

# Full Function Handy DMMs for Lab and Field Services!

Full  $\mu\text{A}/\text{mA}/10\text{A}$  Ranges, Audible + Visible BeepLit™ Continuity, AutoV + Ghost Voltage Buster, VFD V & Hz Fundamentals, Hi & Lo EF-Detection, Records Min/Max/Average, Relative Zero, BeepJack™ Warning!



**BM230 Series**  
**Practical Multimeter**



BRIGHT PEOPLE'S CHOICE  
<http://www.brymen.com>



● **BM235**



● **BM233**



● **BM231**

235	233	231	FUNCTIONS & FEATURES
●	●	●	3-5/6 Digits 6,000 Counts Large Easy To Read LCD Display
●	●	●	Fast Measurements, 5/Sec; Fully Auto-Ranging
●	●	●	Intelligent Auto Power Off
●	●	●	True RMS AC Conversion
●	●	●	Data Hold
●	●	●	Records Max/Min Readings & Calculates Avg Readings Over Time
●	●	●	VFD V & Hz Fundamental Readings Of Most Variable-Frequency-Drives
●	●	●	Paper white Back-Lighted LCD Display
●	●	●	BeepLit™ Continuity. Features Audible Beep & Visible Backlight Effects
●	●	●	Relative Zero Mode
●	●	●	Non-Contact EF-Detection (NCV) With Hi/Lo Selectable Sensitivities
●	●	●	Probe-Contact EF-Detection For More Precise Indication Of Live
●			AutoV LoZ Feature. Automatic DC & AC 1000V Selection With Low Initial Impedance To Drain Ghost Voltages
●	●	●	DC/AC V Ranges 600.0mV To 1000V
●	●	●	Ohms Ranges 600.0Ω To 60.00MΩ
●	●		Cx Ranges 20.00nF to 10.00mF For Start & Run Motor Capacitors
●	●		Line Level Frequency Ranges 99.99Hz To 50.00kHz
●	●	●	DC/AC μA, mA & A Ranges 600.0μA To 10.00A (20A for 30s / 5 mins cool down)
●			Type-K Temperature Readings -40°C To 400°C or -40°F To 752°F
●	●	●	Beep-Jack™ Input Warning Against Improper μAmA/A-Terminals Plug In
●	●	●	Diode Tester
●	●	●	Rugged Fire Retarded Housing
●	●	●	Replaceable Protective Holster With Probe-Holders & Tilt-Stand
●	●	●	Optional Purchase Magnetic Hanger
●	●	●	Batteries And Fuses Access Door
●	●	●	Transient Protection Up To 6kV 1.2/50μs Lightning Surge
●	●	●	LVD: EN61010-1/-2-030/-2-033 CAT-II 1kV, CAT-III 600V & CAT-IV 300V
●	●	●	EMC: EN61326-1:2013

# Compact Yet Optimized For Your Daily Service!

Full  $\mu$ A/mA/10A Ranges, BeepLit™ Continuity, Hi/Lo EF-Detection, LoZ AutoV, VFD V/Hz, °C/°F, Min/Max/Avg, BeepJack™ Warning

