

UNMATCHED PERFORMANCE FOR THOSE WHO WILL ONLY ACCEPT THE BEST!



BRYMEN[®]
BRIGHT PEOPLE'S CHOICE

BM830 SERIES
PROFESSIONAL MULTIMETERS

50ms RECORD MAX, MIN, MAX-MIN, AVG with autoranging capability

You can easily track intermittent signals, capture turn-on/ turn-off surges, and monitor line voltage changes over a much wider dynamic range with the best resolution. It largely surpasses single range recording which is easily over-flowed, or with insufficient resolution. The BM830 series features a fast single range sampling speed of 50ms for MAX, MIN, MAX-MIN and AVG readings. The faster the sampling speed, the more accurate the measurement of surges, spikes and sags will be. The true average AVG feature calculates all readings taken over time continually.

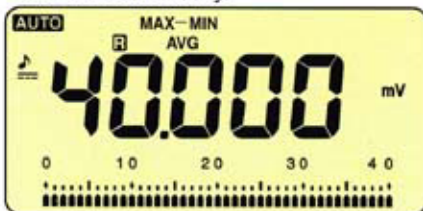


Fig 5: RECORD Function Display

0.8ms CREST MAX, MIN, MAX-MIN capture

You can capture transient signal crest voltage (instantaneous peak value) as short as 0.8ms. This function can be used to determine crest factor which can indicate the presence of harmonics. Crest factor is the ratio of crest value to the true rms value. A pure sinusoidal waveform has a crest factor of 1.414.



Fig 6: CREST Function Display

SORT MAX, MIN, MAX-MIN, AVG with autoranging capability

SORT™ is one of the most useful innovations. The function senses a stable measurement, beeps, captures it for comparison, then stores the maximum and minimum readings together with the event numbers in memory for later display. The average feature calculates all the readings taken and displays the true average value together with number of events counted. This simplifies MAX & MIN values sorting, MAX-MIN & AVG values calculation, and quantity counting in component inspection. When used with relative % change function, readings will be displayed in terms of percentage deviation.

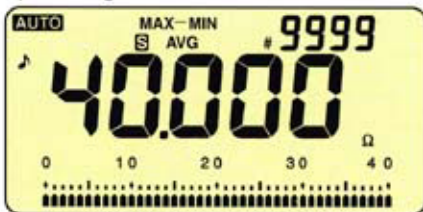


Fig 7: SORT Function Display

Relative zero (Δ) with autoranging capability

Relative zero allows the user to offset the meter measurements with a relative reference value. Practically all measured readings can be set as relative reference value including MAX, MIN, MAX-MIN, and AVG readings of RECORD or SORT™ functions.

Relative percentage change (%) with center zero auto zoom bar graph

In this mode, the readings show relative percentage changes, and the bar graph automatically indicates +/- 200%, or +/- 20% full scale changes with respect to the relative reference value as center zero point. It simplifies zero, peaking, nulling measurements, and is excellent for fine adjustments.

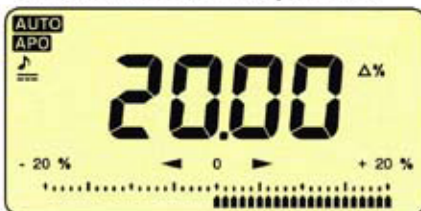


Fig 8: RELATIVE % CHANGE Display

Relative per unit (U)

A unique feature to show the ratio of measuring values to the relative base value. The relative base value is considered to be one unit, and the consecutive measurements will be displayed in terms of units. Measuring the parallel capacitance of co-axial cable or parallel wire in conjunction with the relative per unit mode, for example, helps estimating the total cable length or locating cable breakage locations.

