micro SD card real time data logger

CLAMP POWER ANALYZER

Model : PC-6011SD



Your purchase of this CLAMP POWER ANALYZER with micro SD CARD DATA LOGGER marks a step forward for you into the field of precision measurement. Although this meter 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

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 !



* Double insulation

Environment Conditions

* *Installation Categories III-1000V , IV-600V*
* *Pollution Degree 2.*
* *Altitude up to 2000 meters.*
* *Indoor use.*
* *Relative humidity 80% max.*

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1 FEATURES

* Power quality analyzer for single-phase or balanced three-phase system.
* Voltage and Current are the True RMS value.
* ACV input impedance is 10 Mega ohms.
* True Power(KW、MW、GW) measurement.
* Apparent Power (KVA、MVA、GVA) measurement.
* Reactive Power (KVAR、MVAR、GVAR) measurement.
* Power Factor (PF)、Phase Angle (ϕ) measurement.
* Energy(KWh、KVAh、KVARh、PFh) measurement.
* Voltage measurement range: 10 to 600 ACV
* Current measurement range: 0.5 to 2000 ACA
* Graphic Phasor Diagram.
* Voltage and Current harmonic analysis (1-50th order).
* Voltage and Current Total Harmonic Distortion analysis (THD) measurement.
* Voltage and Current waveforms show.
* Peak-to-Peak voltage and current measurement.
* Capture Transient events (including Dip, Swell and Outage) with programmable threshold (%).
* Thermocouple Temp. sensor:Type K(-100.0℃~199.9℃/200℃~1300℃),℃/℉.
* Programmable PT ratio (1 to 1000).
* Safety Standard : IEC 1010, CAT IV 600V.
* Built-in clock and Calendar, real time data record with micro SD memory card , sampling time set from 2 to 7200 seconds. Just slot in the micro SD card into the computer, it can down load the all the measured value with to the Excel directly, then user can make the further data analysis by themselves.
* micro SD CARD 32 GB maximum supported capacity.
* Powered by AA (UM-3) DC 1.5 V X 2 batteries (Alkaline type) or DC 9V adapter. (linear 110V / 220V)
* Computer data output, can cooperate with optional USB Cable/USB-01, RS232 cable/UPCB-02 and Data Acquisition software, SW-U811-WIN.
* Optional type K probe: TP-11.

2. SPECIFICATIONS

2-1. General Specifications:

Circuit	Custom single-chip microprocessor LSI circuit
Display LCD Size	54.6 X 32.0 mm (2.15 X 1.26 ") Dot Matrix backlit LCD (128 X 64 pixels)
Measurements	ACV,ACA KW / KVA / KVAR / PF / KWH / KVAH / KVARH / PFH Power factor Phase angle Frequency Harmonics display Temperature
Wire configurations	1 Phase, 3 Phase
Voltage ranges	10 ACV to 600 ACV (Auto Range)
Current ranges	0.5 ACA to 2000 ACA (Auto Range)
Safety standard	IEC1010 CAT IV 600 V
ACV input impedance	10M ohms
Clamp frequency response	40 Hz to 1 KHz
Tested clamp	45 to 65 Hz
Over-load protection	ACV 720 ACV RMS ACA 2100 ACA with clamp probe
Over-range	* LCD display show " OL ". * The data save into the micro SD card will show " 9999 " or " 999 " (overleap the decimal point).
Data Hold	Freezes displayed reading
Data Recording	micro SD memory card
Sampling Time(LCD)	Approx. 1 second
Datalogger	* Real time data logger, saved the data into micro 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. * When the system detects micro SD format does not match with the machine that will be mandatory for reformatting to ensure that data records can be normal. * 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	80% Relative Humidity max.
Power Supply	* DC 1.5V, AA (UM-3) Battery X 2 PCs (Alkaline or heavy-duty battery).
	* AC to DC 9V power adapter.(linear 110V / 220V)
Power Consumption	60 mA DC
Max. Conductor size	Clamp can accommodate up to 2.0" (50 mm) diameter
Weight	595 g (meter only)
Dimensions	11.0 X 4.2 X 1.9" (280 X 106 X 47mm)
	Clamp Jaw: 2,0" (50 mm)
Accessories Included	Instruction manual..... 1 PC Test Leads..... 1 Set Alligator clips..... 1 Set AC to DC 9V adapter (linear 110V / 220V)..... 1 PC micro SD card (8 G)..... 1 PC Soft Carrying case (CA-05B)..... 1 PC

2-2. Electrical Specifications (23±5 ℃):

ACV: Peak to Peak (Rms Value >20 V), Crest Factor < 4

Range	Resolution	Accuracy
10 to 600 V(RMS)	0.1V	±(0.5% reading +3d)
Peak to Peak		±(5% reading+30d)

ACA: Peak to Peak (Rms Value > 20 A), Crest Factor < 4

Range	Resolution	Accuracy
5.00A to 2000A	0.01A < 100A	±(1% reading+ 0.5 A) ≦ 200A
	100A ≦ 0.1A < 1000A	±(1% reading+ 5 A) > 200A
Peak to Peak	1A ≧ 1000A	±(5% reading+30d)

* When measurement range < 5 A , the Accuracy for reference only

Power factor: ACV > 10V,ACA ≧ 5A

Range	Resolution	Accuracy
0.000 to 1.000	0.001	±0.04

* When measurement range < 5 A , the Accuracy for reference only

∮(Phase angle):

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

* When measurement range < 5 A , the Accuracy for reference only

Frequency:

Range	Resolution	Accuracy
45 to 65 Hz	0.1 Hz	±0.2 Hz

Active/Apparent/Reactive POWER:PF 0.1~1.0 , PT = 1, ACV >10V,ACA ≧ 5 A

Range	Resolution	Accuracy
0.0 to 9.999M (W/VA/VAR)	0.1-0.001M(W/VA/VAR)	± (1.5% reading+20d)

* When measurement range < 5 A , the Accuracy for reference only

Active/Apparent/Reactive POWER Hour:(WH/SH/QH):

Range	Resolution	Accuracy
0.000K to 9.999M (WH/VAH/VARH)	0.001K-0.001M(W/VA/VAR)H	± (1.5% reading+20d)

* When measurement range < 5 A , the Accuracy for reference only

Harmonics Magnitude: ACV > 80V,ACA > 20A

Function	Range	Resolution	Accuracy
ACV	1 ~20 th	0.1V	±(2% reading+5d)
	21 ~50 th		±(4% reading+5d)
ACA	1 ~20 th	0.01A < 100A	±(2% reading+5d)
	21 ~50 th	100A ≦0.1A <1000A 1A ≧ 1000A	±(4% reading+5d)

Harmonics Percentage :ACV > 80V,ACA > 20A

Function	Range	Resolution	Accuracy
ACV	1 ~20 th	0.1%	±(2% reading+10d)
	21 ~50 th		±(4% reading+20d)
ACA	1 ~20 th		±(2% reading+10d)
	21 ~50 th		±(4% reading+20d)

Total Harmonic Distortion: ACV > 80V, ACA > 20A

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

Type K Temperature

Range	Resolution	Accuracy
-100.0 ℃ to 199.9 ℃	0.1℃	±(1% reading+1℃)
200 ℃ to 1300 ℃	1℃	±(1% reading+2℃)
-148.0℉ to 391.9℉	0.1℉	±(1% reading+1.8℉)
392℉ to 2372℉	1℉	±(1% reading+4℉)

