micro SD card real time data logger

DCA/ACA CLAMP METER

Model : CM-6010SD

Your purchase of this DCA/ACA CLAMP METER 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.*

TABLE OF CONTENTS

1 FEATURES

* Voltage and Current are the True RMS value.
* ACV input impedance is 10 Mega ohms.
* Measurement Function: ACA,DCA,ACV,DCV,
  Resistance,Diode,Continuity,Capacitance,Temp.(temprature probe optional)
* ACA Range: 0 to 2000 ACA, Autorange
* DCA Range: 0 to 2000 DCA,Autorange
* ACV Range: 0 to 1000 ACV,Autorange
* DCV Range: 0 to 1000 DCV,Autorange
* Resistance Range: 0 to 10 MΩ,Autorange
* Capacitance Range: 0 nF to 600 μF,Autorange
* Thermocouple Temp. sensor:Type K temperature(-100.0℃-199.9℃,200℃-1300℃),℃/℉
* DCA zero Button .
* Hold,Peak(Max.,Min. measurement value)
* Clamp Jaw: 2,2” (57 mm)
* 10 M ohm impedance for voltage circuit.
* 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℃),℃/℉.
* 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	3.2 X 2.4” (60 X 44.4 mm) Dot Matrix backlit LCD (128 X 64 pixels)
Measurements	DCV/ACV DCA/ACA Resistance/DIODE/Continuity Beeper. Capacitance , Frequency , Temperature.
A/D counts no.	6000 counts.
Voltage ranges	0.5 mV to 1000 V (DCV/ACV, Auto or Menu Range)
Current ranges	0.5 ACA to 2000 ACA (DCA/ACA, Auto or Menu Range)
Safety standard	IEC1010 CAT IV 600 V
Voltage input impedanc	10M ohms
Clamp frequency response	40 Hz to 1 KHz
Tested clamp	45 to 65 Hz
Over-load protection	DCV/ACV 1000 DCV / 1000 ACV RMS DCA/ACA 2100 DCA/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
Relative	To offset the measurement value
Peak to Peak	DCV/ACV,DCA/ACA peak to peak measurement
DCA zero adj.	DCA zero adjustment
Range selection	Auto range with manual range selecting
Polarity	Automatic Switching, " ----- " indicates
Sampling Time	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	30 mA DC
Max. Conductor size	Clamp can accommodate up to 2.2” (57 mm) diameter
Weight	620 g (includes batteries)
Dimensions	11.0 X 4.2 X 1.9” (280 X 106 X 47mm)
	Clamp Jaw: 2,2” (57 mm)
Accessories Included	Instruction manual…… 1 PC Test Leads……1 Set Alligator clips……1 Set Carrying case …… 1 PC
Optional accessories	AC to DC 9V adapter (linear 110V / 220V)…… 1 PC micro SD card (8 G)…… 1 PC USB cable,USB-01. 1 PC RS232 cable,UPCB-02. 1 PC Data Acquisition software,SW-U801-WIN. 1 PC

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

DC Voltage		
Range	600.0 mV /6 V/60 V/600 V /1000 V	
Resolution	0.1 mV /0.001V /0.01V /0.1V/1 V	
Accuracy	± (0.8% + 2d)	600 mV
	± (0.8% + 1d)	6 V, 60 V, 600 V, 1000 V
Input impedance	10 M ohm.	
Over load protection	±1000 DCV, 1000 ACV	
Peak to Peak Accuracy		± (5% + 30d)

AC Voltage (True RMS)		
Range	600.0 mV /6 V/60 V/600 V /1000 V	
Resolution	0.1 mV /0.001V /0.01V /0.1V/1 V	
Accuracy	± (1% + 2d) * Spec. are tested under 50/60 Hz.	
Input impedance	10 M ohm.	
Over load protection	±1000 DCV, 1000 ACV	
C		± (5% + 30d)

DC Current, AC Current (True RMS)			
Range	Resolution	Accuracy	
0.5 A to 2000 A	0.1 A / 1 A	600 A	± (1% + 12d)
		2000 A	± (1% + 8d)
Peak to Peak Accuracy		± (5% + 30d)	

OHMS	
Range	600 Ω/6 KΩ/60 KΩ/600 KΩ/6 MΩ/60 MΩ
Resolution	0.1Ω/0.001 KΩ/0.01 KΩ/0.1 KΩ/0.001 MΩ/0.01 MΩ
Accuracy	600 ohm : ±(1 % + 2d)
	6K/60K/600K/6 M : ±(1.5 % + 2d)
	60 M : ±(3 % + 5d)
Over load protection	±350 DCV, 350 ACV.

Diode (Forward voltage, VF)	
Range	2.7 V DC.
Accuracy	±(0.5% + 2d)

Continuity Beeper
Beeper will sound if measured resistance less than 20 ohm.

Capacitance		
Auto Range	6 nF/60 nF/600 nF/6 uF/60 uF/100 uF/600 uF	
Resolution	0.001 nF/0.01nF/0.1 nF/0.001 uF/0.01 uF/0.1 uF/1uF	
Accuracy	600 Pf/6 nF/60 nF/600 nF/6 uF /60 uF /600 uF	±(3.0% + 5d)
Test frequency	**(Auto frequency configuration)**	
Remark	Discharge capacitor before testing.	
Over load protection	±30 DCV, 30 ACV.	

