Magnetometer PCE-MFM 4000

Magnetometer for AC and DC magnetic fields /

Precision and standard sensor / LCD display / SD data logger /

Serial interface / Tabletop device

The Gauss meter is used in the laboratory and quality assurance to measure the strength of magnetic fields. The Gauss meter is delivered with two different sensors. There is a magnetic field sensor for general measurements in the Gauss and milli-Tesla range, as well as a precision sensor for measurements in the milli Gauss and micro-Tesla range. The Gauss meter sensors have automatic temperature compensation. The Gauss meter can be used for measurements of DC and AC magnetic fields. The Gauss meter shows the polarity of the DC magnetic field on the display next to the measured value. This precise Gauss meter can be connected to a PC via serial interface for measurement value analysis.

The Gauss meter also has a data logging function. The Gauss meter is able to save the measured values on an SD memory card at a preset interval during the measurement. In addition to interval storage, up to 99 individual measured values can be stored in the memory at the push of a button. The measurement data are stored by the Gauss meter on the SD card in Excel format. This has the advantage that no additional software has to be used for the Gauss meter.

The Gauss meter is supplied as a table device and is particularly suitable for stationary measurements in QA, the test laboratory or also in research and. The bright display of the Gauss meter is easy to read at all times and shows all the necessary information about the magnetic field strength. The Gauss meter also has an automatic switch-off. The Gauss meter is supplied with 6 x 1.5V AA batteries or with a 9V plug-in power supply.

- Tabletop device with 2 sensors
  General Probe Range: **0-3000 milli-Tesla (0-30,000 Gauss)**
  Precision Probe Range: **0-300 micro-Tesla (0-3000 milli-Gauss)**
- For static and changing magnetic fields
- Highly accurate Transverse Hall sensor
- Different units selectable (mG / µT)
- Data storage on SD memory card
- Automatic shutdown
- Serial interface
- Max.- min.- hold function

Specifications

Measuring function DC magnetic field precision sensor

Measuring range	± 30µT
	± 300 µT
	± 300 mG
	± 3000 mG
Resolution	0.01 µT
	0,1µT
	0.1 mG
	1 mG
Accuracy	± (2% of MB + 2 mG)
	@ ± 100µT / 1000 G

Measuring function DC magnetic field standard sensor

measuring range	± 300 mT
	± 3000 mT
	± 3000 G.
	± 30000 G.
Resolution	0.01 mT
	0.1 mT
	0.1 g
	1 G
Accuracy	± (5% of VAT + 10 Dgt)

Measuring function AC magnetic field standard sensor
50/60 Hz

Measuring range	30µT
	300 µT
	300 mG
	3000 mG
Resolution	0.01 µT
	0,1µT
	0.1 mG
	1 mG
Accuracy	± (2% of MB + 2 mG)
	@ 0 ... 100µT / 1000 G

Measuring function AC magnetic field precision sensor
50/60 Hz

Measuring range	30µT
	300 µT

	3000 mG
Resolution	0.01 µT
	0,1µT
	0.1 mG
	1 mG
Accuracy	± (2% of MB + 2 mG)
	@ 0 ... 100µT / 1000 G
Measuring function AC magnetic field standard sensor	
50/60 Hz	
Measuring range	150 mT
	1500 mT
	1500 g
	15000 G.
Resolution	0.01 mT
	0.1 mT
	0.1 g
	1 G
Accuracy	± (5% of VAT + 10 Dgt)
General technical data	
Measuring rate	1 second
Measuring direction	Uniaxially
Display	LCD display
Features	Data hold / max. Min. Memory
Storage	Data logger single value memory
Data logger storage rate	1, 2, 5, 10, 30, 60, 120, 300, 600, 1800, 3600 s
Interface	Serial
Environmental conditions	0 ... 50°C / 32 ... 122°F, max. 85% RH
Power supply	6 x 1.5V AA batteries
	Optional 9V power supply
Current consumption	Approx. 138-mA
Dimension	
Device	292 x 236 x 98 mm / 11.5 x 9.3 x 3.9 in
Precision sensor	195 x 25 x 19 mm / 7.7 x 1 x 0.7 in
Standard sensor	177 x 29 x 17 mm / 7 x 1.1 x 0.7 in
Weight	275 g / < 1 lb

