
    for example "20,6" "1000,53" .

B : Press SHIFT KEY once again will return to screen 1 then
    press ▼ to enter next setting function (Decimal type →
    Clamp type).

screen 1 (4-5-11)

Folder Name:	WTA01	**SETUP**
File Name:	3P401001.XLS	**SHIFT 1**
REC Date: 2017-11-28 00:03:17		
Sampling Time: 2	Trans Ref :	220.0 V
Delete File: 0 %	SDVP :	10% 10%
SD Format: 0 %	**Decimal:** Basic	
Use Size: 388 KB	Clamp Type:	CP1201
Free Size: 1946 MB	A Range:	200A
Total Size: 1946 MB	V Range: 200mV	
	RS232 Out Sel:	
PT: 1 : 1	V1 I1	P1
CT: 1 : 1	S1 Q1	PF1
Beep: ON	Φ1 FREQ	

Year	Month	Date	Hour	Minute	Second
2010	11	13	14	37	25

screen 2 (4-5-11)

Folder Name:	WTA01		**SETUP**

Folder Name: WTA01   **SETUP**
File Name: 3P401001.XLS
REC Date: 2017-11-28 00:03:17
Sampling Time: 2   Trans Ref :   220.0 V
Delete File: 0   %   SDVP :   10%   10%
SD Format: 0   %   **Decimal:**   Basic
Use Size: 388   KB   Clamp Type: CP1201
Free Size: 1946 MB   A   Range: 200A
Total Size: 1946 MB   V   Range: 200mV
                                        RS232 Out Sel:
PT: 1 : 1   V1   I1   P1
CT: 1 : 1   S1   Q1   PF1
Beep: ON   Φ1   FREQ

Year	Month	Date	Hour	Minute	Second
2010	11	13	14	37	25

Clamp Type: set the clamp type to 4-5-12
MRC Clamp or other Clamp

A : When press SHIFT KEY once the symbol " SHIFT1 " will
     be disappeared and show as screen 2, at this time press
     or▼ to select the MRC standard clamp or other ▲
     Clamp (CP-200, CP-1201, CP-2000. CP-2011, CP-3000,
     .(CP-3001, CP-6001, Othe
B : When select the different Clamp type, the V range
     and the A range will show the corresponding value.
C : Press SHIFT KEY once again will return to screen 1 then
     press ▼ to enter next setting function (Clamp Type →
     A range).

screen 1 (4-5-12)

Folder Name:	WTA01		**SETUP**
File Name:	3P401001.XLS		**SHIFT 1**

REC Date: 2017-11-28 00:03:17

Sampling Time:	2	Trans Ref :	220.0 V
Delete File:	0 %	SDVP :	10% 10%
SD Format:	0 %	Decimal: Basic	
Use Size:	388 KB	**Clamp Type:**	CP1201
Free Size:	1946 MB	A Range:	200A
Total Size:	1946 MB	V Range:	200mV
		RS232 Out Sel:	
PT:	1 : 1	V1 I1	P1
CT:	1 : 1	S1 Q1	PF1
Beep: ON		Φ1 FREQ	

Year	Month	Date	Hour	Minute	Second
2010	11	13	14	37	25

screen 2 (4-5-12)

Folder Name:	WTA01		**SETUP**
File Name:	3P401001.XLS		

REC Date: 2017-11-28 00:03:17

Sampling Time:	2	Trans Ref :	220.0 V
Delete File:	0 %	SDVP :	10% 10%
SD Format:	0 %	Decimal: Basic	
Use Size:	388 KB	**Clamp Type:**	CP1201
Free Size:	1946 MB	A Range:	200A
Total Size:	1946 MB	V Range:	200mV
		RS232 Out Sel:	
PT:	1 : 1	V1 I1	P1
CT:	1 : 1	S1 Q1	PF1
Beep: ON		Φ1 FREQ	

Year	Month	Date	Hour	Minute	Second
2010	11	13	14	37	25

36

4-5-13 A range Setting (Current range Setting)

A : When press SHIFT KEY once the symbol " SHIFT1 " will
   be disappeared and show as screen 2, at this time press
   ▲ or ▼ to select A range to 20A to 2000A,
   30A to 3000A or 60A to 6000A.
      * *The setting value should accoding your Clamp type.*
      * *The CP-200 clamp can set 20A, 200A.*
      * *The CP-1201 clamp can set 20A, 200A, 1200A.*
      * *The CP-2000 clamp can set 20A, 200A, 2000A.*
      * *The CP-2011 clamp can set 200A, 2000A.*
      * *The CP-3000, CP-3001 clamp can set 30A, 300A, 3000A.*
      * *The CP-6001 clamp can set 60A, 600A, 6000A.*
      * *The Other clamp can set 20A, 200A, 2000A, 30A*
         300A, 3000A.60A, 600A, 6000A.

> **Attention :**
> **The meter's A range (Current range) value should**
> **same as the Clamp's current selecting range value.**

B : Press SHIFT KEY once again will return to screen 1 then
   press ▼ to enter next setting function (A Range → V range).
screen 1 (4-5-13)

Folder Name:		WTA01			**SETUP**
File Name:		3P401001.XLS			**SHIFT 1**
REC Date:	2017-11-28 00:03:17				
Sampling Time:	2	Trans Ref :		220.0 V	
Delete File:	0 %	SDVP :	10%		
SD Format:	0 %	Decimal:	Basic		
Use Size:	388 KB	Clamp Type:		CP1201	
Free Size:	1946 MB	**A Range:**		200A	
Total Size:	1946 MB	V Range:	200mV		
		RS232 Out Sel:			
PT:	1 : 1	V1	I1	P1	
CT:	1 : 1	S1	Q1	PF1	
Beep: ON		Φ1	FREQ		
Year	Month	Date	Hour	Minute	Second
2010	11	13	14	37	25

screen 2 (4-5-13)

Folder Name:	WTA01			**SETUP**

```
Folder Name:          WTA01                    SETUP
File Name:            3P401001.XLS
REC Date:    2017-11-28  00:03:17
Sampling Time:      2      Trans Ref  :         220.0 V
Delete File:        0    %      SDVP :        10%
SD Format:          0    %      Decimal:      Basic
Use Size:          388   KB     Clamp Type:          CP1201
Free Size:        1946 MB     A        Range:        200A
Total Size:       1946 MB     V        Range:    200mV
                              RS232 Out Sel:
PT:                1 : 1      V1          I1          P1
CT:                1 : 1      S1          Q1          PF1
Beep:   ON                    Φ1          FREQ

Year    Month     Date     Hour       Minute      Second
2010    11        13       14         37          25
```

4-5-14 V range Setting (Voltage range Setting)

A : When press SHIFT KEY once the symbol " SHIFT1 " will
    be disappeared and show as screen 2, at this time press
    ▲ or ▼ to select V range to 200mV, 300mV, 500mV,
    1V, 2V, 3V.
      * *The setting function only available for the Other clamp.*
      * *The V range value of CP-200, CP-1201 will default*
        to 200mV, it can not be adjusted.
      * *The V range value of CP-2000 will default to*
        2V, it can not be adjusted.
      * *The V range value of CP-2011, CP-3000, CP-3001,*
        CP-6001, will default to 3V, it can not be adjusted.

B : Press SHIFT KEY once again will return to screen 1 then
    press ▼ to enter next setting function (A Range →
    RS232 OUT SEL).

screen 1 (4-5-14)

Folder Name:		WTA01			**SETUP**
File Name:		3P401001.XLS			**SHIFT 1**
REC Date:	2017-11-28 00:03:17				
Sampling Time:	2		Trans Ref :	220.0 V	
Delete File:	0 %		SDVP :	10%	
SD Format:	0 %		Decimal:	Basic	
Use Size:	388 KB		Clamp Type:	CP1201	
Free Size:	1946 MB		A Range:	200A	
Total Size:	1946 MB		**V Range:**	200mV	
			RS232 Out Sel:		
PT:	1 : 1		V1	I1	P1
CT:	1 : 1		S1	Q1	PF1
Beep: ON			Φ1	FREQ	
Year	Month	Date	Hour	Minute	Second
2010	11	13	14	37	25

screen 2 (4-5-14)

Folder Name:		WTA01			**SETUP**
File Name:		3P401001.XLS			
REC Date:	2017-11-28 00:03:17				
Sampling Time:	2		Trans Ref :	220.0 V	
Delete File:	0 %		SDVP :	10%	
SD Format:	0 %		Decimal:	Basic	
Use Size:	388 KB		Clamp Type:	CP1201	
Free Size:	1946 MB		A Range:	200A	
Total Size:	1946 MB		**V Range:**	200mV	
			RS232 Out Sel:		
PT:	1 : 1		V1	I1	P1
CT:	1 : 1		S1	Q1	PF1
Beep: ON			Φ1	FREQ	
Year	Month	Date	Hour	Minute	Second
2010	11	13	14	37	25

4-5-15 RS232 Out Sel setting

A : When press SHIFT KEY continuously at least two
seconds as screen 2 and now press ▲ or ▼ to select
the item that intend to output, maximum up to nine
items, when the cursor stops on the selected item and
then press SETUP KEY again, the selected item will be
displayed in highlight.

B : Press SHIFT KEY it can change the screen page
from Screen 2 → Screen 5.

C : If the selected items are over nine, the low right
display will show indicator " full " as screen 6.

D : After the selecting is completed, press SHIFT KEY
continuously at least two seconds again will return to
screen 1 and show all the selected items at the same
time.

E : Press ▼ in screen 1 to enter next setting function
(RS232 Out Sel → Year)

screen 1 (4-5-15)

Folder Name:		WTA01			**SETUP**
File Name:		3P401001.XLS			**SHIFT 1**
REC Date:	2017-11-28	00:03:17			
Sampling Time:	2	Trans Ref :		220.0 V	
Delete File:	0 %	SDVP :		10%	
SD Format:	0 %	Decimal:		Basic	
Use Size:	388 KB	Clamp Type:		CP1201	
Free Size:	1946 MB	A Range:		200A	
Total Size:	1946 MB	V Range:		200mV	
		RS232 Out Sel:			
PT:	1 : 1	V1	I1	P1	
CT:	1 : 1	S1	Q1	PF1	
Beep: ON		Φ1	FREQ		
Year	Month	Date	Hour	Minute	Second
2010	11	13	14	37	25

screen 2 (4-5-15)

RS232 OUTPUT SELECT

1.	V12	12.	P3	23.	PF2
2.	V23	13.	PΣ	24.	PF3
3.	V31	14.	**S1**	25.	PFΣ
4.	V1	15.	S2	26.	PFH
5.	V2	16.	S3	27.	**Φ1**
6.	V3	17.	SΣ	28.	Φ1 2
7.	**I1**	18.	**Q1**	29.	Φ1 3
8.	I2	19.	Q2	30.	**WH**
9.	I3	20.	Q3	31.	SH
10.	**P1**	21.	QΣ	32.	QH
11.	P2	22.	**PF1**	33.	**FREQ**

screen 3 (4-5-15)

RS232 OUTPUT SELECT

34.	H01	45.	H12	56	H23
35.	H02	46.	H13	57	H24
36.	H03	47.	H14	58	H25
37.	H04	48.	H15	59	H26
38.	H05	49.	H16	60	H27
39.	H06	50.	H17	61	H28
40.	H07	51	H18	62	H29
41.	H08	52	H19	63	H30
42.	H09	53.	H20	64	H31
43.	H11	54.	H21	65	H32
44.	H01	55.	H22	66	H33

screen 4 (4-5-15)

RS232 OUTPUT SELECT

67.	H34	78.	H45	89	ΦV12
68.	H35	79.	H46	90	ΦV23
69.	H36	80	H47	91	ΦV31
70.	H37	81.	H48	92	ΦV1
71.	H38	82.	H49	93	ΦV2
72.	H39	83.	H50	94	ΦV3
73.	H40	84.	THD	95	ΦA1
74.	H41	85.	Vpp	96	ΦA2
75.	H42	86.	CFV	97	ΦA3
76.	H43	87.	App	98	AveV
77.	H44	88	CFA	99	AveA

screen 5 (4-5-15)

RS232 OUTPUT SELECT

100.	Vn
101.	An
102.	dV
103.	VUR
104.	Vd0
105.	Vd2
106.	dA
107.	AUR
108.	Ad0
109.	Ad2

42

screen 6 (4-5-15)

RS232 OUTPUT SELECT

1.	V12	12.	P3	23.	PF2
2.	V23	13.	PΣ	24.	PF3
3.	V31	14.	**S1**	25.	PFΣ
4.	**V1**	15.	S2	26.	PFH
5.	V2	16.	S3	27.	**Φ1**
6.	V3	17.	SΣ	28.	Φ1 2
7.	I1	18.	**Q1**	29.	Φ1 3
8.	I2	19.	Q2	30.	**WH**
9.	I3	20.	Q3	31.	SH
10.	**P1**	21.	QΣ	32.	QH
11.	P2	22.	**PF1**	33.	**FREQ**
					FULL

4-5-16 Year/Month/Date/Hour/Minute/Second setting

A : When press SHIFT KEY once the symbol " SHIFT1"
will disappear as screen 2, at this time press ▲ or ▼
to adjust expect numbers, and press ▲ or ▼
continuously at least two seconds can skip the
numbers faster.

