

# *SD card, real time* **DATALOGGER**

Model : DL-9602SD



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



**OPERATION MANUAL**

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# 1. FEATURES

- \* Real time SD memory card Datalogger, it can cooperate with most LUTRON instruments if it build in the computer interface.
- \* Built-in Clock and Calendar, real time data recorder , sampling time set from 1 second to 8 hours 59 minutes 59 seconds.
- \* Manual datalogger is available ( set the sampling time to 0 ), during execute the manual datalogger function, it can set the different place ( location ) No. ( place 1 to place 99 ).
- \* Innovation and easy operation, computer is not need to setup extra software, after execute datalogger, just take away the SD card from the meter and plug in the SD card into the computer, it can down load the measured value with the time information ( year/month/date/ hour/minute/second ) to the Excel directly, then user can make the further data or graphic analysis by themselves.
- \* SD card capacity : 1 GB to 16 GB.
- \* Can set the numerical decimal point character to " . " or " , " with default, then Datalogger data that saved into the SD card can be used in different country.
- \* Can set max. 9 channels data input with default.
- \* DC 1.5V battery ( UM-3 , AA ) x 6 or DC 9V adapter in.
- \* LCD with green light backlight, easy reading.
- \* RS232 signal output, can connect the external computer.

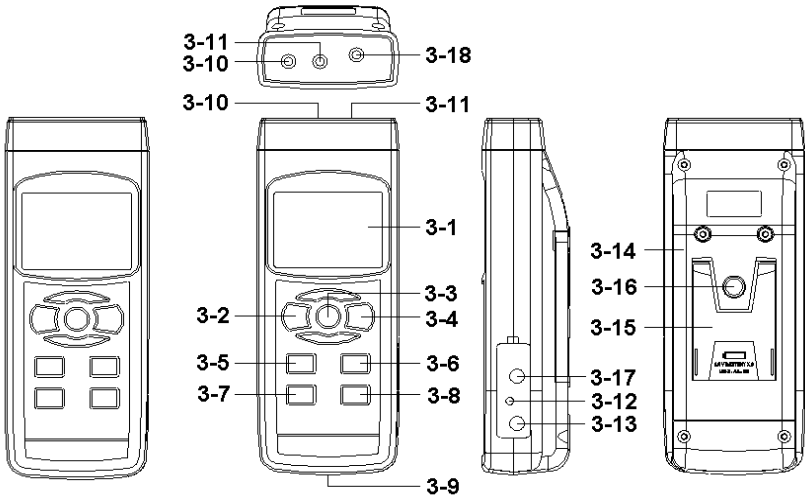
## 2. SPECIFICATIONS

Application	<ul style="list-style-type: none"> <li>* Real time SD memory card Datalogger can cooperate with all LUTRON instruments if it build in the computer interface.</li> <li>* Innovation and easy operation, computer no need to setup extra software, after execute datalogger, just plug in the SD card into the computer, it can down load the all the measured value and unit along with the time information ( year/month/date/ hour/minute/second ) to the Excel directly, user can make the further data or graphic analysis by themselves.</li> </ul>
Circuit	Custom one-chip of microprocessor LSI circuit.
Display	LCD size : 52 mm x 38 mm LCD with Backlight ( ON/OFF ).
Input Signal	Direct RS232 signal input. Isolate RS232 signal input.
Advanced setting	* SD memory card Format
	* Set input channel No. Set clock time ( Year/Month/Date, Hour/Minute/ Second )
	* Set sampling time ( Hour/Minute/ Second )
	* Auto power OFF management
	* Set LCD backlight ON/OFF
	* Set beeper sound ON/OFF
Power off	Auto shut off saves battery life or manual off by push button.