Frequency		
Range	Resolution	Accuracy
40Hz to 999.9Hz	0.1Hz	±(0.5% + 2d)

Temperature		
Auto Range	Resolution	Accuracy
-100.0 ℃ to 199.9 ℃	0.1 ℃	±(1% + 1 ℃)
200 ℃ to 1000 ℃	1 ℃	±(1% + 2 ℃)
-148.0 ℉ to 391.9 ℉	0.1 ℉	±(1% + 1.8 ℉)
392 ℉ to 1832 ℉	1 ℉	±(1% + 3.6 ℉)
Temp. probe	The temperature probe (TP-11) is the optional accessory.	

3. FRONT PANEL DESCRIPTION

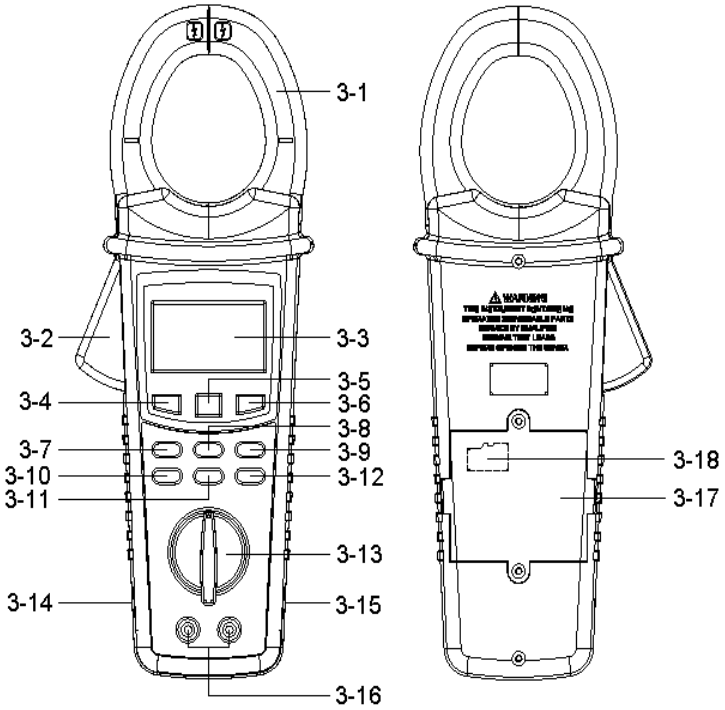
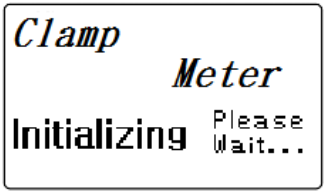


Fig.1

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

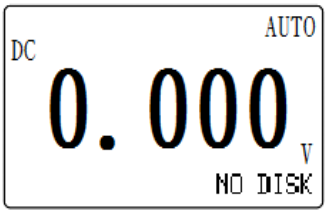
4. MEASURING PREPARATION

4-1. The original screen

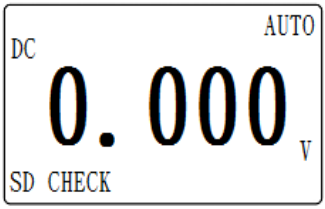


4-2. Entry the measurement Screen

SCREEN 4-2A



SCREEN 4-2B



1) When the bottom right corner "NO DISK" and showed flashing, it indicates the SD CARD is not inserted (as SCREEN 4-2A)
2) The bottom left display of screen will show as " SD Check " (as SCREEN 4-2B) 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): Press the " REC " Key ,The data will recording to Sd Card
5) SETUP(ENTER) KEY (3-7,Fig.1): Press the key to setup the function before measuring.
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.
10) ＞ KEY (3-12,Fig.1): Press the key to move the cursor right in setting screen.

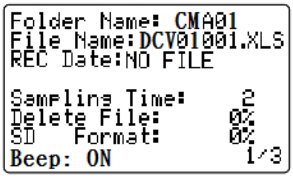
4-4.SETUP KEY description:

4-4-1 Setting Feature List:

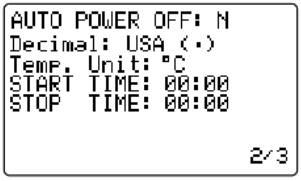
* Folder Name: Set the expect folder name for Sd Card, the range is between CMA01 to CMA10.
* File Name: Set the file name for SD CARD, It allows setting 50 filenames in this function.
* REC Date: Show the recorded time of existing files (Year/Month/Date, Hour/Min./Sec.)
* Sampling Time: Set the sampling time from 2 to 7200 seconds.
* Delete File: To delete the existing data from SD CARD.
* SD Format: To Format SD CARD fast.
* Beep: Set to ON/OFF for buzzer.
* AUTO POWER OFF: Set auto power off function.
* Decimal: set the Decimal type to USA (.) or Euro (,)
* 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

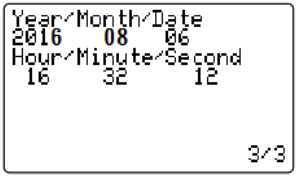
SCREEN 4-5 A



SCREEN 4-5 B



SCREEN 4-5 C

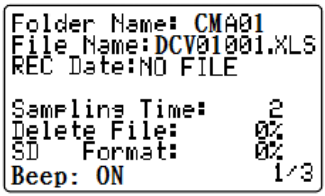


A: Press SETUP(ENTER) KEY to enter setting function screen ,total 3 page (SCREEN 4-5 A～SCREEN 4-5 C).