B : When press SHIFT KEY once, the symbol " SHIFT1"
will appear as screen 1, at this time press ▼
to enter next setting function (Year → Month).

C : The settings about (Month → Date), (Date →
Hour), (Hour → Minute), (Minute → Second) are
same as above step A and step B.

D : In this setting function (Year → Minute), press ▲ or
▼ in addition to adjust the numbers, and the setting
value will also be saved during the adjusting.

E : In the function of setting " second ", press ▲ or ▼
to adjust numbers. at this point the number of second
is at a standstill condition and then press setup key
that will save setting value and also start counting
function of " second ".

screen 1 (4-5-16)

Folder Name:	WTA01	**SETUP**
File Name:	3P401001.XLS	**SHIFT 1**

REC Date: 2008-11-28 00:03:17

Sampling Time:	2	Trans Ref :	220.0 V
Delete File:	0 %	SDVP :	10%
SD Format:	0 %	Decimal:	Basic
Use Size:	388 KB	Clamp Type:	CP1201
Free Size:	1946 MB	A Range:	200A
Total Size:	1946 MB	V Range:	200mV

RS232 Out Sel:

PT:	1 : 1	V1	I1	P1
CT:	1 : 1	S1	Q1	PF1
Beep:	ON	Φ1	FREQ	

Year	Month	Date	Hour	Minute	Second
2010	11	13	14	37	25

screen 2 （4-5-16）

```
Folder Name:   WTA01                              SETUP
File Name: 3P401001.XLS
REC Date:    2008-11-28  00:03:17
Sampling Time:        2      Trans Ref :    220.0 V
Delete File:       0   %      SDVP :        10%
SD Format:         0   %      Decimal:      Basic
Use Size:       388   KB      Clamp Type:        CP1201
Free Size:      1946 MB       A      Range:      200A
Total Size:     1946 MB       V      Range:     200mV
                              RS232 Out Sel:
PT:            1 : 1          V1          I1          P1
CT:            1 : 1          S1          Q1          PF1
Beep:   ON                    Φ1          FREQ


 Year    Month        Date       Hour        Minute       Second
2010    11          13         14          37          25
```

4-5-17 When all settings are completed, press EXIT
KEY to return measuring screen.

4-5-18 The descriptions about SD CARD memory
space

A : Use Size - To show the space data numbers that have
      been used.
B : Free Size - To show the data numbers of balance space.
C : Total Size - To show the data numbers of total space.
D : Typical SD CARD and SDHC both can be used with the
      instrument, except the SD CARD memory size is less
      than 32MB.

4-5-19 RESET KEY : Press this key to reboot the
instrument

5. MEASURING PROCEDURES

5-1 1Φ2W (one phase by two wires) measurement

A : Diagram   SCREEN 1 (5-1)
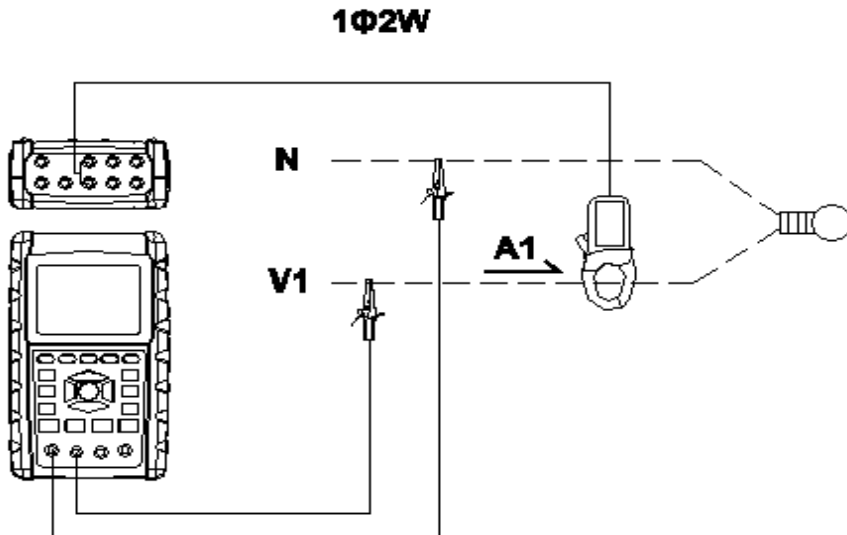
1Φ2W

B : Operation Instructions:

B-1 : Power on the instrument by pressing POWER
KEY, and then press 1Φ3Φ KEY to select the 1Φ2W
system, At the time, display will show 1Φ2W connect
diagram approx 4 sec. and the selected name of system
will be appeared on bottom left display of screen 2.

B-2 : Connect the line voltage L1, Vn (Neutral) to
V1 and N terminals of the instrument.

B-3:Place the conductor of CP-1201(A1)to A1 as screen 1.

B-4: Connect the output of clamp meter " CP-1200(A1) "
to A1 terminal of the instrument.

B-5: The related measuring factors will be appeared on
display, about the instruction of factor please refer
appendix 1 (5-16, page 68).

Remark:

During connection ,If want to check connect
Correct or not,please press and hold the "▼" key, display
will show 1Φ2W connect diagram,when release the "▼" key
, will back to measurement.

screen 2 (5-1)

```
V 1 :    0.0          V
A 1 :    0.00         A

P1 :-   0.000KW          P  F  1      :  - 0.00
S1:     0.000KVA         P  F  H      :    0.00
Q1: -   0.000KVAR        Φ 1 :  :        - 0.0°

WH      0.000KWH
SH      0.000KVAH
QH      0.000KVARH       F R E Q      :  50.1      Hz




CP1201
    20A          1Φ2W       SEC:  2      CT:  1      PT: 1
```

5-2 1Φ3W (one phase by three wires) measurement
A : Diagram

screen1 (5-2)
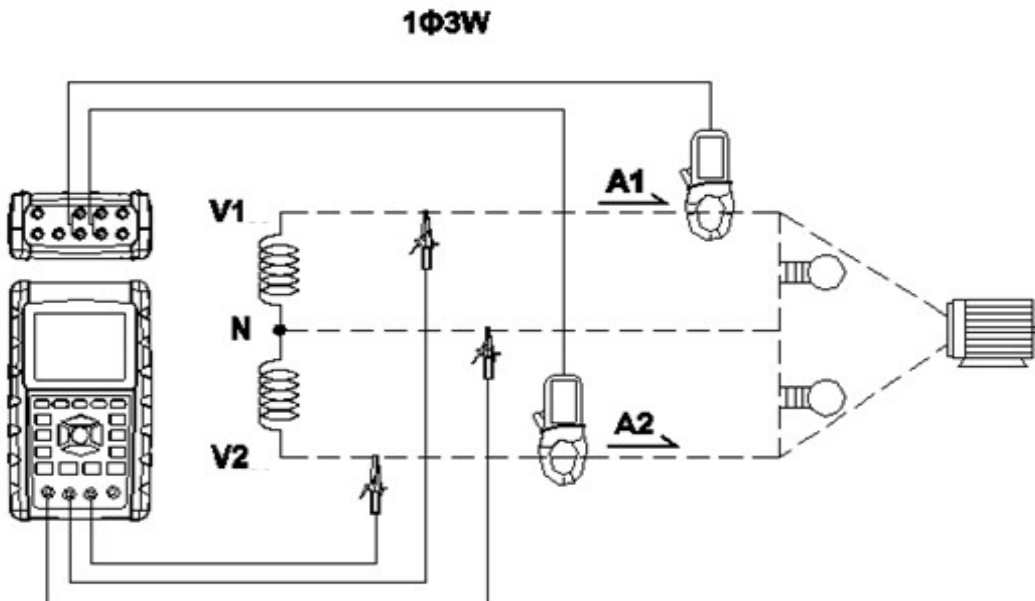
1Φ3W

B : Operation Instructions:

B-1 : Power on the instrument by pressing POWER KEY, and then press 1Φ3Φ KEY to select the 1Φ3W system,At the time, display will show 1Φ3W connect diagram approx 4 sec., and the selected name of system will be appeared on bottom left display of screen 2.

B-2 : Connect the line voltage L1, L2 and Vn (Neutral) to V1, V2 and N terminals of the instrument.

B-3 : Place the conductor of CP-1201(A1), CP-1201(A2) hook to A1 and A2 as screen 1.

B-4 : Connect the outputs of clamp meter CP-1201(A1)、CP-1201(A2) to A1 and A2 terminals of the instrument.

B-5 : The related measuring factors will be appeared on display, about the instruction of factor please refer appendix 1 (5-16, page 68).
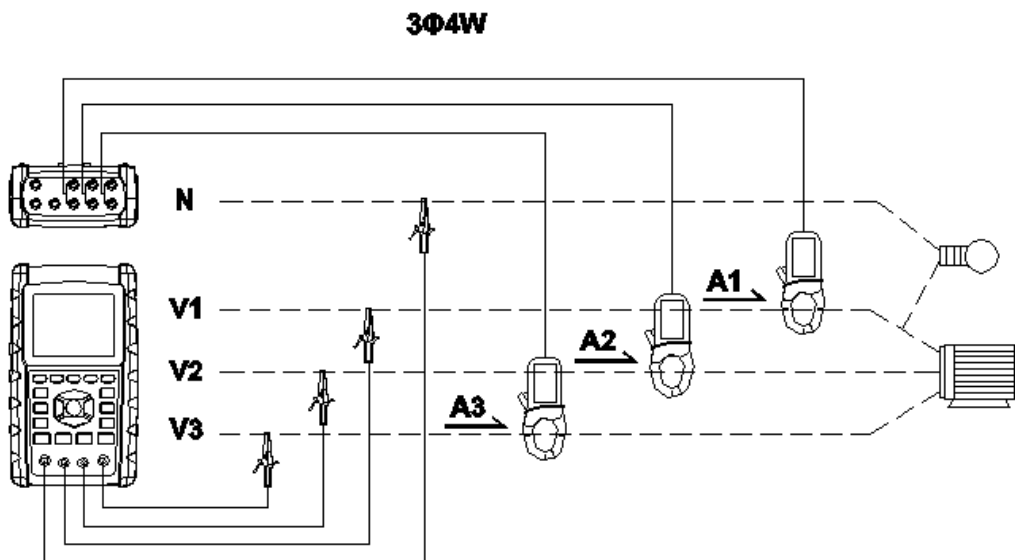
Remark:

During connection ,If want to check connect Correct or not, please press and hold the "▼" key, display will show 1Φ3W connect diagram,when release the "▼" key , will back to measurement.

screen 2 (5-2)

V1 :	0.0	V		P 1 :	-	0.000KW
V2 :	0.0	V		P 2 :	-	0.000KW
A1 :	0.00	A		S 1 :		0.000KVA
A2 :	0.00	A		S 2 :		0.000KVA
Q1 :	- 0.000KVAR					
Q2 :	- 0.000KVAR					

PΣ: 0.000 KW	**SΣ:** 0.000 KVA	**QΣ:** 0.000 KVAR
PF1: - 0.00	**PF2:** - 0.00	**PFΣ:** 0.00
PFH: 0.00	**Φ1:** - 0.0°	**Φ2:** - 0.0°

