

Handy Electrical DMM + 3Ø Rotation Meter!

System & Motor 3Ø Rotation, Audible + Visible BeepLit™ Continuity, AutoV + Ghost Voltage Buster, VFD V & Hz Fundamentals, Hi & Lo EF-Detection, No Amps & 10 Amps Models, Records Min/Max/Average!

BM230R SERIES

Electrical
Multimeter





BM239R



BM237R



BM236R

239R	237R	236R	FUNCTIONS & FEATURES
•			DC/AC μ A Ranges 200.0 μ A To 2000 μ A
•			Type-K Temperature Readings -40°C To 400°C or -40°F To 752°F
•	•		Non-Contact EF-Detection (NCV) With Hi/Lo Selectable Sensitivities
•	•		Probe-Contact EF-Detection For More Precise Indication Of Live
•	•		Cx Ranges 2000nF to 10.00mF For Start & Run Motor Capacitors
•	•		Line Level Frequency Ranges 99.99Hz To 50.00kHz
•	•		DC/AC A Ranges 6.000A To 10.00A (20A for 30s / 5 mins cool down)
•	•		Beep-Jack™ Input Warning Against Improper A-Terminal Plug In
•	•	•	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
•	•	•	White Back-Lighted LCD Display
•	•	•	BeepLit™ Continuity. Features Audible Beep & Visible Backlight Effects
•	•	•	Relative Zero Mode
•	•	•	(R) 3Ø-Rotation-R (Regular-sensitivity mode) for Supply Systems (Probe-contact)
•	•	•	(M) 3Ø-Rotation-M (Hi-sensitivity mode) for Motors (Probe-contact)
•	•	•	AutoV LoZ Feature. Automatic DC & AC 600V Selection With Low Initial Impedance To Drain Ghost Voltages
•	•	•	DC/AC V Ranges 60.00mV To 600V
•	•	•	Ohms Ranges 600.0 Ω To 60.00M Ω
•	•	•	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 1.2/50 μ s Lightning Surge
•	•	•	LVD: EN61010-1/61010-2-033 CAT-III 600V & CAT-IV 300V
•	•	•	EMC: EN61326-1

An Electrical DMM Engineered For Professionals!

LoZ AutoV, VFD V/Hz, 3Wire RST, °C/°F, μ A/10A, BeepLit™ Continuity, Hi/Lo EF-Detection, BeepJack™ Warning

True RMS Measurements

For Non-sinusoidal Waveforms
Of AC Voltages & AC Currents

Auto & Manual-ranging

Auto-ranging With
Manual-ranging Override

White Display Backlight

For Easy Viewing In The Dark

High Impedance Voltage

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

Hz Of Line Level Voltage

Measures Noisy High Voltage
ACV Frequencies

Function Selection

Toggle Conveniently Between
Primary & Secondary Functions

VFD V & Hz Feature

Measures Fundamental
Voltage & Frequency Of Most
Variable-Frequency-Drives

AutoV LoZ Feature

Automatic Selection Of
LoZ DCV And LoZ ACV

Ghost-voltage-buster

AutoV LoZ Drains Ghost/ Stray Voltages
Leaving Only Hard Signals
On Meter Readings

Beep-jack™ Audible Warning

Beeps Against Improper A-terminal
Plug In. Decreases Risks Of Damage

Protective Holster

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

EMC

Meets EN61326-1



Max Min Avg Record

Record Max/Min And
Calculates Average
Readings Over Time

Large 6000 Counts LCD Display

5/sec Fast Nominal Update Rate

RST Phase Rotation

Dual Sensitivity Modes For
Both Motors And Supply Systems

Relative Zero Mode

For Convenient Readings
Comparison & Offset

Data Hold

Freezes The Displaying
Reading For Later View

Hi/Lo Senses EF-Detection

Both Non-contact (NCV) &
Single-probe Voltage Detection
For Identifying Live Lines

BeepLit™ Continuity

Quick Open-short Tests.
Beep and Backlight Effects
For Noisy Environments

Type-k Temperature

Selectable °C & °F Readings

Transient Protection

Up To 6kV 1.2/50 μ s Lightning Surge;
Superb Protection For Serious Users

Intelligent Auto-power-off

To Extend Battery Life

LVD Safety

Meets EN61010-1/61010-2-033
CAT III 600V & CAT IV 300V

ELECTRICAL SPECIFICATIONS

Accuracy is given as \pm (% of reading digits + number of digits) or otherwise specified @ 23°C \pm 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
50Hz ~ 60Hz	
6.000V ¹⁾ , 60.00V, 600.0V	0.7% + 3d
45Hz ~ 440Hz	
6.000V ¹⁾ , 60.00V, 600.0V	2.0% + 3d