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)



A:Folder Name range: CMA01 to CMA10

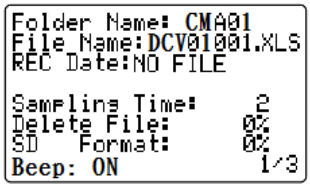
B:At this time Folder Name flashes,When you press ＜ or ＞ key its Folder number will flash , press ▲ or ▼ KEY choice Folder number, its number from "01 to 10" (as SCREEN 4-5-1)

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

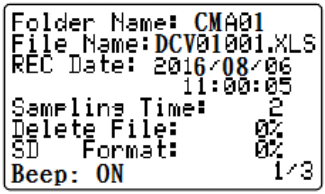
D:Press ＜ or ＞ KEY will return to Folder Name function, and this was flashing , press ▼ KEY then go to the next option as SCREEN 1(Folder Name → File Nam

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

SCREEN 4-5-2A



SCREEN 4-5-2Ｂ



A: The screen will show " NO File " indicator in REC Date option when the selected file is new (as SCREEN 4-5-2A).

B. The screen will show recording date and time in REC Date option when the selected file has been recorded (as SCREEN 4-5-2Ｂ).

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 4-5-2B)

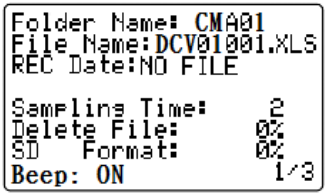
Remark: Press ▲ or ▼ KEY> 2 SEC then the number will quickly change

* DCV01001 : DCV means DCV measurement.
* ACV01001 : ACV means ACV measurement.
* OHM01001 : OHM means Resistor measurement.
* DIO01001 : DIO means Diode measurement.
* CON01001 : CON means Continuity measurement.
* CAP01001 : CAP means Capacitor measurement.
* DCA01001 : DCA means DCA measurement.
* ACA01001 : ACA means ACA measurement.
* TMP01001 : TMP means temperature measurement.

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

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

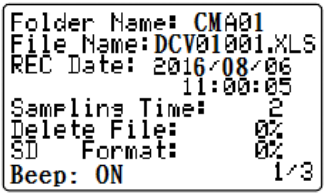
SCREEN 1(4-5-3)



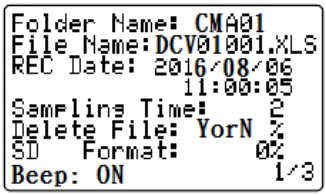
A: When entering the Sampling Time option and is flashing(as SCREEN1(4-5-3)).
B: When you press ＜ or ＞ KEY then enter the digital adjustment and showed flashes, press ▲ or ▼ KEY can be adjusted.
Remark: Press ▲ or ▼ KEY> 2 SEC then the number will quickly change.
C: Press ＜ or ＞ KEY then returned Sampling 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 4-5-4A



SCREEN 4-5-4Ｂ



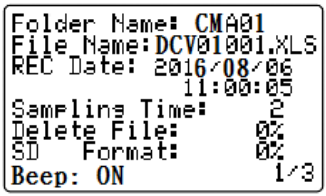
A : When entering the Delete File option and is flashing(as SCREEN 4-5-4A).

B : When you press ＜ or ＞ KEY > 2 Sec will show " Y or N " and " N " is flashing (as SCREEN 4-5-4Ｂ), Press ▲ or ▼ KEY select " Y " and press SETUP(ENTER) KEY perform the Delete action (ex: DCV01001.XLS) will also return to SCREEN 4-5-4Ａ or select " N " and press SETUP(ENTER)KEY then returned SCREEN 4-5-4Ｂ.

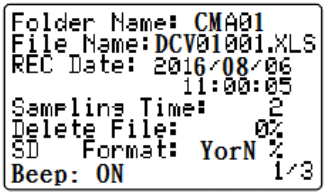
C : Press ＜ or ＞ KEY will return to Delete File option and is flashing , press ▼ KEY then go to the next option (Delete File→SD Format)

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

SCREEN 4-5-5A



SCREEN 4-5-5B



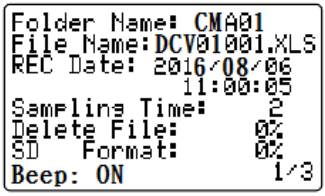
A : When entering the SD Format option and is flashing(as SCREEN 4-5-5Ａ).

B : When you press ＜ or ＞ KEY > 2 Sec will show " Y or N " and " N " is flashing (as SCREEN 4-5-5Ｂ) , Press ▲ or ▼ KEY select " Y " and press SETUP(ENTER)KEY proceed to Format the action, execution is completed then returned SCREEN 4-5-5A or select " N " and press SETUP(ENTER) KEY then returned SCREEN 4-5-5Ａ.

C : Press ＜ or ＞ KEY will return to SD Format option and is flashing , press ▼ KEY then go to the next option as (SD Format→Beep)

4-5-6 Beep: Set the buzzer ON or OFF

SCREEN 4-5-6



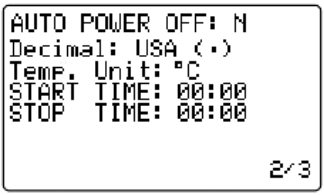
A : When entering the Beep option and is flashing(as SCREEN 4-5-6).

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 SCREEN 4-5- 6 (Beep→AUTO POWER OFF)

4-5-7 AUTO POWER OFF : AUTO POWER OFF Function Setting

SCREEN 4-5-7



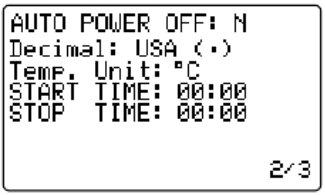
A : When entering the AUTO POWER OFF option and is flashing(as SCREEN 4-5-7) , while the AUTO POWER OFF Choose the instrument will start in 10 minutes automatically shut down when you turn the dial switch and enter the boot state measurements, when connected Adapter is automatically canceled when AUTO 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 (AUTO POWER OFF→Trans Ref)

4-5-8 Decimal: set the Decimal type to USA (.) or Euro (,)

SCREEN 4-5- 8



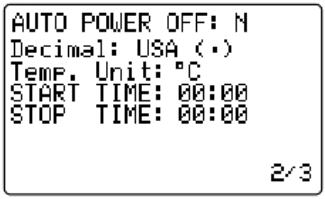
A : When entering the Decimal option and is flashing(as SCREEN 4-5-8).