WH: 0.000 KWH	**SH:** 0.000 KVAH
QH: 0.000 KVARH	**FREQ:** 50.0 Hz

CP1201				
20A	**1Φ3W**	**SEC: 2**	**CT: 1**	**PT: 1**

5-3 3Φ3W (three phases by three wires) measurement

A : Diagram   screen 1 (5-3)
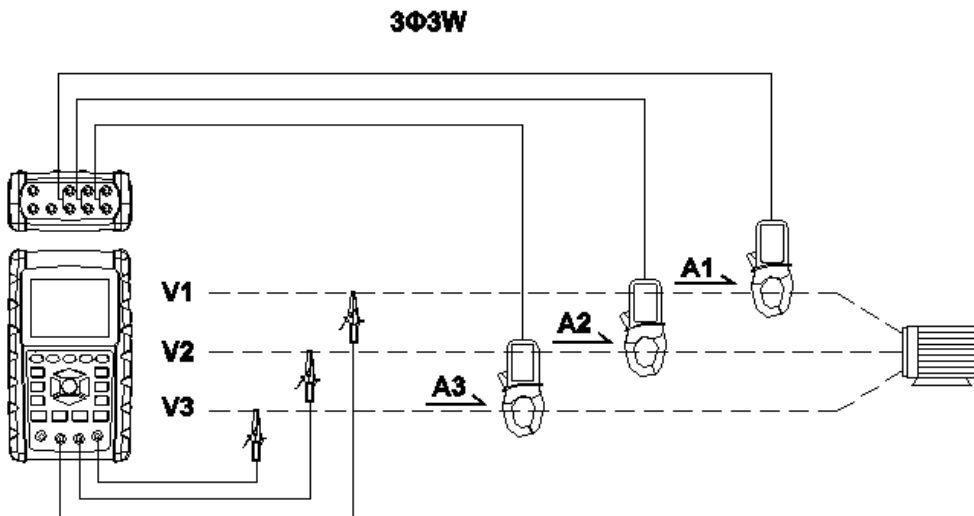
3Φ3W

B : Operation Instructions:

B-1 : Power on the instrument by pressing POWER KEY, and then press 1Φ3Φ KEY to select the 3Φ3W system,At the time, display will show 3Φ3W connect diagram approx. 4 sec. and the selected name of system will be appeared on bottom left display of screen 2.

B-2: Connect the line voltage L1, L2 and L3 to V1, V2 and V3 terminals of the instrument.

B-3: Place the conductor of CP-1201(A1), CP-1201(A2), CP-1201(A3) hook to A1, A2 ,A3 as screen 1.

B-4 : Connect the outputs of clamp meter CP-1201(A1) , CP-1201(A2), CP-1201(A3) to A1, A2, A3 terminals of the instrument.

B-5: The related measuring factors will be appeared on display, about the instruction of factor please refer appendix 1 (5-16, page 68).

Remark:

During connection ,If want to check connect Correct or not, please press and hold the "▼" key, display will show 3Φ3W connect diagram,when release the "▼" key , will back to measurement.

screen 2 (5-3)

```
V1 1 :  0.0      V          A  1  :        0.00     A
V2 3 :  0.0      V          A  2  :        0.00     A
V3 1 :  0.0      V          A  3  :        0.00     A


P Σ     -    0.000 KW
S Σ          0.000 KVA
Q Σ          0.000 KVAR
PFΣ:         0.00                    P   F   H  :   0.00


WH:     0.000 KWH           SH:              0.000 KVAH
QH:     0.000 KVARH         FREQ:               50.0   Hz



CP1201
    20A          3Φ3W       SEC:   2      CT:  1     PT:  1
```

5-4 3Φ4W (three phases by four wires) measurement

A : Diagram

3Φ4W

screen 1 (5-4)

50

B: Operation Instructions:

B-1 : Power on the instrument by pressing POWER KEY, and then press 1Φ3Φ KEY to select the 3Φ4W system,At the time, display will show 3Φ4W connect diagram approx. 4 sec. and the selected name of system will be appeared on bottom left display of screen 2.

B-2 : Connect the line voltage L1, L2, L3 and Vn to V1, V2, V3 and N terminals of the instrument.

B-3 : Place the conductor of CP-1201(A1), CP-1201(A2)、 CP-1201(A3) hook to A1, A2, A3 as screen 1.

B-4 : Connect the outputs of clamp meter CP-1201(A1), CP-1201(A2), CP-1201(A3) to A1、A2、A3 terminals of the instrument.

B-5 : The related measuring factors will be appeared on display, about the instruction of factor please refer appendix 1 (5-16, page 68).

Remark:

During connection ,If want to check connect Correct or not, please press and hold the "▼" key, display will show 3Φ4W connect diagram,when release the "▼" key , will back to measurement.

screen 2 (5-4)

V12:	0.0	V	V1:	0.0	V	A1:	0.00	A
V23:	0.0	V	V2:	0.0	V	A2:	0.00	A
V31:	0.0	V	V3:	0.0	V	A3:	0.00	A

P1:	-0.000 KW	S1:	0.000 KVA	Q1:	-0.000 KVAR
P2:	-0.000 KW	S2:	0.000 KVA	Q2:	-0.000 KVAR
P3:	-0.000 KW	S3:	0.000 KVA	Q3:	-0.000 KVAR

PΣ :	-0.000 KW	SΣ:	0.000 KVA	QΣ:	-0.000 KVAR
PF1:	- 0.00	PF2:	- 0.00	PF3:	0
PFΣ:	0.00	PFH:	0.00		
Φ1:	- 0.0°	Φ2:	- 0.0°	Φ3:	-0.0°

WH:	0.000 KWH	SH:	0.000 KVAH
QH:	0.000 KVARH	FREQ:	0.0 Hz

CP1201 20A	3Φ4W	SEC: 2	CT: 1	PT: 1

5-5 The CT and PT measurement

A : Diagram   screen 1 (5-5)
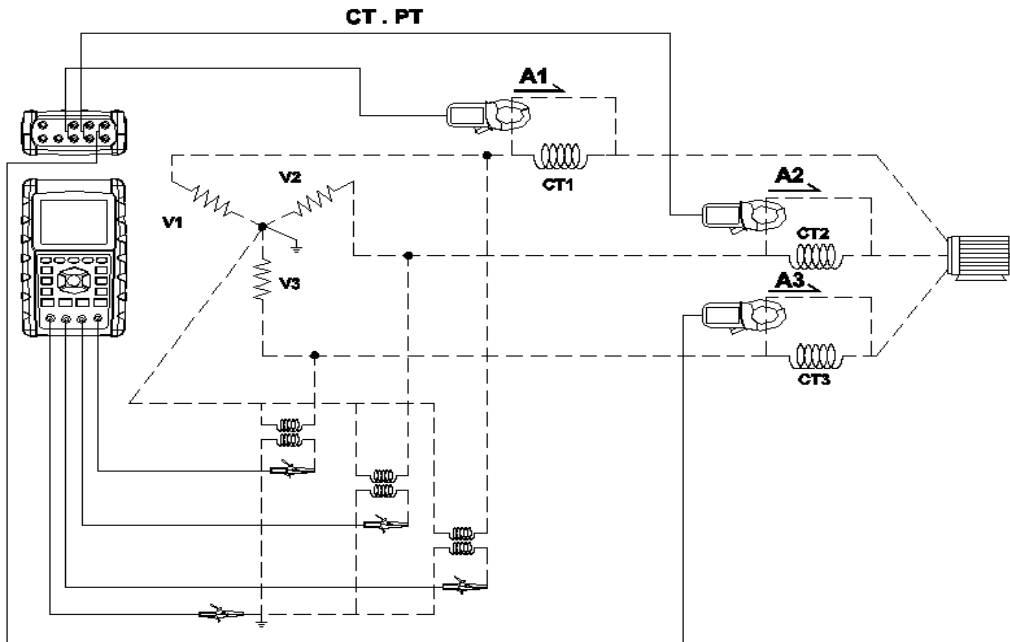
B : Operation Instructions

B-1 : Power on the instrument by pressing POWER KEY, and then press 1Φ3Φ KEY to select the 3Φ4W system,At the time, display will show 3Φ4W connect diagram approx. 4 sec. the selected name of system will be appeared on bottom left display of screen 2.

B-2 : Connect the line voltage L1, L2, L3 and Vn to V1, V2, V3 and N terminals of the instrument.

B-3 : Place the conductor of CP-1201(A1), CP-1201(A2), CP-1201(A3) hook to A1, A2 , A3 as screen 1.

B-4: Connect the outputs of clamp meter CP-1201(A1), CP-1201(A2), CP-1201(A3) to A1, A2, A3 terminals of the instrument.

B-5: The related measuring factors will be appeared on display, about the instruction of factor please refer appendix 1 (5-16, page 68).

Remark:

During connection ,If want to check CT and PT measurement connect Correct or not, please press and hold the "▼"and " ▲" key, display will show CT and PT measurement connect diagram,when release the " ▼" and " ▲" key , will back to measurement .

screen 2 (5-5)

V12:	0.0	V	V1:	0.0	V	A1:	0.00	A
V23:	0.0	V	V2:	0.0	V	A2:	0.00	A
V31:	0.0	V	V3:	0.0	V	A3:	0.00	A

P1:	-0.000 KW	S1:	0.000 KVA	Q1:	-	0.000 KVAR
P2:	-0.000 KW	S2:	0.000 KVA	Q2:	-	0.000 KVAR
P3:	-0.000 KW	S3:	0.000 KVA	Q3:	-	0.000 KVAR

PΣ :	-0.000 KW	SΣ:	0.000 KVA	QΣ:	-	0.000 KVAR
PF1	- 0.00	PF2:	- 0.00	PF3:	-	0.00
PFΣ:	- 0.00	PFH:	0.00			
Φ1:	-0.0°	Φ2:	- 0.0°	Φ3:	-	0.0°