USER MANUAL

MAGNETIC METER

PCE-MFM 4000

ENGLISH

User manuals in various languages (français, italiano, español, português, nederlands, türk, polski) can be found via our product search on:
www.pce-instruments.com

1. FEATURES

- Wide range, 2 in 1 general purpose magnetic measurement for industrial, mechanical, material, electrical, laboratory field usage:
  - **Precision milli magnetic field measurement Unit:** µT (micro Tesla), mG (milligauss)
  - **General magnetic field measurement:** G (Gauss), mT (milli Tesla)
  - **DC and AC magnetic field measurement:** N pole/S pole indicator

- Hall sensor with automatic Temp. compensation
- Zero button for DC 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 with hard carrying case, designed for easy carry out & operation
- 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 use: No additional software needs to be installed on the computer. After running the data logger, simply remove the SD card from the measuring device and insert it into the computer. All measured values with time stamps (year/month/day/hour/minute/second) are downloaded directly into Excel, allowing the user to perform further data or graphical analyses.
- SD card capacity : 1 GB to 16 GB
- TFT LCD with green light backlight, easy reading
- 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: mm x mm
Datalogger Sampling Time Setting range	Auto 1 sec to 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
Temp. Compensation for hall sensor	Probe head build the Temp. sensor or using the ATC (automatic Temp. compensation)
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 to save battery life.
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 equiralent DC 9V adapter input. » The AC/DC power adapter is optional. Power consumption increases by approx. 3 mA.
Power Current	Normal operation (w/o SD card save data and LCD Backlight is OFF): Approx. DC 13 mA. When SD card save the data but and LCD Backlight is OFF: Approx. DC 35 mA. » When the LCD backlight is turned on, power consumption increases by approx. 3 mA.

Weight	Approx. 303 g/0.67 LB (Meter & probe)
Dimension	Main instrument: 280 x 210 x 90 mm (11 x 8.26 x 3.54 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 Magnetic Probe..... 1 PC
Optional Accessories	RS232 cable, UPCB-02 USB cable, USB-01 Data Acquisition software, SW-U801-WIN

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

2-2 General Specifications

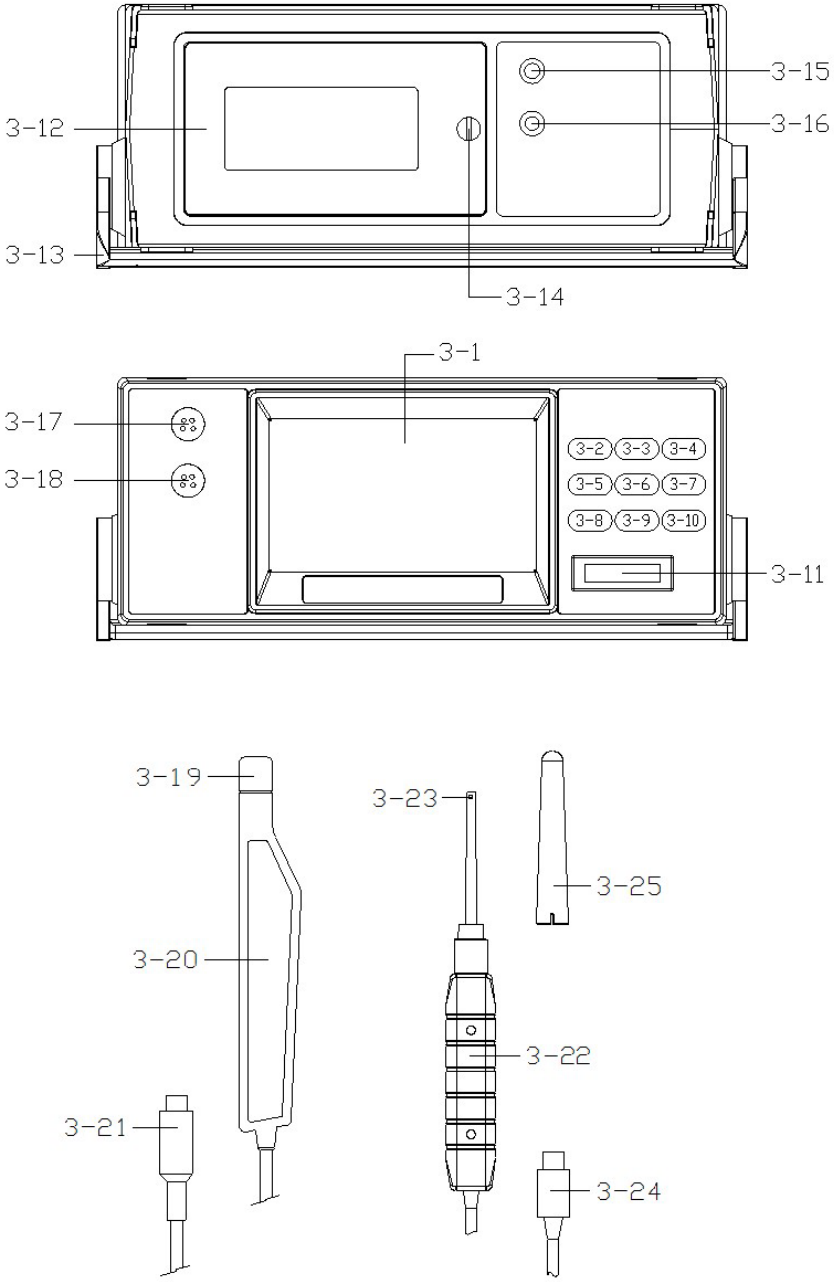
A. Precision milli magnetic field measurement