Sampling Time Setting range	Auto	2 seconds to 8 hours 59 min. 59 seconds. <i>@ Sampling time can set to 1 second, but memory data may loss</i>
	Manual	Push the data logger button once will save data one time. <i>@ Set the sampling time to 0 second.</i>
Data Output	RS 232/USB PC computer interface. * <i>The output data structure are same as the input data.</i> * <i>Connect the optional RS232 cable UPCB-02 will get the RS232 plug.</i> * <i>Connect the optional USB cable USB-01 will get the USB plug.</i>	
Operating Temperature	0 to 50 °C .	
Operating Humidity	Less than 85% R.H.	
Power Supply	* Alkaline or heavy duty DC 1.5 V battery ( UM3, AA ) x 6 PCs, or equivalent.	
	* DC 9V adapter input. ( AC/DC power adapter is optional ).	
Power Current	Normal operation ( w/o SD card save data and LCD Backlight is OFF ) : <i>Approx. DC 7 mA.</i>	
	When SD card save the data and LCD Backlight is OFF) : <i>Approx. DC 28 mA.</i>	
	* <i>If LCD backlight on, the power consumption will increase approx. 17 mA.</i>	
Weight	468 g/1.03 LB.	
Dimension	178 x 68 x 44 mm (7.0 x 2.7x 1.7 inch)	
Accessories Included	* Instruction manual..... 1 PC * Double earphone cable, UPCB-03 ..... 1 PC	

## 3. FRONT PANEL DESCRIPTION

Fig. 1

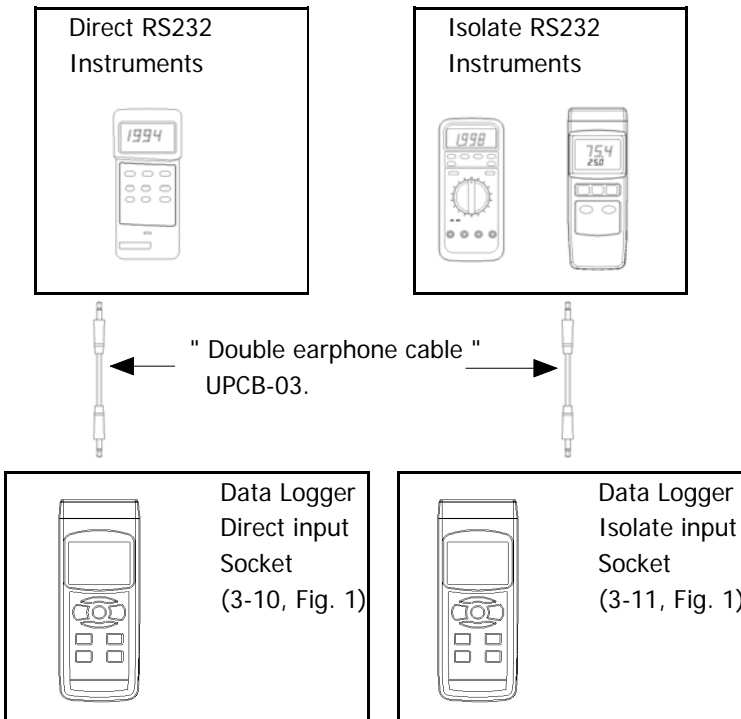


- 3-1 Display
- 3-2 Power Button
- 3-3 Backlight ON/OFF Button ( Esc Button )
- 3-4 LOGGER Button ( ENTER Button )
- 3-5 Channel Button ( ▲ Button )
- 3-6 Start/Pause Button
- 3-7 Time Button ( ▼ Button )
- 3-8 SET Button
- 3-9 SD card socket
- 3-10 Direct input socket
- 3-11 Isolate input socket
- 3-12 Reset Button
- 3-13 DC 9V Power Adapter Input Socket
- 3-14 Battery Compartment/Cover
- 3-15 Stand
- 3-16 Tripod Fix Nut
- 3-17 RS-232 Output Terminal
- 3-18 DCV output (Approx.DCV 8V, Max. output current : 100 mA )

## 4. MEASURING PROCEDURE

### 4-1 Wire connection

- 1) Connect the " Data Logger " to the " Data Source Meters " via the " Double earphone cable ", UPCB-03.
  - a. For connecting the Direct RS232 instruments should plug the UPCB-03 to the " DIRECT input Socket " ( 3-10, Fig. 1 ) of DL-9602SD.
  - b. For connecting the Isolate RS232 instruments should plug the UPCB-03 to the " ISOLATE input Socket " ( 3-11, Fig. 1 ) of DL-9602SD.
  - c. Should power on the " Data Source Meters " before input the data.