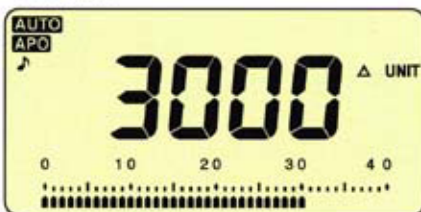


Fig 9: RELATIVE PER UNIT Display

HOLD function

When in normal measuring modes, the hold feature freezes the display for later view. When in RECORD or CREST mode, however, the hold function stops updating the measurements, and you can read throughout the locked MAX, MIN, MAX-MIN, and AVG readings. Release the hold function to continue RECORD or CREST.

Data store & recall (MEM)

This feature stores the whole display data in memory for later recall. The memory will remain even in auto-power-off mode, and can also be recalled while you are in another meter function.

Diode test

Diode test is a simple way to check the condition of diodes by measuring the diode forward and reverse voltage.

Autoranging current measurements with audible & visible input warnings

The BM830 series equips with 6 ranges of current measurements from 400.0uA up to 10.00A, high energy fuses protection, and audible & visible input warnings to ensure ease of use as well as safe operation. The input warnings produce a 'InErr' display and a beep tone to warn the user against possible damage to the meter due to improper connections to the A or uA input jack.

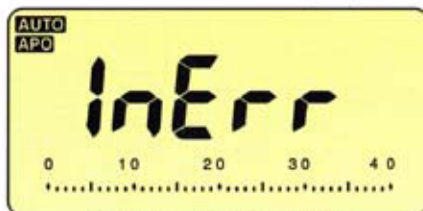


Fig 10: Input Warning Display

Rugged, individual battery compartment, sealed construction

An individual battery compartment sealed against battery leakage contaminant which easily cause fatal printed circuit board shortage and also degradation of accuracy. A splash proof case sealed against dust, dirt and moisture even under harsh operating environments.

Safety

Designed to meet UL3111-1, CSA C22.2 No.231, and IEC 1010-1 installation category III.

PRODUCT SUMMARY

FUNCTION/FEATURE	BM835	BM837
4,000 COUNTS (FAST)	●	●
40,000 COUNTS (SLOW)	●	●
ANALOG BARGRAPH	●	●
DUAL DISPLAY	●	●
0.08% BASIC DCV ACC.	●	●
BACKLIGHT DISPLAY	●	●
TRUE RMS CONVERSION	●	●
DC VOLTAGE, 6 RANGES	●	●
AC VOLTAGE, 5 RANGES	●	●
DC+AC VOLTAGE, 4 RANGES	●	●
DC CURRENT, 6 RANGES	●	●
AC CURRENT, 6 RANGES	●	●
RESISTANCE, 7 RANGES	●	●
CONDUCTANCE, 1 RANGE	●	●
FREQUENCY, 6 RANGES	●	●
DUTY CYCLE, 1 RANGE	●	●
CAPACITANCE, 8 RANGES	●	●
DC ADAPTOR, 1 RANGE	●	●
AC ADAPTOR, 1 RANGE	●	●
dBm & dB (20 REF), 1 RANGE	●	●
DIODE TEST, 1 RANGE	●	●
CONTINUITY, 1 RANGE	●	●
50ms RECORD	●	●
0.8ms CREST	●	●
SORT	●	●
DATA HOLD	●	●
STORE & RECALL	●	●
RELATIVE ZERO	●	●
RELATIVE % CHANGE	●	●
RELATIVE PER UNIT	●	●
INPUT WARNING	●	●
SPLASH PROOF CASE	●	●
PROTECTIVE HOLSTER	●	●
TOTAL RANGES	49	55

HOW HIGH PERFORMANCE DMM'S WILL BE JUDGED FROM NOW ON

True rms DC+AC & AC Voltage with 20kHz band-width (BM837 only)

DC+AC true rms is given by the expression: $\sqrt{DC^2 + (AC\ rms)^2}$. With DC+AC true rms voltage measurements, you can accurately measure the voltage values regardless of the waveforms such as: square, sawtooth, triangle, pulse trains, spikes, as well as distorted waveforms with the presence of harmonics and DC components. Harmonics and DC components may cause:

- 1) Overheated transformers, generators and motors to burn out faster than their shelf life
- 2) Circuit breakers to trip prematurely
- 3) Fuses to blow
- 4) Neutrals to overheat due to triplen harmonics present on the neutral (180Hz)
- 5) Bus bars and electrical panels to vibrate

The wider the frequency band-width of the meter, the more accurate the measurement will be. AC only true rms and average reponding meters can introduce significant errors in many applications. See table 1 for typical example.