3. FRONT PANEL DESCRIPTION

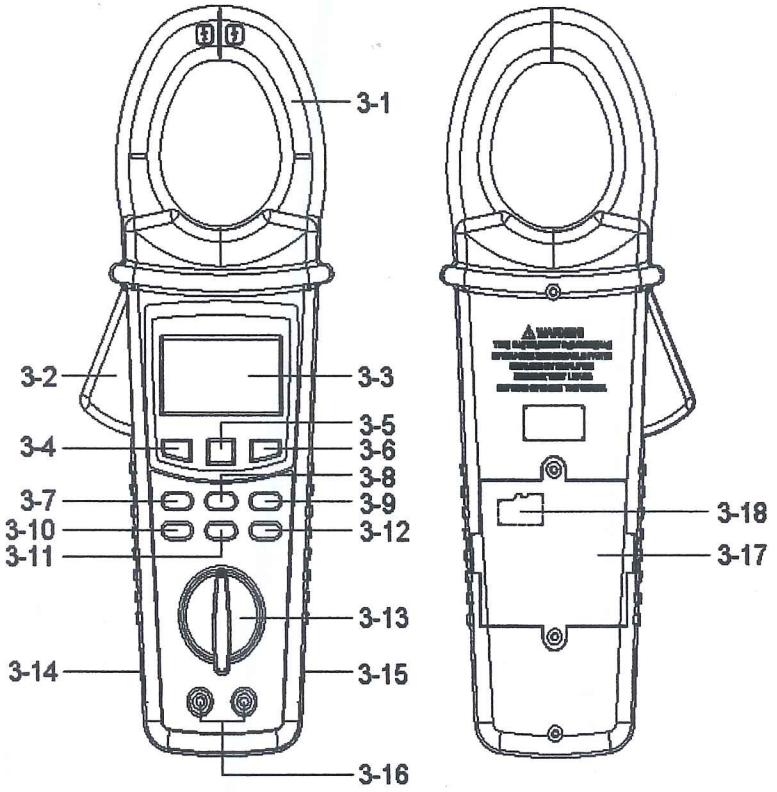


Fig.1

3-1 Current Sense Jaws
3-2 Trigger
3-3 Display
3-4 FUNC key button
3-5 HOLD key button
3-6 REC key button
3-7 SETUP(ENTER) key button
3-8 ▲ key button
3-9 EXIT(✱) key button
3-10 ◄ key button
3-11 ▼ key button
3-12 ► key button
3-13 Function rotary switch
3-14 RS232 socket
3-15 DC 9V power adapter socket
3-16 Voltage input terminals
3-17 Battery Cover/Battery compartment
3-18 micro SD card socket

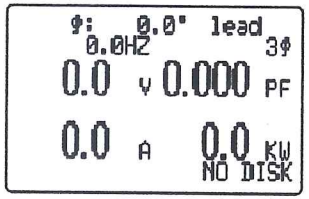
4. MEASURING PREPARATION

4-1. The original screen

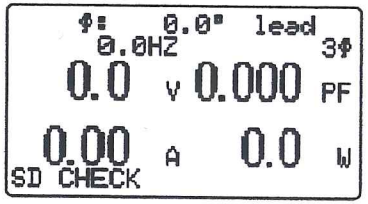


4-2. Entry the measurement Screen

SCREEN 1(4-2)



SCREEN 2(4-2)



1) When the bottom right corner "NO DISK" and showed flashing, it indicates the SD CARD is not inserted (as SCREEN 1)
2) The bottom left display of screen 2 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.

4-3. The summary description of keyboard

1) Function Rotary switch(3-13,Fig.1):Select the measurement function rotary switch.
2) FUNC KEY (3-4,Fig.1): Press the key to select the screen display.
3) HOLD KEY (3-5,Fig.1): Press the key to freeze the display reading.
4) REC KEY (3-6,Fig.1): The data record key for Sd Card.
5) SETUP(ENTER) KEY (3-7,Fig.1): Press the key to setup the function before measuring or select function input determine.
6) EXIT(✱) KEY (3-9,Fig.1): Press the key to exit setting screen or measurement screen LCD backlight key .
7) ▲ KEY (3-8,Fig.1): Press the key to move the cursor up in setting screen.
8) ▼ KEY (3-11,Fig.1): Press the key to move the cursor down in setting screen.
9) ◄ KEY (3-10,Fig.1): Press the key to move the cursor left in setting screen or harmonic analysis left Key.
10) ► KEY (3-12,Fig.1): Press the key to move the cursor right in setting screen or harmonic analysis right Key.

4-4.SETUP KEY description:

4-4-1 Setting Feature List:

* Folder Name: Set the expect folder name for Sd Card, the range is between WTA01 to 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.
* Beep: Set to ON/OFF for buzzer.
* MD: Maximum demand metering setting (1-60 minutes), initially set to 15 minutes.
* AUTO POWER OFF: Set auto power off function.
* Trans Ref: Nominal voltage for transient detection reference.
* SVDP: Set up upper and low limits % of transient voltage detection.
* Decimal: set the Decimal type to USA (.) or Euro (,)
* RS232 OUT SEL: RS232 output function setting, maximum output option set to 9
* Temp. Unit: Setting the temperature unit ℃/℉
* START TIME: Data logging, the scheduled start time setting records
* STOP TIME: Data logging, scheduled to end recording time settings
* 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

SCREEN 1(4-5)

```
Folder Name: WTA01
File Name:3P301001.XLS
REC Date:2013/11/06
          11:00:05
Sampling Time:     2
Delete File:      0%
SD   Format:      0%
PT:    1 : 1       1/3
```

SCREEN 2(4-5)

```
Beep: ON   MD: 60 MIN
AUTO POWER OFF: N
Trans  Ref: 220.0 V
SDVP:  10%
Decimal: USA (.)
RS232 OUT SEL:
V    I    P    S    Q
PF   φ    FREQ      2/3
```


SCREEN 3(4-5)

```
Freq: AUTO
Temp. Unit: ℃
START TIME: 00:00
STOP  TIME: 00:00
Year/Month/Date
2013   11   06
Hour/Minute/Second
 16    34    48   3/3
```

A: Press SETUP(ENTER) KEY to enter setting function screen ,total 3 page (SCREEN 1~SCREEN 3).

B: The selected item will be displayed in flashing.

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

SCREEN 1(4-5-1)

```
Folder Name: WTA01
File Name:3P301001.XLS
REC Date:2013/11/06
          11:00:05
Sampling Time:     2
Delete File:      0%
SD   Format:      0%
PT:    1 : 1       1/3
```

A:Folder Name range: WTA01 to WTA10

B:At this time Folder Name flashes,When you press or key its Folder number will flash , press ▲ or ▼ KEY choice Folder number, its number from "01 to 10" (as SCREEN 1)

C: Press ▲ or ▼ KEY> 2 SEC then the number will quickly change

D:Press ◄ or ► KEY will return to Folder Name function, and this was flashing , press ▼ KEY then go to the next option as SCREEN 1 (Folder Name → File Name)

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

SCREEN 1(4-5-2)

```
Folder Name: WTA02
File Name:3P302001.XLS
REC Date:NO FILE

Sampling Time:     2
Delete File:      0%
SD   Format:      0%
PT:    1 : 1       1/3
```

SCREEN 2(4-5-2)

```
Folder Name: WTA01
File Name:3P301001.XLS
REC Date:2013/11/06
          11:00:05
Sampling Time:     2
Delete File:      0%
SD   Format:      0%
PT:    1 : 1       1/3
```

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).

C:When entering the File Name option will flash, then go to File on ◄ or ► KEY digital adjustment and flashes. press ▲ or ▼ KEY select File numbers, their numbers from "001-050" (as SCREEN 2)

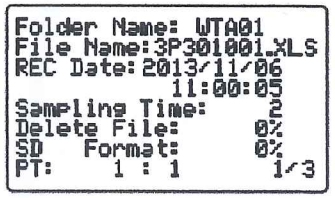
Remark: Press ▲ or ▼ KEY> 2 SEC then the number will quickly change

* 1P201001 : 1P2 means one phase.
* 3P301001 : 3P3 means three phases.
* HAV01001 : HAV means voltage harmonic measurement.
* HAA01001 : HAA means current harmonic measurement.
* SIN01001 : SIN means voltage & current waveform measurement.
* TRA01001 : TRA means transient measurement.
* TMP01001 : TMP means temprature measurement.

D: Press ◄ or ► KEY will return to File Name function, and this was flashing. press ▼ KEY then go to the next option as screen 2 (File Name→Sampling Time)

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

SCREEN 1(4-5-3)



A: When entering the Sampling Time option and is flashing(as SCREEN1).

B: When you press ◄ or ► KEY then enter the digital adjustment and showed flashes, press ▲ or ▼ KEY can be adjusted.

Remark: Press ▲ or ▼ KEY> 2 SEC then the number will quickly change.

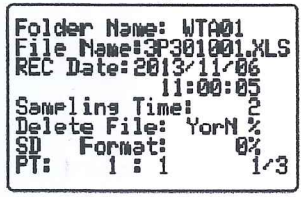
C: Press ◄ or ► KEY then returned Sampling Time function, this time is flashing , press ▼ KEY then go to the next option (Sampling Time→ Delete File).

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

SCREEN 1(4-5-4)



SCREEN 2(4-5-4)



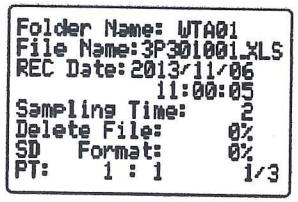
A : When entering the Delete File option and is flashing(as SCREEN1).