Measurement Unit	mG: milligauss µT: micro Tesla
Measurement Range	-3000mG to 3000 mG -300 µT to 300 µT
Resolution	0.1 mG -199,9 to 199.9 mG 1 mG ≥ 200 mG , ≤ - 200 mG 0.01µT -19.99 µT to 19.99 µT 0.1µT ≥ 20.0 µT , ≤ - . µT
Accuracy at 23 ± 5 °C	± (2%+ 2 mG) » -1,000 mG to 1,000 mG » -100.0 µT to 100.0 µT
Sensor Type	MI 素子 sensor.

B. General magnetic field measurement

Measurement Range		**Range**		**Resolution**	**Accuracy at 23 ± 5 °C**
DC	mT	Range 1	300.00 mT	0.01 mT	± (5 %+ 10 digit) reading
		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 50/60 Hz	mT	Range 1	150.00 mT	0.01 mT	± (5 %+ 10 digit) reading
		Range 2	1,500.0 mT	0.1 mT	
	G	Range 1	1,500.0 G	0.1 G	
		Range2	15,000 G	1 G	
Sensor Type		Hall sensor.			

G: milligauss mT: micro Tesla


3-12
3-13
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3-22
3-24

Fig. 1

3. FRONT PANEL DESCRIPTION

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
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“ (3-2, 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 (3-23, 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 measuremen range select by pressing the „Range Button“ (3-5, Fig. 1) to select, Range 1 or, Range 2 .
6. Unit selection by press the „Range Button2 (3-5, Fig. 1) to select the unit mT or G.

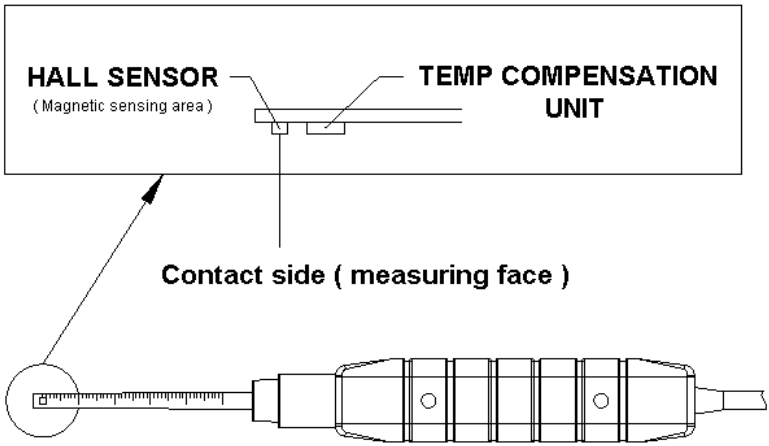
DC magnetic field measurement

- 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.