WH:	0.000 KWH	SH:	0.000 KVAH
QH:	0.000 KVARH	FREQ:	0.0 Hz

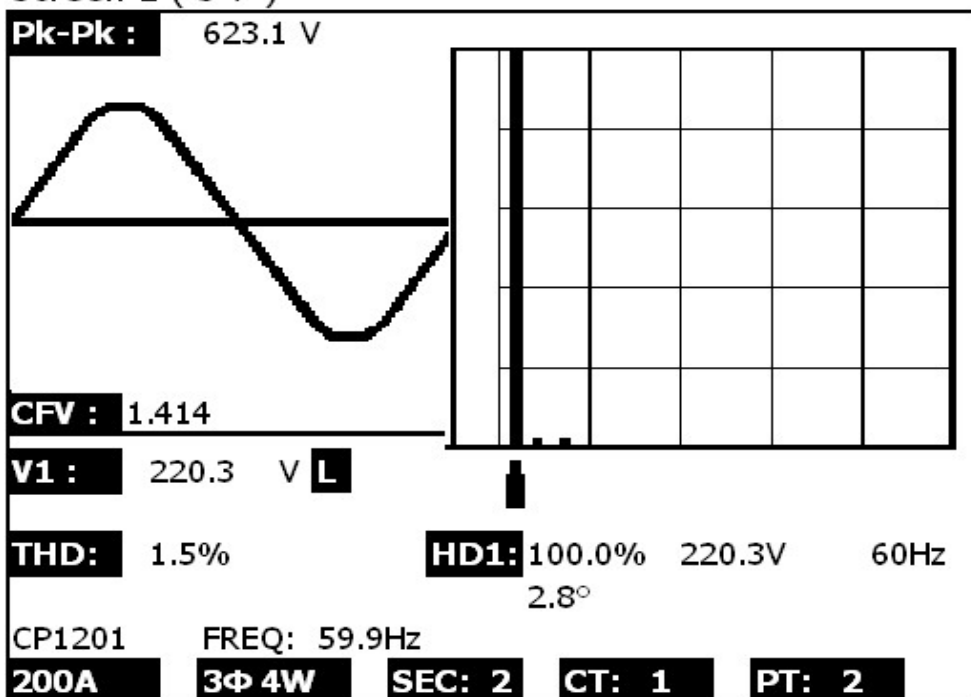| CP1201				
20A	3Φ4W	SEC: 2	CT: 1	PT: 1

5-6 ZERO adjustment for Watt Hour

If reset the " Exit key button " (3-8, Fig. 1) continuously
and > 6 seconds, the measurement value of " WH ", " SH ",
" QH " will reset to Zero value.
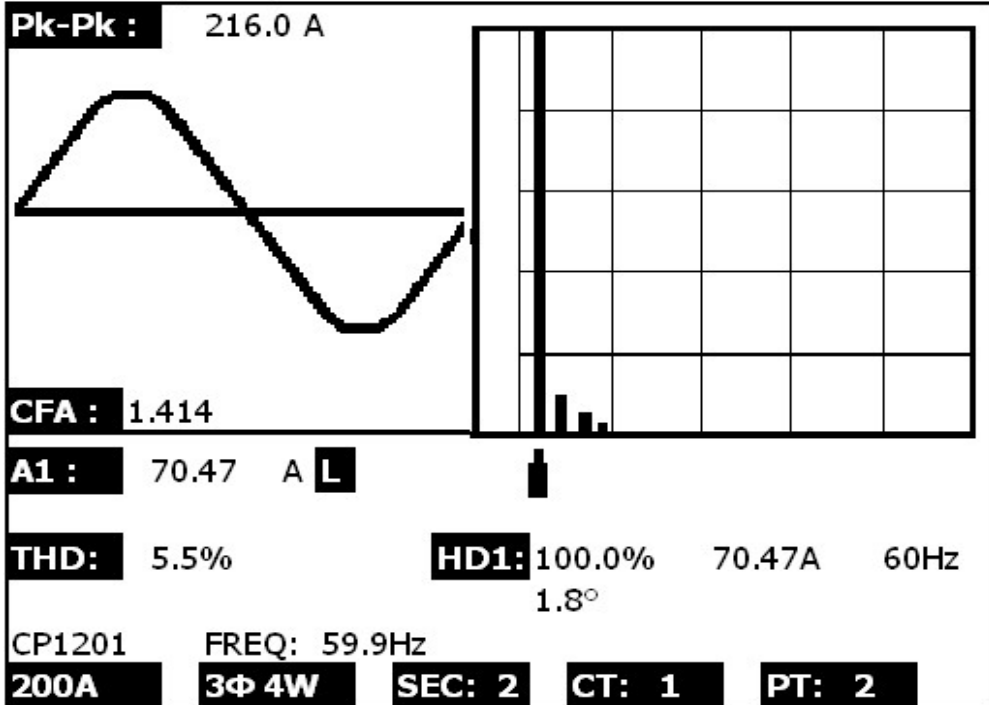
5-7 Harmonic Function Measurement

1) Press " Harmonic Key " (3-25, Fig. 1) will enter the Screen 1.
2) Press " V/A 1. 2. 3 Key " (3-27, Fig. 1) will enter the Screen 2.
3) If the wave show the distortion, Press " V/A range Key " (3-28, Fig. 1), switch to VH or AH to let the waveform not existing distortion as Screen 3, Screen 4.
4) Press " Left Key " (3-24, Fig. 1) or " Right Key " (3-26, Fig. 1) will show the voltage or current Nth harmonic value
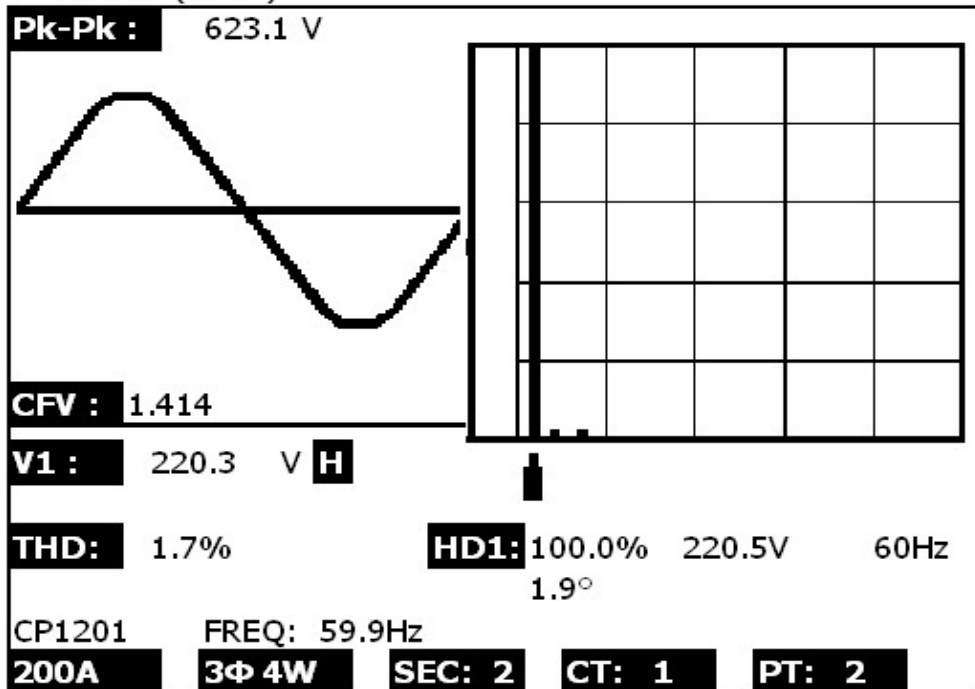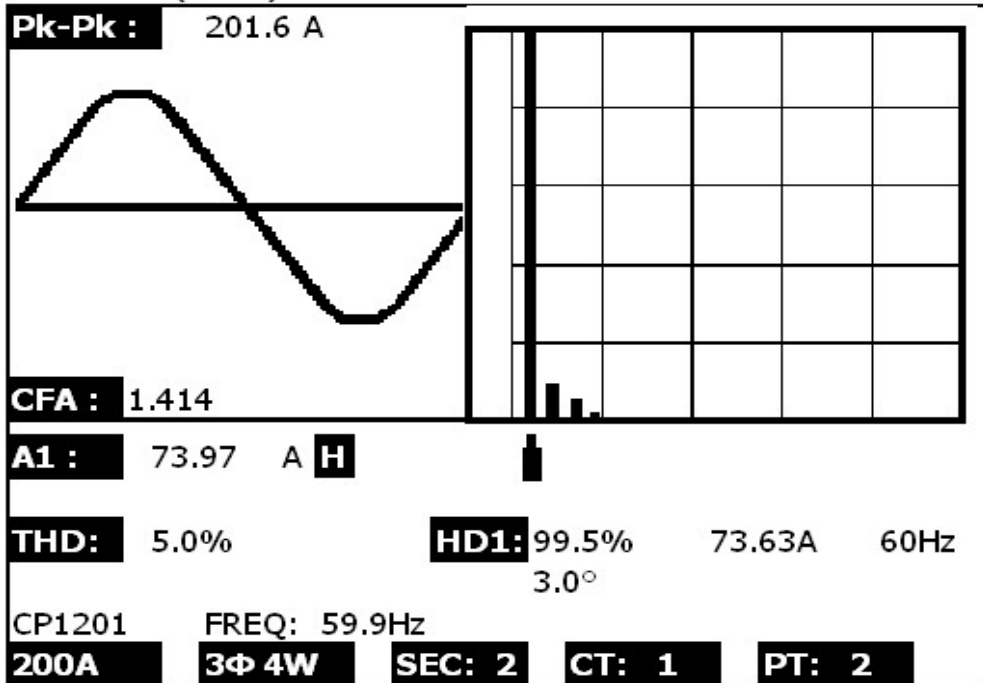
Screen 1 (5-7)

Screen 1 (5-7)

Pk-Pk :	623.1 V

CFV : 1.414

V1 :   220.3   V L

THD:	1.5%		HD1:	100.0%	220.3V	60Hz

2.8°

CP1201   FREQ: 59.9Hz

200A	3Φ 4W	SEC: 2	CT: 1	PT: 2

Screen 2（5-7）

Pk-Pk :	216.0 A

CFA : 1.414

A1 : 70.47 A **L**

THD: 5.5% HD1:100.0% 70.47A 60Hz
1.8°

CP1201 FREQ: 59.9Hz

200A **3Φ 4W** **SEC: 2** **CT: 1** **PT: 2**

Screen 3（5-7）

Pk-Pk :	623.1 V

CFV : 1.414

V1 : 220.3 V **H**

THD: 1.7% HD1:100.0% 220.5V 60Hz
1.9°

CP1201 FREQ: 59.9Hz

200A **3Φ 4W** **SEC: 2** **CT: 1** **PT: 2**

Screen 4 (5-7)

Pk-Pk :	201.6 A

CFA :	1.414

A1 :	73.97	A **H**

THD:	5.0%	HD1: 99.5%	73.63A	60Hz
		3.0°		

CP1201   FREQ: 59.9Hz

| 200A	3Φ 4W	SEC: 2	CT: 1	PT: 2

5-8 Graphic Phasor Diagram

1) Press " Phase Diagram Key " (3-30, Fig. 1) will display
   the phasor diagram as the Screen 1 (5-8).
   If the wrong phase sequence, will display the
   phasor diagram as the Screen 2 (5-8).
2) Description of phasor diagram :
   a. V1, V2, V3 :
      Phase voltages in phasor format with respect to V1.
      A1, A2, A3 :
      Line currents in phasor format with respect to A1.
   b. AVE :
      Average of the line voltages V12, V23 and V31
      an the line current A1, A2 and A3.
   c. AVn :
      Calculated voltage and current of neutral with respect
      to ground.

d. dV% :
   Historical maximum % value of
   (Max. (V1, V2, V3) - Min. (V1, V2, V3))/
   Min. (V1, V2, V3) * 100%
e. VUR :   Voltage unbalance ratio.

f. do2 (do, d2) :
   *   do - The first number is Zero Sequence Unbalance
       Ratio in % (d0) of voltage or current.
   *   d2 - The second number is the Negative Sequence
       Unbalance Ratio in % (d2) of voltage or current.
g. dA% :
   Historical maximum % value of
   (Max. (A1, A2, A3) - Min. (A1, A2, A3))/
   Min. (A1, A2, A3) * 100%
h. AUR :
   *Current unbalance ratio.*

