

SD Card real time data recorder
Precision and General measurement, 2 in 1
MAGNETIC METER



Precision
probe



General
probe



Your purchase of this MAGNETIC METER marks a step forward for you into the field of precision measurement. Although this Meter is a complex and delicate instrument, its durable structure developed. Please read the following instructions carefully and always keep this manual within easy reach.

OPERATION MANUAL

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1. FEATURES

- * Wide range, 2 in1 general purpose magnetic measurement for industrial, mechanical, material, electrical, laboratory field usage.
- * **Precision milli magnetic field measurement**
Unit : μT (micro Tesla), mG (milli Gauss)
- * **General magnetic field measurement**
- * G (Gauss), mT (milli Tesla).
- * DC and AC magnetic field measurement
- * N pole/S pole indicator.
- * Use Hall sensor with automatic Temp. compensation.
- * Zero button for DC/AC magnetic function.
- * Separate probe, easy operation and convenient for remote measurement.
- * RS232/USB computer interface.
- * Microprocessor circuit assures maximum possible accuracy, provides special functions and features.
- * Heavy duty & compact housing
- * Auto shut off is available to save battery life.
- * Real time SD memory card Datalogger, it Built-in Clock and Calendar, real time data recorder , sampling time set from 1 second to 3600 seconds.
- * Manual datalogger is available (set the sampling time to 0), during execute the manual datalogger function, it can set the different position (location) No. (position 1 to position 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 all the measured value with the time information (year/month/date / hour/minute/second) to the Excel directly, then user can make the further data or graphic analysis by themselves.
- * SD card capacity : 1 GB to 16 GB.
- * TFT LCD with can select from 4rd-order White LCD Backlight brightness.
- * Can default auto power off or manual power off.
- * Data hold, record max. and min. reading.
- * Microcomputer circuit, high accuracy.
- * Power by UM3/AA (1.5 V) x 6 batteries or DC 9V adapter.

2. SPECIFICATIONS

2-1 General Specifications

Circuit	Custom one-chip of microprocessor LSI circuit.	
Display	TFT LCD size : 95 mm x 55 mm	
Datalogger Sampling Time Setting range	Auto	1,2,5,10,30,60,120,300,600,1800,3600 sec. @ Sampling time can set to 1 second, but memory data may loss.
	Manual	Push the data logger button once will save data one time. @ Set the sampling time to 0 second. @ Manual mode, can also select the 1 to 99 position (Location) no.
Data error no.	≤ 0.1 % no. Of total saved data typically.	
Field Direction	Uniaxial.	
Data Hold	Freeze the display reading.	
Memory Recall	Maximum & Minimum value.	
Display Sampling Time	Approx. 1 second.	
Power off	Manual off by push button or Auto shut off (Approx. 10 minute) to save battery life. (when there is not any operating & measurement)	
Operating Temperature	0 to 50 °C.	
Operating Humidity	Less than 85% R.H.	

Data Output	RS 232/USB PC serial interface. * Connect the optional RS232 cable UPCB-02 will get the RS232 plug. * Connect the optional USB cable USB-01 will get the USB plug.	
Power Supply	(Alkaline or Heavy duty type 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) : Approx. DC 138 mA.	
	When SD card save the data but and LCD Backlight is OFF) : Approx. DC 35 mA.	
	* LCD Backlight brightness select from 4 rd-order consumption will increase approx .11~30 mA.	
Weight	Approx. 1835 g/ 4.04 LB. W/O Battery (Meter & 2 pcs probe)	
Dimension	Main instrument : 292 x 236 x 98 mm (11.5 x 9.3 x 3.9 inch)	Probe A: 195 x 25 x 19 mm (7.7 x 1.0 x 0.7 inch).
		Probe B: 177 x 29 x 17 mm (6.9 x 1.14 x 0.66 inch).
Accessories Included	Instruction manual..... 1 PC General Magnetic Probe..... 1 PC Precision milli Magnetic Probe..... 1 PC	
Optional Accessories	RS232 cable, UPCB-02 USB cable, USB-01 Data Acquisition software, SW-U801-WIN Excel Data Acquisition software, SW-E802 AC to DC 9V adapter. SD CARD	

* Above specification tests under the environment RF Field Strength less than 3
V/M & frequency less than 30 MHz only.

