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PCE-MFM 3500 AC/DC Magnetic Field Meter User's Manual



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1 Introduction

- Measurement for the magnetic field generated from Direct Current (DC, with display by N/S Magnetic polarity) or Alternating Current (AC in 40-500Hz).
- Measurement for the residual magnetic after processing of mechanical parts
- Measurement for the magnetic field strength of magnetic applications
- Measurement for the residual magnetic generated from the stress after processing of stainless material
- Measurement for the magnetic force of magnetic materials
- Measurement for the various steel materials with natural magnetism
- Measurement for the magnetic field strength of motors in various electrical appliances
- Measurement for the magnetic field strength of permanent magnets
- Detection for the magnetic field of leakage generated from superconductive magnets

2 Accessories

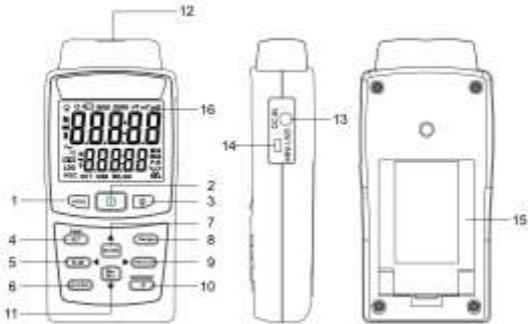
- 1 Meter
- 1 AC/DC magnetic probe
- 1 User's Manual
- 6 Battery 1.5V(UM4/AAA)
- 1 Carrying case
- 1 Power adapter DC 9V
- 1 USB cable and Installation disk

3 Safety Precaution:

	Caution! Please refer to this manual. Improper use may damage the meter and its components.
	Complies with European Directive.

- Do not operate in environments with flammable gas or humid environments.
 - Operating altitude: up to 2000M.
 - Operating environment: Indoor use; Pollution degree 2.
 - Clean with soft cloth when dirty, such as glasses cloth. Do not clean with chemicals and other solvents.
 - EMC: EN61326-1:CISPR 11:Group 1, Class B
- ◇ Class B – Equipment for use in all establishments other than domestic.
- ◇ Group 1 – RF energy generated is needed for internal functioning.

4 Instrument Description:



1. Data hold
2. Power
3. Backlight button
4. SET/Peak value hold
5. Read the record data from RAM (R-M)/Left
6. Set to Zero (Zero)/ Relative Value (REL)
7. AC/DC switch/Up
8. Manual range mode/Automatic range mode
9. Manual record (REC)/ Auto record (LOG)
10. Buzzer/GO & NO-GO
11. The max. & min. value hold/Down
12. Probe connector
13. External power DC 9V input
14. USB data output jack
15. Battery cover and tilt stand
16. LCD display

5 Operation:

1. Press $\overline{\text{ON}}$ to turn on or turn off.
2. Remove the cap of probe.
3. Move the HALL ELEMENT which is located on the tip of probe close to the magnet under test and start measuring. Please refer to Fig. 1.
4. Read the measured value from the LCD display.
5. Cover the cap of probe back.



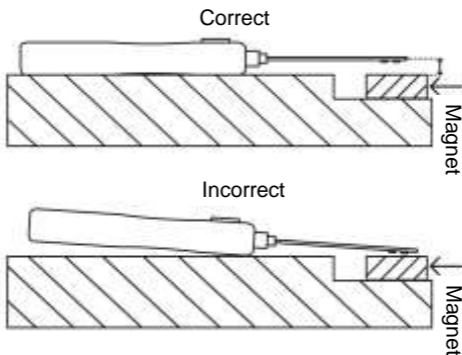






	If the probe not inserted into the host or not inserted completely, Err 0 , will appear. Please turn power off and ensure to insert the probe into the host; again, turn power on.
	If the probe is disconnected with the host while working, Err 5 will appear for warning.

Fig. 1




5.1 Zeroing



Move the probe away from the magnetic field and press , ZERO will appear on the LCD. After zeroing completed, the ZERO disappears.

	If more than 3G or 0.3mT,  will appear to prevent from erroneous zeroing the value in measuring. (from PC)
	If more than 3G or 0.3mT,  will appear to prevent from erroneous zeroing the value in measuring. (from HOST)
	The zeroing function is unavailable for temperature.