#### **4-2A Insert the SD card**

Prepare a " SD memory card " ( 1 GB to 16 GB, optional ), insert the SD card into the " SD card socket " ( 3-9, Fig. 1). The front panel of the SD card should face against the down case.

#### **4-2B Decimal point setting consideration**



The numerical data structure of SD card is default used the " . " as the decimal, for example "20.6" "1000.53" . But in certain countries ( Europe ...) is used the " , " as the decimal point, for example " 20, 6 " "1000,53". Under such situation, it should change the Decimal character at first, details of setting the Decimal point, refer to Chapter 6-8, page 17

#### **4-3 Data logger ( Save the measuring data with time information )**

##### **Auto Datalogger ( Set sampling time $\geq$ 1 second )**

###### **a. Start the datalogger**

Press the " LOGGER Button ( 3-4, Fig. 1 ) once , the lower position of LCD will show the text " DATALOGGER " and flashing per sampling time ( for example 2 seconds.... ), at the same time the measuring data along the time information will be saved into the memory circuit, the Beeper will sound ( if beeper sound is enable, refer to Chapter 6-7, page 17 ).

*Remark :*

\* *How to set the sampling time, refer to Chapter 6-4, page 15.*



## b. Pause the datalogger

During execute the Datalogger function ( the lower LCD show the text " DATALOGGER " with flashing ), if press the " Start/Pause Button " ( 3-6, Fig. 1 ) will pause the Datalogger function ( stop to save the measuring data into the memory circuit temporarily ). In the same time the lower LCD will show the text of " LOGGER " ( without flashing ).

*Remark :*

*If press the " Start/Pause Button " ( 3-6, Fig. 1 ) once again will execute the Datalogger again, the lower LCD will show the flashing text of " DATALOGGER " per sampling time.*

### **Manual Datalogger ( Set sampling time = 0 second )**

Set sampling time is to 0 second .

Press the " LOGGER Button ( 3-4, Fig. 1 ) once , the lower position of LCD will show the text " LOGGER " . If press the " Start/Pause Button " ( 3-6, Fig. 1 ) once the measuring data along the time information will be saved into the memory circuit, the text " DATA " will be flashed and Beeper will sound ( if beeper sound is enable ).

*Remark :*

*During execute the Manual Datalogger, it can use the " ▲ Button " ( 3-5, Fig. 5 ) or " ▼ Button " ( 3-7, Fig. 1 ) to set the measuring place ( 1 to 99 place, for example room 1 to room 99 ) to identify the measurement location , the lower Display will show P x ( x = 1 to 99 ).*

### c. Finish the datalogger

During the period of executing the Datalogger function, if press the LOGGER Button ( 3-4, Fig. 1 ) once will finish the Datalogger function. Then the text of " DATALOGGER " will be disappeared. Following the lower LCD will show the text " DATA ", in the same time the lower Display will count down from the certain no to zero, it means the logger data along the time information are saved into the SD card now.



*Remark :*

- 1. During the lower LCD show the text " DATA ", please do not take away the SD card from the meter, otherwise the SD card may damaged.*
- 2. After the text " DATA " is disappeared, then it can take the SD card away from the meter*

### d. LCD text description when execute datalogger

DATALOGGER	When execute the datalogger function, The " DATALOGGER " will be flashed per sampling time.
LOGGER	The datalogger function is paused temporally.
DATA	When finish the Datalogger function, during the period that memorized data is saved into the SD card , the LCD will show text " DATA " .
EMPTY	The SD card is not plugged into the meter.
ErrX	Error

e. Data structure

1) When the first time, the SD card is used into the meter, the SD card will generate a route :

***DLG01***

2) If the first time to execute the Datalogger, under the route DLG01\, will generate a new file name DLG01001.XLS.