2-2 General Specifications

A. Precision milli magnetic field measurement

Measurement		Range		Resolution	Accuracy at 23 ± 5 °C
DC Unit	μT	Range 1	±30 μT	0.01 μT	± (2% F.S + 2 mG) * -1,000 to 1,000 mG * -100.0 to 100.0 μT
		Range 2	±300 μT	0.1 μT	
	mG	Range 1	±300 mG	0.1 mG	
		Range 2	±3000 mG	1 mG	
AC Unit 50/60 Hz	μT	Range 1	30 μT	0.01 μT	± (2% F.S + 2 mG) * 0 to 1,000 mG * 0 to 100.0 μT
		Range 2	300 μT	0.1 μT	
	mG	Range 1	300 mG	0.1 mG	
		Range 2	3000 mG	1 mG	
Sensor Type		MI Type sensor.			

mG : milli Gauss μT : micro Tesla

F.S : Full scale

B. General magnetic field measurement

Measurement		Range		Resolution	Accuracy at 23 ± 5 °C
DC Unit	mT	Range 1	300.00 mT	0.01 mT	± (5%reading+ 10 d)
		Range 2	3,000.0 mT	0.1 mT	
	G	Range 1	3,000.0 G	0.1 G	
		Range 2	30,000 G	1 G	
AC Unit 50/60 Hz	mT	Range 1	150.00 mT	0.01 mT	± (5%reading+ 10 d)
		Range 2	1,500.0 mT	0.1 mT	
	G	Range 1	1,500.0 G	0.1 G	
		Range 2	15,000 G	1 G	
Sensor Type		Hall sensor.			