5.2 Peak Measurement

Move the probe away from the magnetic field, then press and hold  for ≥ 2 seconds to start Peak Measurement. The upper digit row presents the instant measuring; the lower digit row presents the peak value x.x|


Again, press and hold  to quit this function.

	Zeroing will run automatically in prior to Peak Measurement. If more than 3G or 0.3mT,  will appear to prevent from erroneous zeroing the value in measuring.
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5.3 Relative Value Measurement

Press and hold  for ≥ 2 seconds to start Relative Value Measurement.

The difference between the two magnetic fields can be compared here. For instance, the 1st magnetic field is measured to be 100. At the time, press "REL" button, and the LCD displays 0; again, measure the 2nd magnetic field. If the measured value of the 2nd magnetic field is 120, the LCD will display 20 ($120-100=20$).

Again, press and hold  to quit this function.


5.4 Turn on backlight

Press  to turn the backlight on or off.


If connected via an external power supply, the backlight will lit automatically and stay on.

* The backlight will automatically turn off after being lit for 30 seconds.



5.5 Manual Record for One Log

Press  to save one log of data, the LCD will show "REC" and the number of logs. For instance, if the current number is 10, it will be increased by 1 at each pressing. The number of logs is limited to be 200; if exceeded, the LCD will show "Full".






5.6 Auto Record

Press and hold , LCD displays **LOG**, and the auto-recording function is enabled.


Again, press  to quit this function.

	The record is setup on PC via USB connection.
	If the power is insufficient when recording in logs, Err6 will appears.




5.7 Read the record data from RAM

Press  for the reading mode, and  appears on the LCD. Press  or  to select the log number for reading. Press and hold  to quit this mode.



5.8 Data Hold

Press  to enable or disable the data hold function.

5.9 The Max./Min. Values Hold:

Press  to enable MIN/MAX function; again, press  to show the MAX and MIN values by turns. Press and hold  to quit. The measured data can be held and updated as the measured the MAX and MIN values.



5.10 Disable Auto Power Off Function:



With power off mode, keep pressing  and press  to turn on power, LCD will show "n-SL" that means to disable auto power off function. Re-starting will reset to the auto power off function. The function will be disabled when an external power is detected.

5.11 Stopping buzzer


Press  to stop the buzzer's beep.

5.12 Manual range mode/Automatic range mode


Press  to operate in the manual range mode with the LCD showing . This can change into two different range modes.

Press and hold  for ≥ 2 seconds to return to automatic range mode with LCD showing .




5.13 AC/DC Switching magnetic field

Press  to switch the measurement between AC magnetic field and DC magnetic field.




5.14 Setup : Step 1~ Step 8

Press  to enter the setup procedure from step 1 to step 8, while **SET** flashes on the LCD.




Step 1. Setup unit G or mT.

1. Press  or  to select the unit G or mT.
2. Again, press  to go to Step 2.




Step 2. Setup unit °C or °F


1. Press  or  to select the unit °C or °F.
2. Again, press  to go to Step 3.

Step 3. Set up the upper limit (Max.) for alarm GO/NO-GO




1. The default value is 20000G (2000.0mT). Press  or  to modify and setup the default value.
2. Again, press  to go to Step 4.

Step 4. Set up the lower limit (Max.) for alarm GO/NO-GO






1. The default value is 0G (0.0mT). Press  or  to modify and setup the default value.
2. Again, press  to go to Step 5.

	If the min. value is more than the max. value, <i>Err 1</i> appears.
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Step 5. Setup the measurement interval of alarm GO/NO-GO

1. The default value is 2 seconds. Press  or  to modify and setup the default value.
2. Again, press  to go to Step 6.

Step 6. Setup year/month/date










1. Go to the mode to setup the year/month/date.
2. Press  or  to select the item to modify, the digits of the selected item will flash.
3. Then, press  or  to correct the value.
4. Again, press  to go to Step 7.

Step 7. Setup hour/minute:

1. Go to the mode to setup the hour/minute.
2. Press  or  to select the item to modify, the digits of the selected item will flash.
3. Then, press  or  to correct the value.
4. Again, press  to go to Step 8.