Screen 1 (5-8)
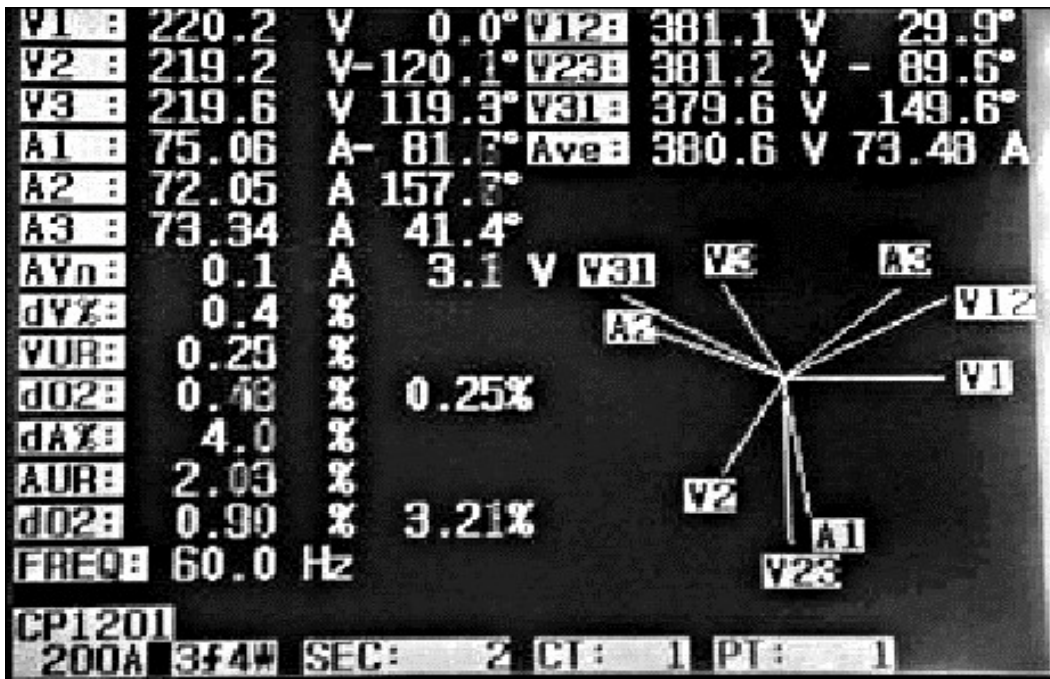
Screen 2 (5-8)
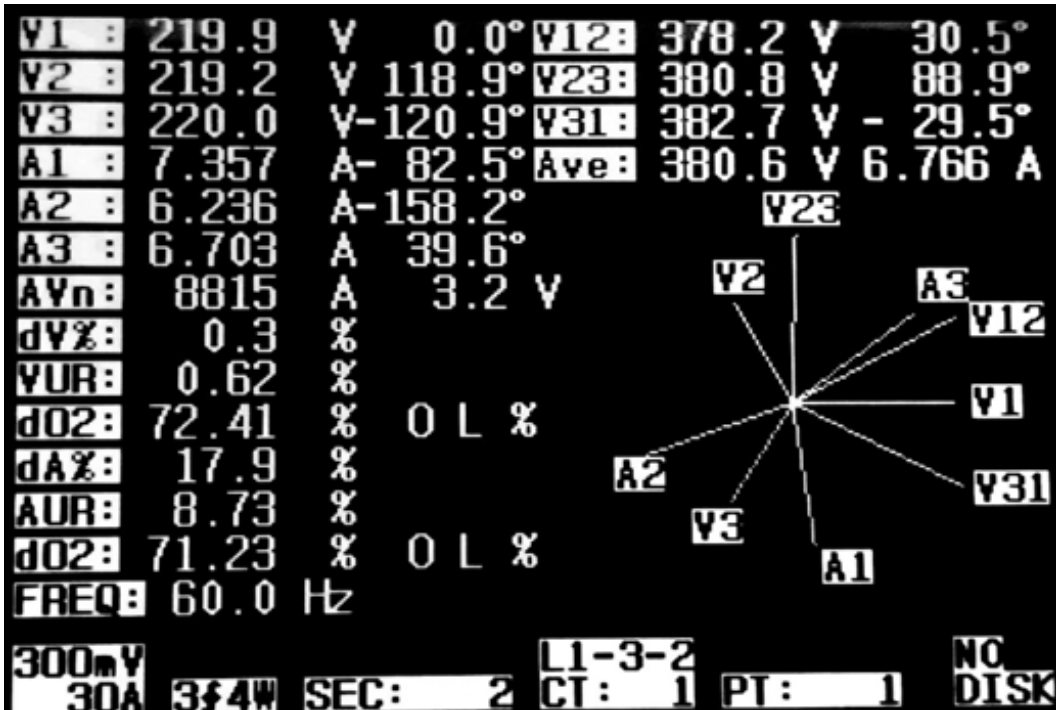
## 5-9 Voltage/Current Waveform

1) Press " Waveform Key " (3-31, Fig. 1) will enter to
   Voltage Waveform screen as Screen 1, then Press
   " 1Φ/3Φ Key " (3-2, Fig. 1) once in sequence
   will switch the Voltage waveform from V1 to V2, V3.

2) Press " Waveform Key " (3-31, Fig. 1) once again will
   enter to Current Waveform screen as Screen 2, then
   " 1Φ/3Φ Key " (3-2, Fig. 1) once in sequence
   will switch the Current waveform from A1 to A2, A3.

3) Press " Waveform Key " (3-31, Fig. 1) once again will
   enter to Voltage/Current Waveform screen as Screen 3,
   then press " 1Φ/3Φ Key " (3-2, Fig. 1) once in
   sequence will switch the Voltage/Current waveform
   from V1/A1 to V2/A2, V3/A3.

Screen 1 (5-9)
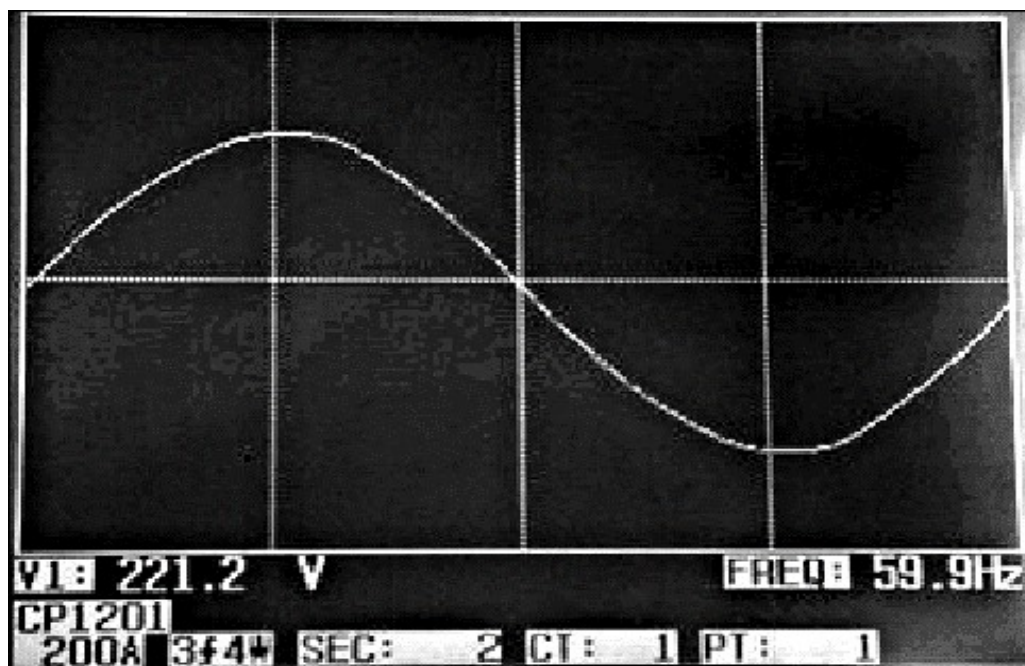
Screen 2 (5-9)

Screen 3 (5-9)
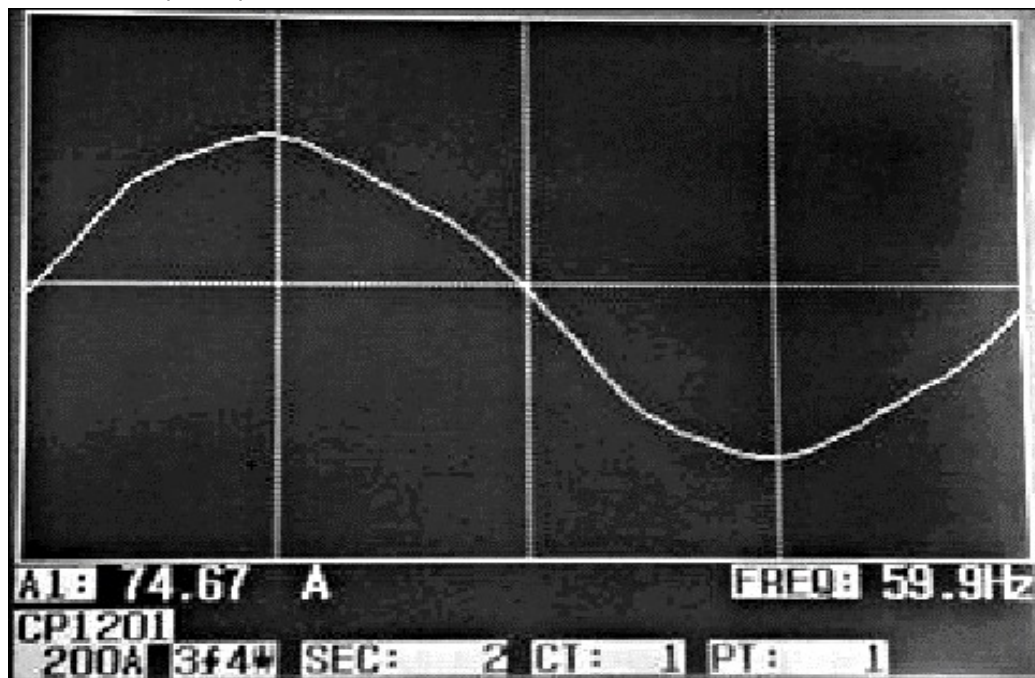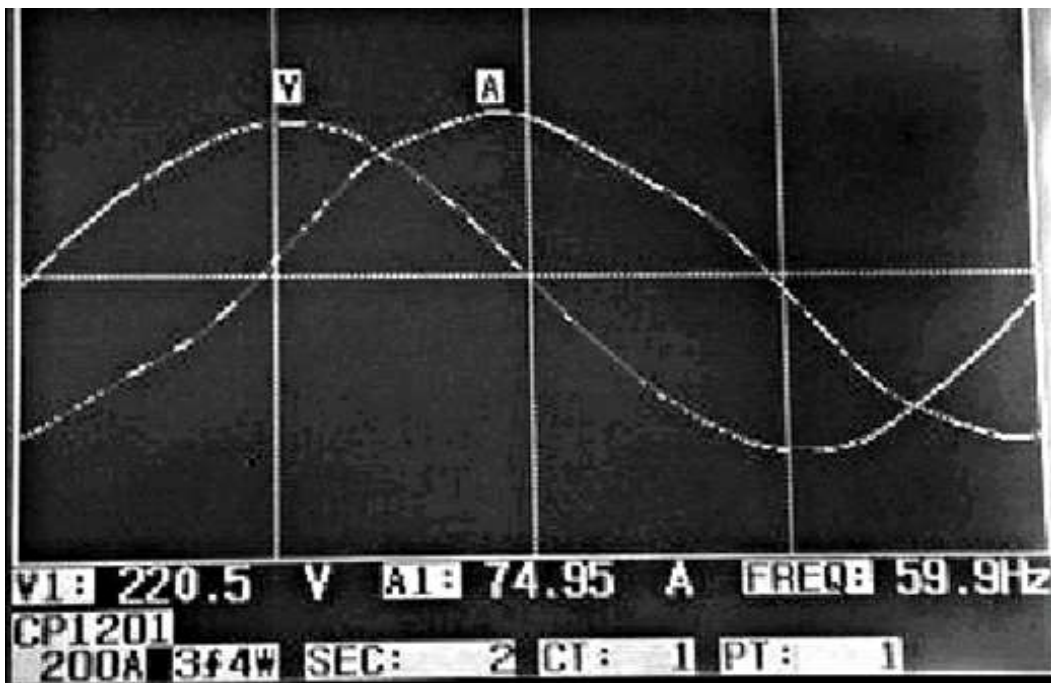
5-10 Transient Capture (Dips, Swells, Outage)

1) If intend to make the Transient Capture measurement it should set the transient voltage level (high level, low level) at first , the setting procedures, please refere to chapter 4-5-9 and chapter 4-5-10.

2) Press " Transient Key " (3-32, Fig. 1) will enter to Transient Capture screen, insert the SD memory card then press the " REC Button " (3-9, Fig. 1) will make the measurement, refer as the Screen 1

3) Definition :

   a. SWELL :

      $Vrms > (Vref + (Vref * SDVP\%))$

   b. DIP

      $Vrms < (Vref - (Vref * SDVP\%))$

   c. OUTAGE

      $Vrms < 30 V$ to $40 V.$

d. Line item :
     *   V is the code show the all phase V1, V2, V3 ever
         happen the transient event.
     *   V1, V2, V3 is the code that show each phase V1,
         V2, V3 ever happen the transient event.
     *   Refer to Screen 2.
 4) Press the " REC Button " will exit the Transient Capture
     function as Screen 3.
 5) One screen can show 13 transient events.
     One file can record 99 transient events.
     When the transient even more than 13 no, then
     press the " ▼ Button " , " ▲ Button " can show more
     transient events. If the transient events less than 13 no.,
     " ▼ Button " , " ▲ Button " are disable.

