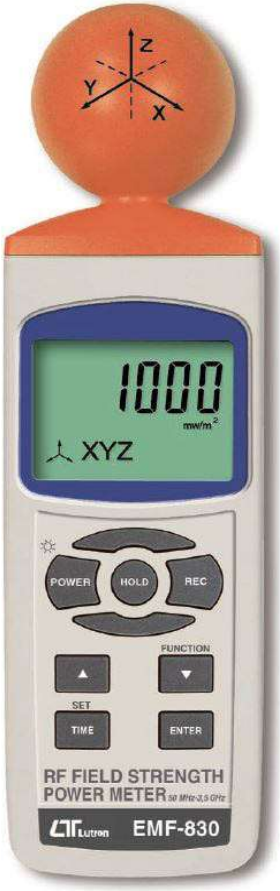
RS232/USB

RF EMF Strength Meter

Model : EMF-830



Your purchase of this Personal RF EMF Strength Meter with marks a step forward for you into the field of precision measurement. Although this METER 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

TABLE OF CONTENTS

1. FEATURES

* Measurements range : 50MHz to 3.5GHz.
* For electromagnetic field strength measurement including mobile phone base station antenna radiation, RF power measurement for transmitters, wireless LAN (Wi-Fi) detection/installation, wireless communication applications (CW, TDMA, GSM, DECT) and microwave leakage
* The meter is a broadband device for monitoring high-frequency radiation in the specific frequency ranges of 900MHz, 1800MHz, and 2.7GHz. Other measurements can be made,using the entire range of 50MHz to 3.5GHz.
* Non-directional (isotropic) measurement with three-channel (triaxial) measurement probe
* Microcomputer circuit provides intelligent function and high accuracy.
* 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.
* RS232/USB PC COMPUTER interface.
* Heavy duty & compact housing case.

2. SPECIFICATIONS

2-1 General Specifications

Circuit	Custom one-chip of microprocessor LSI circuit.
Display	LCD size : 52 mm x 30 mm
Measurement method	Digital, triaxial measurement.
Sensor type	Electrical-field sensors
resolution	0.1mV/m, 0.1uA/m, 0.1uW/m^2, 0.001uW/cm^2
Range	autorange
Advanced setting	* Set clock time (Year/Month/Date, Hour/Minute/ Second) * Auto power OFF management * Set beep Sound ON/OFF * Set mesurement value gain * Set the alarm unit/value * Select the alarm function yes or no
Over Indication	Show " - - - - ".
Data Hold	Freeze the display reading.
Memory Recall	Maximum & Minimum value.
Sampling Time of Display	Approx. 1 second.
Data Output	RS 232/USB PC computer 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 off	Auto shut off saves battery life or manual off by push button.

Operating Temperature	-20 ~ 50 ℃
Operating Humidity	Less than 85% R.H.
Power Supply	** Batteries(UM3, AA) x 6 PCs, or equivalent.*
	** AC/DC power adapter .* (adapter is optional).
Power Current	Normal operation (w/o SD card save data) : Approx. DC 24 mA.
	When SD card save the data : Approx. DC 50 mA.
Weight	244 g/0.54 LB (meter only).
Dimension	177 x 68 x 45 mm (7.0 x 2.7x 1.8 inch)
Accessories Included	* Instruction manual..... 1 PCS
Optional Accessories	* SD Card (4 GB) * USB cable, USB-01. * RS232 cable, UPCB-02. * Data Acquisition software, * SW-U801-WIN., SW-E802. AC to DC 9V adapter. * Hard carrying case, CA-06. * Soft carrying case, CA-05A.

2-2 Electrical Specifications (23±5 ℃ , 25% ~ 75 % RH)

Frequency range:	50 MHz to 3.5GHz
Specified measurement range: CW signal (f > 50MHz):	20 mV/m to 25.0 V/m 53 uA/m2 to 66.3mA/m 1 uW/m2 to 7.15W/m2 0 uW/cm2 to 0.715mW/cm2
Units	mV/m, V/m, μA/m, mA/m, μW/m2, mW/m2, W/m2, μW/cm2, mW/cm2
Display resolution:	0.1mV/m, 0.1uA/m, 0.1uW/m^2, 0.001uW/cm^2 , 0.001W/cm2
Dynamic range	Typically 75dB
Absolute error	1.0dB at 1 V/m & 2.45GHz
Frequency response Sensor (with typical CAL factors)	1.0dB (1.9GHz to 3.5GHz) 2.4dB (50MHz to 1.9GHz)
Isotropy deviation	Typically 1.0dB (f>2.45GHz)
Overload limit	0.42 mW/cm^2 per axis.
Thermal response (0 to 50°)	± 0.5dB