B : When you press ◄ or ► KEY> 2 Sec will show "Y or N" and "N" is flashing (as SCREEN 2), Press ▲ or ▼ KEY select "Y" and press SETUP(ENTER) KEY perform the Delete action (ex: 3P301001.XLS) will also return to SCREEN 1 or select "N" and press SETUP(ENTER) KEY then returned SCREEN 1.

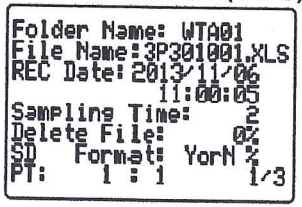
C : Press ◄ or ► KEY will return to Delete File option and is flashing , press ▼ KEY then go to the next option as SCREEN1 (Delete File→SD Format)

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

SCREEN 1(4-5-5)



SCREEN 2(4-5-5)



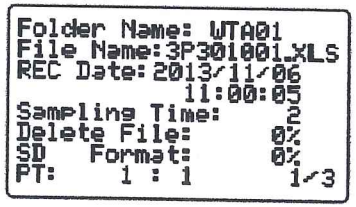
A : When entering the SD Format option and is flashing(as SCREEN1).

B : When you press ◄ or ► KEY> 2 Sec will show "Y or N" and "N" is flashing (as SCREEN 2) , Press ▲ or ▼ KEY select "Y" and press SETUP(ENTER) KEY proceed to Format the action, execution is completed then returned SCREEN 1 or select "N" and press SETUP(ENTER) KEY then returned SCREEN 1.

C : Press ◄ or ► KEY will return to SD Format option and is flashing , press ▼ KEY then go to the next option as SCREEN1(SD Format→PT)

4-5-6 PT: Set the Potential Transformer

SCREEN 1(4-5-6)



A : When entering the PT option and is flashing(as SCREEN1).

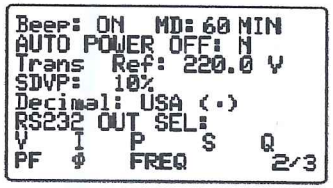
B : When you press ◄ or ► KEY then enter the digital adjustment and showed flashes, press ▲ or ▼ KEY can be adjusted.

Remark: Press ▲ or ▼ KEY> 2 SEC then the number will quickly change.

C : Press ◄ or ► KEY will return to PT option and is flashing , press ▼ KEY then go to the next option (PT→Beep)

4-5-7 Beep: Set the buzzer ON or OFF

SCREEN 1(4-5-7)



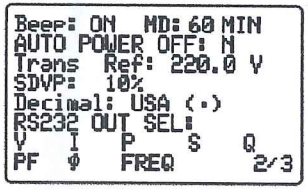
A : When entering the Beep option and is flashing(as SCREEN1).

B : When you press ◄ or ► KEY then enter the "ON" function and is flashing, press ▲ or ▼ KEY then enter the "OFF" Function and is flashing

C : Press ◄ or ► KEY will return to Beep option and is flashing , press ▼ KEY then go to the next option as SCREEN1(Beep→MD)

4-5-8 MD(Maximum Demand): Maximum demand metering settings

SCREEN 1(4-5-8)



A : When entering the MD option and is flashing(as SCREEN1).

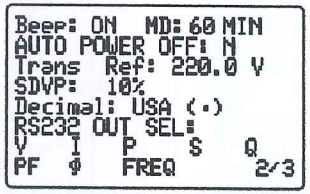
B : When you press ◄ or ► KEY then enter the digital adjustment and showed flashes, press ▲ or ▼ KEY can be adjusted.(1 MIN~60 MIN)

Remark: Press ▲ or ▼ KEY> 2 SEC then the number will quickly change.

C : Press ◄ or ► KEY will return to MD option and is flashing , press ▼ KEY then go to the next option as SCREEN1 (MD→AUTO POWER OFF)

4-5-9 AUTO POWER OFF : AUTO POWER OFF Function Setting

SCREEN 1(4-5-9)



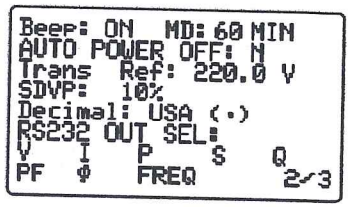
A : When entering the AUTO POWER OFF option and is flashing(as SCREEN1) , while the AUTO POWER OFF Choose the instrument will start in 10 minutes automatically shut down when you turn the dial switch and enter the boot state measurements, when connected Adapter is automatically canceled when AUTO POWER OFF function.

B : Press ◄ or ► KEY then enter "N" option is selected and flashes, press ▲ or ▼ KEY then enter "Y" option and is now flashing

C : Press ◄ or ► KEY will return to AUTO POWER OFF option and is flashing , press ▼ KEY then go to the next option as SCREEN1 (AUTO POWER OFF→Trans Ref)

4-5-10 Trans Ref: Nominal voltage for transient detection reference

SCREEN 1(4-5-10)



A : When entering the Trans Ref option and is flashing(as SCREEN1).

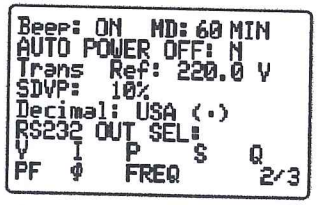
B : When you press ◄ or ► KEY then enter the digital adjustment and showed flashes, press ▲ or ▼ KEY can be adjusted its range(50.0V ~ 850.0V)

Remark: Press ▲ or ▼ KEY> 2 SEC then the number will quickly change.

C : Press ◄ or ► KEY will return to AUTO POWER OFF option and is flashing , press ▼ KEY then go to the next option(Trans Ref→SVDP)

4-5-11 SVDP:Set up upper and low limits % of transient voltage detection

SCREEN 1(4-5-11)



A : When entering the SVDP option and is flashing(as SCREEN1).

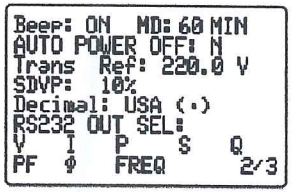
B : Press ◄ or ► KEY then enter the digital adjustment and showed flashes, press ▲ or ▼ KEY can be adjusted its range (1%~100%)

Remark: Press ▲ or ▼ KEY> 2 SEC then the number will quickly change.

C : Press ◄ or ► KEY will return to SVDP option and is flashing , press ▼ KEY then go to the next to the next option (SVDP→Decimal)

4-5-12 Decimal: set the Decimal type to USA (.) or Euro (,)

SCREEN 1(4-5-12)



A : When entering the Decimal option and is flashing(as SCREEN1).

B : Press ◄ or ► KEY then enter "USA (.)" function and flashes, press ▲ or ▼ KEY then enter "EURO (,) "function and is flashing

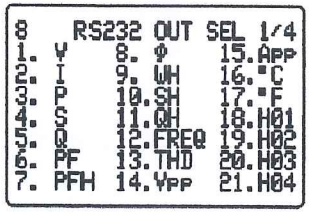
C : Press ◄ or ► KEY will return to Decimal option and is flashing , press ▼ KEY then go to the next option (Decimal→RS232 OUT SEL:RS232)

4-5-13 RS232 OUT SEL: RS232 output setting

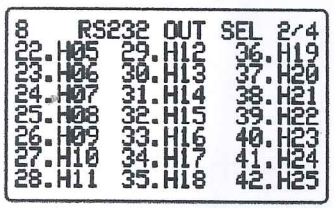
SCREEN 1(4-5-13)



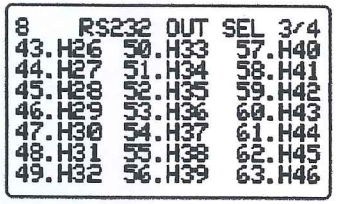
SCREEN 2(4-5-13)



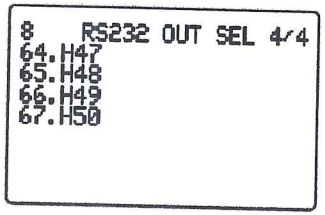
SCREEN 3(4-5-13)



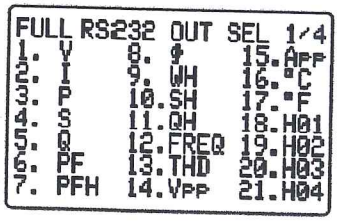
SCREEN 4(4-5-13)



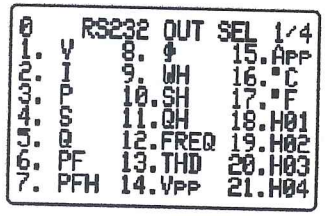
SCREEN 5(4-5-13)



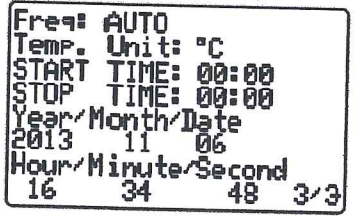
SCREEN 6(4-5-13)



SCREEN 7(4-5-13)



SCREEN 8(4-5-13)



A : When entering the RS232 OUT SEL option and is flashing(as SCREEN1).