G : Gauss mT : milli Tesla

3. FRONT PANEL DESCRIPTION

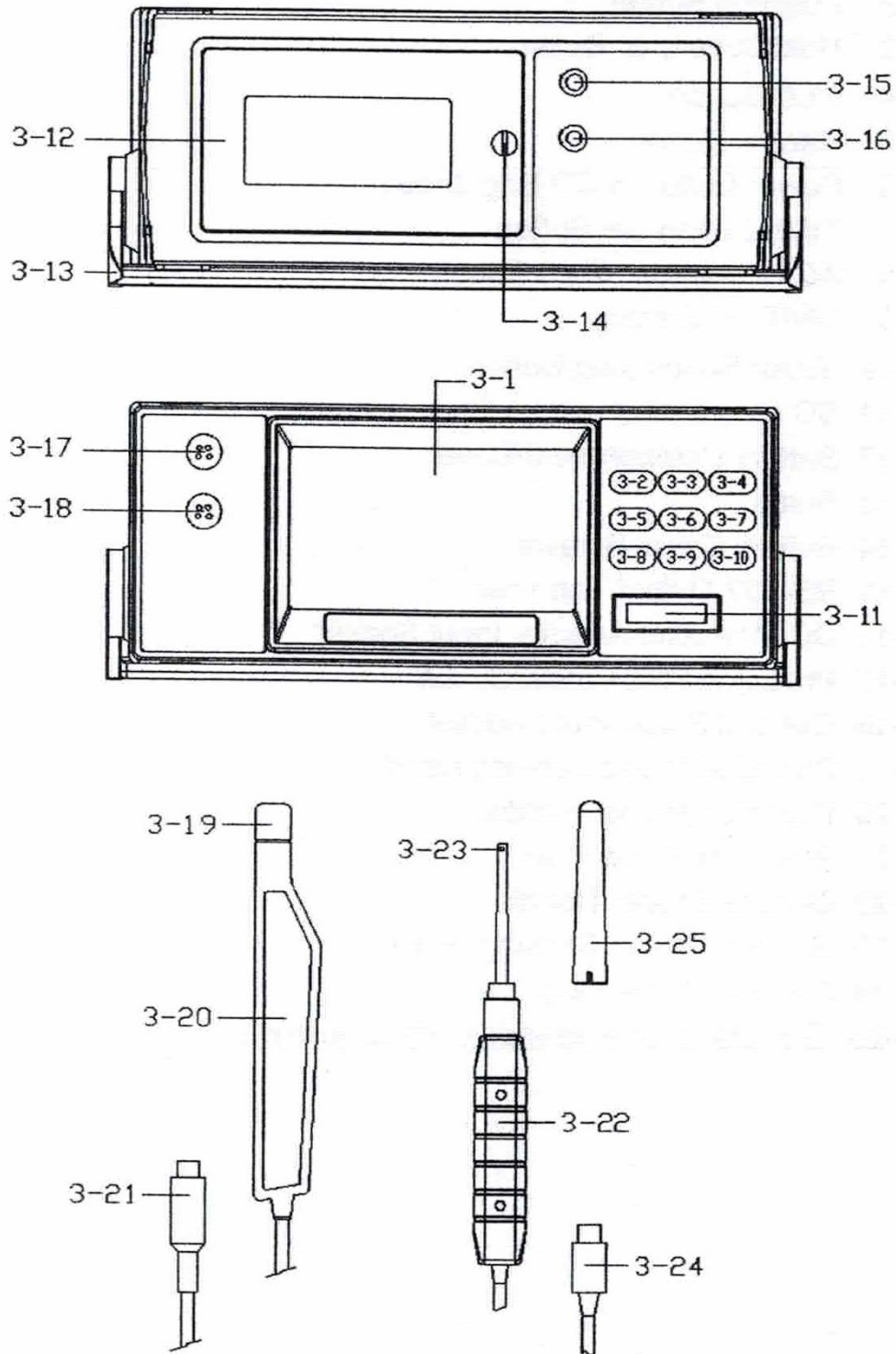


Fig.1

- 3-1 Display
- 3-2 Function Button
- 3-3 Hold Button, ▲ Button
- 3-4 REC Button
- 3-5 Range Button
- 3-6 Power Button , LCD Brightness
- 3-7 TIME Button,Set Button
- 3-8 AC/DC Button , Zero Button
- 3-9 UNIT, ▼ Button,
- 3-10 Enter Button ,Log Button
- 3-11 SD card socket
- 3-12 Battery Compartment/Cover
- 3-13 Stand
- 3-14 Battery Cover Screws
- 3-15 RS-232 Output Terminal
- 3-16 DC 9V Power Adapter Input Socket
- 3-17 Precision Probe Input Socket
- 3-18 General Probe Input Socket
- 3-19 Precision Probe Sensing Head
- 3-20 Precision Probe Handle
- 3-21 Precision Probe Plug
- 3-22 General Probe Handle
- 3-23 General Probe Sensing Head
- 3-24 General Probe Plug
- 3-25 General probe sensor protection cover

4. MEASURING PROCEDURE

4-1 AC/DC magnetic field measurement

A. General magnetic field measurement

- 1) Power ON the meter by pressing and holding the " Power Button " (3-6, Fig. 1) for at least 2 seconds .
- 2) General magnetic field measurement Function by pressing the " Function Button " (3-2, Fig. 1) to select General measure function .
- 3) General Probe Plug (3-24, Fig. 1) into the meter General Probe Input Socket (3-18, Fig. 1)
- 4) "DC" or "AC" measurement Function select by pressing the " AC/CD Button " (3-8, Fig. 1) to select measure function DC or AC function .
- 5) magnetic field measurement range select by pressing the " Range Button " (3-5, Fig. 1) to select ' Range 1 or 'Range 2 .
- 6) unit selection by press the " Unit Button " (3-9, Fig. 1) to select the unit mT or G .

DC magnetic field measurement

- * The Display will show " N " or " S " indicator.
- * North pole : Display will show " N " indicator
- * South pole : Display will show " S " indicator

AC magnetic field measurement

- * Display will show " AC " indicator.
- * Display will not show " N (S) indicator.

- 5) General magnetic field contact and close the testing material to the probe head , the Display will show the magnetic field value along with the unit (mT,G).

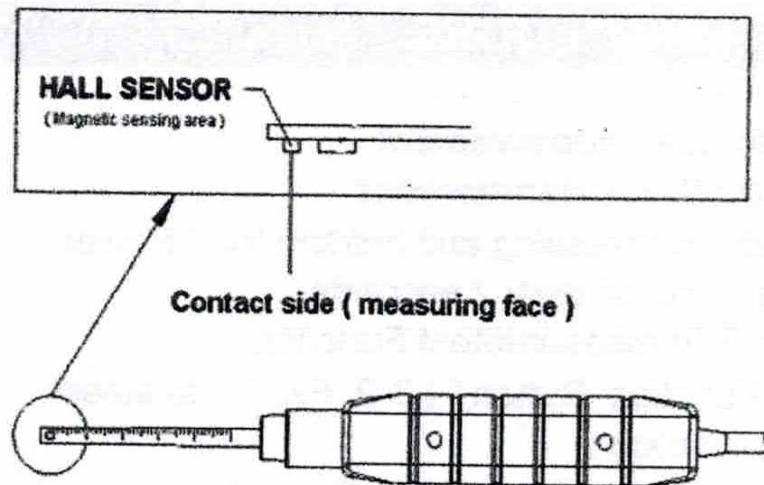


Fig. 3

6.) Relative measurement :