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

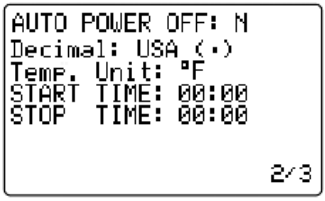
C : Press ＜ or ＞ KEY will return to Decimal option and is flashing , press ▼ KEY then go to the next option (Decimal→RS232 OUT SEL:RS232)

4-5-9 Temp. Unit:Temp. Unit Setting

SCREEN 4-5-9A



SCREEN 4-5-9B



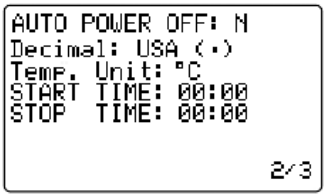
A : When entering the Temp Unit option and is flashing(as SCREEN 4-5-9A).

B : Press ＜ or ＞ KEY then enter " ℃ " option and is flashing, press ▲ or ▼ KEY then enter Into " ℉ " feature and showed flashes state(as SCREEN 4-5-9B)

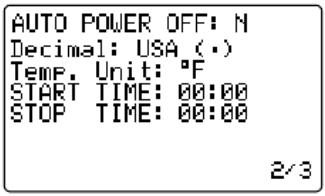
C : Press ＜ or ＞ KEY will return to Temp. Unit option and is flashing , press KEY then go to the next option (Temp. Unit→START TIME)

4-5-10 START TIME/STOP TIME:Data Record Function ,Scheduled start and end records time settings.

SCREEN 4-5-10A



SCREEN 4-5-10B



A : When entering the START TIME or STOP TIME option and is flashing (as SCREEN 4-5-10A)

B : Press once ＜ or ＞ KEY then enter the hours adjustment options and is flashing (as SCREEN 4-5-10B), 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

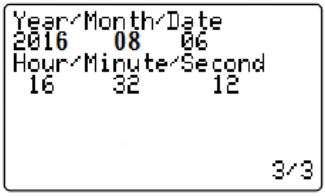
Remark:Press ▲ or ▼ KEY> 2 SEC then the number will quickly change.

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.

4-5-11 Year/Month/Date/Hour/Minute/Second Setting

SCREEN 4-5-11



A : When entering the Year option and is flashing(as SCREEN 4-5-11).

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.

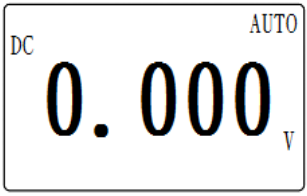
4-5-12 When all settings are completed, press EXIT (※) KEY

5.MEASURING PROCEDURES

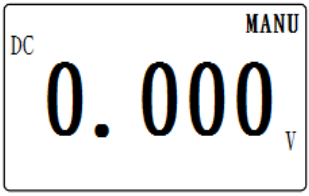
5-1 DCV,ACV measurements

A. Diagram

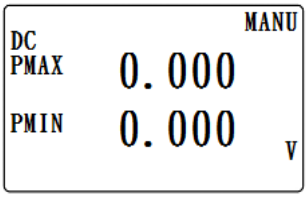
SCREEN 5-1A



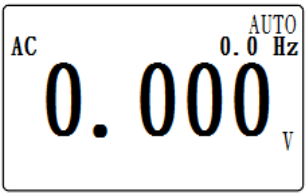
SCREEN 5-1B



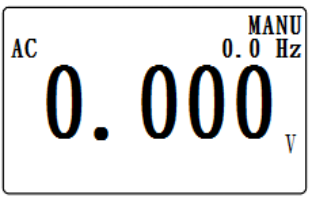
SCREEN 5-1C



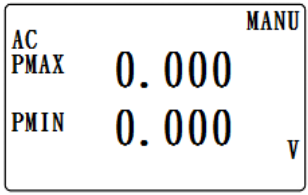
SCREEN 5-1D



SCREEN 5-1E



SCREEN 5-1F



DC Voltage Measurement

1) Turn the " Function rotary switch " (3-13, Fig. 1) to the " V " position. (as SCREEN 5-1A).
2) Connect BLACK test lead into " COM " terminal (3-16,Fig. 1).
3) Connect RED test lead into " V " terminal (3-16, Fig. 1).
4) When the connection is completed, the test results will be displayed on the LCD (as SCREEN 5-1A).

AC voltage true rms Measurement

1) Turn the " Function rotary switch " (3-13, Fig. 1) to the " V " position. (as SCREEN 5-1A).
2) Connect BLACK test lead into " COM " terminal (3-16,Fig. 1).
3) Connect RED test lead into " V " terminal (3-16, Fig. 1).
4) Press the " Func button " (3-4, Fig. 1) once, select to the " ACV "Function. (as SCREEN 5-1D).
5) When the connection is completed, the test value will be show on the LCD displayed (as SCREEN 5-1D).