**White Display Backlight**  
For Easy Viewing In The Dark

**Auto & Manual-ranging**  
Auto-ranging With Manual-ranging Override

**True RMS Measurements**  
For Non-sinusoidal Waveforms Of AC Voltages & AC Currents

**Large 6000 Counts LCD Display**  
5/sec Fast Nominal Update Rate

**Function Selection**  
Toggle Conveniently Between Primary & Secondary Functions

**Max Min Avg Record**  
Record Max/Min And Calculates Average Readings Over Time

**Hz Of Line Level Voltage**  
Measures Noisy High Voltage ACV Frequencies

**Relative Zero Mode**  
For Convenient Readings Comparison & Offset

**VFD V & Hz Feature**  
Measures Fundamental Voltage & Frequency Of Most Variable-Frequency-Drives

**Data Hold**  
Freezes The Displaying Reading For Later View

**High Impedance Voltage**  
1000VAC/DC Measuring Capabilities; High Input Impedance For Load Sensitive Circuits

**Hi/Lo Senses EF-Detection**  
Both Non-contact (NCV) & Single-probe Voltage Detection For Identifying Live Lines

**AutoV LoZ Feature**  
Automatic Selection Of LoZ DCV And LoZ ACV

**Full  $\mu$ A, mA & A Ranges**  
6 Full Current Ranges With 1000V HBC Fuses Protected

**Ghost-voltage-buster**  
AutoV LoZ Drains Ghost/ Stray Voltages Leaving Only Hard Signals On Meter Readings

**BeepLit™ Continuity**  
Quick Open-short Tests. Beep and Backlight Effects For Noisy Environments

**Beep-jack™ Audible Warning**  
Beeps Against Improper A-terminal Plug In. Decreases Risks Of Damage

**Type-k Temperature**  
Selectable °C & °F Readings

**Protective Holster**  
With Holders For Probe Storage And "third Hand" Feature, Replaceable & Washable

**Intelligent Auto-power-off**  
To Extend Battery Life

**EMC**  
Meets EN61326-1:2013

**LVD Safety**  
Meets EN61010-1/-2-030/-2-033  
CAT II 1kV & CAT III 600V

**Transient Protection**  
Up To 6kV 1.2/50 $\mu$ s Lightning Surge; Superb Protection For Serious Users

## GENERAL SPECIFICATION

**Display:** 3-5/6 digits 6,000 counts  
**Update Rate:** 5 per second nominal  
**Operating Temperature:** -10°C to 45°C  
**Relative Humidity:** Maximum relative humidity 80% for temperature up to 31°C decreasing linearly to 50% relative humidity at 45°C  
**Altitude:** Operating below 2000m  
**Storage Temperature:** -20°C ~ 60°C, < 80% R.H. (with battery removed)  
**Temperature Coefficient:** Nominal 0.15 x (specified accuracy) / °C @ (-10°C ~ 18°C or 28°C ~ 45°C), or otherwise specified  
**Sensing:** True RMS sensing  
**Pollution Degree:** 2  
**Safety:** Double insulation per IEC/UL/EN61010-1 Ed. 3.0, IEC/UL/EN61010-2-030 Ed. 1.0, IEC/UL/EN61010-2-033 Ed. 1.0, IEC/UL/EN61010-031 Ed. 1.1 and the corresponding CAN/CSA-C22.2 regulations to Measurement CAT II 1000V, CAT III 600V and CAT IV

## Electrical Specification

Accuracy is given as ±(% of reading digits + number of digits) or otherwise specified @ 23°C ± 5°C  
 ACV & ACA accuracies are specified from 1% to 100% of range or otherwise specified. Maximum Crest Factor <2:1 at full scale & <4:1 at half scale, and with frequency components fall within the meter specified frequency bandwidth for non-sinusoidal waveforms

## AC Voltage

RANGE	Accuracy
<b>50Hz ~ 60Hz</b>	
6.000V, 60.00V, 600.0V, 1000V	0.7% + 3d
<b>45Hz ~ 440Hz</b>	
6.000V, 60.00V, 600.0V, 1000V	2.0% + 3d
<b>10Hz ~ 500Hz</b>	
60.00mV, 600.0mV	1.0% + 3d
<b>500Hz ~ 800Hz</b>	
60.00mV, 600.0mV	2.0% + 3d

Input Impedance: 10MΩ, 54pF nominal

## VFD\_ACV (with Low Pass Filter)

RANGE	Accuracy <sup>1)</sup>
<b>10Hz ~ 440Hz (fundamental)</b>	
600.0V, 1000V	2.0% + 3d

<sup>1)</sup>Not specified for fundamental frequency > 440Hz

## AutoV\_ACV (BM235 only)

RANGE	Accuracy <sup>1)</sup>
<b>45Hz ~ 440Hz</b>	
600.0V, 1000V	2.0% + 3d

<sup>1)</sup>Not specified at <1VAC

Threshold: > 1VAC nominal

Input Impedance:

Initially approx. 2.1kΩ, 164pF nominal; Impedance increases abruptly within a fraction of a second as display voltage is above 50V (typical). Ended up impedances vs display voltages typically are:

12kΩ	@100V
100kΩ	@300V
240kΩ	@600V
580kΩ	@1000V

## DC Voltage

RANGE	Accuracy
<b>60.00mV, 600.0mV, 6.000V, 60.00V, 600.0V, 1000V</b>	0.3% + 2d

Input Impedance: 10MΩ, 54pF nominal

## AutoV\_DCV (BM235 only)

RANGE	Accuracy <sup>1)</sup>
600.0V, 1000V	2.0% + 3d

<sup>1)</sup>Not specified at <1VDC

Threshold: > +1.0VDC or < -1.0VDC nominal

Input Impedance:

Initially approx. 2.1kΩ, 164pF nominal; Impedance increases abruptly within a fraction of a second as display voltage is above 50V (typical). Ended up impedances vs display voltages typically are:

12kΩ	@100V
100kΩ	@300V

300V AC & DC

**Transient Protection:** 6.0kV (1.2/50μs surge)

**Terminals (to COM) Measurement Category:**

V / mAμA / A: Category II 1000V, CAT III 600V and CAT IV 300V AC & DC.