1. General, before the measurement the display will not show zero due to the it will present the environment earth's magnetic field value, it is normal.
2. For precision DC ,AC magnetic field measurement it should deduct those "not zero " value (existing environment earth's magnetic field value) at first . Before the measurement, fix the probe at the exact position, by pressing and holding the" ZERO (3-8 , Fig. 1) " continuously at least two seconds until the Display show " ZERO " indicator then release the finger from the button.
 - *press the " ZERO Button " (3-8, Fig 1) continuously at least 2 seconds the " ZERO " indicator will be disappeared and the Display will return to the value ." no zero "value (show the environment magnetic field.
3. Contact and close the testing material to the probe head (refer Fig. 3, page 8) the display will show the magnetic field value along with the unit (G,mT).

B Precision magnetic field measurement

- 1) Power ON the meter by pressing and holding the " Power Button " (3-6, Fig. 1)for at least 2 seconds .
- 2) Precision magnetic field measurement Function by pressing the " Function Button " (3-2, Fig. 1) to select Precision measure function .

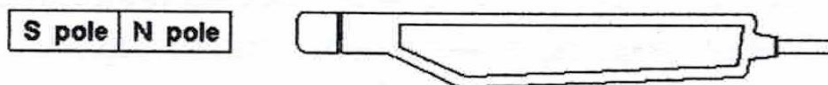
- 3) Precision Probe Plug (3-21, Fig. 1) into the meter Precision Probe Input Socket (3-17, Fig. 1)
- 4) "DC" or "AC" measurement Function select by pressing the " AC/CD Button " (3-8, Fig. 1) to select measure function DC or AC function .
- 5) magnetic field measurement range select by pressing the " Range Button " (3-5, Fig. 1) to select ' Range 1 or 'Range 2 .
- 6) unit selection by press the " Unit Button " (3-9, Fig. 1) to select the unit micro Tesla or milli Gauss .

a. Measurement Consideration

Display direction:

DC magnetic field measurement

Display value (+)



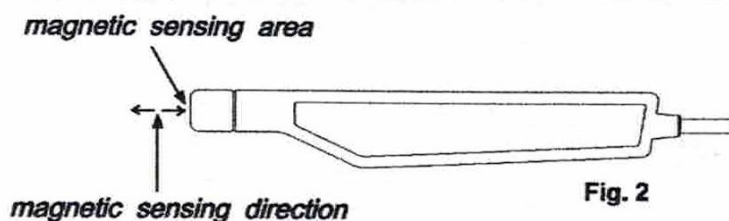
*** North pole : Display will show " N " indicator**

*** South pole : Display will show " S " indicator**

AC magnetic field measurement

*** Display will show " AC " indicator.**

1 : Probe head sensing area and the sensing direction :



2. When the measure value is over then ± 3500 mG, the display will show " _____ " (≥ 3500 mG) or " _____ " (≤ 3500 mG).

3. Environment Earth's magnetic not zero when power on the meter , the display will show certain values(not zero value for example 195 mG...),it is normal due to the instrument is the high precision magnetometer, it can measure the absolute environment Earth's magnetic field as reference For the material precision DC magnetic measurement, it should deduct those " not zero value (environment earth's magnetic field value) at first, details please refer to the following section " B. b,c DC measurement "

b.) DC magnetic field measurement

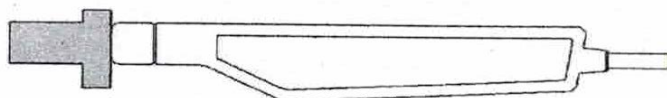
1. As the device has extremely high sensitivity, the LCD display will very greatly even aslight movement the probe. It is recommended to firmly fix the probe before measurement.
2. Power ON the meter by pressing the " Power Button "(3-6 Fig 1) >2 S.
3. Select the unit (mG or uT) by press the " UNIT Button "(3-9 Fig 1)once.

c.) Relative measurement :

1. General, before the measurement the display will not show zero due to the it will present the environment earth's magnetic field value, it is normal.
2. For Precision DC, AC magnetic field measurement it should deduct those "not zero " value (existing environment earth's magnetic field value) at first .Before the measurement, fix the probe at the exact position, by pressing and holding the"ZERO (3-8 , Fig. 1) " continuously at least two seconds until the Display show " ZERO " indicator then release the finger from the button.