7. 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).



8. Zero adjustment:
   When power ON the meter, due to the environment interference, the display may show certain values (not zero value), it is normal.

» Before the measurement, fix the probe at the exact position, by pressing and holding the "▲" (3-3 Fig. 1) & „▼" Button (3-9 Fig. 1) continuously at least 1.5 seconds until the display shows „0" value, then release the finger from the button, if want to zero value > 40 count the display will show „Error", then back to normal value.

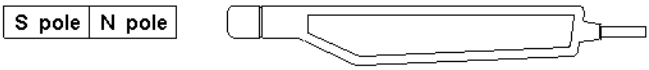
B. Precision magnetic field measurement

1. Power ON the meter by pressing and holding the „Power Button" (3-2, 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. Select the magnetic field measuremen range by pressing the „Range Button" (3-5, Fig. 1) to select Range 1 or Range 2.
6. Unit selection by pressing the „Range Button" (3-5, Fig. 1) to select the unit micro Tesla or milligauss.

a) Measurement Considerration - Display direction:

DC magnetic field measurement

Display value (+)



AC magnetic field measurement

» Display will show „AC„ indicator.
1: Probe head sensing area and the sensing direction

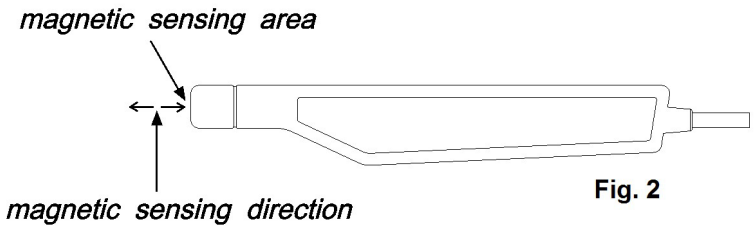


Fig. 2

2. When the measure value is over then ± 3500 mG, the display will show „‾‾‾“(≥3500 mG) / „ ___“(≤3500mG).
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‘s high precision magnetometer, it can measure the absolute environment Earth‘s magnetic fieldas reference.
For the material precision DC magnetic measurement, it should deduct those not zero value (environ ment earth‘s magnetic field value) at first, datails please refer to the following section „B. b,c DC measurement“.

b.) DC magnetic field measurement

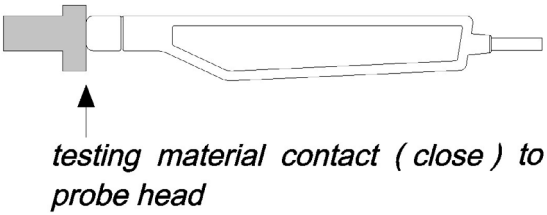
1. As the device has extremely high sensiitivity, the LED display will vary greatly even aslight movement the probe. It is recommended to firmly fix the probe before measurement.
2. Power ON the meter by pressing the „Power Button“ (3-2 Fig 1) once.
3. Select the unit (mG or uT) by press the „UNIT Button“ (3-5 Fig 1) once.

c.) Relative measurement:

1. General, before the measurement the display will not show zero due to the it will present the en- vironment earth‘s magnetic field value, it is normal.
2. For precesion DC magnetic filed measurement it should 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 "▲“ key (3-3, Fig. 1) continuously at least two seconds until the display shows „0“ indicator then release the finger from the button.

» Press the „Zero Button“ (3-5, Fig 1) continuously at least 2 seconds the „0“ indicator will be disappeared and the Display will return to the value “no zero“ (show the environment magnetic field).

