# MULTI-FIELD EMF METER

# TM-190 User's Manual



CE

B2TM1900001

#### Meun

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English

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### 1 Features

- Data hold (HOLD)
- Low battery indication : HIGH LOW L
- Over load display "OL".
- External USB Power Supply: "
- Brightness options: low-Middle-high
- Magnetic unit : Gauss(mG) or. Tesla(uT)
- RF Strength Unit: (uW/m<sup>2</sup> ~mW/m<sup>2</sup>) (µW/cm<sup>2</sup>) (m V/m ~V/m) (mA/m) (dBm).
- Languages: English; Traditional Chinese; Simplified Chinese; Japanese; Español.
- Power Off Time : No; 1; 3; 5; 10; 15; 30. Factory default sets as
  - "5". Settings can be changed by the user. Si is displayed on the screen after power off time is set.
- Keys/Alarm Sounds: On \$\overline{D}\$; Off \$\overline{D}\$
- Low-Frequency EMF Readings: Individual and aggregated XYZ
  - axial readings \*\*\*\* SENSOR.
- RF Historical Records:



- Information: Software version: V1.0
- High-frequency EMF Readings: Please perform tests according to the indicated direction RESENSOR.

 Electric field Measurement Precautions: Please perform tests according to the indicated direction Better Fred SENSOR. Please hold the meter at the bottom of the display, as shown in the figure below:



Fig. 1 Electric Field measurement:

	Magnetic Fields	Electric Field	RF strength	
The Green zone	0~10.00mG	0~500V/m	0~0.99mW/m2;0~0.59V/m	
The Yellow zone	10.01~100mG	501~1000V/m	1~9.99mW/m²;0.6~1.9V/m	
The Red zone	101~2000mG	>1001V/m	>10mW/m²;>2V/m	

The color zones are for reference only

electromagnetic safety reference standard

international國際的	Council Recommendation1999/519/EC	42V/m(4.75W/m2)	59V/m(9.25W/m2)
international國際的	ICNIRP Guidelines, April 1998	42V/m(4.75W/m2)	59V/m(9.25W/m2)
Austria 奥地利	ONORM S1120	49V/m(6.33W/m2)	61V/m(10W/m <sup>2</sup> )
Belgium比利時	Belgisch Staatsblad F.2001-1365	21V/m(1.18W/m <sup>2</sup> )	30V/m(2.31W/m2)
Germang 德國	26.Deutsche Verordnung	42V/m(4.75W/m2)	59V/m(9.25W/m2)
italy意大利	Decreto n.381,1998	20V/m(1W/m2)	20V/m(1W/m <sup>2</sup> )
the netherlands荷蘭	Health Council	51V/m(6.92W/m2)	83V/m(18W/m2)
switzerland瑞士	Verordnung 1999	4V/m(0.04W/m2)	6V/m(0.1W/m <sup>2</sup> )
united states美國	IEEE C95.1	49V/m(6.33W/m2)	68V/m(12W/m²)
china 中國	Draft:National Quality Technology Monitoring Bureau	49V/m(6.33W/m2)	61V/m(10W/m <sup>2</sup> )
japan 日本	Radio-Radiadiation Protection Guidelines, 1990	49V/m(6.33W/m2)	61V/m(10W/m <sup>2</sup> )

 $1W/m^2 = 0.1mW/Cm^2 = 100uW/Cm^2.1mW/m^2 = 0.1uW/Cm^2$ 

#### English

### 2 Identifying Parts



Fig. 2 Instrument description:

- 1. 2.4" 240\*320 resolution color TFT.
- 2. Power and Menu button
- 3. Hold and Enter button
- 4. Select and Down button
- 5. Mini USB power interface
- 6. Battery cover

### 3 TFT description



- 1 Data Hold indicator.
- 2 Auto power off indicator.
- 3 Buzzer indicator.
- 4 Battery indicator.
- 5 Connecting a USB power indicator.
- 6 Tesla(uT) or Gauss(mG) display.
- 7 Electric Field (V/m) display.
- 8 RF strength history histogram display.
- 9 RF strength digital (mV/m/ W/m<sup>2</sup>/ μ W/cm<sup>2</sup>/dB) display.
- 10 Menu key indication
- 11 Hold/ Enter key indicator
- 12 RF electronic field warning indicator: GOOD/NORMAL/WARNING.
- 13 LF electric field warning indicator: GOOD/NORMAL/WARNING.
- 14 Individual XYZ axial value of LF electromagnetic wave display
- 15 LF electromagnetic wave warning indicator: GOOD/NORMAL/WARNING

### 4 Measurement Procedures

#### 4.1 POWER ON/OFF Button:

- Press Use button to power on. LCD display measurement screen. (see Fig. 3)
- Press button for 3 seconds to power off LCD display.