C. Manual Range Measurement

1) Push the "▼(Range) KEY"(3-11,Fig.1) > 2 SEC. the AUTO Range will chang to Manual Range as (SCREEN 5-1E) or as (SCREEN 5-1B),
2) Push the "▼(Range) KEY"(3-11,Fig.1) > 2 SEC. the Manual Range will chang to AUTO Range as (SCREEN 5-1A) or as (SCREEN 5-1D),

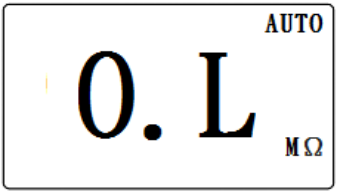
D. PEAK Function

1) during the "ACV " or " DCV " Function , Press and hold the " PEAK button " (3-12, Fig. 1) > 2 sec. ,When display show the SCREEN 5-1C or SCREEN 5-1F , PEAK function will be start.
2) when in the SCREEN 5-1C or SCREEN 5-1F , press and hold the " PEAK button " (3-12, Fig. 1) > 2 sec. ,back to SCREEN 5-1A or SCREEN 5-1D , PEAK function will be stop.

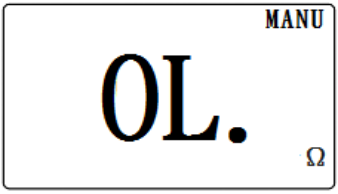
5-2 Ω、Diode、Continuity Measurement

A : Diagram

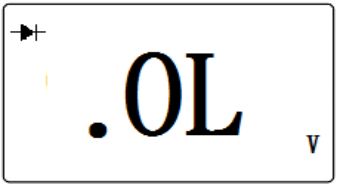
SCREEN 5-2A



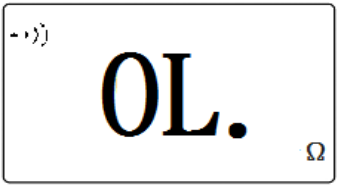
SCREEN 5-2B



SCREEN 5-2C



SCREEN 5-2D



B. Ω Measurement

1) Turn the " Function rotary switch " (3-13, Fig. 1) to the " Ω、Diode、Continuity position. (as SCREEN 5-2A).
2) Connect BLACK test lead into " COM " terminal (3-16,Fig. 1).
3) Connect RED test lead into " Ω、Diode、Continuity " terminal (3-16, Fig. 1).
4) When the connection is completed, the test results will be displayed on the LCD (as SCREEN 5-2A).
5) Push the " ▼(Range) KEY " (3-11,Fig.1) > 2 SEC. the AUTO Range will chang to Manual Range as (SCREEN 5-2B) ,Push the " ▼(Range) KEY " (3-11,Fig.1) > 2 SEC. again , will return to auto range operation.

C. Diode Measurement

1) Turn the " Function rotary switch " (3-13, Fig. 1) to the " Ω、Diode、Continuity position. (as SCREEN 5-2A).
2) Connect BLACK test lead into " COM " terminal (3-16,Fig. 1).
3) Connect RED test lead into " Ω、Diode、Continuity " terminal (3-16, Fig. 1).
4) Press "FUNC KEY(3-4,Fig.1)" once,Function (SCREEN 5-2A) chang to (SCREEN 5-2C) Function.
4) When the connection is completed, the test results will be displayed on the LCD (as SCREEN 5-1C).

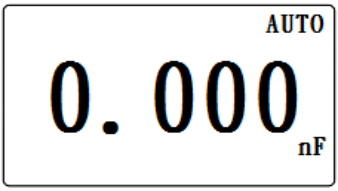
D. Continuity Measurement

1) Turn the " Function rotary switch " (3-13, Fig. 1) to the " Ω、Diode、Continuity position. (as SCREEN 5-1A).
2) Connect BLACK test lead into " COM " terminal (3-16,Fig. 1).
3) Connect RED test lead into " Ω、Diode、Continuity " terminal (3-16, Fig. 1).
4) Press "FUNC KEY(3-4,Fig.1)"once ,Function (SCREEN 5-2C) chang to (SCREEN 5-2D) Function.
5) When the connection is completed, the test results will be displayed on the LCD (as SCREEN 5-1D).
6) When the test resistance value is less than 5 ohm, the beeper sound will be generated.

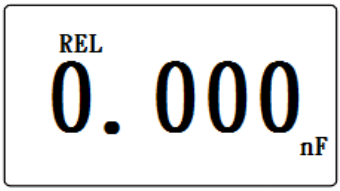
5-3 Capacitance Measurement

A : Diagram

SCREEN 5-3A



SCREEN 5-3B



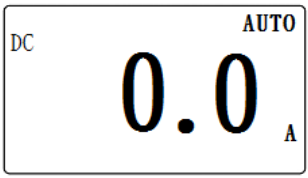
B. Capacitance Measurement

1) Turn the " Function rotary switch " (3-13, Fig. 1) to the " Capacitance " position (as SCREEN 5-3A).
2) Connect BLACK test lead into " COM " terminal (3-12,Fig. 1).
3) Connect RED test lead into " Capacitance " terminal (3-11, Fig. 1).
4) When connected to the measuring stick, no connect the capacitor , the display no zero, please press " (REL.) KEY " (3-10, Fig.1)> 2 SEC. Deduct the residual value, Let LCD display to zero (SCREEN 5- 3B), than capacitor test.