3. FRONT PANEL DESCRIPTION

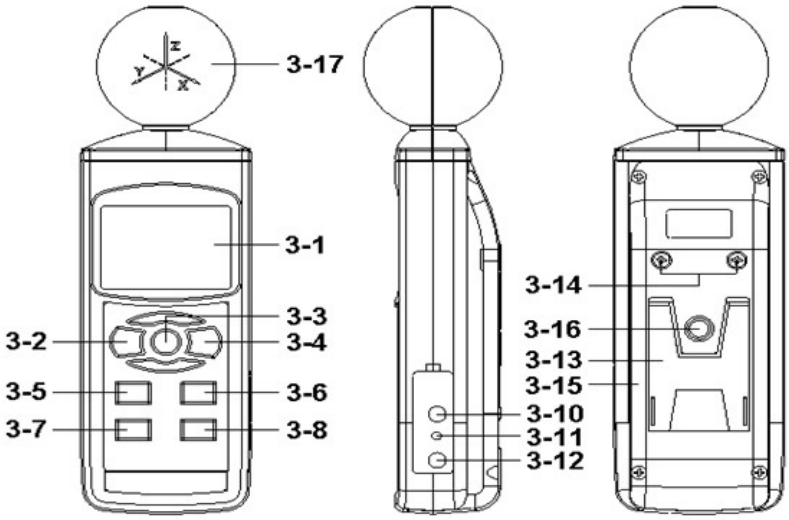


Fig. 1

3-1 Display.
3-2 Power Button
3-3 Hold Button
3-4 REC Button
3-5 ▲ Button (UNIT Button)
3-6 ▼ Button (X,Y,Z,XYZ Function Button)
3-7 Time Button (SET Button)
3-8 Enter Button
3-10 RS-232 output terminal
3-11 Reset Button
3-12 DC 9V adapter socket
3-13 Stand
3-14 Battery Cover Screws
3-15 Battery compartment/Cover
3-16 Tripod Fix Nut
3-17 RF EMF detect seneor

4. MEASURING PROCEDURE

E-field sensors
The 3-channel sensor is located at the top of the meter. The three voltages generated by the sensor are fed back to the meter.
The measurement of the field is done by moving the aerial of the sensor in the desired measured environment. A direct wide band measurement is obtained of the field that the measurement sensor is subjected to.
To find the value of the field emitted by a source of interference, simply point the aerial towards it and get as close as possible (the value of the field is inversely proportional to the distance of the sensor/emission source).
The operator must take care not to be between the source of disturbance and the zone to be checked. The human body shields electromagnetic fields.

4-1 RF EMF Strength Function selection and measurement

1) Turn on the meter by pressing the " Power Button " (3-2, Fig. 1) > 1.5 seconds continuously.

   * *Pressing the " Power Button " (3-2, Fig. 1) continuously and > 1.5 seconds again will turn off the meter.*

2) measurement Function select
   pressing and hold the " Function Button "(3-6, Fig. 1),
   to select X axis,Y axis, Z axis, and XYZ axis measurement Function.
3) measurement UNIT select
   pressing and hold the " UNIT Button "(3-5, Fig. 1),
   to select …
   1 mV/m, When Test values > 999.9 ,the unit auto chang to V/m unit ,
   2 μA/m, When Test values > 999.9 ,the unit auto chang to mA/m unit ,
   3 μW/m^2, When Test values > 999.9 ,the unit auto chang to mW/m^2 unit, mW/m^2, When Test values > 999.9 ,the unit auto chang to W/m^2 unit ,
   4 μW/cm^2, When Test values > 999.9 ,the unit auto chang to mW/cm^2 unit .

4) measurement Procedure
   1. Hold the meter at arm's length.
   2. Make several measurements at various locations around the work place or the interested areas as described above. This is particularly important if the field conditions are unknown.

3. Pay special attention to measuring the neighboring vicinity for possible radiation sources. Apart from active sources, those components connected to a source may also act as radiators. For example, the cables used in diathermy equipment may also radiate electromagnetic energy. Note that metallic objects within the field may locally concentrate or amplify the field from a distant source.

4-2 Data Hold

During the measurement, press the " Hold Button " (3-3, Fig. 1) once will hold the measured value & the " HOLD " symbole will be light, Press the " Hold Button " once again will release the data hold function , (3-20, Fig. 1) HOLD symbole will be quenched

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 indicator " will be light.

2) With the " REC " Symbol is light on the display :
   a) Press the " REC Button " (3-4, Fig. 1) once, the " REC and MAX Symbol indicator will be light , and the maximum value will appear on the display.

   b) Press the " REC Button " (3-4, Fig. 1) again, the " REC and MIN " Symbol indicator will be light , and the minimum value will appear on the display.

   c) To exit the memory record function, just press the " REC " button for 1.5 seconds at least. The display will revert to the current reading, red led indicator will be quenched

5. 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 display will show :

SET DATE... Set clock time (Year/Month/Date, Hour/Minute/Second)
POFF..... Auto power OFF management
BEEP..... Set beeper sound ON/OFF
CAL..... Set alarm mesurement value gain .
ALARM UNIT/VALUE... Set alarm value .
ALARM YES / NO… Set alarm to yes or no.

Remark :
During execute the " Advanced Setting " function,if press " Power Button " (3-2, Fig. 1) once will exit the " Advanced Setting " function, the LCD will return to normal screen.