     Screen 1 (5-10)

     Remark :
     When press " 1Φ 3Φ Button " (3-2, Fig. 1) once in sequence,
     it can switch to the the transient measurement of different
     Wire connections such as 1P2W, 1P3W, 3P3W, 3P4W.

Screen 2 (5-10)

NO	DATE	TIME	LINE	STATUS
1	2011-03-01	10:12:09	V3	DIP-OUTAGE
2	2011-03-01	10:12:10	V3	DIP-OUTAGE
3	2011-03-01	10:13:21	V1	SWELL
4	2011-03-01	10:13:21	V	DIP
5	2011-03-01	10:13:22	V	DIP-OUTAGE
6	2011-03-01	10:13:30	V	DIP-OUTAGE
7	2011-03-01	10:13:41	V2	DIP
8	2011-03-01	10:13:41	V2	DIP-OUTAGE
9	2011-03-01	10:13:43	V2	SWELL

CP1201 REF: 220.0 V
200A 3∮4W SEC: 2 CT: 1 PT: 1 REC 9

Screen 3 (5-10)

NO	DATE	TIME	LINE	STATUS
1	2011-03-01	10:12:09	V3	DIP-OUTAGE
2	2011-03-01	10:12:10	V3	DIP-OUTAGE
3	2011-03-01	10:13:21	V1	SWELL
4	2011-03-01	10:13:21	V	DIP
5	2011-03-01	10:13:22	V	DIP-OUTAGE
6	2011-03-01	10:13:30	V	DIP-OUTAGE
7	2011-03-01	10:13:41	V2	DIP
8	2011-03-01	10:13:41	V2	DIP-OUTAGE
9	2011-03-01	10:13:43	V2	SWELL

CP1201 REF: 220.0 V
200A 3∮4W SEC: 2 CT: 1 PT: 1

5-11 Data Logger Function

Remark : Please do the following , then execution data logger function.

1. First connect the mains adaptor, with no batteries installed.

2. Check that the unit power on.

3. then install the batteries, as a backup in case there is a power failure during data logging.

4. After installing the battery, remove the adaptor and confirm that the meter action is normal after installing the battery. If no problem, connect the adaptor to the meter.

5. Then start data logging.

A : Press REC KEY once to start the data record function.

   A-1 : If the bottom right shows as " Change Card ", it indicates the memory space is already full either or the SD CARD exist some wrong.

   A-2 : If the SD CARD is normal, the data logger function will start to be executed.

V12:	0.0	V	V1:	0.0	V	A1:	0.00	A
V23:	0.0	V	V2:	0.0	V	A2:	0.00	A
V31:	0.0	V	V3:	0.0	V	A3:	0.00	A
P1:	-0.000 KW		S1:	0.000 KVA		Q1:	- 0.000 KVAR	
P2:	-0.000 KW		S2:	0.000 KVA		Q2:	- 0.000 KVAR	
P3:	-0.000 KW		S3:	0.000 KVA		Q3:	- 0.000 KVAR	
PΣ :	-0.000 KW		SΣ:	0.000 KVA		QΣ:	- 0.000 KVAR	
PF1:	- 0.00		PF2:	- 0.00		PF3:	- 0.00	
PFΣ:	0.00		PFH:	0.00				
Φ1:	- 0.0°		Φ2:	- 0.0°		Φ3:	- 0.0°	
WH:	0.000 KWH					SH:	0.000 KVAH	
QH:	0.000 KVARH					FREQ:	0.0 Hz	
CP1201								Change
20A		3Φ4W		SEC: 2		CT: 1	PT: 1	Card

B : The bottom right display will show the recorded data points.

   B-1 : Each file can record up to 30,000 data points as screen 1 when the record points exceed 30,000 points, system will create a new file automatically. (For example, WTA01001.XLS will be replaced by WTA01002.XLS)

   B-2 : While pressing REC KEY once, the data logger function will stop to execute, the record points will disappear on bottom right display as screen 2.

screen 1 (5-11 B)

V12:	0.0	V	V1:	0.0	V	A1:	0.00	A
V23:	0.0	V	V2:	0.0	V	A2:	0.00	A
V31:	0.0	V	V3:	0.0	V	A3:	0.00	A

P1:	-0.000 KW	S1:	0.000 KVA	Q1:	-	0.000 KVAR
P2:	-0.000 KW	S2:	0.000 KVA	Q2:	-	0.000 KVAR
P3:	-0.000 KW	S3:	0.000 KVA	Q3:	-	0.000 KVAR

PΣ :	-0.000 KW	SΣ:	0.000 KVA	QΣ:	-	0.000 KVAR
PF1:	- 0.00	PF2:	- 0.00	PF3:	-	0.00
PFΣ:	0.00	PFH:	0.00			
Φ1:	- 0.0°	Φ2:	- 0.0°	Φ3:	-	0.0°

WH:	0.000 KWH	SH:	0.000 KVAH
QH:	0.000 KVARH	FREQ:	0.0 Hz

CP1201   REC
20A   3Φ4W   SEC: 2   CT: 1   PT: 1   9

screen 2 (5-11 B)

V12:	0.0	V	V1:	0.0	V	A1:	0.00	A
V23:	0.0	V	V2:	0.0	V	A2:	0.00	A
V31:	0.0	V	V3:	0.0	V	A3:	0.00	A

P1:	-0.000 KW	S1:	0.000 KVA	Q1:	-	0.000 KVAR
P2:	-0.000 KW	S2:	0.000 KVA	Q2:	-	0.000 KVAR
P3:	-0.000 KW	S3:	0.000 KVA	Q3:	-	0.000 KVAR

PΣ :	-0.000 KW	SΣ:	0.000 KVA	QΣ:	-	0.000 KVAR
PF1:	- 0.00	PF2:	- 0.00	PF3:	-	0.00
PFΣ:	0.00	PFH:	0.00			
Φ1:	- 0.0°	Φ2:	- 0.0°	Φ3:	-	0.0°

WH:	0.000 KWH	SH:	0.000 KVAH
QH:	0.000 KVARH	FREQ:	0.0 Hz

CP1201
20A   3Φ4W   SEC: 2   CT: 1   PT: 1

5-12 Data HOLD Function

A: During the measurement, press HOLD KEY once, the bottom right display will show "HOLD symbol as screen 1.
B: Press the HOLD KEY once will disable the Data HOLD function and the "HOLD" symbol will disappear in the meantime

screen 1 (5-12)

V12:	0.0	V	V1:	0.0	V	A1:	0.00	A
V23:	0.0	V	V2:	0.0	V	A2:	0.00	A
V31:	0.0	V	V3:	0.0	V	A3:	0.00	A

P1:	-0.000 KW	S1:	0.000 KVA	Q1:	-	0.000 KVAR
P2:	-0.000 KW	S2:	0.000 KVA	Q2:	-	0.000 KVAR
P3:	-0.000 KW	S3:	0.000 KVA	Q3:	-	0.000 KVAR

PΣ :	-0.000 KW	SΣ:	0.000 KVA	QΣ:	-	0.000 KVAR
PF1:	- 0.00	PF2:	- 0.00	PF3:	-	0.00
PFΣ:	0.00	PFH:	0.00			
Φ1:	- 0.0°	Φ2:	- 0.0°	Φ3:	-	0.0°

WH:	0.000 KWH	SH:	0.000 KVAH
QH:	0.000 KVARH	FREQ:	0.0 Hz

CP1201 20A	3Φ4W	SEC: 2	CT: 1	PT: 1	HOLD

←

screen 2 (5-12)

V12:	0.0	V	V1:	0.0	V	A1:	0.00	A
V23:	0.0	V	V2:	0.0	V	A2:	0.00	A
V31:	0.0	V	V3:	0.0	V	A3:	0.00	A

P1:	-0.000 KW	S1:	0.000 KVA	Q1:	-	0.000 KVAR
P2:	-0.000 KW	S2:	0.000 KVA	Q2:	-	0.000 KVAR
P3:	-0.000 KW	S3:	0.000 KVA	Q3:	-	0.000 KVAR

PΣ :	-0.000 KW	SΣ:	0.000 KVA	QΣ:	-	0.000 KVAR
PF1:	- 0.00	PF2:	- 0.00	PF3:	-	0.00
PFΣ:	0.00	PFH:	0.00			
Φ1:	- 0.0°	Φ2:	- 0.0°	Φ3:	-	0.0°

WH:	0.000 KWH	SH:	0.000 KVAH
QH:	0.000 KVARH	FREQ:	0.0 Hz

CP1201 20A	3Φ4W	SEC: 2	CT: 1	PT: 1

5-13 BACKLIGHT KEY
Depending on the brightness of the environment, can choose from 3rd-order LCD Backlight brightness.

5-14 A Range (Current Range) KEY function
a) The A Range (Current Range) function key is used to change the current range quickly.
b) Press A RANGE KEY once will entry to screen as following " screen 1 (5-14) " , it is the same screen as " screen 2 (4-5-13) , page 38 ".
c) The detail Current range Setting procedures, please refer to section " 4-5-13 A range Setting (Current range Setting), page 37 "

Remark :
The function of the " A Range (Current Range) key " is available for the Clamp Type, A Range, V Range setting only.

screen 1 (5-14)

Folder Name: WTA01			**SETUP**
File Name: 3P401001.XLS			
REC Date: 2008-11-28 00:03:17			
Sampling Time: 2	Trans Ref :	220.0 V	
Delete File: 0 %	SDVP	10%	0
SD Format: 0 %	Decimal:	Basic	
Use Size: 388 KB	Clamp Type:		CP1201
Free Size: 1946 MB	**A Range:**		200A
Total Size: 1946 MB	V Range:	200mV	
	RS232 Out Sel:		
PT: 1 : 1	V1	I1	P1
CT: 1 : 1	S1	Q1	PF1
Beep: ON	Φ1	FREQ	

Year	Month	Date	Hour	Minute	Second
2010	11	13	14	37	25

5-15 The LOWBAT screen: as show on lower right display of the following screen.

V12:	0.0	V	V1:	0.0	V	A1:	0.00	A
V23:	0.0	V	V2:	0.0	V	A2:	0.00	A
V31:	0.0	V	V3:	0.0	V	A3:	0.00	A

P1:	-0.000 KW	S1:	0.000 KVA	Q1:	-	0.000 KVAR
P2:	-0.000 KW	S2:	0.000 KVA	Q2:	-	0.000 KVAR
P3:	-0.000 KW	S3:	0.000 KVA	Q3:	-	0.000 KVAR

PΣ :	-0.000 KW	SΣ:	0.000 KVA	QΣ:	-	0.000 KVAR
PF1:	- 0.00	PF2:	- 0.00	PF3:	-	0.00
PFΣ:	0.00	PFH:	0.00			
Φ1:	- 0.0°	Φ2:	- 0.0°	Φ3:	-	0.0°

WH:	0.000 KWH	SH:	0.000 KVAH
QH:	0.000 KVARH	FREQ:	0.0 Hz

CP1201				LOWBAT
20A	3Φ4W	SEC: 2	CT: 1	PT: 1

←

Remark:
* During power on , when battery voltage < 7.0 V , the power analyzer
 meter will show as 5-15 The LOWBAT screen .

* During power off ,press power button want to power on the meter,
  if the battery voltage < 7.0 V , the power analyzer meter will auto
  power off again.

* When the meter is turned on the screen stops and cannot
  continue, At this time, please check the battery power,
  If not enough 7.0 V, please replace the battery.