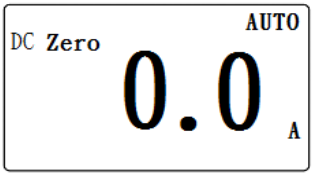
5-4 DCA,ACA Measurement

A : Diagram

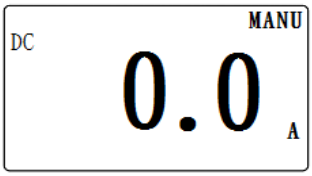
SCREEN 5-4A



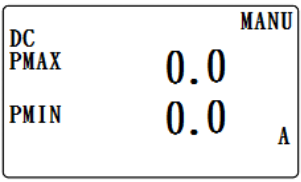
SCREEN 5-4B



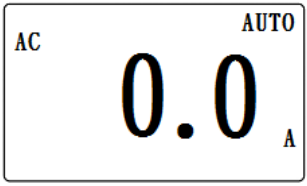
SCREEN 5-4C



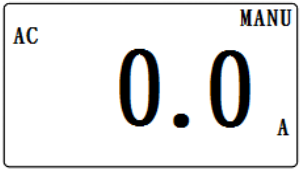
SCREEN 5-4D



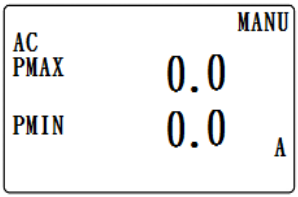
SCREEN 5-4E



SCREEN 5-4F



SCREEN 5-4G



B. DCA Measurement

1) Turn the " Function rotary switch " (3-13, Fig. 1) to the " A " position. (as SCREEN 5-4A).
2) please press "▲ (DCA ZERO) KEY " (3-8, Fig.1)> 2 SEC. Deduct the residual va Let LCD display to zero (SCREEN 5- 4B), than do DCA test , the test results wi displayed on the LCD.

C. ACA Measurement

1) Turn the " Function rotary switch " (3-13, Fig. 1) to the " A " position. (as SCREEN 5-4A).
2) press the " Func button " (3-4, Fig. 1) once, select to the " ACA " Function. (as SCREEN 5-4E), than do ACA test , the test results will be displayed on the LCD.

D. Manual Range Measurement

1) Press the " ▼ (Range) KEY " (3-11,Fig.1) > 2 SEC. the AUTO Range will chang to Manual Range as " DCA " (SCREEN 5-4C) or " DCA " as (SCREEN 5-4F),
2) Press the " ▼(Range) KEY " (3-11,Fig.1) > 2 SEC. the Manual Range will chang to AUTO Range as " DCA " (SCREEN 5-4A) or " DCA " as (SCREEN 5-4E),

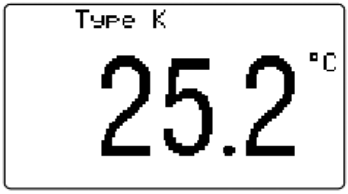
E. PEAK Function

1) during the "ACA " or " DCA " Function , Press and hold the " PEAK button " (3-12, Fig. 1) > 2 sec. ,When display show the SCREEN 5-4D or SCREEN 5-4G. , PEAK function will be start.
2) when in the SCREEN 5-4D or SCREEN 5-4G , press and hold the " PEAK button " (3-12, Fig. 1) > 2 sec. ,back to SCREEN 5-4A or SCREEN 5-4E , PEAK function will be stop.

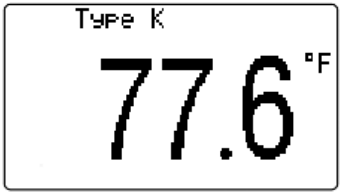
5-5 Temperature Measurement

A : Diagram

SCREEN 5-5A



SCREEN 5-5B



B. Temperature Measurement

1) Turn the " Function rotary switch " (3-13, Fig. 1) to the " Temp. " position. (as SCREEN 5-5A).
2) Plug in the optional " Type K Temperature probe, TP-11 " into the input terminals, " TEMP input terminal " (3-16, Fig. 1), display will show test value (as SCREEN 5-5A).
3) ℃/℉ unit change ref 4-5-9 , ℉ unit display (as SCREEN 4-5-9B)

5-6 Data Logger Function

A:When the START TIME and STOP TIME are set to 00:00 hours (as SCREEN 5-6A) , 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.

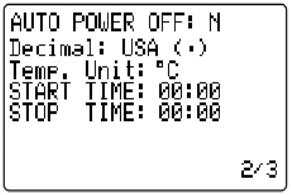
B:START TIME or STOP TIME, which one is not 00:00 (such as SCREEN 5-6B), press the REC KEY (3-6 Fig.1) once, the LCD will display the lower left corner and the REC symbol (as SCREEN 5-6E),real time reaches until START TIME (08:00) then start doing data logging,real time is reached when the STOP TIME (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.

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 5-6D), 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).

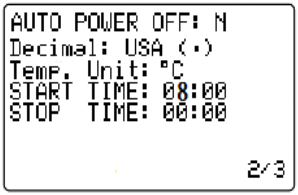
Remark:

* If the bottom left shows as " ChangeSD "(SCREEN 5-6F), 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 5-6G), said not inserted SD CARD. Then press the REC KEY (3-6, Fig.1) once it is released. "NO DISK " screen.