B :When you press ◄ or ► KEY> 2 Sec enters SCREEN 2, press ▲ or ▼ KEY to select the desired option total 4 Page (as SCREEN 2 ~ SCREEN 5 , 1 ~ 67 item), then the digital option is flashing when press the SETUP(ENTER) KEY option content is flashing while digital options appear stationary state indicates options have been identified, while upper left corner of the LCD will display the total number of the currently selected (as SCREEN 2),when you choose to nine pen upper left corner of the LCD appears "FULL" (as SCREEN 6), the upper right corner displays the current number of pages

Remark:

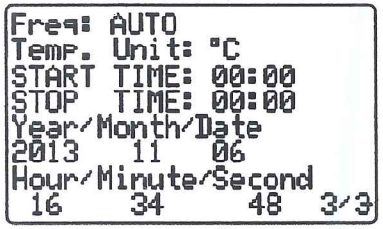
* Press ▲ KEY> 2 Sec selected items are cleared to zero (as SCREEN 7)

* Press ▼ KEY> 2 Sec enters pages selection function (as SCREEN 2 ~ SCREEN 5),the number of pages for the top right corner of the LCD flashing (as SCREEN 2), when you press or KEY then begin Pages selection, and then press ▼ KEY> 2 Sec is then lifted pages options. while the LCD top right corner of pages were static state.

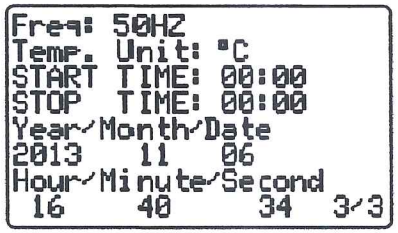
C : Press ◄ or ► KEY will return to RS232 OUT SEL option and is flashing , press ▼ KEY then go to the next option as SCREEN8 (RS232 OUT SEL→Freq)

4-5-14 Freq:

SCREEN 1(4-5-14)



SCREEN 2(4-5-14)



A:When entering the Freq option and is flashing(as SCREEN 1).

B:Press ◄ or ► KEY then enter "AUTO" option and is flashing, press ▲ or ▼ KEY then enter Into "50HZ" feature and showed flashes state (as SCREEN 2)

C:Press ◄ or ► KEY will return to Freq option and is flashing , press ▼ KEY then go to the next option as SCREEN1 (Freq→Temp Unit)

4-5-15 Temp. Unit:Temp. Unit Setting

SCREEN 1(4-5-15)



SCREEN 2(4-5-15)



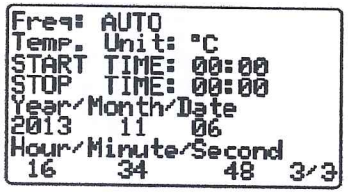
A : When entering the Temp Unit option and is flashing(as SCREEN 1).

B : Press ◄ or ► KEY then enter "°C" option and is flashing, press ▲ or ▼ KEY then enter Into "°F" feature and showed flashes state (as SCREEN 2)

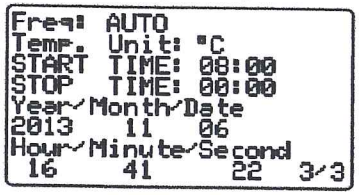
C : Press ◄ or ► KEY will return to Temp. Unit option and is flashing , press ▼ KEY then go to the next option as SCREEN1 (Temp. Unit→START TIME)

4-5-16 START TIME/STOP TIME:Data Record Function ,Scheduled start and end records time settings.

SCREEN 1(4-5-16)



SCREEN 2(4-5-16)



A : When entering the START TIME or STOP TIME option and is flashing (as SCREEN 1)

B : Press once ◄ or ► KEY then enter the hours adjustment options and is flashing (as SCREEN 2), then press ▲ or ▼ KEY to adjust its range (0 to 23) and press again ◄ or ► KEY then enter minute adjustment function and is flashing , you can press the ▲ or ▼ KEY to adjust its range (0 to 59) and press again ◄ or ► KEY returns START TIME or STOP TIME option and is flashing

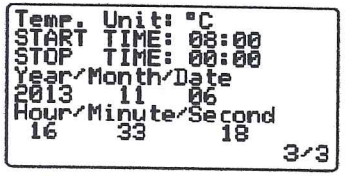
Remark:Press ▲ or ▼ KEY> 2 SEC then the number will quickly change.

C : Press ◄ or ► KEY will return to START TIME or STOP TIME option and is flashing.When the STOP TIME option mode ,press ▼ KEY then go to the next option (STOP TIME→Year)

* Remark:When the START TIME or STOP TIME content options, press ◄ or ► KEY> 5 Sec is the setting options quickly cleared to zero.

4-5-17 Year/Month/Date/Hour/Minute/Second Setting

SCREEN 1(4-5-17)



A : When entering the Year option and is flashing(as SCREEN 1).

B : When the option is in the Year goes to press once ◄ or ► KEY Year adjustment function and is flashing, press ▲ or ▼ KEY is to be adjusted. Then returns Year ◄ or ► KEY option and is flashing.

Remark: Press ▲ or ▼ KEY> 2 SEC then the number will quickly change.

C : Press ▲ or ▼ KEY is carried (Year → Month), (Month → Date), (Date → Hour), (Hour → Minute) , (Minute → Second) and other options to adjust, in accordance with "B" item to make adjustments to the figures.

D :Second option when press once ◄ or ► KEY then enter the Second adjustment function and is flashing, then press ▲ or ▼ KEY adjusted figures showed a stationary state at this time when the press SETUP(ENTER) KEY settings will be saved and when the figure was flashing, press ◄ or ► KEY returns Second option and is flashing.

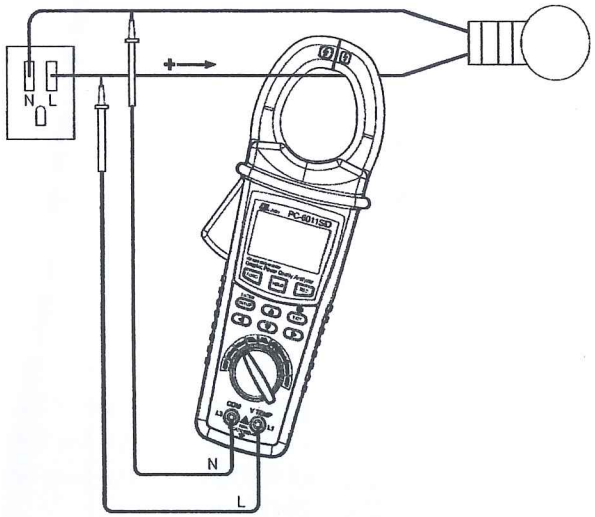
4-5-18 When all settings are completed, press EXIT (✱) KEY

5.MEASURING PROCEDURES

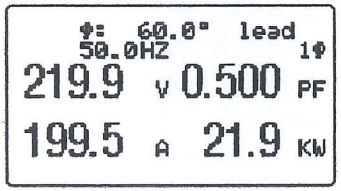
5-1 Single-phase power quality measurements

A : Diagram

SCREEN 1(5-1)

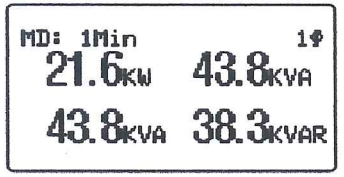


SCREEN 2(5-1) Voltage and current (RMS), power factor (PF) and active power (KW) measurements



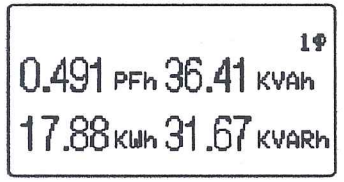
SCREEN 3(5-1) Maximum Demand (KW and KVA), apparent power (KVA) and reactive power (KVAR) measurements

Remark: When measuring the battery is required to cancel AUTO POWER OFF function.