5-16 Appendix 1

* V12, V23, V31 : Line Voltage
* V1, V2, V3 : Phase Voltage
* A1, A2, A3 : Line Current
* P1, P2, P3 : True Power of each phase. (W)
* S1, S2, S3 : Apparent Power of each phase. (VA)
* Q1, Q2, Q3 : Reactive Power of each phase (VAR)
* PΣ: Total True Power (W)
* SΣ: Total Apparent Power (VA)
* QΣ: Total Reactive Power (VAR)
* PF1, PF2, PF3 : Power Factor of each phase
* PFΣ : Total Power Factor
* PFH : Long Term Average Power Factor (WH/SH)
* Φ1, Φ2, Φ3 : Phase Angle of each phase
* WH : Watt Hour
* SH : Apparent Power Hour
* QH : Reactive Power Hour
* 1Φ2W : One phase by two wires
* 1Φ3W : One phase by three wires
* 3Φ3W : Three phases by three wires
* 3Φ4W : Three phases by four wires
* SEC : The sampling time of data logger
* CT : Current transformer
* PT : Potential transformer

6. MAINTENANCE
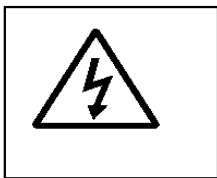
Caution : *Remove test leads before opening the battery cover or housing case !*

6-1 Cleaning
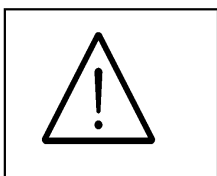
Caution : *Cleaning - Only use the dry cloth to clean the plastic case !*

6-2 Replacement of batteries

1) When Display show the " LOWBAT " indicator (ref. 5-15 page 67), it should change the batteries.
2) open the " Battery Cover " (3-19, Fig. 1) away from the instrument and remove the battery.
3) Replace with batteries (DC 1.5V, AA/UM-3 battery X 8 PCs) and reinstate the cover.

   * When install the batteries, should make attention the battery polarity.
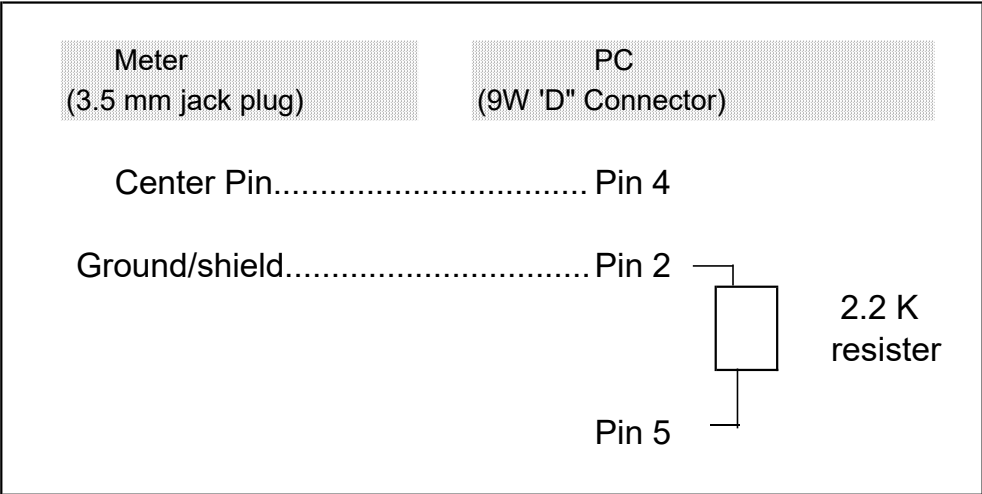
4) Make sure the battery cover is secured after changing the batteries.

7. RS232 PC SERIAL OUTPUT

The instrument is provided an 3.5 mm dia. phone socket (3-16, Fig. 1) for RS232 computer interface socket.

The connector output is a 16 digits data stream which can be utilized to the user's specific application.

A RS232 lead with the following connection will be required to link the instrument with the PC serial input.

Meter (3.5 mm jack plug)	PC (9W 'D" Connector)
Center Pin.................................. Pin 4	
Ground/shield................................Pin 2	

2.2 K resister

Pin 5

The 16 digits data stream will be displayed in the following format :

D15 D14 D13 D12 D11 D10 D9 D8 D7 D6 D5 D4 D3 D2 D1 D0

Each digit indicate the following status :

D15	Start Word		
D14	4		
D13	1 CH = 1	2 CH = 1 to 2	3 CH = 1 to 3
	4 CH = 1 to 4	5 CH = 1 to 5	6 CH = 1 to 6
	7 CH = 1 to 7	8 CH = 1 to 8	9 CH = 1 to 9
D12 & D11	Annunciator for Display		
	03=%	B9 = MACA	D0 = MW/Hr
	31=HZ	C0 = MW	D1 = GW/Hr
	32=DEGREE	C1 = GW	D2 = TW/Hr
	48=K WATT	C2 = TW	D3 = KVA/Hr
	50=ACV	C3 = MVA	D4 = MVA/Hr
	52=ACA	C4 = GVA	D5 = GVA/Hr
	64=KVA	C5 = TVA	D6 = TVA/Hr
	65=KW/HR	C6 = KVAR	D7 = KVAR/Hr
	B6 = KACV	C7 = MVAR	D8 = MVAR/Hr
	B7 = MACV	C8 = GVAR	D9 = GVAR/Hr
	B8 = KACA	C9 = TVAR	E0 = TVAR/Hr
D10	Polarity 0 = Positive 1 = Negative		
D9	Decimal Point(DP), position from right to the left 0 = No DP, 1= 1 DP, 2 = 2 DP, 3 = 3 DP		
D8 to D1	Display reading, D1 = LSD, D8 = MSD For example : If the display reading is 1234, then D8 to D1 is : 00001234		
D0	End Word		

RS232 setting

Baud rate	9600
Parity	No parity
Data bit no.	8 Data bits
Stop bit	1 Stop bit

8. Download the saving data from the SD card to the computer (EXCEL software)

1) After execute the Data Logger function, take away the SD card out from the " SD card socket " (3-15, Fig. 1).

2) Plug in the SD card into the Computer's SD card slot (if your computer build in this installation) or insert the SD card into the " SD card adapter ". then connect the " SD card adapter " into the computer.

3) Power ON the computer and run the " EXCEL software ". Down load the saving data file (for example the file name : 3P401001.XLS, 1P201001.XLS, 1P301001.XLS, 3P301001.XLS........) from the SD card to the computer. The saving data will present into the EXCEL software screen (for example as following EXCEL data screens) , then user can use those EXCEL data to make the further Data or Graphic analysis usefully.

EXCEL data screen 1 (for example)

	A	B	C	D	E	F	G	H	I	J	K	L
											K21	
1	Position	Date	Time	V12	Unit	V23	Unit	V31	Unit	V1	Unit	V2
2	0	2009/1/14	08:58:53	0	ACV	0	ACV	0	ACV	0	ACV	0
3	0	2009/1/14	08:58:55	0	ACV	0	ACV	0	ACV	0	ACV	0
4	0	2009/1/14	08:58:57	0	ACV	0	ACV	0	ACV	0	ACV	0
5	0	2009/1/14	08:58:59	0	ACV	0	ACV	0	ACV	0	ACV	0
6	0	2009/1/14	08:59:01	0	ACV	0	ACV	0	ACV	0	ACV	0
7	0	2009/1/14	08:59:03	0	ACV	0	ACV	0	ACV	0	ACV	0
8	0	2009/1/14	08:59:05	0	ACV	0	ACV	0	ACV	0	ACV	0
9	0	2009/1/14	08:59:07	0	ACV	0	ACV	0	ACV	0	ACV	0
10	0	2009/1/14	08:59:09	0	ACV	0	ACV	0	ACV	0	ACV	0
11	0	2009/1/14	08:59:11	0	ACV	0	ACV	0	ACV	0	ACV	0
12												
13												

EXCEL data screen 2 (for example)

	N	O	P	Q	R	S	T	U	V	W	X	Y
1	V3	Unit	A1	Unit	A2	Unit	A3	Unit	P1	Unit	P2	Unit
2	0	ACV	0	ACA	0	ACA	0	ACA	0	KW	0	KW
3	0	ACV	0	ACA	0	ACA	0	ACA	0	KW	0	KW
4	0	ACV	0	ACA	0	ACA	0	ACA	0	KW	0	KW
5	0	ACV	0	ACA	0	ACA	0	ACA	0	KW	0	KW
6	0	ACV	0	ACA	0	ACA	0	ACA	0	KW	0	KW
7	0	ACV	0	ACA	0	ACA	0	ACA	0	KW	0	KW
8	0	ACV	0	ACA	0	ACA	0	ACA	0	KW	0	KW
9	0	ACV	0	ACA	0	ACA	0	ACA	0	KW	0	KW
10	0	ACV	0	ACA	0	ACA	0	ACA	0	KW	0	KW
11	0	ACV	0	ACA	0	ACA	0	ACA	0	KW	0	KW
12												
13												

EXCEL data screen 3 (for example)

	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK
1	P3	Unit	P(SUM)	Unit	S1	Unit	S2	Unit	S3	Unit	S(SUM)	Unit
2	0	KW	0	KW	0	KVA	0	KVA	0	KVA	0	KVA
3	0	KW	0	KW	0	KVA	0	KVA	0	KVA	0	KVA
4	0	KW	0	KW	0	KVA	0	KVA	0	KVA	0	KVA
5	0	KW	0	KW	0	KVA	0	KVA	0	KVA	0	KVA
6	0	KW	0	KW	0	KVA	0	KVA	0	KVA	0	KVA
7	0	KW	0	KW	0	KVA	0	KVA	0	KVA	0	KVA
8	0	KW	0	KW	0	KVA	0	KVA	0	KVA	0	KVA
9	0	KW	0	KW	0	KVA	0	KVA	0	KVA	0	KVA
10	0	KW	0	KW	0	KVA	0	KVA	0	KVA	0	KVA
11	0	KW	0	KW	0	KVA	0	KVA	0	KVA	0	KVA
12											
13											

EXCEL data screen 4 (for example)

	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW
1	Q1	Unit	Q2	Unit	Q3	Unit	Q(SUM)	Unit	PF1	Unit	PF2	Unit
2	0	KVAR	0	KVAR	0	KVAR	0	KVAR	0		0	
3	0	KVAR	0	KVAR	0	KVAR	0	KVAR	0		0	
4	0	KVAR	0	KVAR	0	KVAR	0	KVAR	0		0	
5	0	KVAR	0	KVAR	0	KVAR	0	KVAR	0		0	
6	0	KVAR	0	KVAR	0	KVAR	0	KVAR	0		0	
7	0	KVAR	0	KVAR	0	KVAR	0	KVAR	0		0	
8	0	KVAR	0	KVAR	0	KVAR	0	KVAR	0		0	
9	0	KVAR	0	KVAR	0	KVAR	0	KVAR	0		0	
10	0	KVAR	0	KVAR	0	KVAR	0	KVAR	0		0	
11	0	KVAR	0	KVAR	0	KVAR	0	KVAR	0		0	
12												
13												

EXCEL data screen 5 (for example)

	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW
1	Q1	Unit	Q2	Unit	Q3	Unit	Q(SUM)	Unit	PF1	Unit	PF2	Unit
2	0	KVAR	0	KVAR	0	KVAR	0	KVAR	0		0	
3	0	KVAR	0	KVAR	0	KVAR	0	KVAR	0		0	
4	0	KVAR	0	KVAR	0	KVAR	0	KVAR	0		0	
5	0	KVAR	0	KVAR	0	KVAR	0	KVAR	0		0	
6	0	KVAR	0	KVAR	0	KVAR	0	KVAR	0		0	
7	0	KVAR	0	KVAR	0	KVAR	0	KVAR	0		0	
8	0	KVAR	0	KVAR	0	KVAR	0	KVAR	0		0	
9	0	KVAR	0	KVAR	0	KVAR	0	KVAR	0		0	
10	0	KVAR	0	KVAR	0	KVAR	0	KVAR	0		0	
11	0	KVAR	0	KVAR	0	KVAR	0	KVAR	0		0	
12												
13												

EXCEL data screen 6 (for example)

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|	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS	BT	BU
1	WH	Unit	SH	Unit	QH	Unit	FREQ	Unit				
2	0	KWH	0	KVAH	0	KVARE	0	Hz				
3	0	KWH	0	KVAH	0	KVARE	0	Hz				
4	0	KWH	0	KVAH	0	KVARE	0	Hz				
5	0	KWH	0	KVAH	0	KVARE	0	Hz				
6	0	KWH	0	KVAH	0	KVARE	0	Hz				
7	0	KWH	0	KVAH	0	KVARE	0	Hz				
8	0	KWH	0	KVAH	0	KVARE	0	Hz				
9	0	KWH	0	KVAH	0	KVARE	0	Hz				
10	0	KWH	0	KVAH	0	KVARE	0	Hz				
11	0	KWH	0	KVAH	0	KVARE	0	Hz				
12												
13												