After exist the Datalogger, then execute again, the data will save to the DLG01001.XLS until Data column reach to 30,000 columns, then will generate a new file, for example DLG01002.XLS

3) Under the route DLG01\, if the total files more than 99 files, will generate anew route, such as DLG02\ .....

4) The file's route structure :

```
DLG01\  
  DLG01001.XLS  
  DLG01002.XLS  
  .....  
  DLG01099.XLS  
DLG02\ .....  
  DLG02001.XLS  
  DLG02002.XLS  
  .....  
  .....  
DLG03\ .....  
  
.....  
.....
```

#### ***4-4 To check the time information***

Under the normal measurement condition ( it do not execute the Datalogger function ).

- 1) Press " Time Button " ( 3-7, Fig. 1 ) once , the lower LCD display will present the time information of Hour/Minute/Second ( h.m.s ) in the lower Display.
- 2) Press " Time Button " ( 3-7, Fig. 1 ) once again , the lower LCD display will present the time information of Year/Month/Date ( yy.mm.dd ) in the lower Display.
- 3) Press " Time Button " ( 3-7, Fig. 1 ) once again , the LCD will return to normal screen.

#### ***4-5 To check the channel information***

The meter can set max. 9 channels data input with default. The channel No. ( 1 to 9 ) is depend your meter's character, For example :

Humidity/Temp. meter

It build two channels, channel 1 is Humidity value, channel 2 is Temperature Value.

4 channel Thermometer

It build 4 channels, channel 1 is Temp. 1 value, channel 2 is Temp. 2 value, channel 3 is Temp. 3 value, channel 4 is Temp. 4 value.

Digital multimeter

It build one channel only, channel value is ACV, DCV, ACA. DCA, or resistance.....

The meter only can show the two channel's data value. Upper Display present the channel 1 value, the lower Display present the channel 2 value.

Suppose you already set the meter to accept 4 channels input, if intend to show the channel 3, channel 4 value, then during execute the Datalogger function ( the lower LCD show text " Datalogger " with flashing ), then press " Channel Button " ( 3-5, Fig. 1 ) once will show the channel 3 value, press " Channel Button " once again will show the channel 4 value.

*Remark :*

*How to set the channel No., refer to Chapter 6-2, page 14.*

#### **4-6 LCD backlight ON/OFF**

Press the " Backlight ON/OFF Button " (3-3, Fig. 1 " once will turn Off the LCD backlight. Press the " Backlight ON/OFF Button " (3-3, Fig. 1 " once again will turn ON the LCD backlight again.

#### **4-7 To check the sampling time**

It do not execute the Datalogger function.

If press " Set Button " ( 3-8, Fig. 1 ) once , the lower LCD display will present the sampling time.

## **5. Download the saving data from the SD card to the computer ( EXCEL software )**

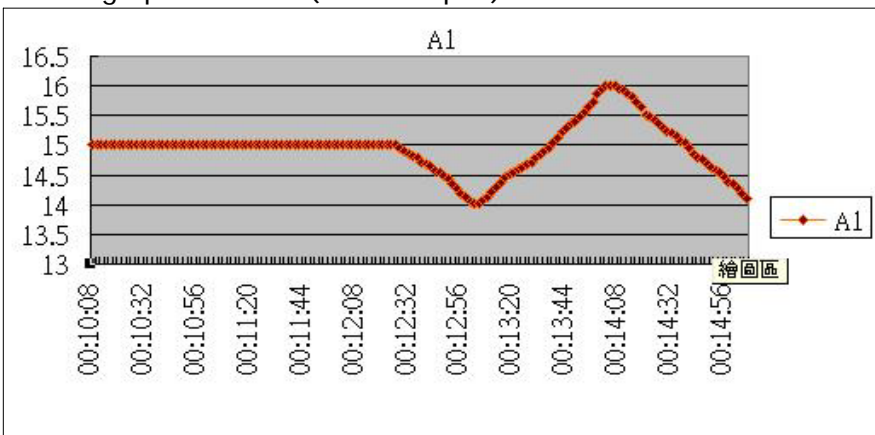
- 1) After execute the Data Logger function, take away the SD card out from the " SD card socket " ( 3-9, Fig. 1 ).
- 2) Plug in the SD card into the Computer's SD card slot ( if your computer build in this installation ) or insert the SD card into the " SD card adapter ". then connect the " SD card adapter " into the computer.