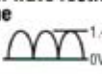
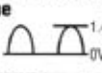
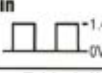
INPUT WAVEFORM	DC+AC TRMS	AC TRMS	AVERAGE RESPONSE
Sine 	1.000V ERROR=0% CF=1.414	1.000V ERROR=0% CF=1.414	1.000V ERROR=0%
Full wave rectified Sine 	1.000V ERROR=0% CF=1.414	0.436V ERROR=56.4% CF=3.247	0.421V ERROR=57.9%
Half wave rectified Sine 	0.707V ERROR=0% CF=2.000	0.546V ERROR=22.7% CF=2.591	0.550V ERROR=22.2%
50% duty pulse train 	1.000V ERROR=0% CF=1.414	0.707V ERROR=29.3% CF=2.000	0.785V ERROR=21.5%

Table 1: Waveforms and Crest Factors

40.00Ω low resistance range

Additional 40.00Ω low resistance range is excellent for locating contact resistance of motor carbon brushes, connectors, or relays.

DC 40.00mV low voltage range

Additional 40.00mV low dc voltage range measures extremely small signals with superb resolutions.

99.999Hz low frequency range

With 0.001Hz resolution, you can effectively test variable frequency motor drives, motor controllers, and other equipment that operates at very low frequencies. The frequency counter is capable of measuring 05.000Hz up to 4.0000MHz in 6 ranges with full 5 digits 99,999 count resolutions.

4,000/40,000 counts + 9,999 counts dual display

To ensure maximum speed, accuracy and resolution, the fast 3-3/4 digit 4,000 count digital display updates 5 times per second nominal. The 10 times high resolution mode 4-3/4 digit 40,000 count digital display updates 1.25 times per second nominal, and is available in most functions. In dual display mode, you can simultaneously view ACV+Hz, ACA+Hz, AC ADP+Hz, nS+GΩ, SORT™ VALUES+EVENT #, %+Hz, or dBm+Hz in a 4 digit 9,999 count complementary digital display.

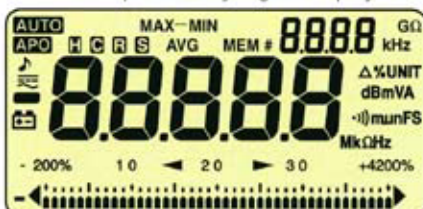


Fig 1: LCD Full Display, Shown Actual Size

dBm and relative dB gain with 20kHz band-width (BM837 only)

Direct dual display read out of frequency and dBm referenced to 20 selectable impedances from 4, 8, 16, 32, 50, 75, 93, 110, 125, 135, 150, 200, 250, 300, 500, 600, 800, 900, 1000, up to 1200Ω. In testing of amplifiers, filters, or attenuators, use the relative function to express the ratio of output power to input power in dB for fast gain or loss test. Output of audio amplifiers typically runs as high as 20kHz.



Fig 2: dBm + Hz Display

Conductance with GΩ in dual display

Conductance is the inverse of resistance, that is $S=1/\Omega$. The series features 400.0nS range with GΩ in dual display, which virtually extends the resistance measuring capability up to the order of Giga Ohms. It is useful for leakage measurements in diodes, transistors, connectors, printed circuit boards, capacitors, and transformer insulation.