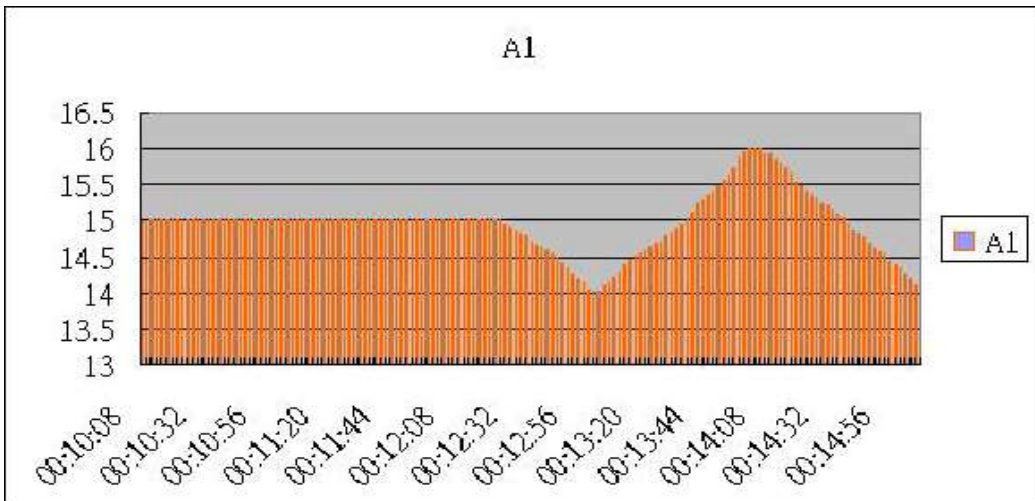EXCEL graphic screen 1 (for example)

74
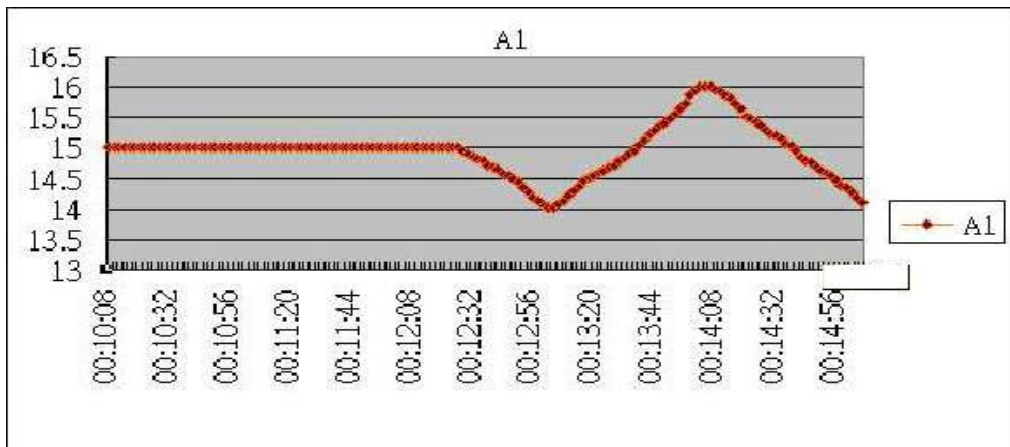
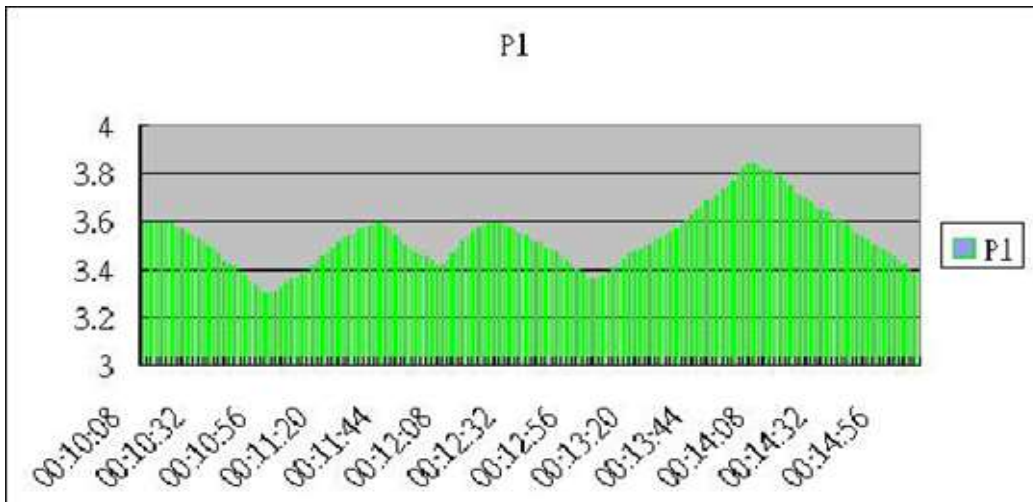EXCEL graphic screen 2 (for example)
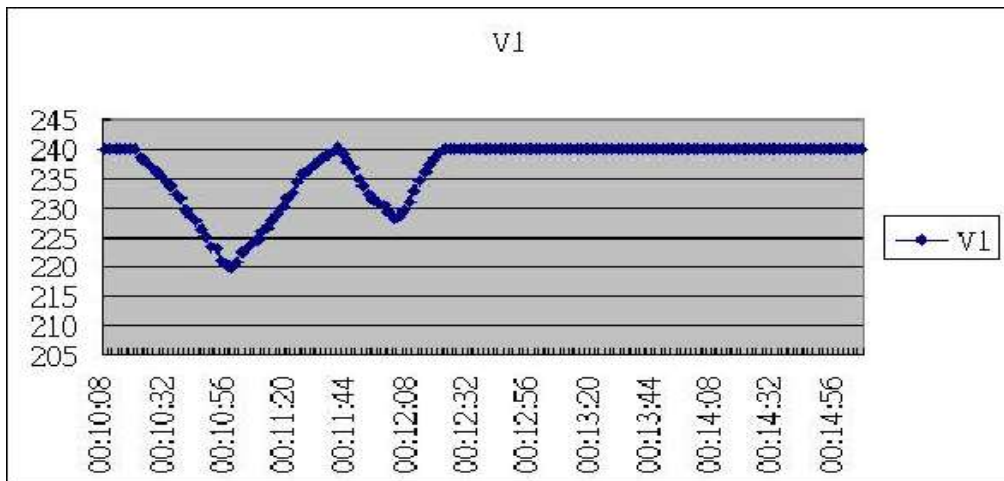
EXCEL graphic screen 3 (for example)
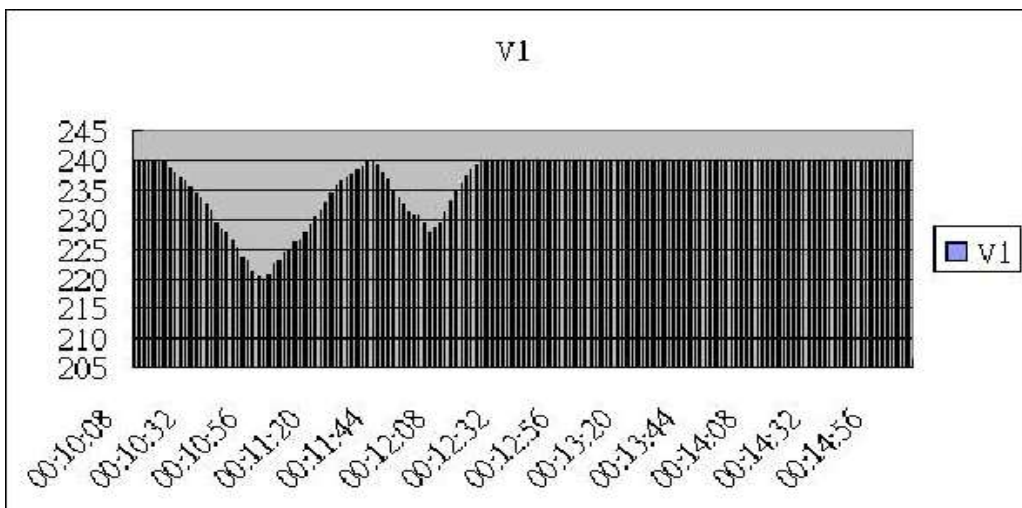
EXCEL graphic screen 4 (for example)
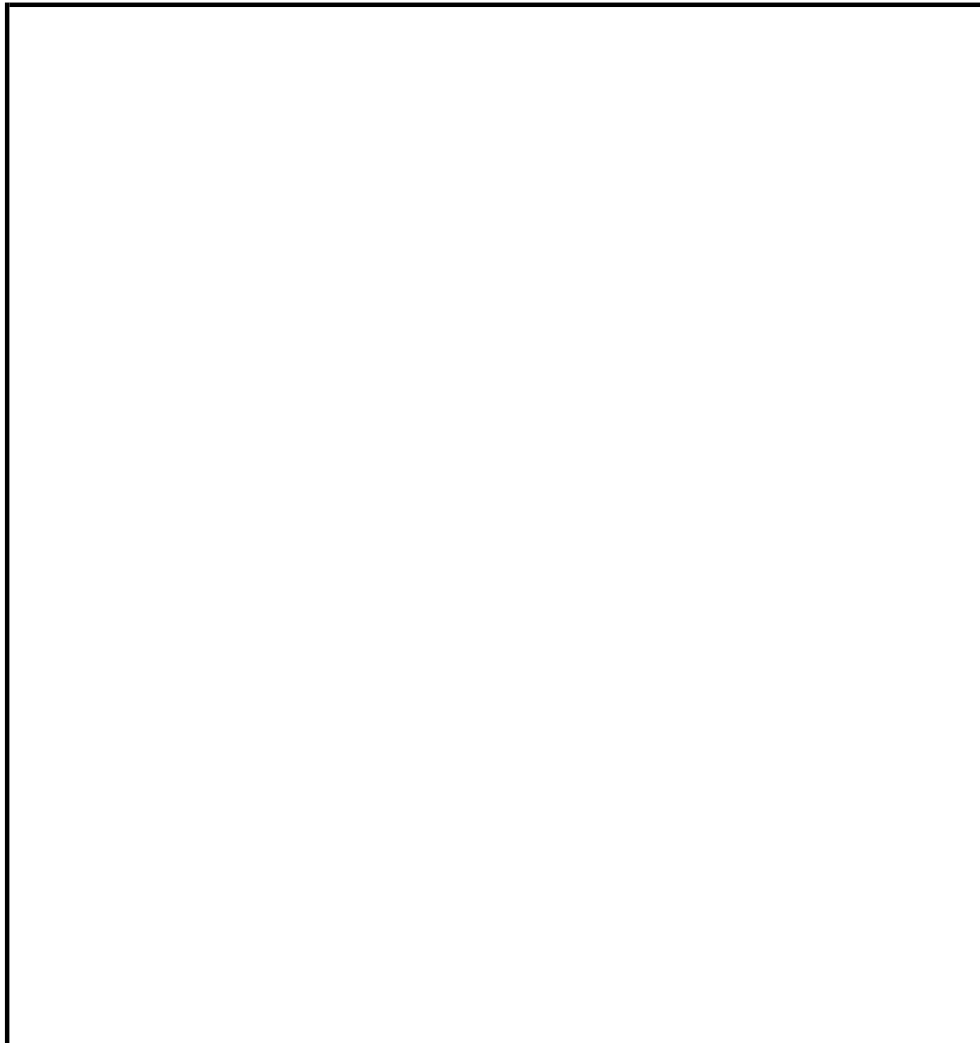

EXCEL graphic screen 5 (for example)

9. PATENT

The meter (SD card structure) already get patent or patent pending in following countries :

Germany	Nr. 20 2008 016 337.4
JAPAN	3151214
CHINA	ZL 2008 2 0189918.5
	ZL 2008 2 0189917.0
USA	Patent pending

10. THE ADDRESS OF AFTER SERVICE CENTER

Hagavish st. Israel 58817 Tel: 972 3 5595252, Fax: 972 3 5594529   mrc@mrclab.com

MRC.9.22