*press the " ZERO Button " (3-8, Fig 1) continuously at least 2 seconds the " ZERO " indicator will be disappeared and the Display will return to the value)." no zero "value (show the environment magnetic field.

3. Contact and close the testing material to the probe head (refer Fig. 2, page 9) the display will show the magnetic field value along with the unit (mG,uT).



testing material contact (close) to probe head

d.) AC magnetic field measurement

The measurement procedures are similar as section 4-1 DC magnetic field measurement but should select the function to " AC " , the procedures are :

- 1) power on the meter by press the " power button " > 2 Sec.
- 2) press the " AC/DC button " once ,the display will show " AC " symbol , now the meter is ready for AC magnetic field measurement.

4-2 Data Hold

During the measurement, press the " Hold Button " (3-3, Fig. 1) once will hold the measured value & the LCD will display a " HOLD " symbol.

* Press the " Hold Button " once again will release the data hold function.

4-3 Data Record (Max., Min. reading)

- 1) The data record function records the maximum and minimum readings. Press the " REC Button " (3-4, Fig. 1) once to start the Data Record function and there will be a " RECORD " symbol on the display.
- 2) With the " RECORD " symbol on the display :
 - a) Press the " REC Button " (3-4, Fig. 1) once, the "RECORD MAXIMUM " symbol along with the maximum value will appear on the display.
 - b) Press the "REC Button "(3-4, Fig. 1) again, the " RECORD MINIMUM " symbol along with the minimum value will appear on the display.
 - c) To exit the memory record function, just press the " REC Button " for at least 2 seconds. The display will revert to the current reading.

Remark :

When make the DC magnetic field measurement and execute the " RECORD " function, it can not change from the " North pole " to " South pole " or from the " South pole " to " North pole " during the measurement. It can make the measurement under the same pole (S pole or N pole) only, otherwise the Max., Min. value will be no sense.

4-4 LCD brightness select

Depending on the brightness of the environment, can use the "Backlight Button " (3-6, Fig. 1) select from 4 rd-order LCD Backlight brightness.

5. DATALOGGER

5-1 Preparation before execute datalogger function

a. Insert the SD card

Prepare a " SD memory card " (1 G to 16 G, optional), insert the SD card into the " SD card socket " (3-11, Fig. 1). The front panel of the SD card should face against the the down case.

*** It recommend use memory card \leq 4 GB.**

b. SD card Format

If SD card just the first time use into the meter, it recommend to make the " SD card Format " at first. , please refer chapter 7 & 7-1, (page 18,19).

*** It recommend strongly, do not use memory cards that have been formatted by other meter or by other installation (such as camera...) .**

Reformat the memory card with your meter.

*** If the SD memory card exist the trouble during format by the meter use the computer to reformat again can fix the problem .**

c. Time setting

If the meter is used at first time, it should to adjust the clock time exactly, please refer chapter 7 & 7-2 (page 18.19).

d. Decimal for 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 7 & 7-6, page 18 & 21.

5-2 Auto Datalogger (Set sampling time \geq 1 second)

a. Start the datalogger

Press the " LOG Button (3-10, Fig. 1) > 2 seconds continuously, the LCD will show the text of " DATA LOGGER " indicator and flashing per second, at the same time the measuring data along the time information will be saved into the memory circuit.

Remark :

- * **How to set the sampling time, refer to Chapter 7 & 7-3, page 18 & 20.**
- * **How to set the beeper sound is enable, refer to Chapter 7 & 7-5, page 18 & 21 .**

b. Pause the datalogger

During execute the Datalogger function, if press the " LOG Button " (3-10, Fig. 1) once will pause the Datalogger function (stop to save the measuring data into the memory circuit temporarily). In the same time the " DATA LOGGER " symbol will stop flashing.

Remark :

If press the " LOG Button " (3-10, Fig. 1) once again will execute the Datalogger again, the " DATA LOGGER " symbol will flashing.

c. Finish the Datalogger

During execute the Datalogger function, press the " LOG Button (3-10, Fig. 1) > 2 seconds continuously again will finish the datalogger function, the " DATA LOGGER " text will be disappeared and finish the Datalogger function.