#### 4.2 Reading Individual and Aggregated XYZ Axial Data:

Direct the front section of the meter at the desired electromagnetic field for measurements.

The meter simultaneously displays the electromagnetic field readings of individual and aggregated XYZ axes, where the aggregated calculation equation can be expressed as follows:

 $B = \sqrt{Bx^2 + By^2 + Bz^2}$ 

Because of environment-related magnetic field factors, this electromagnetic field EMF meter may display a reading of under 0.50 mG prior to testing. This is caused by the magnetic noise in the environment, rather than meter failure.

#### 4.3 Data hold (HOLD):

Press the left button as for a ctivate the HOLD function and hold the current readings at the upper left of the display.

To release the held data, press the left for button again.

Press the middle U button for 3 seconds to power off the meter.

#### 4.4 Menu Settinas:

On the measurement screen: Press the middle U button to enter the main menu, where 7 options can be selected, namely, Brightness. Magnetic unit, RF Strength Unit, Language, Power off. Sound. and Information.

Press the right set button to make the blue brick scroll down.

Press the right Set button repeatedly, and the blue brick will cvcle through the options.

Press the left to button to enter the selected option. Press the left field button again to exit the selected option and return to the main menu

Press the middle W button to return to the previous menu.



#### 4.4.1. Option Buttons:

Press the right **Get** button to scroll to and check the next check box. Press the right **Get** button repeatedly to cycle through the check boxes.

Press the left finter button to exit to the main menu.

Press the middle without to return to the previous setting menu.

Enter Menu. Select

#### 4.4.2. Screen Brightness options:

Following the operation procedures in 4.4, the Brightness setting comprises the following three options, namely, Low, Middle, and High. Under the sub-directory, use the option buttons to select and confirm the desired selection.



Default: Middle

#### 4.4.3. Magnetic Unit:

Following the operation procedures in 4.4, the Magnetic Unit setting comprises the following two options, namely, Gauss/mG and Tesla/uT. Under the sub-directory, use the option buttons to select and confirm the desired selection.



Default: mG

#### 4.4.4. RF Strength Unit :

Following the operation procedures in 4.4, the RF Strength Unit setting comprises the following five options, namely, uW/m<sup>2</sup>~mW/m<sup>2</sup>, uW/cm<sup>2</sup>, mV/m~V/m, mA/m, and dBm (files are automatically skipped within the selected unit). Under the sub-directory, use the option buttons to select and confirm the desired selection.

RF Strength Unit	RF Strength Unit	RF Strength Unit	RF Strength Unit
yWim <sup>1</sup> mWim <sup>1</sup> y	⊭Wim <sup>2</sup> mW/m <sup>3</sup> □	µWim³ mW/m³	µW/m² mW/lm²
yWicm <sup>2</sup>	⊭Wicm <sup>2</sup> ∑	µWicm³	µW/cm²
mVim Vim	mVim Vim □	mV/m VIm	mV/m V/m
mAim	mAim □	mAim	mA/m
dBm	dBm □	dBm	dBm
Enter Menu. Select	Enter Menu. Select	Enter Menu. Select	Enter Menu. Select



Default: uV/m<sup>2</sup> ~ mW/m<sup>2</sup>

#### 4.4.5. Language:

Following the operation procedures in 4.4, the Language setting comprises the following five options, namely, English, Traditional Chinese, Simplified Chinese, Japanese, and Español (Spanish). Under the sub-directory, use the option buttons to select and confirm the desired selection.



Default: English

#### 4.4.6. Power Off Time:

Following the operation procedures in 4.4, the Power Off setting comprises the following seven options, namely, NO, 1, 3, 5, 10, 15, and 30 (min). Under the sub-directory, use the option buttons to select and confirm the desired selection.



Default: 5min

#### 4.4.7. Sound on/off:

Following the operation procedures in 4.4, the Sound setting comprises the following two options, namely, On and Off.

Press the right state button to scroll to and check the next check

box. Press the right set button to cycle thought he options.

Press the left **(inter)** button to select the "Enable" setting and enter the Keys/Alarm Sound menu (Section 4.4.8).

Press the left finer button to select the "Disable" setting and return to the main menu(Fig. 3).

Press the middle U button to return to the measurement screen



#### 4.4.8. Keys/Alarm Sound:

Following the selection of the Enable option in the Sound settings menu, the Keys/Alarm Sound setting comprises the following two options, namely, Keys and Alarm.

Press the right **Select** button to scroll to and check the check the next check box. Press the right **Select** button repeatedly to cycle through the options.

Press the left [inter] button to enter the next options screen.

Sound Keys ⊽	Sound Keys
Alarm 🗌	Alarm 🗹

#### 4.4.9. Keys Sound:

Following the selection of the Keys option in the Keys/Alarm Sound settings menu, the Keys setting comprises 3 options, namely 1, 2, and 3.