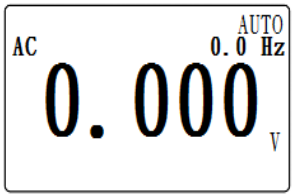
SCREEN (5-6A)



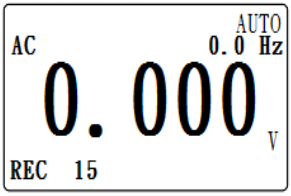
SCREEN (5-6B)



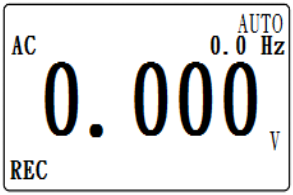
SCREEN (5-6C)



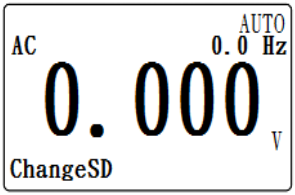
SCREEN (5-6D)



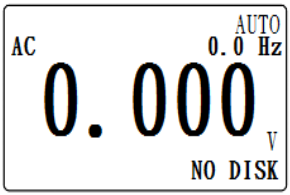
SCREEN (5-6E)



SCREEN (5-6F)



SCREEN (5-6G)



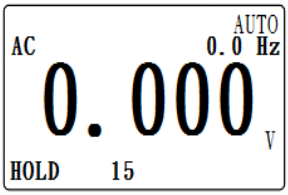
5-7 Hard copy function:

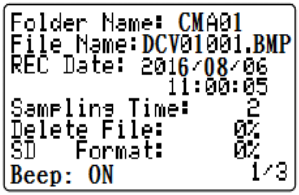
A:Press HOLD KEY (3-5, Fig.1) once, then press REC KEY (3-6, Fig.1) once, LCD screen will be displayed to make replication (as SCREEN 5-7A)

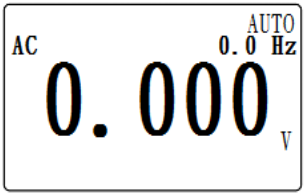
B:Directory name according to "Folder Name" setting,as WTA01 automatically changed BMP01, File name according to "File Name" setting such as ACV01001.XLS automatically changed ACV01001.BMP on SD CARD , 4-5-2 Maximum file record of 50 items (such as SCREEN 5-7B) Refer to according to the file name.

C:Press HOLD KEY (3-5, Fig.1) once,you release the function (as SCREEN 5-7C)

SCREEN 5-7A SCREEN 5-7B SCREEN 5-7C





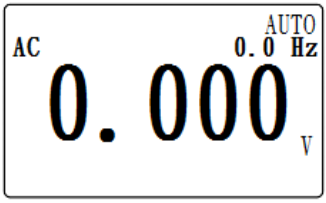


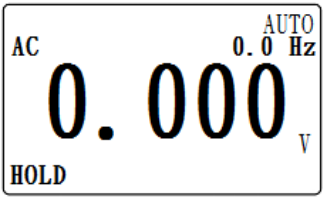
5-8 Data HOLD Function

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 5-8A).

B:Press HOLD KEY (3-5, Fig.1) once you release the function (as SCREEN 5-8B).

SCREEN 5-8A SCREEN 5-8B



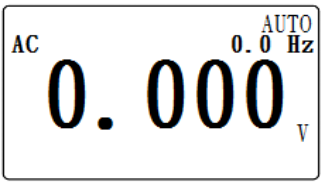


5-9 EXIT(❄) KEY

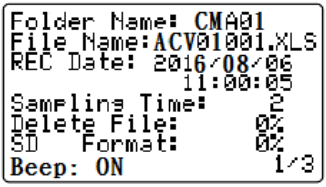
A:In the measurement mode(as SCREEN 5-9A) press EXIT(❄) KEY (3-9, Fig. on behalf of control of LCD backlight ON / OFF

B:In setting mode(as SCREEN 5-9B) Press EXIT(❄) KEY (3-9, Fig.1), EXIT KI represents the exit setting mode.

SCREEN 5-9A



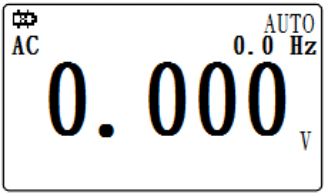
SCREEN 5-9B



5-10 LOWBAT screen

Upper left corner of the LCD display LOWBAT symbols (as SCREEN 5-10A)