3) Power ON the computer and run the " EXCEL software ".  
 Down load the saving data file ( for example the file name : DLG01001.XLS, DLG01002.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 ( for example )

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

EXCEL graphic screen ( for example )



## 6. ADVANCED SETTING

It do not execute the Datalogger function.

Press the " SET Button " ( 3-8, Fig. 1 ) continuously at least two seconds will enter the " Advanced Setting " mode. then press the " Set Button " once a while in sequence to select the eight main function, the lower display will show :

**Sd F.....** SD memory card Format

**InPut....**Set input channel No.

**dAtE.....** Set clock time ( Year/Month/Date, Hour/Minute/Second )

**SP-t.....** Set sampling time ( Hour/Minute/Second )

**PoFF.....** Auto power OFF management

**Light.....**Set LCD backlight ON/OFF

**bEEP.....**Set beeper sound ON/OFF

**dEC.....**Set SD card Decimal character

**ESC.....**Escape from the advanced setting

**Remark :**

***During execute the " Advanced Setting " function, if press " Esc Button " ( 3-3, Fig. 1 ) will exit the " Advanced Setting " function, the LCD will return to normal screen.***

### **6-1 SD memory card Format**

When the lower display show " Sd F "

- 1) Use the " ▲ Button " ( 3-5, Fig. 1 ) or " ▼ Button " ( 3-7, Fig. 1 ) to select the upper value to " yES " or " no " .

**yES - Intend to format the SD memory card**

**no - Not execute the SD memory card format**

- 2) If select the upper to " yES ", press the " Enter Button " ( 3-4, Fig. 1 ) once again, the Display will show text " yES Enter " to confirm again, if make sure to do the SD memory card format, then press " Enter Button " once will format the SD memory clear all the existing data that already saving into the SD card.

### ***6-2 Set the input channel No.***

When the lower display show " Input "

- 1) Use the " ▲ Button " ( 3-5, Fig. 1 ) or " ▼ Button " ( 3-7, Fig. 1 ) to set the input channel No. ( 1 to 9 ).
- 2) After set the channel No, press the " Enter Button " ( 3-4, Fig. 1 ) will save the setting function with default.

*Remark :*

- \* The meter can set max. 9 channels data input with default.*
- \* The channel No. ( 1 to 9 ) is depend your meter's character.*



### **6-3 Set clock time ( Year/Month/Date, Hour/Minute/ Second )**

When the upper display show " dAtE "

- 1) Use the " ▲ Button " ( 3-5, Fig. 1 ) or " ▼ Button " ( 3-7, Fig. 1 ) to adjust the value ( Setting start from Year value ). After the desired value is set, press the " Enter Button " ( 3-4, Fig. 1 ) once will going to next value adjustment ( for example, first setting value is Year then next to adjust Month, Date, Hour, Minute, Second value ).

*Remark :*

*The adjusted value will be flashed.*

- 2) After set all the time value ( Year, Month, Date, Hour, Minute, Second ), press the " SET Button " ( 3-8, Fig. 1 ) once will save the time value, then the screen will jump to " Sampling time " setting screen ( Chapter 6-4 ).

*Remark :*

*After the time value is setting, the internal clock will run precisely even Power off if the battery is under normal condition ( No low battery power ).*

### **6-4 Set sampling time ( Hour/Minute/Second )**

When the upper display show " SP-t "

- 1) Use the " ▲ Button " ( 3-5, Fig. 1 ) or " ▼ Button " ( 3-7, Fig. 1 ) to adjust the value ( Setting start from Hour value ). After the desired value is set, press the " Enter Button " ( 3-4, Fig. 1 ) once will going to next value adjustment ( for example, first setting value is Hour then next to adjust Minute, Second value ).