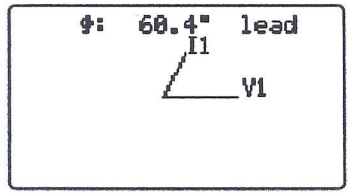


SCREEN 4(5-1) Energy (PFh, KWh, KVAh, KVARh) measurements

Remark: When measuring the battery is required to cancel AUTO POWER OFF function



SCREEN 5(5-1) Graphic Phasor Diagram Display



B : Operation Instructions

B-1 : Turn the rotary switch (3-13, Fig.1) to position 1 PHASE

B-2 : The terminals L and N test instrument connected to L1 (L) and L3 (N)

B-3 : The hook portion of the load of a single clip a line (L)

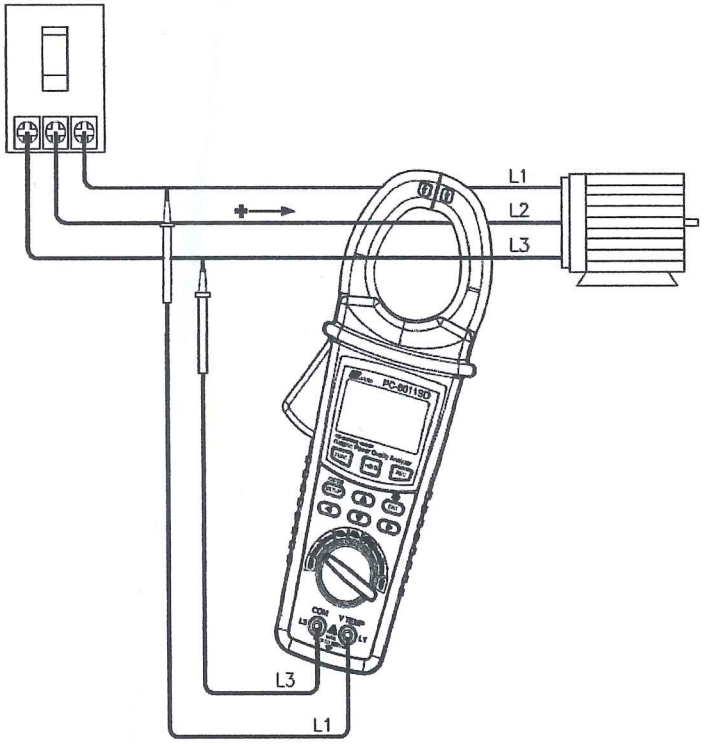
B-4 : When the "B-2 and B-3" connection is completed, the test results will be displayed on the LCD (as SCREEN 2)

B-5 : Press the FUNC KEY (3-4, Fig.1), select the LCD screen to be displayed (as SCREEN 2 ~ SCREEN 5)

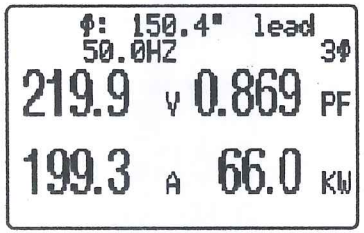
5-2 Balanced three-phase power quality measurements

A : Diagram

SCREEN 1(5-2)

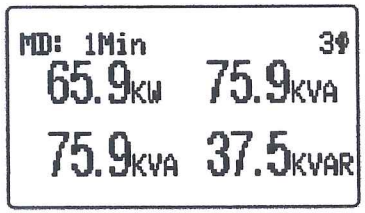


SCREEN 2(5-2) Voltage and current (RMS), power factor (PF) and active power (KW) measurements



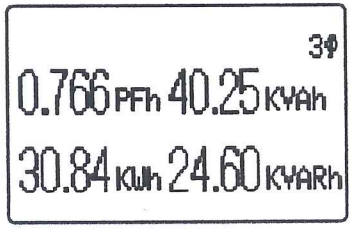
SCREEN 3(5-2) Maximum Demand(KW and KVA), apparent power(KVA) and reactive power(KVAR) measurements

Remark: When measuring the battery is required to cancel AUTO POWER OFF function

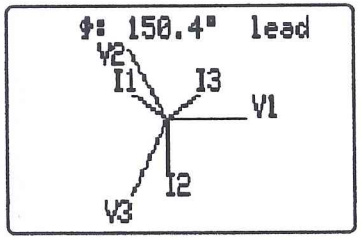


SCREEN 4(5-2) Energy (PFh, KWh, KVAh, KVARh) measurements

Remark:When measuring the battery is required to cancel AUTO POWER OFF function



SCREEN 5(5-2) Graphic Phasor Diagram Display



B : Operation Instructions

B-1 : Turn the rotary switch (3-13, Fig.1) to position 3 PHASE

B-2 : The terminals L1 and L3 test instrument connected to L1 (L) and L3 (N)

B-3 : The hook portion of the load of a single clip a line (L2)

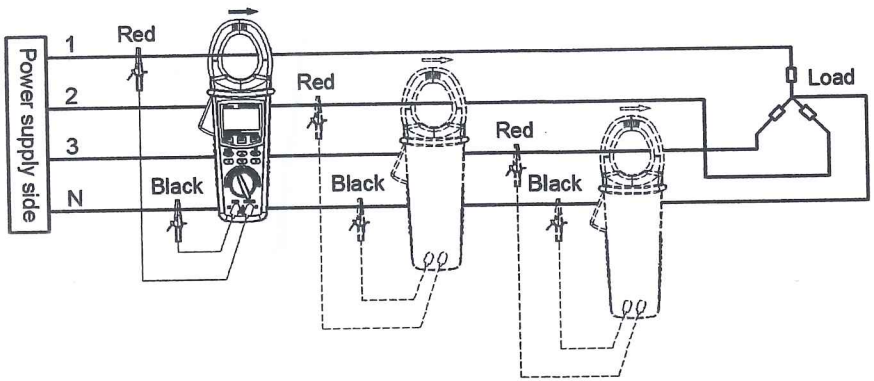
B-4 : When the "B-2 and B-3" connection is completed, the test results will be displayed on the LCD (as SCREEN 2)

B-5 : Press the FUNC KEY (3-4, Fig.1), select the LCD screen to be displayed (as SCREEN 2 ~ SCREEN 5)

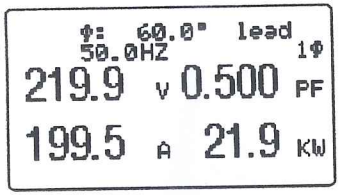
5-2-1 Three-phase 4 Wire power quality measurements

A : Diagram

SCREEN 1(5-2-1)



SCREEN 2(5-2-1) Voltage and current (RMS), power factor (PF) and active power (KW) measurements



B : Operation Instructions

1: Turn the rotary switch (3-13, Fig.1) to position 1 PHASE

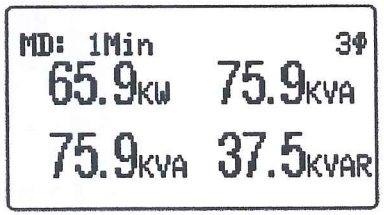
2 : measurement is conducted similar to measurement on a single-phase two-wire circuit.

Connect the black cord to the neutral wire(N) as shown in Figure (5-2-1), then switch the red cord and clamp sensor to the respective wires. In this way, the power and power factor between the wires can be measured.