Fig 3: nS + GΩ Display

8 Capacitance measurement ranges with 600V protections

You can practically use test leads to check small electronic capacitor values in the order of pF, as well as large motor run and start capacitor values in the order of mF. The new measuring technology employed provides superb accuracy, resolution, and fully autoranging capabilities.

AC/DC Adaptor (ADP) ranges. AC true rms 50kHz band-width (BM837 only)

Featuring 50kHz true rms ACV, or DCV adaptor ranges with 1000MΩ high input impedance. It can virtually cope with any type of transducer at the highest sensitivity and the least current drain. In conjunction with the CREST, RECORD, or SORT™ feature, the DMM practically serves as a superior recording instrument. With a current clamp adaptor and the MAX/MIN crest feature, you can capture in rush current and troubleshoot motor starting circuit.

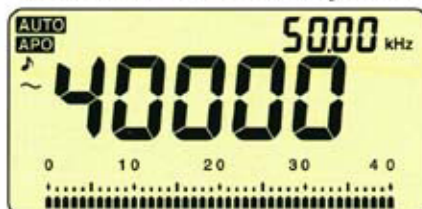


Fig 4: ADP + Hz in 40,000 Counts Display

128 times/sec extra high speed 43 segments analog bar graph

With the 43 segment analog bar graph updates 128 times/sec in DC Voltage & Resistance functions, you can easily detect faulty contacts, identify potentiometer clicks, and indicate signal spikes during adjustments. In other modes & functions, the bar graph updates 20 times/sec showing excellent trending to cope with the signal characteristic.

Fast audible continuity test with 150us response time

Audible continuity test is a quick go/no-go test that distinguishes between an open and a closed circuit. The meter will give a continuous beep tone when the input resistance drops below 10Ω for at least 150us (micro-second). This is useful for checking wiring connections and operation of switches. The faster the response time, the more practical the function will be.

Back lighted LCD display (BM837 only)

Allow better visibility in low-light conditions. It turns off automatically after 42 seconds to extend battery life.

GENERAL SPECIFICATIONS

Display : 3-3/4 digits 4000 counts or 4-3/4 digits 40000 counts selectable (5 digits 99999 counts for Hz), and 4 digits 9999 counts dual display LCD
Polarity : Automatic
Update Rate :
 3-3/4D Data: 5 per second nominal;
 4-3/4D Data: 1.25 per second nominal;
 43 Segments Bar graph: 128 per second max
Low Battery: The indicator appears when the battery voltage drops below approx. 5.8V
Operating Temperature : 0°C to 35°C, 0-80% R.H.; 35°C to 50°C, 0-70% R.H.

Storage Temperature : -20°C to 60°C, 80% R.H. (with battery removed)
Temperature Coefficient : nominal 0.15 x (specified accuracy)/°C @ (0°C-18°C or 28°C-40°C), or otherwise specified
Power Supply : Single Alkaline 9V battery; NEDA1604, JIS006P or IEC6F22
APO Timing : Idle for 4.5 minutes
APO Consumption : 20 μ A
Dimension : L186mm X W87mm X H35.5mm (without holster)
Safety : Designed to UL3111-1, CSA C22.2 NO.231, and IEC1010-1 installation category III

Overload Protections :
 μ A & mA : 0.63A/500V Fuse, IR 200kA;
 A : 15A/600V Fuse, IR 100kA;
 V : 780Vrms, 1000Vpeak;
 mV : 600VDC/VAC rms;
 Others: 600VDC/VAC rms
Sensing : True RMS for BM837; Average responding for BM835
Power Consumption : 12 mA
Weight : 390 gm (without holster)
Accessories : Test leads (pair), holster, battery installed and user's manual

ELECTRICAL SPECIFICATIONS

ACCURACY IS \pm (% READING DIGITS + NUMBER OF DIGITS) OR OTHERWISE SPECIFIED, AT 23°C \pm 5°C & LESS THAN 75% R.H.