Step 8. Clear the manual record:

1. Go to the mode to clear the manual record
LCD shows *Err n*.

2. Press  or  to select  or  where the default value is .
3. If the record is not cleared, press  again to return to the measurement mode when the LCD shows .
4. If  is selected, press  to return to the measurement mode and clear the record while LCD shows "CLEAR".

6 Software Installation:

Windows 7 / Windows 10 operating systems

- Place the CD included with this meter into the CD/DVD-ROM drive of the PC to connect to and install the desktop program:
- Run the desktop application:



- Connect the USB cable included with this meter to the PC, as shown in the figure below.



- Execute the PC desktop software program:
Double-click the left mouse button on the desktop program (Thermometer Meter) to execute the desktop program.



7 General Specifications:

- Liquid crystal display (LCD) of 5 digits with the displaying value up to 30000.
- Backlight display. The backlight is manually turned on (it will turn off automatically after turned on for 30 seconds) and turned off. If connected via an external power supply, the backlight will lit and stay on; it will turn off until the external power supply disconnected.
- Enable and disable auto power off function (default 15 minutes).
- Measurement range: 0~3000mT (milli Tesla) /0~30000G (Gauss); Auto Range function (with Automatic Measurement).
- Conversion of units: 1mT (milli Tesla) = 10G (Gauss)
- Relative value/Peak hold/Real time Zeroing function.
- Enable and disable auto power off function (default power off is 15 minutes from the last operation).
- DATA HOLD(Data hold)
- MAX/MIN (Maximum hold/ Minimum hold)
- The GO and NO-GO alarm function and its settings that can be applied to detect good and defective products on the production line.
- Unit switch for Gauss/Tesla.
- The maximum, minimum, and average values: auto export the top 10 max./top 10 min./ average values based on the data which is recorded and downloaded to the computer.
- As connected to a PC, press REC to record the real-time data in the PC.
- Overload display: "OL".
- Manual recording: up to 200 logs.

- Automatic recording: up to 7000 logs where the record interval shall be setup with PC.
- "🔋": detection for battery low
- Battery life: Approximately 100 hours.
- Operation temperature and humidity: 5°C to 40°C (41°F to 104°F), < 80%RH ◦
- Storage temperature and humidity: 0°C to 50°C, relative humidity under 70%.
- Weight: Approximately 320 grams (with battery)
- Dimensions: 156 (L) x 73 (W) x 35 (H) mm
- **AC to DC Adaptor**

External AC 100~240V to DC 9V/0.5A power supply

Plug: The pin in the center connects to the positive electrode and the outer case is negative electrode

Diameter: 5.5mm; internal diameter: 2.1mm



8 Electrical Specification:


Accuracy is indicated as [% rdg + dgt] at 23°C ± 5°C with RH < 80%.

Specifications	Range	Resolution	Accuracy
DC milli Tesla	300.00 mT	0.01 mT	±(4% + 10dgt)
	2000.0 mT	0.1 mT	
	2000.1 ~ 3000.0 mT	0.1 mT	N/A
DC Gauss	3000.0G	0.1G	±(4% + 10dgt)
	20,000G	1G	
	20,001 ~ 30,000 G	1G	N/A
AC milli Tesla	150.00mT	0.01 mT	±(5% + 20dgt)
	1500.0mT	0.1 mT	
AC Gauss	1500.0G	0.1G	
	15,000G	1G	

Temperatures:

Range	-20~50°C/-4~122°F
Resolution	±0.1°C/±0.1°F
Tolerance	±1.0°C/±1.8°F

9 Maintenance or Repair

1. When the When “” symbol is displayed on the LCD, it means that there is insufficient power; please change the battery immediately in order to ensure its accuracy.
2. Do not place the meter in locations that have high temperature, humidity or that are exposed to direct sunlight.
3. Remember to turn off the power after usage; remove the battery if not used for a long period of time in order to prevent battery leakage and causing damages to internal components.
4. When the instrument failure, only by the authorized service provider or return the original repair.

10 Battery Replacement

1. Turn off the power.
2. Open the frame and battery cover at the back of the meter, remove the batteries.
3. Insert 6 pcs of new AAA 1.5V batteries according to the battery polarity.
4. Put the battery cover and frame back in place.

11 End of Life Disposal



Note: This symbol indicates that the meter and its accessories must be separated and processed properly.