5-3 Maximum demand metering zero

Press the EXIT(✱) KEY (3-9, Fig.1) > 6 Sec when the MD (KW, KVA) of the measured value to zero

SCREEN 1(5-3)



5-4 Watt-hour zero

Press the EXIT (✱) KEY (3-9, Fig.1)> 6 Sec when the "KWh", "KVAh", "KVARh" of the measured value zero

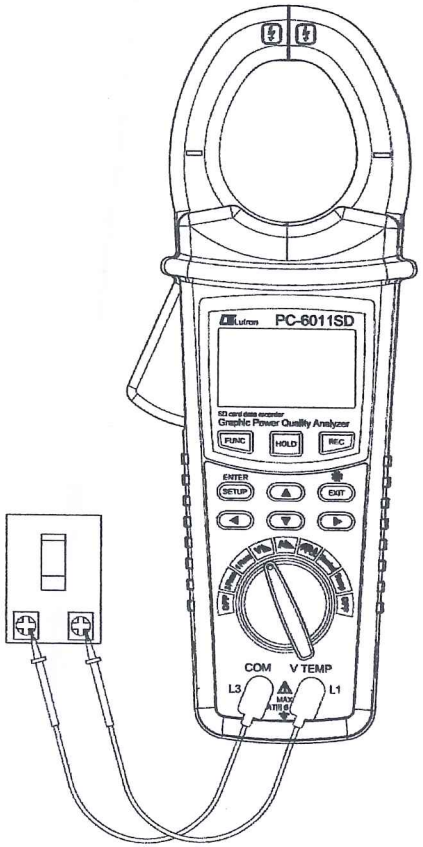
SCREEN 1(5-4)



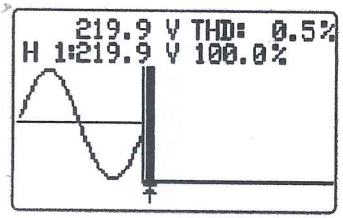
5-5 Voltage Harmonics Measurement

A : Diagram

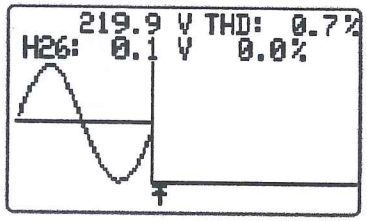
SCREEN 1(5-5)



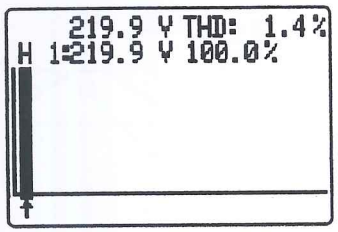
SCREEN 2(5-5)



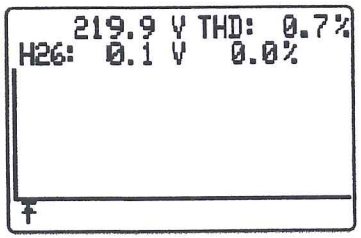
SCREEN 3(5-5)



SCREEN 4(5-5)



SCREEN 5(5-5)



B : Operation Instructions:

B-1 :Turn the rotary switch (3-13, Fig.1) to position V⎓

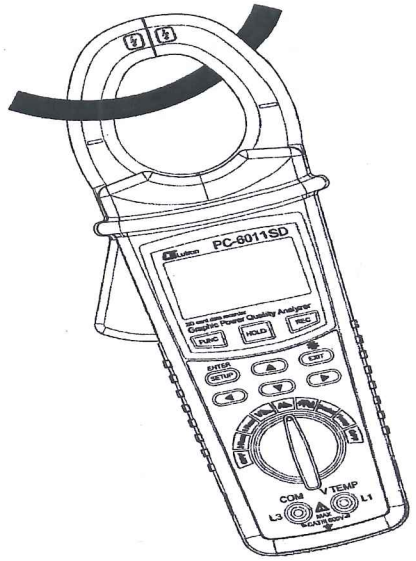
B-2 :The test lead (V, COM) connected to the voltage signal, the LCD will display the waveform and harmonic chart (as SCREEN 2), press ◄ or ► KEY choose H1 ~ H50 and exhibits harmonic value, press ► KEY> 2 Sec is fast switch to H26 ~ H50 screen (as SCREEN 3).

B-3 : Press FUNC KEY once the screen is switched to the harmonic map features (as SCREEN 4), press ► KEY> 2 Sec then quickly switch to H26 ~ H50 screen (as SCREEN 5), press it again to return to the SCREEN 2

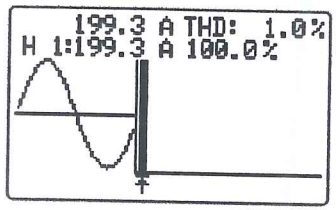
5-6 Current Harmonics Measurement

A : Diagram

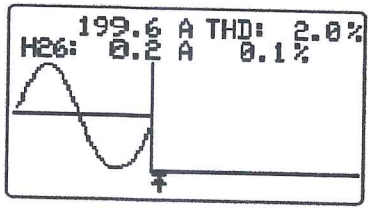
SCREEN 1(5-6)



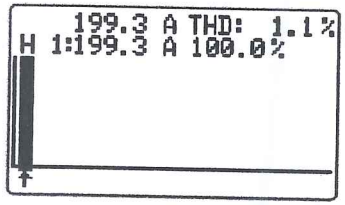
SCREEN 2(5-6)



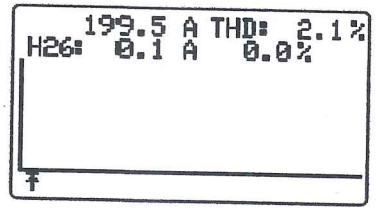
SCREEN 3(5-6)



SCREEN 4(5-6)



SCREEN 5(5-6)



B : Operation Instructions:

B-1 : Turn the rotary switch (3-13, Fig.1) to position A

B-2 : When the input voltage signal, the system will automatically detect the correct measurement frequency measurements made when the input voltage when no signal, make sure the measurement frequency, at"4-5-14"option to select the measurement frequency.

B-3 : The hook on the hook current signals, the LCD will display the waveform and harmonic chart (eg SCREEN 2), ◄ or ► KEY choose H1 ~ H50 and exhibits harmonic value, press ► KEY > 2 Sec then quickly switch to H26 ~ H50 screen (eg SCREEN 3).

B-4 : Press FUNC KEY once the screen is switched to the harmonic map features (as SCREEN 4), press ► KEY > 2 Sec then quickly switch to H26 ~ H50 screen (as SCREEN 5), press it again to return to the SCREEN 2

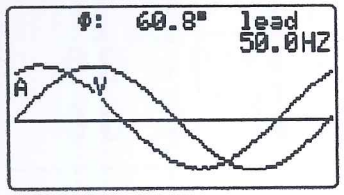
5-7 Voltage and Current Waveforms Measured

1) Turn the rotary switch (3-13, Fig.1) to position

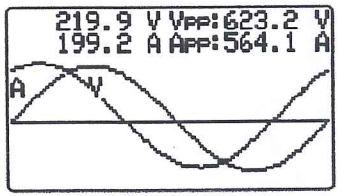
2) Connect the voltage and current signals, the LCD will display the voltage and waveforms (as SCREEN 1)

3) Press FUNC KEY once the screen switches to SCREEN 2, press it again to current return to the SCREEN 1.

SCREEN 1(5-7)

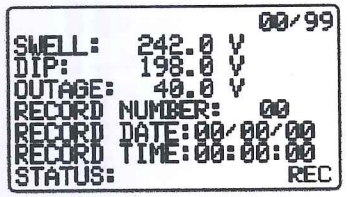


SCREEN 2(5-7)

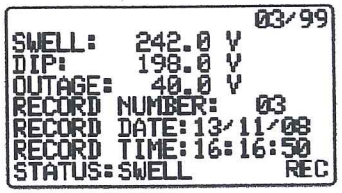


5-8 Transient Measurement:

SCREEN 1(5-8)



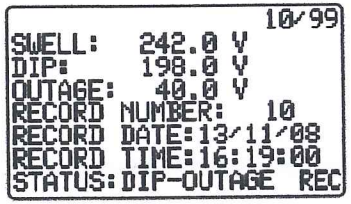
SCREEN 2(5-8)



SCREEN 3(5-8)



SCREEN 4(5-8)



1) Turn the rotary switch (3-13, Fig.1) to position Transient

2) Connect the voltage signals, press REC KEY (3-6, Fig.1) event does not occur (as SCREEN 1) screen ,when the Transient Voltage ≧ 242.0V LCD will display SCREEN 2 screen (SWELL),upper right corner of the currently logged items. when 40.0V ≦Transient Voltage≦ 198.0V when the LCD screen will display SCREEN 3 (DIP),when the Transient Voltage≦ 40.0V when the LCD screen will display SCREEN 4 (DIP-OUTAGE)

3) Press the REC KEY (3-6, Fig.1) and once released data logging mode, press ▲ or ▼ KEY (3-8 or 3-11, Fig.1) to browse records in each state (as SCREEN 2 ~ SCREEN 4).

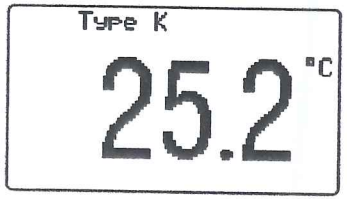
5-9 Temperature Measurements:

1)Turn the rotary switch (3-13, Fig.1) to position Temp

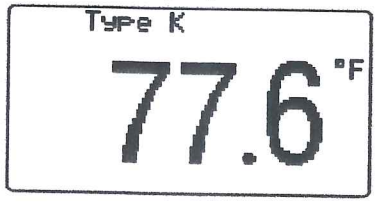
2)Connect Type K Sensor, the screen will display SCREEN 1

3)℃ / ℉ switching, refer to 4-5-15. Their ℉ display screen such as SCREEN 2

SCREEN 1(5-9)



SCREEN 2(5-9)



5-10 Data Logger Function

A:When the START TIME and STOP TIME are set to 00:00 hours (as SCREEN 1) , press the REC KEY (3-6, Fig.1) once you start doing data records, more than 30,000 pen will automatically add the file name and press REC KEY (3-6, Fig.1) and once released data logging(as SCREEN 3).