*Remark :*

*The adjusted value will be flashed.*

- 2) After set all the sampling time value ( Hour, Minute, Second ), press the " SET Button " ( 3-8, Fig. 1 ) once will save the sampling value with default then the screen will jump to " Auto power OFF " setting screen ( Chapter 6-5 ).

### ***6-5 Auto power OFF management***

When the lower display show " PoFF "

- 1) Use the " ▲ Button " ( 3-5, Fig. 1 ) or " ▼ Button " ( 3-7, Fig. 1 ) to select the upper value to " yES " or " no " .

**yES - Auto Power Off management will enable.**

**no - Auto Power Off management will disable.**

- 2) After select the upper text to " yES " or " no ", press the " Enter Button " ( 3-4, Fig. 1 ) will save the setting function with default.

### ***6-6 Set LCD backlight ON/OFF***

When the lower display show " Light "

- 1) Use the " ▲ Button " ( 3-5, Fig. 1 ) or " ▼ Button " ( 3-7, Fig. 1 ) to select the upper value to " yES " or " no " .

**yES - LCD backlight will be lit when meter is power ON.**

**no - LCD backlight will be OFF when meter is power ON.**

2) After select the upper text to " yES " or " no ", press the " Enter Button " ( 3-4, Fig. 1 ) will save the setting function with default.

### ***6-7 Set beeper sound ON/OFF***

When the lower display show " bEEP "

1) Use the " ▲ Button " ( 3-5, Fig. 1 ) or " ▼ Button " ( 3-7, Fig. 1 ) to select the upper value to " yES " or " no ".

**yES - Meter's beep sound will be ON with default.**  
**no - Meter's beep sound will be OFF with default.**  
**is power ON.**

2) After select the upper text to " yES " or " no ", press the " Enter Button " ( 3-4, Fig. 1 ) will save the setting function with default.

### ***6-8 Decimal point of SD card setting***

The numerical data structure of SD card is default used the " ." as the decimal, for example "20.6" "1000.53" . But in certain countries ( Europe ...) is used the " ," as the decimal point, for example " 20,6 " "1000,53". Under such situation, it should change the Decimal character at first.

When the lower display show " dEC "

1) Use the " ▲ Button " ( 3-5, Fig. 1 ) or " ▼ Button " ( 3-7, Fig. 1 ) to select the upper value to " bASIC " or " Euro ".


**bASIC - Use " ." as the Decimal point with default.**  
**Euro - Use " ," as the Decimal point with default.**

- 2) After select the upper text to " BASIC " or " Euro ", press the " Enter Button " ( 3-4, Fig. 1 ) will save the setting function with default.

## 7. POWER SUPPLY from DC ADAPTER

The meter also can supply the power supply from the DC 9V Power Adapter ( optional ). Insert the plug of Power Adapter into " DC 9V Power Adapter Input Socket " ( 3-13, Fig. 1 ). The meter will permanent power ON when use the DC ADAPTER power supply ( The power Button function is disable ).

## 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 " ( 3-14, 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 6 PCs, and reinstate the cover.
- 4) Make sure the battery cover is secured after changing the battery.

## 9. SYSTEM RESET

If the meter happen the troubles such as :

*CPU system is hold ( for example, the key button can not be operated... ).*

Then make the system RESET will fix the problem.  
The system RESET procedures will be either following method :

During the power on, use a pin to press the " Reset Button " ( 3-12, Fig. 1 ) once a while will rest the circuit system.

## 10. PATENT

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

Germany	Nr. 20 2008 016 337.4
JAPAN	3151214
TAIWAN	M 358970 M 359043
CHINA	ZL 2008 2 0189918.5 ZL 2008 2 0189917.0
USA	Patent pending