* True RMS responding accuracies are specified from 5% to 100% of range or otherwise specified; Crest Factor <3:1 at full scale, and <6:1 at half scale

DC Voltage

RANGE	BM835	BM837
	Accuracy	
40.00 mV	0.5% + 6d	
400.0mV, 4.000V, 40.00V, 400.0V, 1000V	0.08% + 1d	

NMRR : >60dB @ 50/60Hz
 CMRR : >120dB @ DC, 50/60Hz, $R_s=1k\Omega$
 Input Impedance : 10M Ω , 30pF nominal (100pF nominal for 40mV & 400mV ranges)

AC Voltage

RANGE	BM835	BM837*
	Accuracy	
50Hz — 60Hz		
400.0mV, 4.000V, 40.00V, 400.0V, 750V	0.5% + 3d	0.5% + 3d
40Hz — 1kHz		
400.0mV	0.8% + 3d	0.8% + 3d
4.000V, 40.00V, 400.0V	0.8% + 4d	0.8% + 4d
750V	1.0% + 4d	1.0% + 4d
1kHz — 5kHz		
400.0mV	1.0% + 3d	1.0% + 3d
4.000V, 40.00V, 400.0V	1.0% + 6d	1.0% + 4d
750V	3.0%+8d**	3.0%+6d**
5kHz — 20kHz		
400.0mV	2.0%+6d**	1.5%+6d**
4.000V, 40.00V, 400.0V	1.8%+8d**	1.8%+6d**
750V	Unspec'd	Unspec'd
20kHz — 50kHz		
400.0mV	Unspec'd	2.5%+6d***

CMRR : >60dB @ DC to 60Hz, $R_s=1k\Omega$
 Input Impedance : 10M Ω , 30pF nominal (100pF nominal for 400mV range)

**Specified from 10% to 100% of range
 ***Add (30000/reading) counts below 38% of range

(AC + DC) Voltage

RANGE	BM837*
	Accuracy
50Hz — 60Hz	
4.000V, 40.00V, 400.0V, 750V	0.8% + 8d
40Hz — 1kHz	
4.000V, 40.00V, 400.0V	1.0% + 8d
750V	1.2% + 8d
1kHz — 5kHz	
4.000V, 40.00V, 400.0V	1.2% + 8d
750V	3.2% + 8d**
5kHz — 20kHz	
4.000V, 40.00V, 400.0V	2.0%+8d**
750V	Unspec'd

Input Impedance : 10M Ω , 30pF nominal
 **Specified from 10% to 100% of range

Diode Tester

Range	Accuracy	Test Current (Typical)	Open Circuit Voltage
4.000V	2%+1d	0.8mA	< 3.5 VDC

DC Current

RANGE	BM835	BM837	Burden Voltage
	Accuracy		
400.0 μ A	0.4% + 4d		0.15mV/ μ A
4000 μ A	0.2% + 2d		0.15mV/ μ A
40.00mA	0.4% + 4d		3.3mV/mA
400.0mA	0.2% + 3d		3.3mV/mA
4.000A	0.8% + 6d		0.03V/A
10.00A	0.4% + 4d		0.03V/A

AC Current

RANGE	BM835	BM837*	burden Voltage
	Accuracy		
50Hz — 60Hz			
400.0 μ A	1.0%+4d	1.0%+4d**	0.15mV/ μ A
4000 μ A	0.8%+3d	0.8%+3d	0.15mV/ μ A
40.00mA	1.0%+4d	1.0%+4d**	3.3mV/mA
400.0mA	0.8%+3d	0.8%+3d	3.3mV/mA
4.000A	1.0%+4d	1.0%+4d**	0.03V/A
10.00A	0.8%+3d	0.8%+3d	0.03V/A
40Hz — 300Hz			
400.0 μ A	1.5%+4d	1.5%+4d**	0.15mV/ μ A
4000 μ A	1.0%+3d	1.0%+3d	0.15mV/ μ A
40.00mA	1.5%+4d	1.5%+4d**	3.3mV/mA
400.0mA	1.0%+3d	1.0%+3d	3.3mV/mA
4A	1.5%+4d	1.5%+4d**	0.03V/A
10A	1.0%+3d	1.0%+3d	0.03V/A
300Hz — 3kHz			
400.0 μ A	Unspec'd	Unspec'd	0.15mV/ μ A
4000 μ A	1.2%+3d	1.2%+3d	0.15mV/ μ A
40.00mA	Unspec'd	Unspec'd	3.3mV/mA
400.0mA	1.2%+3d	1.2%+3d	3.3mV/mA
4A	Unspec'd	Unspec'd	0.03V/A
10A	1.2%+3d	1.2%+3d	0.03V/A