3. Contact and close the testing material to the probe head (refer to Fig. 2, page 5) the display will show the magnetic field value along with the unit (mG,uT).



d.) **AC magnetic field measurement**
The measurement procedures are similar to section 4-2 DC magnetic filed measurement but should select the function to „AC“, the procedures are:

1. Power on the meter by press the „power button“ once.
2. Press the „AC/DC button“ once, the display will show „AC“ symbole, 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 „REC“ symbol on the display.

2. With the „REC“ symbol on the display:

a. Press the „REC Button“ (3-4, Fig. 1) once, the „REC MAX“ symbol along with the maximum value will appear on the display.
b. Press the „REC Button“ (3-4, Fig. 1) again, the „REC MIN“ 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 1.5 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.

5. DATALOGGER

5-1 Preparation before executing the datalogger function

a. Insert the SD card
Prepare an „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‘s recommend use memory card ≤ 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 7-6 (page 18).

» **It is 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 to chapter 7-1 (page 15).

d. Decimal for the numerical data structure of SD card

The decimal for the numerical data structure of SD card 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 a situation, it should change the Decimal character at first, details of setting the Decimal point, refer to Chapter 7-5, page 17.

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

a. Start the datalogger
Press the „LOG Button“ (3-8, Fig. 1) > 1.5 seconds continuously, the LCD will show the text of „LOGGER“ indecator 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 7-2, page 16.**

» **How to set the beeper sound is enable, refer to Chapter 7-4, page 17.**

b. Pause the datalogger
During execute the Datalogger function, if press the „LOG Button“ (3-8, Fig. 1) once will pause the Datalogger function (stop to save the measuring data into the memory circuit temporally). In the same time the „LOGGER“ symbol will stop flashing.

Remark:
If press the „LOG Button“ (3-8, Fig. 1) once again will execute the Datalogger again, the „LOGGER“ symbol will flashing.

c. Finish the Datalogger
During the execution of the Datalogger function, press the „LOG Button“ (3-8, Fig. 1) > 1.5 seconds continuously again will finish the Datalooger function, the „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“ (3-8, Fig. 1) >1.5 second, the LCD will show the indecator „LOGGER“ and „Position no.“ symbol then press the „LOG Button“ (3-8, Fig. 1) once, the „LOGGER“ symbol will flashing once and the 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“ (3-5, Fig. 1) or „˅ Button“ (3-6, Fig. 1) to set the measuring position (1 to 99, for example room 1 to room 99) to identify the measurement location, the top display will show P x (x = 1 to 99).

b. Finish the Datalogger
During execute the Datalogger function, press the „LOG Button“ (3-8, Fig. 1) > 1.5 seconds continuously again will finish the Datalooger function, the position no. „ PXX „ will be disappeared and finish the Datalogger function.