**E.M.C.:** Meets EN61326-1:2006

In an RF field of 3V/m:

Temperature function is not specified

Ohm function:

Total Accuracy = Specified Accuracy + 15 digits

Other functions:

Total Accuracy = Specified Accuracy

Performance above 3V/m is not specified

**Overload Protection:**

μA & mA: 0.4A/1000V DC/AC rms, IR 30kA, F fuse

A: 11A/1000V DC/AC rms, IR 20kA, F fuse

V & AutoV: 1100V DC/AC rms

mV, Ohm & others: 1000V DC/AC rms

**Low Battery:** Below approx. 2.5V

240kΩ	@600V
580kΩ	@1000V

## Ohm

RANGE <sup>1)</sup>	Accuracy
600.0Ω, 6.000KΩ	0.3% + 3d
60.00KΩ, 600.0KΩ	0.5% + 3d
6.000MΩ <sup>2)</sup> , 60.00MΩ <sup>3)</sup>	0.9% + 2d <sup>4)</sup>

<sup>1)</sup>Open Circuit Voltage: 1.6VDC typical

<sup>2)</sup>Constant Test Current: 0.2μA Typical

<sup>3)</sup>Constant Test Current: 0.02μA Typical

<sup>4)</sup>5%+20d @ >30MΩ

## BeepLit™ Continuity Tester

Continuity Threshold: Between 30Ω and 480Ω

Response time: 64ms

Latch time: 128ms

Audible Response: Beep sound

Visible Response: LCD Backlight

## Capacitance (BM233 & BM235 only)

RANGE	Accuracy
20.00nF, 200.0nF	1.5% + 8d
2000nF, 20.00μF, 200.0μF, 2000μF	1.5% + 2d
10.00mF	4.5% + 10d

Accuracies with film capacitor or better

## Diode Tester

RANGE	Accuracy
3.000V	0.9% + 2d

Test Current: 0.3mA typical

Open Circuit Voltage: < 3.2VDC typical

## DC Current

RANGE	Accuracy	Burden Voltage
600.0μA, 6000μA	1.0% + 3d	0.1mV/μA
60.00mA, 600.0mA	0.7% + 3d	1.9mV/mA
6.000A, 10.00A <sup>1)</sup>		0.04V/A

<sup>1)</sup>10A continuous, >10A to 20A for 30 seconds max with 5 minutes cool down interval

## AC Current

RANGE	Accuracy	Burden Voltage
<b>50Hz ~ 400Hz</b>		
600.0μA, 6000μA	1.5% + 3d	0.1mV/μA
60.00mA, 600.0mA	1.0% + 3d	1.9mV/mA
6.000A, 10.00A <sup>1)</sup>		0.04V/A

<sup>1)</sup>10A continuous, >10A to 20A for 30 seconds max with 5 minutes cool down interval

**Power Supply:** 1.5V AAA Size battery X 2

**Power Consumption (typical):** 3.2mA

**APO Consumption (typical):** 10μA

**APO Timing:** Idle for 30 minutes

**Dimension:** 161\*80\*50mm L\*W\*H (With Holster)

**Weight:** Approx. 334 gm (With Holster)

**Special Features:** AutoV (LoZ) (BM235 only); VFD; Auto-ranging MAX/MIN/AVG Record; Backlighted LCD; Auto-ranging Relative Zero mode; Display Hold; EF-Detection (NCV); BeepJack™ on μA/mA terminals  
**Accessories:** Test lead pair; Batteries installed; User's manual; BKP60 banana plug type-K thermocouple (BM235 only)

**Optional Purchase Accessories:** BKB32 banana plug to type-K socket plug adaptor (BM235 only); BMH-01 magnetic hanger; BMP-25x soft carrying pouch

## Temperature (BM235 only)

RANGE	Accuracy
-40.0 °C ~ 99.9 °C	1% + 1 °C
100 °C ~ 400 °C	
-40.0 °F ~ 99.9 °F	1% + 2 °F
100 °F ~ 752 °F	

Type-K thermocouple range & accuracy not included

## Line Frequency (BM233 & BM235 only)

Function	Sensitivity (Sine RMS)	Range
60mV, 600mV	50mV	10Hz - 50kHz
6V	3V	10Hz - 50kHz
60V	5V	10Hz - 50kHz
600V	50V	10Hz - 1kHz
1000V	500V	10Hz - 1kHz
VFD 600V	50V	10Hz - 1kHz
VFD 1000V	500V	10Hz - 1kHz
600μA, 6000μA	500μA	10Hz - 5kHz
60mA, 600mA	50mA	10Hz - 5kHz
6A, 10A	8A	50Hz - 1kHz

Accuracy: 0.03% + 2d

## Non-Contact EF-Detection (BM237R & BM239R only)

Bar-Graph Indication	EF-H (Hi Sensitivity)	EF-L (Lo Sensitivity)
	Typical Voltage (Tolerance)	
-	10V (3V~19V)	40V (16V~71V)
--	20V (10V~38V)	80V (32V~142V)
---	40V (21V~79V)	160V (63V~285V)
----	80V (40V~156V)	300V (105V~608V)
-----	160V (>80V)	500V (>300V)

Indication: Bar-graph segments & audible beep tones proportional to the field strength  
 Detection Frequency: 50/60Hz  
 Detection Antenna: Top-left end of the meter  
 Probe-Contact EF-Detection: For more precise indication of live wires, such as distinguishing between live and ground connections, use direct contact testing with one single test-probe via the input terminal COM or V. The COM terminal (Black) has the best sensitivity.



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