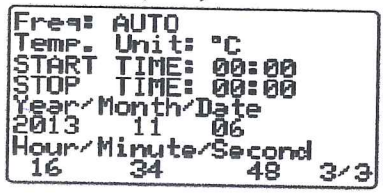
B:START TIME or STOP TIME, which one is not 00:00 (such as SCREEN 2), press the REC KEY (3-6 Fig.1) once, the LCD will display the lower left corner and the REC symbol (as SCREEN 5),real time reaches until START TIME (08:00) then start doing data logging,real time is reached when the STOP TIME (00:00) will automatically stop recording, set Repeat this action every day.when the press REC KEY (3-6, Fig.1) data logging function is released (as SCREEN 3).

C:When the REC KEY (3-6, Fig.1)> 2 Sec in the first round regardless of when START TIME setting ,will start doing data records (such as SCREEN 4), Real time until the arrival STOP TIME (00:00) will automatically stop recording. after the second round will be based on START TIME and STOP TIME time setting is used for data recording ,when the press REC KEY (3-6, Fig.1)> 2 Sec is released this data logging function(as SCREEN 3).

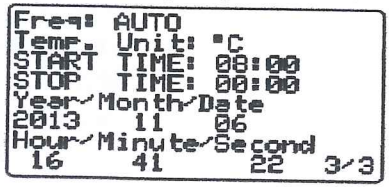
Remark:

* If the bottom left shows as " ChangeSD "(SCREEN 6), it indicates the memory space is already full either or the SD CARD exist some wrong.
* When you press the REC KEY (3-6, Fig.1) If the lower left corner appears "NO DISK" (SCREEN 7), said not inserted SD CARD. Then press the REC KEY (3-6, Fig.1) once it is released. "NO DISK " screen.

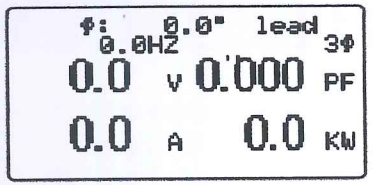
SCREEN 1(5-10)



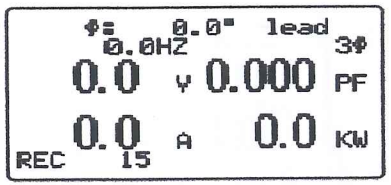
SCREEN 2(5-10)



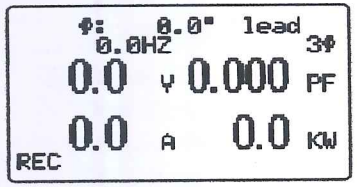
SCREEN 3(5-10)

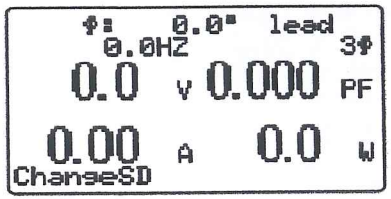


SCREEN 4(5-10)

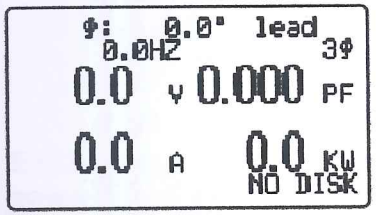


SCREEN 5(5-10)





SCREEN 7(5-10)



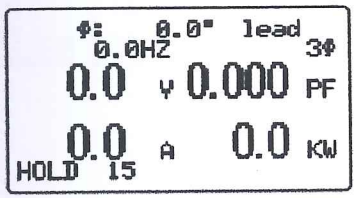
5-11 Hard copy function:

A:Press HOLD KEY (3-5, Fig.1) once, then press REC KEY (3-6, Fig.1) once, LCD screen will be displayed to make replication (as SCREEN 1)

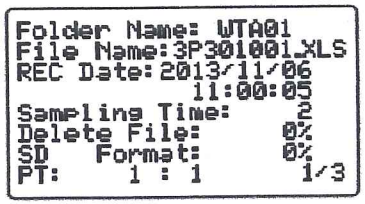
B:Directory name according to "Folder Name" setting,as WTA01 automatically changed BMP01, File name according to "File Name" setting such as 3P301001.XLS automatically changed 3P301001.BMP on SD CARD , 4-5-2 Maximum file record of 50 items (such as SCREEN 2) Refer to according to the file name.

C:Press HOLD KEY (3-5, Fig.1) once,you release the function (as SCREEN 3)

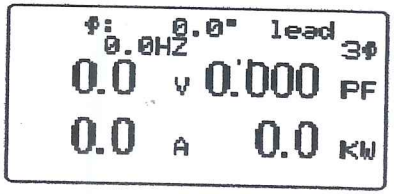
SCREEN 1(5-11)



SCREEN 2(5-11)



SCREEN 3(5-11)

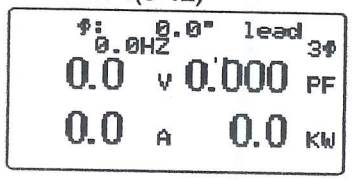


5-12 Data HOLD Function

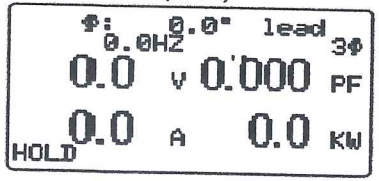
A:In the measurement, press HOLD KEY (3-5, Fig.1) and once the displayed value remains in the LCD, and the LCD will display the lower left corner for HOLD symbol (as SCREEN 2).

B:Press HOLD KEY (3-5, Fig.1) once you release the function

SCREEN 1(5-12)



SCREEN 2(5-12)

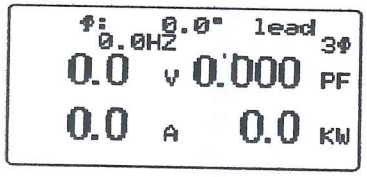


5-13 EXIT(✱) KEY

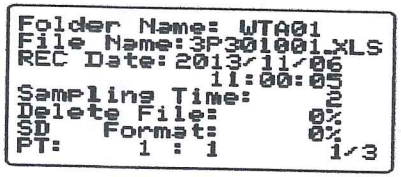
A:In the measurement mode(as SCREEN 1) press EXIT(✱) KEY (3-9, Fig.1), on behalf of control of LCD backlight ON / OFF

B:In setting mode(as SCREEN 2) Press EXIT(✱) KEY (3-9, Fig.1), EXIT KEY represents the exit setting mode.

SCREEN 1(5-13)



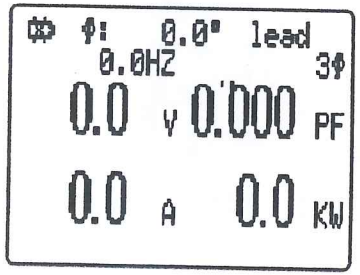
SCREEN 2(5-13)



5-14 LOWBAT screen

Upper left corner of the LCD display LOWBAT symbols (as SCREEN 1)

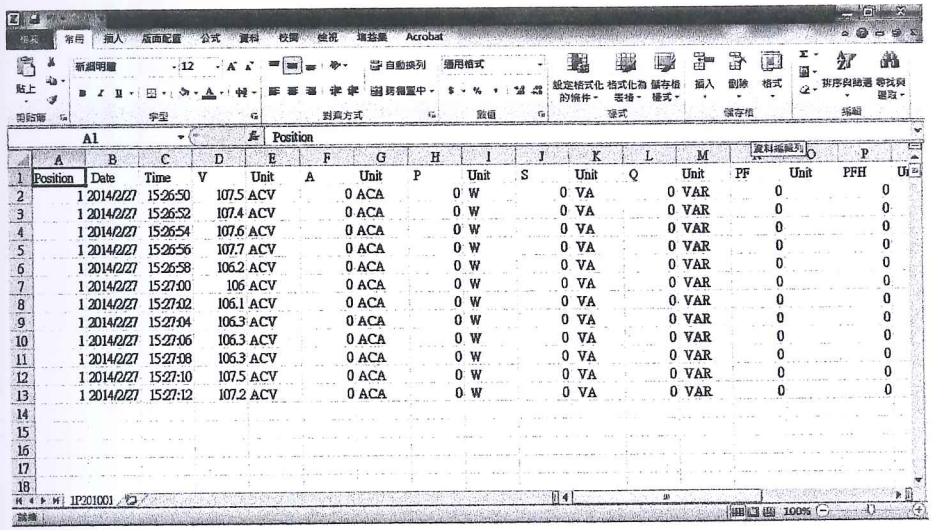
SCREEN 1(5-14)