5-3 Manual Datalogger (Set sampling time = 0 second)

a. Set sampling time is to 0 second

Press the " LOG Button (3-10, Fig. 1) > 2 seconds, the LCD will show the indicator " DATA LOGGER " and " Position no. " symbol then press the " LOG Button " (3-10, Fig. 1) once , the " DATA LOGGER " symbol will flashing once and Beeper will sound once at the same time the measuring data along the time information will be saved into the memory circuit .

Remark :

During execute the Manual Datalogger, it can use the " ▲ Button " (3-3, Fig. 1) or " ▼ Button " (3-9, Fig. 1) to set the measuring position (1 to 99, for example room 1 to room 99) to identify the measurement location , the Below the Display will show P x (x = 1 to 99).

b. Finish the Datalogger

During execute the Datalogger function, press the " LOG Button (3-10, Fig. 1) > 2 seconds continuously again will finish the Datalogger function.

5-4 Check time & Sampling time information

During the normal measurement
If press " Time Button " (3-7, Fig. 1)
once , the LCD display will present the time information of Year/Month/Date , Hour/ Minute/Second and the Sampling time (Second) information.

5-5 SD Card Data structure

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

MGB01

- 2) If the first time to execute the Datalogger, under the route MGB01\, will generate a new file name MGB01001.XLS.
After exist the Datalogger, then execute again, the data will save to the MGB01001.XLS until Data column reach to 30,000 columns, then will generate a new file, for example MGB01002.XLS
- 3) Under the folder MGB01\, if the total files more than 99 files, will generate anew route, such as MGB02\
- 4) The file's route structure :

```
MGB01\  
    MGB01001.XLS  
    MGB01002.XLS  
    .....  
    MGB01099.XLS  
MGB02\  
    MGB02001.XLS  
    MGB02002.XLS  
    .....  
    MGB02099.XLS  
MGBXX\  
    .....
```

Remark : XX - Max. value is 10.

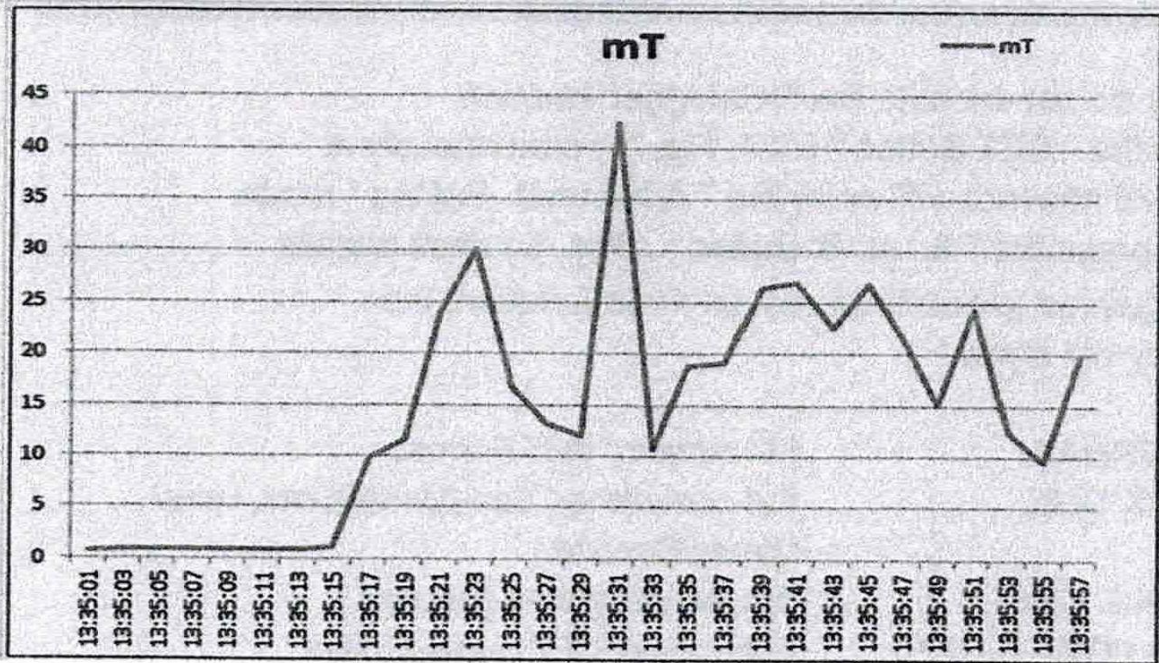
6. Saving data from the SD card to the computer (EXCEL software)

- 1) After execute the Data Logger function, take away the SD card out from the " SD card socket " (3-11, 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 : MGB01001.XLS, MGB01002.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 graphic screen (for example)