**Specified from 10% to 100% of range

Ohms

RANGE	BM835	BM837
	Accuracy	
40.00 Ω	0.2% + 6d	
400.0 Ω , 4.000k Ω , 40.00k Ω , 400.0k Ω	0.15% + 2d	
4.000M Ω	0.3% + 2d	
40.00M Ω	1.5% + 5d	
400.0nS	0.7% + 5d	

Open Circuit Voltage : < 1.3VDC

Frequency

RANGE	BM835	BM837
	Accuracy	
99.999Hz, 999.99Hz, 9.9999kHz, 99.999kHz, 999.99kHz, 4.0000MHz	0.002% + 3d	

Sensitivity : 5Hz — 100kHz*, >200 mVrms;
 100kHz — 500kHz, >400 mVrms;
 500kHz — 2MHz, >850 mVrms;
 2MHz — 4 MHz, >1Vrms

**Pulse Width > 3 μ s

Frequency & ACV or AC ADP in Dual Display

RANGE	BM835	BM837
	Accuracy	
99.99Hz, 999.9Hz, 9.999kHz, 20.00kHz	0.002% + 1d	

Sensitivity** : 5Hz—100 Hz, >15% F.S. of AC range;
 100Hz—1kHz, >20% F.S. of AC range;
 1kHz—10kHz, >35% F.S. of AC range;
 10kHz—20kHz, >50% F.S. of AC range
 **ACV 750V range : 5Hz—100Hz, >420VAC
 100Hz—1kHz, >550VAC

Duty Cycle

RANGE	BM837
	Accuracy
0.1% — 99.9%	0.5d/kHz + 2d

Input Frequency : 50Hz — 300 kHz; 5V Logic Family

Capacitance

RANGE	BM835	BM837
	Accuracy**	
4.000nF***	4.0% + 10d	
40.00nF	3.0% + 5d	
400.0nF	0.8% + 5d	
4.000 μ F	0.8% + 3d	
40.00 μ F	2.0% + 3d	
400.0 μ F	3.0% + 5d	
4.000mF	3.5% + 5d	
40.00mF	4.0% + 5d	

**Accuracies with film capacitor or better

***Specified from 10% to 100% of range

dBm (BM837 only)

Selectable reference impedance of 4, 8, 16, 32, 50, 75, 93, 110, 125, 135, 150, 200, 250, 300, 500, 600, 800, 900, 1000, 1200 Ω
 At 600 Ω , -11.76dBm to 54.25dBm,
 Accuracy : \pm 0.25dB + 2d (@40Hz—20kHz)
 Input Impedance : 10M Ω , 30pF nominal

➔) Audible Continuity Tester

Audible threshold : the beeper sounds if the measured resistance is lower than 10 Ω , and turns off when greater than 60 Ω . Response time < 150 μ s

DC Adaptor

10 counts per 1 mVDC
 Accuracy : 0.08%+1d
 Input Impedance : 1000M Ω , 70pF nominal

AC Adaptor

10 counts per 1 mVAC
 Accuracy : Same as AC 400.0mV range
 Input Impedance : 1000M Ω , 70pF nominal



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