5-1 Set clock time (Year/Month/Date,Hour/Minute/ Second)

When the lcd display show "DATE "

1) Press the " Enter Button " (3-8, Fig. 1) once, ,YY symbol will light ,Use the " ▲ Button " (3-5, Fig. 1) or " ▼ Button " (3-6, Fig. 1) to adjust the correct value (Setting start from Year value). press the " Enter Button " (3-8, Fig. 1) once, After the desired value is set, YY symbol will be quenched and will going to Month adjustment (for example, first setting value is Year then next to adjust Month, Date, Hour, Minute, Second value).

2) After set all the time value (Year, Month, Date, Hour, Minute, Second), the screen will jump to " Set sampling time " setting screen (Chapter 5-2).

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).

5-2 Auto power OFF management

When the lcd display show " POFF "

1) Use the " ▲ Button " (3-5, Fig. 1) or " ▼ Button " (3-6, Fig. 1) to select the led display show " YES " or " NO ".

   YES - Auto Power Off management will enable.
   no - Auto Power Off management will disable.

2) After select the lcd displary show " YES " or " NO ", press the " Enter Button " (3-8, Fig. 1) will save the setting function with default.

5-3 Set beeper sound ON/OFF

When the lcd display show " bEEP "

1) Use the " ▲ Button " (3-5, Fig. 1) or " ▼ Button " (3-6, Fig. 1) to select the lcd display show " 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 led displary show " YES " or " NO ", press the " Enter Button " (3-8, Fig. 1) will save the setting function with default.

5-4 Set mesurement value gain.

When the lcd display show " CAL "

1) Use the " ▲ Button " (3-5, Fig. 1) or " ▼ Button "(3-6, Fig. 1) to set mesurement value gain.
2) After Display will show gain value, press the " Enter Button " (3-8, Fig. 1) will save the setting value with default.

5-5 Set the alarm unit/value .

When the lcd display show " ALARM UNIT "

1) Use the " ▲ Button " (3-5, Fig. 1) or " ▼ Button "(3-6, Fig. 1) to set alarm unit, then press " Enter Button ".
2) Then Use the " ▲ Button " (3-5, Fig. 1) or " ▼ Button "(3-6, Fig. 1) to set alarm value .
3) After Display will show alarm value, press the " Enter Button " (3-8, Fig. 1) will save the alarm value with default.

5-6 Select the alarm function yes or no.

When the led display show " ALARM YES/NO "

1) Use the " ▲ Button " (3-5, Fig. 1) or " ▼ Button " (3-6, Fig. 1) to select the alarm function to show " YES " or "No ".

YES - the alarm function to enable.
NO - the alarm function to disable.

6. 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 " (3-12, Fig. 1).

7. BATTERY REPLACEMENT

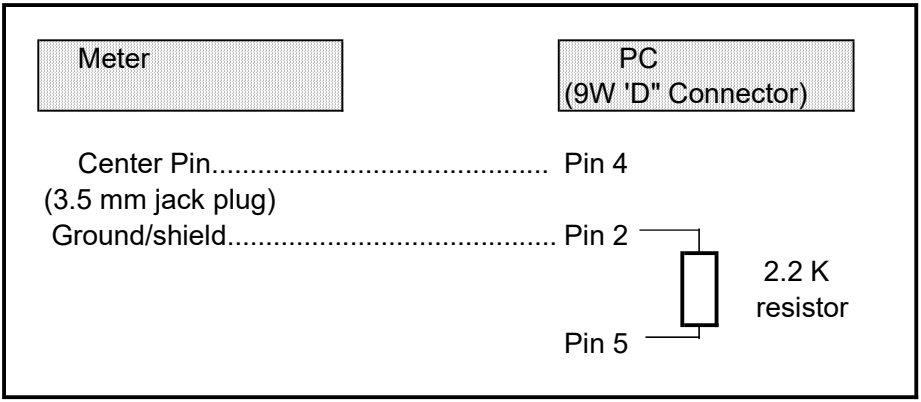
1) When the left corner of " Lobattery text " indicator is light, it is necessary to replace the battery. However, in-spec. measurement may still be made for several hours after low battery indicator appears before the instrument become inaccurate.
2) Loose the " Battery Cover Screws " (3-14, Fig. 1) 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.

8. RS232 PC SERIAL INTERFACE

The instrument has RS232 PC serial interface via a 3.5 mm terminal (3-10, 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 :

D15	Start Word		
D14	4		
D13			
D12, D11	Annunciator for Display		
	mV/m = A7	V/m = G9	μA/m = H1
	mA/m = H2	μW/m2 = F4	mW/m2 = F3
	W/m2 = A9	μW/cm2 = B0	mW/cm2 = A8
D10	Polarity 0 = Positive 1 = Negative		

D9	Decimal Point(DP), position from right to the left 0 = No DP, 1= 1 DP, 2 = 2 DP, 3 = 3 DP
D8 to D1	Display reading, D1 = LSD, D8 = MSD For example : If the display reading is 1234, then D8 to D1 is : 00001234
D0	End Word

RS232 FORMAT : 9600, N, 8, 1

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