	A	B	C	D	E
1	Place	Date	Time	Value	Unit
2		8	2012/11/30	13:35:01	0.7 N mT
3		9	2012/11/30	13:35:03	0.8 N mT
4		10	2012/11/30	13:35:05	0.8 N mT
5		11	2012/11/30	13:35:07	0.8 N mT
6		12	2012/11/30	13:35:09	0.8 N mT
7		13	2012/11/30	13:35:11	0.8 N mT
8		14	2012/11/30	13:35:13	0.8 N mT
9		15	2012/11/30	13:35:15	1.1 N mT
10		16	2012/11/30	13:35:17	9.8 N mT
11		17	2012/11/30	13:35:19	11.6 N mT
12		18	2012/11/30	13:35:21	23.9 N mT
13		19	2012/11/30	13:35:23	30.2 N mT
14		20	2012/11/30	13:35:25	16.8 N mT
15		21	2012/11/30	13:35:27	13.2 N mT
16		22	2012/11/30	13:35:29	12 N mT
17		23	2012/11/30	13:35:31	42.4 N mT
18		24	2012/11/30	13:35:33	10.8 N mT
19		25	2012/11/30	13:35:35	18.9 N mT
20		26	2012/11/30	13:35:37	19.1 N mT
21		27	2012/11/30	13:35:39	26.4 N mT
22		28	2012/11/30	13:35:41	27 N mT
23		29	2012/11/30	13:35:43	22.5 N mT
24		30	2012/11/30	13:35:45	26.8 N mT
25		31	2012/11/30	13:35:47	21.7 N mT
26		32	2012/11/30	13:35:49	15.2 N mT

EXCEL graphic screen (for example)



7. ADVANCED SETTING

Under do not execute the Datalogger function, press the " SET Button " (3-7, Fig. 1) continuously at least >2 seconds will enter the " Advanced Setting " mode. then press the " ▲ or ▼ Button " (Fig. 1) once a while in sequence to select the seven main function, the display will show :

SD FORMAT	SD memory card Format
CLOCK TIME	Set clock time (Year/Month/Date, Hour/Minute/Second)
SAMPLE TIME	Set sampling time (Second)
AUTO POWER OFF	Auto power OFF management
BEEPER SOUND	Set beeper sound ON/OFF
DECIMAL POINT	Set SD card Decimal character
ESCAPE SETTING	Escape from the advanced setting

Remark :

During execute the " Advanced Setting " function, if press " SET Button " (3-7, Fig. 1) > 2 seconds will exit the " Advanced Setting " function, the LCD will return to normal screen.

During into the " Advanced Setting " function, if not execute any setting, over than eight seconds ,will exit the " Advanced Setting " function, the LCD will return to normal screen.

7-1 SD memory card Format

When the " SD FORMAT " text is yellow color

- 1) Press "Enter" into the setting function, then use the " ▲ Button " (3-3, Fig. 1) or " ▼ Button " (3-9, 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 " (3-10, Fig. 1) once again, the Display will show text " 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.

7-2 Set clock time (Year/Month/Date, Hour/Minute/ Second)

When the " CLOCK TIME " text is yellow color

- 1) Press "Enter" into the setting function, then use the " ▲ Button " (3-3, Fig. 1) or " ▼ Button " (3-9, Fig. 1) to adjust the value (Setting start from Year value). After the desired value is set, press the " Enter Button " (3-10, 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 adjust value will be flash.

- 2) After set all the time value (Year, Month, Date, Hour, Minute, Second), press the " Enter Button " (3-10, Fig. 1) once will save the time value, then the screen will jump to " Sampling time " setting screen (Chapter 7-3).

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).

7-3 Set sampling time (Second)

When the " SAMPLE TIME " text is yellow color

- 1) Press "Enter" into the setting function, then use the " ▲ Button " (3-3, Fig. 1) or " ▼ Button " (3-9, Fig. 1) to adjust the value (Setting start from value) 0,1,2,5,10,30,60,120,300, 600,1800,3600 Sec., After the desired value is set, press the " Enter Button " (3-10, Fig. 1) once will save the sampling value with default then the screen will jump to " Auto power OFF " setting screen (Chapter 7-4).

Remark :

The adjust value will be flash.

7-4 Auto power OFF management

When the " AUTO POWER OFF " text is yellow color

- 1) Press "Enter" into the setting function, then use the " ▲ Button " (3-3, Fig. 1) or " ▼ Button " (3-9, 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 " (3-10, Fig. 1) will save the setting function with default.