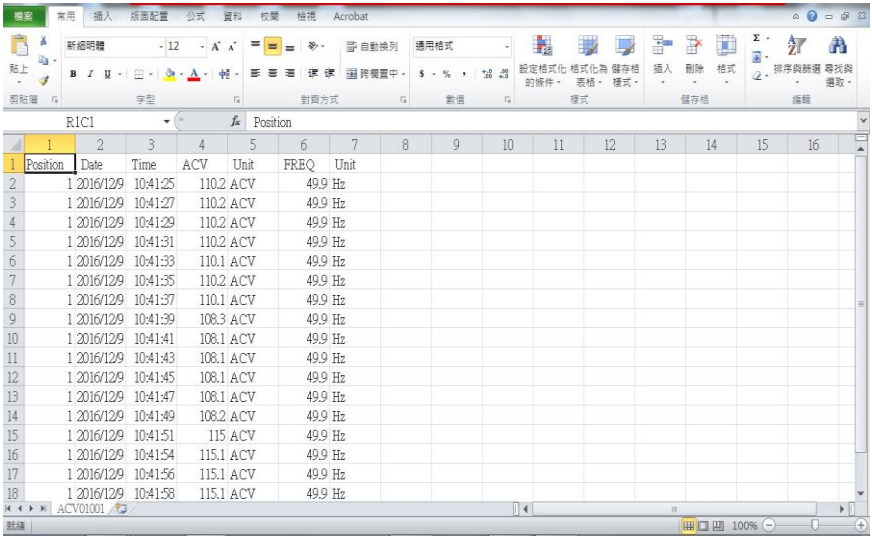
SCREEN 5-10A



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

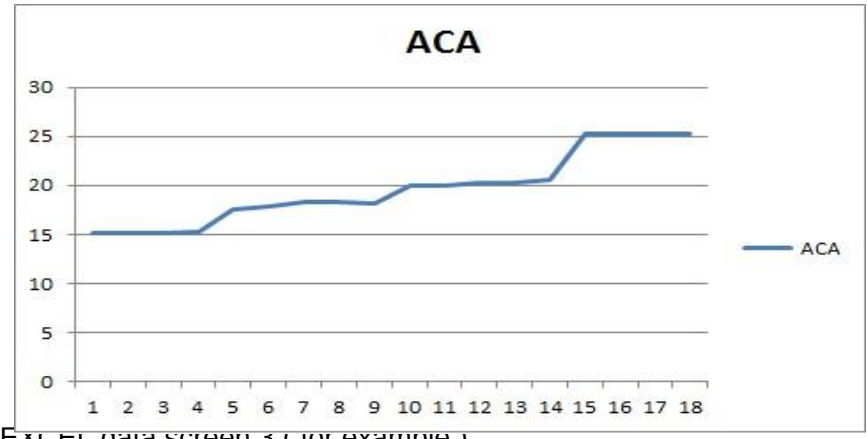
1) After execute the Data Logger function, take away the micro SD card out from the "micro SD card socket " (3-18, Fig. 1).
2) Plug in the micro SD card into the Computer's micro SD card slot (if your computer build in this installation) or insert the micro SD card into the " micro SD card adapter ". 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 : DCV01001.XLS, ACV01001.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)

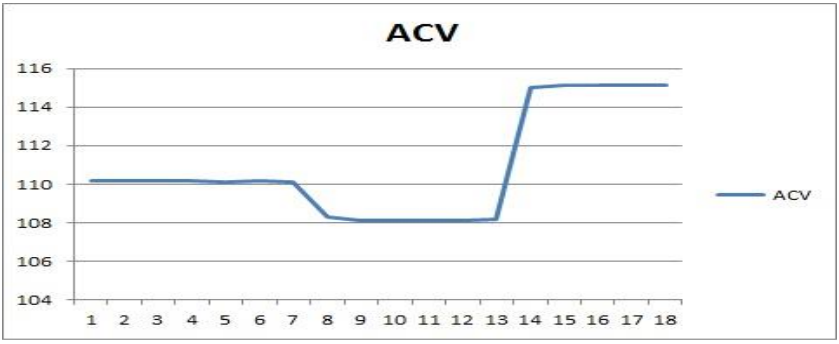


Position	Date	Time	ACV	Unit	FREQ	Unit
1	2016/12/9	10:41:25	110.2	ACV	49.9	Hz
1	2016/12/9	10:41:27	110.2	ACV	49.9	Hz
1	2016/12/9	10:41:29	110.2	ACV	49.9	Hz
1	2016/12/9	10:41:31	110.2	ACV	49.9	Hz
1	2016/12/9	10:41:33	110.1	ACV	49.9	Hz
1	2016/12/9	10:41:35	110.2	ACV	49.9	Hz
1	2016/12/9	10:41:37	110.1	ACV	49.9	Hz
1	2016/12/9	10:41:39	108.3	ACV	49.9	Hz
1	2016/12/9	10:41:41	108.1	ACV	49.9	Hz
1	2016/12/9	10:41:43	108.1	ACV	49.9	Hz
1	2016/12/9	10:41:45	108.1	ACV	49.9	Hz
1	2016/12/9	10:41:47	108.1	ACV	49.9	Hz
1	2016/12/9	10:41:49	108.2	ACV	49.9	Hz
1	2016/12/9	10:41:51	115	ACV	49.9	Hz
1	2016/12/9	10:41:54	115.1	ACV	49.9	Hz
1	2016/12/9	10:41:56	115.1	ACV	49.9	Hz
1	2016/12/9	10:41:58	115.1	ACV	49.9	Hz

EXCEL data screen 2 (for example)



EXCEL data screen 3 (for example)



7. POWER SUPPLY from DC ADAPTER

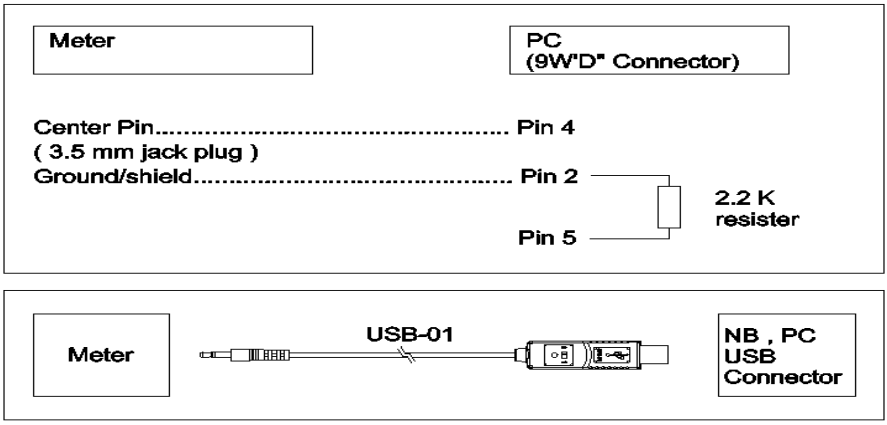
The meter also can supply the power supply from the DC 9V Power Adapter . Insert the plug of Power Adapter into " DC 9V Power Adapter Input Socket " (3-15, Fig. 1). The meter will use the DC ADAPTER power supply .

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 or NB USB port or serial port.



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		
	01=℃	02=℉	18= m V
	31=HZ	34 = V	36 = A
	38 = OHM	39 = K OHM	40 = M OHM
	43 = n F	44 = u F	46 = DIODE
	49 = AC mV	50 = ACV	52 = ACA
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

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