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

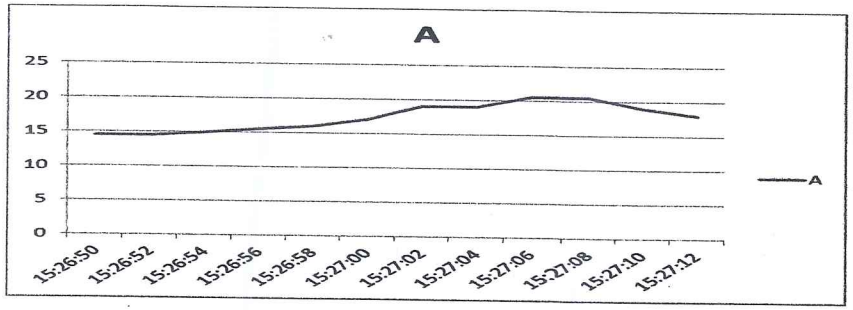
1) After execute the Data Logger function, take away the micro SD card out from the "micro SD card socket " (3-18, Fig. 1).
2) Plug in the micro SD card into the Computer's micro SD card slot (if your computer build in this installation) or insert the micro SD card into the " micro SD card adapter ". then connect the " micro 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 : 1P201001.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)

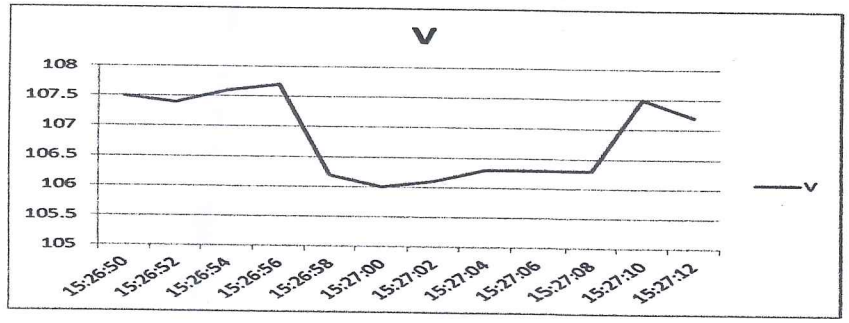


Position	Date	Time	V	Unit	A	Unit	P	Unit	S	Unit	Q	Unit	PF	Unit	PFH	Unit
1	2014/2/27	15:26:50		107.5 ACV		0 ACA		0 W		0 VA		0 VAR		0		0
1	2014/2/27	15:26:52		107.4 ACV		0 ACA		0 W		0 VA		0 VAR		0		0
1	2014/2/27	15:26:54		107.6 ACV		0 ACA		0 W		0 VA		0 VAR		0		0
1	2014/2/27	15:26:56		107.7 ACV		0 ACA		0 W		0 VA		0 VAR		0		0
1	2014/2/27	15:26:58		106.2 ACV		0 ACA		0 W		0 VA		0 VAR		0		0
1	2014/2/27	15:27:00		106 ACV		0 ACA		0 W		0 VA		0 VAR		0		0
1	2014/2/27	15:27:02		106.1 ACV		0 ACA		0 W		0 VA		0 VAR		0		0
1	2014/2/27	15:27:04		106.3 ACV		0 ACA		0 W		0 VA		0 VAR		0		0
1	2014/2/27	15:27:06		106.3 ACV		0 ACA		0 W		0 VA		0 VAR		0		0
1	2014/2/27	15:27:08		106.3 ACV		0 ACA		0 W		0 VA		0 VAR		0		0
1	2014/2/27	15:27:10		107.5 ACV		0 ACA		0 W		0 VA		0 VAR		0		0
1	2014/2/27	15:27:12		107.2 ACV		0 ACA		0 W		0 VA		0 VAR		0		0

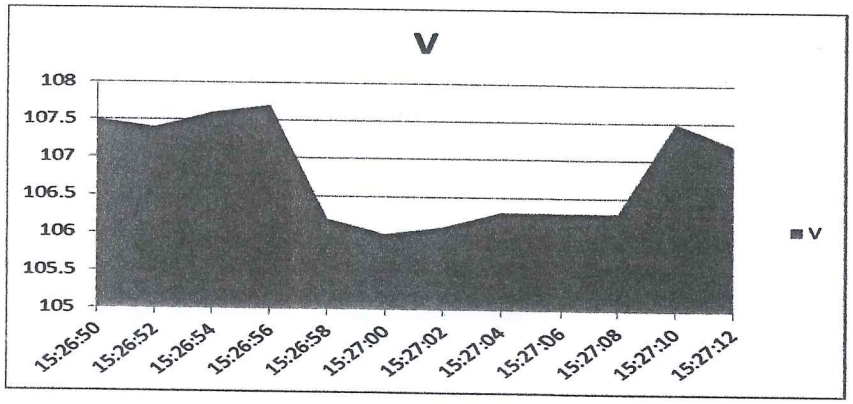
EXCEL data screen 2 (for example)



EXCEL data screen 3 (for example)



EXCEL data screen 4 (for example)



7. POWER SUPPLY from DC ADAPTER

The meter also can supply the power supply from the DC 9V Power Adapter . Insert the plug of Power Adapter into " DC 9V Power Adapter Input Socket " (3-15, Fig. 1). The meter will use the DC ADAPTER power supply .

8. BATTERY REPLACEMENT

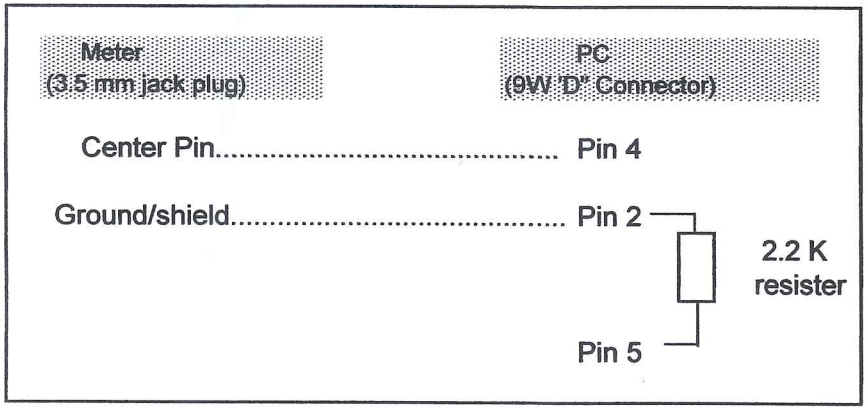
1) When the left corner of LCD display show "  ", it is necessary to replace the battery. However, in-spec. measurement may still be made for several hours after low battery indicator appears before the instrument become inaccurate.
2) Loose the screws of the " Battery Cover " (3-17, Fig. 1) and take away the " Battery Cover " from the instrument and remove the battery.
3) Replace with DC 1.5 V battery (UM3, AA, Alkaline/heavy duty) x 2 PCs, and reinstate the cover.
4) Make sure the battery cover is secured after changing batteries.

9. RS232 PC SERIAL OUTPUT

The instrument is provided an 3.5 mm dia. Phone socket (3-14, 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.



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 ~ 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
	F9 = PF	G2 = PFH	
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

10. OPTIONAL ACCESSORIES

RS232 cable UPCB-02	* Computer interface cable. * Used to connect the meter to the computer (COM port).
USB cable USB-01	* Computer interface cable. * Used to connect the meter to the computer (USB port).
Data Acquisition software SW-U811-WIN	The SW-U811-WIN is a multi displays (1/2/4/6/8/12 displays) powerful application software, provides the functions of data logging system, text display, angular display, chart display, data recorder high/low limit, data query, text data recorder high/low limit, data report, chart report.. .xxx.mdb data file can be retrieved for EXCEL, ACESS.., wide intelligent applications.

11. PATENT

The meter (micro 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

12. THE ADDRESS OF AFTER SERVICE CENTER