7-5 Set beeper sound ON/OFF

When the " BEEPER SOUND " text is yellow color

- 1) Press "Enter" into the setting function, then use the " ▲ Button " (3-3, Fig. 1) or " ▼ Button " (3-9, 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.

- 2) After select the upper text to " Yes " or " No ", press the " Enter Button " (3-10, Fig. 1) will save the setting function with default.

7-6 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 " DECIMAL CHARACTER " text is yellow color

- 1) Press "Enter" into the setting function, then use the " ▲ Button " (3-3, Fig. 1) or " ▼ Button " (3-9, Fig. 1) to select the upper text to " USA " or " EURO ".

USA - Use " ." as the Decimal point with default.


EURO- Use " , " as the Decimal point with default.

- 2) After select the upper text to " USA " or " EURO ", press the " Enter Button " (3-10, Fig. 1) will save the setting function with default.

8. 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 " (3-16, Fig. 1). The meter will permanent power ON when use the DC ADAPTER power supply.

9. BATTERY REPLACEMENT

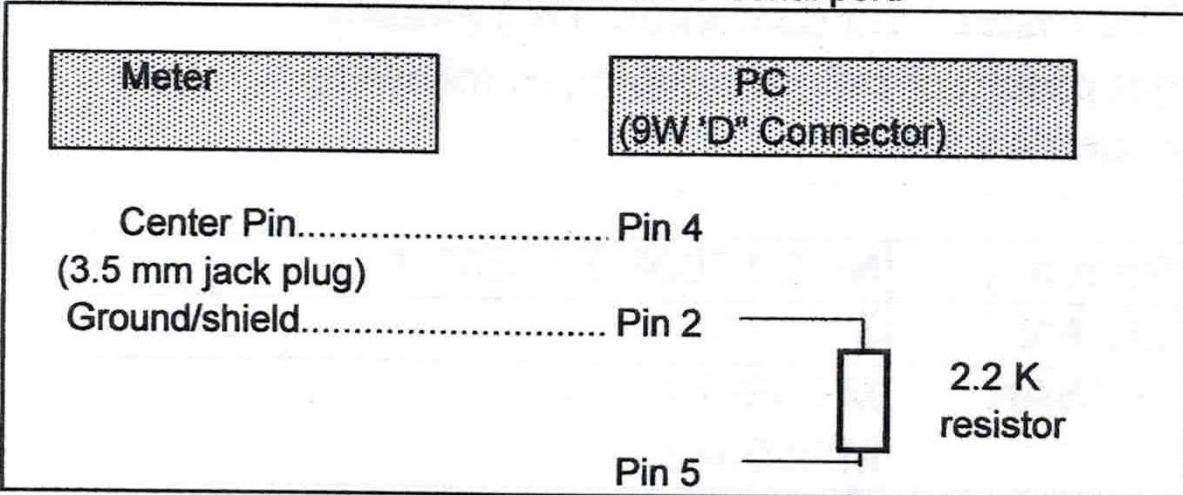
- 1) When the left corner of LCD display show "  ", it is necessary to replace the battery. However, in-spec. measurement may still be made for several hours after low battery indicator appears before the instrument become inaccurate.
- 2) Loosen the screws of the " Battery Cover " (3-14, Fig. 1) and take away the " Battery Cover "(3-12, Fig. 1) 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.

10. RS232 PC SERIAL INTERFACE

The instrument has RS232 PC serial interface via a 3.5 mm terminal (3-15, Fig. 1).

The data output is a 16 digit stream which can be utilized for user's specific application.

A RS232 lead with the following connection will be required to link the instrument with the PC 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 indicates the following status :

D0	End Word = 0D			
D1 & D8	Display reading, D8 = MSD , D1 = LSD For example : If the display reading is 1234, then D8 to D1 is : 00001234			
D9	Decimal Point(DP), position from right to the left 0 = No DP, 1= 1 DP, 2 = 2 DP, 3 = 3 DP			
D10	Polarity 0 = Positive 1 = Negative			
D11 & D12	Annunciator for Display			
	mT = E3	G = B5	μ T = B2	mG = B3
	AC_mT = I1	AC_G = I5	AC_ μ T = I0	AC_mG = I4
D13	When send the upper display data = 1			
D14	4			
D15	Start Word			

RS232 FORMAT : 9600, N, 8, 1

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

11. 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