5-4 Check time & Sampling time information

During the normal measurement (not execute the Datalogger), if you 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. The first time the SD card is used with 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.
```

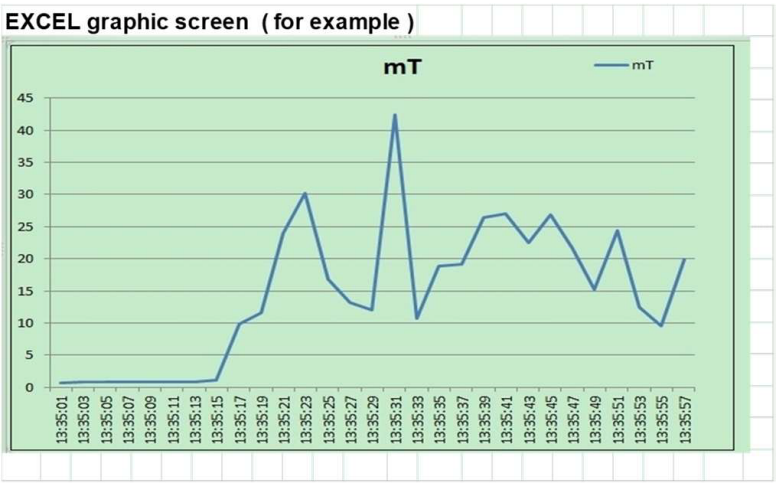
6. SAVING DATA FROM THE SD CARD TO THE COMPUTER (EXCEL SOFTWARE)

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“ to the computer.
3. Power ON the computer and run the „EXCEL software“. Download the saving data file (for example the file name: MGA01001.XLS, MGA01002.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 the user can use those EXCEL data to make the further Data or Graphic analysis usefully.

EXCEL graphic screen (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 >1.5 seconds will enter the „Advanced Setting“ mode. Then press the „SET Button“ (3-7, Fig. 1) once a while in sequence to select the seven main function, the lower 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:
While executing the „Advanced Settin“ function, if you press the „SET Button“ (3-7, Fig. 1) > 1.5 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“ (3-5, Fig. 1) or „▼ Button“ (3-6, 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 you select „Yes“, press the „Enter Button“ (3-4, 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“ (3-5, Fig. 1) or „▼ Button“ (3-6, 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 „Enter Button“ (3-8, Fig. 1) once will save the time value, then the screen will jump to Sampling time Setting screen (Chapter 12-3).

   Remark:
   After the time value is set, 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“ (3-5, Fig. 1) or „▼ Button“ (3-6, Fig. 1) to adjust the value (Setting start from value)1,2,5,10,30,60,120,180,300, 600,1800,3600 sec. After the desired value is set, press the“Enter Button“ (3-4, Fig. 1) once will save the sampling value with default then the screen will jump to „Auto power OFF“ setting screen (Chapter 12-4).

   Remark: The adjusted value will be flashed.

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“ (3-5, Fig. 1) or „ ▼ Button“ (3-6, 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 selecting „Yes“ or „No“, press the „Enter Button“ (3-8, 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“ (3-5, Fig. 1) or „▲ Button“ (3-6, 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 selecting „Yes“ or „No“, press the „Enter Button“ (3-8, 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 ...) the „ , „ is used as the decimal point, for example „20,6“ „1000,53“. Under such a situation, it should change the Decimal character at first.

When the „DECIMAL POINT“ text is yellow color:

1. Press „Enter“ into the setting function, then use the „▲ Button“ (3-5, Fig. 1) or „▼ Button“ (3-6, 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 selecting „USA“ or „EURO“, press the „Enter Button“ (3-8, 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“ (3-14, Fig. 1). The meter will permanent power ON when use the DC ADAPTER power supply (the power Button function is disabled).

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. Loose the screws of the „Battery Cover“ (3-16, Fig. 1) and take away the „Battery Cover“ (3-15, 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. 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

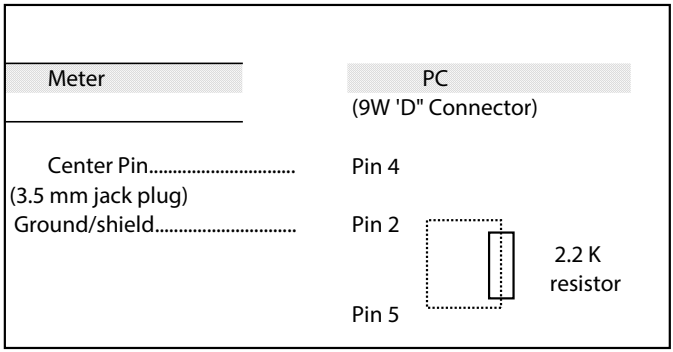
Method:

During the power on, use a pin to press the „Reset Button“ (3-13, Fig. 1) once a while will reset the circuit system.

11. RS232 PC SERIAL INTERFACE

The instrument has RS232 PC serial interface via a 3.5 mm terminal (3-12, 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.



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

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 µT = B2 mG = B3
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

12. 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

DISPOSAL

For the disposal of batteries in the EU, the (EU) 2023/1542 directive of the European Parliament applies. Due to the contained pollutants, batteries must not be disposed of as household waste. They must be given to collection points designed for that purpose. In order to comply with the EU directive 2012/19/EU we take our devices back. We either re-use them or give them to a recycling company which disposes of the devices in line with law. For countries outside the EU, batteries and devices should be disposed of in accordance with your local waste regulations. If you have any questions, please contact PCE Instruments.

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