Press the right button to scroll to and check the next check box. Press the right button repeatedly to cycle through the options.

Press the left [inter] button to exit to the main menu.

Keys 1 2 3	200	Keys 1 2 3	OKC	Keys 1 2 3	800
Enler Mere	Belect	Enter Men	u, Select	Enter Men	u. Select

Default: 3

#### 4.4.10. Alarm Sound:

Following the selection of the Alarm option in the Keys/Alarm Sound settings menu, the Alarm setting comprises 3 options, namely 1, 2, and 3.

Press the right **select** button to scroll to and check the next check box. Press the right **select** button repeatedly to cycle through the options.

Press the left [enter] button to exit to the main menu.







Default: 3

#### 4.4.11. Information:

Following the operation procedures in 4.4, select the Information option to display the software version (V1.0).

Press the left **Enter** button to exit to the main menu.

Press the middle utton to return to the settings screen.



# 5 Specifications

#### 5.1 Sensor type: LF Magnetic Fields (MF)

- The meter is equipped with three individual aerial sensors to measure EMFs. The overload indications can be displayed simultaneously on three axes (X, Y, Z):
- Range: 20/200/2000mG, 2/20/200µT.
- Resolution: 0.02/0.1/1 mG or 0.02/0.1/1 µT.
- Frequency response: 50/60 Hz
- Sensor: Triple Axis (X, Y, Z).
- Accuracy: ±(15%+100dgt).

#### 5.2 Sensor type: LF Electric Fields

- Range: 50V/m to 2000V/m.
- Frequency response: 50/60Hz
- Accuracy: ± (7% + 50dgt).

#### 5.3 Sensor type: RF Strength

- Frequency range : 50MHz to 3.5GHz.
- Accuracy: ± 2dB at 2.45GHz
- Measurement units: uW/m<sup>2</sup>~mW/m<sup>2</sup>; µW/cm<sup>2</sup>; mV/m~V/m, mA/m, and dBm
- Specified measurement range: (0.02uW/m<sup>2</sup>to 554.6mW/m<sup>2</sup>)
- (0.02uW/cm<sup>2</sup>to 55.4uW/cm<sup>2</sup>)(36.1mV/mto14.46V/m) (0.02mA/m to 38.35mA/m)( -51dB to 16dBm)
- Display resolution: 0.02µW / m<sup>2</sup>, 0.2µA / m, 0.2mV/m, m, 0.002µW/cm<sup>2</sup>, 2dB.
- Display: 4 digits Triple LCD display.
- Sample rate: 6 seconds per time.
- Battery life: Approximate 8 hours.
- Battery: 1.5V AAA Alkaline Battery\*3.
- Audible Key tone alarm: Buzzer
- Operating temperature & humidity: 5°C to 40°C, below 80% RH.
- Storage temperature & humidity: -10°C to 60°C, below 70%.
- Weight: About 120g.
- Dimensions: 115(L)\*60(W)\*21(H) mm.

### 6 Battery replacement



- Turn off the instrument.
  - Open the battery covers and remove the battery.
  - Take three new 1.5VAAA alkaline batteries, and install the batteries according to the polarity.
  - Put back the battery cover.



### 7 External USB power supply:

- External USB.
- Specifications: Voltage DC 4.8 ~ 5.2V current ≧ 500mA.
- A 

   icon is displayed when an external USB power supply is connected to the meter.
- The meter determines connected USB cables to be antennas, and thus such cables should not exceed the top rim of the buttons during testing. If the cables exceed this limit, the readings of subsequent tests are considered invalid.



### 8 Safety and maintenance standards

- Do not operate around combustible gases or in damp environment.
- Operating altitude: below 2,000m.
- Operating environment: for indoor use, expose to pollution level II.
- This is a precision device. During use or storage, do not go beyond its spec. to prevent any possible damage or danger.
- Do not put this device in direct sunlight or where it is hot and/or damp.
- For long storage, remove the battery to prevent the battery from leaking and causing damage to the parts inside.
  - Clean the device with a dry soft cloth. The use of wet cloths, liquid and water is prohibited.



## 9 End of life



### Caution

This symbol indicates that equipment and its accessories shall be subject to a separate collection and correct disposal



### Professional Electrical and Environment Test & Measurement Instruments:

Battery Capacity/Impedance Tester, TACHO Meter, LED light meter, Temperature & Humidity meter, Infrared Thermometer, Sound level meter, Light meter, EMF meter, UV Light meter, RF meter, Hot wire Anemometer, CO meter, Anemometer, Lan cable tester, CO<sub>2</sub> meter, Solar power meter, Radiation meter, Clamp meter, Multimeter, Phase Rotation test, Digital Insulation tester.

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