Input Impedance: 10M Ω , 54pF nominal

Overload protection: 1100Vrms for AC & 660V for DC

¹⁾<5d non-zero residue may appear when backlight is on, which will not affect the specified measuring range and accuracy

ACmV

RANGE	Accuracy
10Hz ~ 500Hz	
60.00mV ¹⁾²⁾ , 600.0mV ³⁾	1.0% + 3d
500Hz ~ 800Hz	
60.00mV ¹⁾²⁾ , 600.0mV ³⁾	2.0% + 3d

Overload protection: 600Vrms AC/DC

Input Impedance: 10M Ω , 54pF nominal

¹⁾<5d non-zero residue may appear when backlight is on, which will not affect the specified measuring range and accuracy

²⁾Signal peak absolute values, including DC bias, less than 130mV_{peak}

³⁾Signal peak absolute values, including DC bias, less than 1300mV_{peak}

GENERAL SPECIFICATIONS

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% (specified accuracy) / °C @ -10°C ~ 18°C or 28°C ~ 45°C, or otherwise specified

Sensing: True RMS sensing

Ingress Protection: IP40

Pollution Degree: 2

Safety: Certified per IEC/UL/EN61010-1 Ed. 3.1, IEC/UL/EN61010-2-033 Ed. 2.0, IEC/UL/EN61010-031 Ed. 2.0 and the corresponding CAN/CSA-C22.2 regulations to Measurement Categories:

CAT III 600V and CAT IV 300V AC & DC

Transient Protection: 6.0kV (1.2/50 μ s surge)

E.M.C.: Meets EN61326-1

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:

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

V, AutoV & L3: 660Vdc / 1100Vac rms

mV, Ohm & others: 600Vdc/Vac rms

Low Battery: Below approx. 2.5V

Power Supply: 1.5V AAA Size battery X 2

Power Consumption (typical): 3.2mA

APO Consumption (typical): 10 μ A

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); 3-Phase Rotation detection; VFD; BeepLit™

Continuity; Auto-ranging MAX/MIN/AVG Record; Backlighted LCD; Auto-ranging Relative Zero mode; Display Hold; EF-Detection (NCV) (Models 237 & 239 only); BeepJack™ on A terminal (Models 237 & 239 only)

Accessories: Test lead set; Alligator clip set; Batteries installed; User's manual; BKP60 banana plug type-K thermocouple (Model 239 only)

Optional Purchase Accessories: BKB32 banana plug to type-K socket plug adaptor (Model 239 only); BMH-01 magnetic hanger; BMP-25x soft carrying pouch

DC Voltage

RANGE	Accuracy
60.00mV ¹⁾ , 600.0mV ¹⁾ , 6.000V ²⁾	0.3% + 2d
60.00V ²⁾	0.4% + 2d
600.0V ²⁾	0.2% + 2d

Input Impedance: 10M Ω , 54pF nominal

¹⁾Overload protection: 600Vrms AC/DC

²⁾Overload protection: 1100Vrms for AC & 660V for DC

VFD_ACV (with Low Pass Filter)

RANGE	Accuracy ¹⁾
10Hz ~ 100Hz (fundamental)	
600.0V	1.0%+3d
100Hz ~ 400Hz (fundamental)	
600.0V	10%+3d ²⁾

Overload protection: 1100Vrms for AC & 660V for DC

¹⁾Not specified for fundamental frequency > 400Hz

²⁾Accuracy linearly decreases from 1% + 3d @100Hz to 10% + 3d @400Hz

AutoV_ACV

RANGE	Accuracy ¹⁾
45Hz ~ 440Hz	
600.0V	2.0% + 3d

Overload protection: 1100Vrms for AC & 660V for DC

¹⁾Not specified at <1VAC

Threshold: > 1VAC nominal

Approximate input impedance (//164pF) for reference:

At direct input \leq 50Vac (typical) from quiescence:

>8M Ω @ < 5.6Vac

22k Ω @ 7Vac

12k Ω @ 8Vac

2.6k Ω @ 50Vac

At direct input >>50V (typical) from quiescence:

Initial impedance is approximately 2.1k Ω . Impedance increases abruptly within a fraction of a second as display voltage (hard signal) is much higher than 50V (typical). End-up impedances vs display voltages typically are:

12k Ω @100V

100k Ω @300V

240k Ω @600V

AutoV_DCV

RANGE	Accuracy ¹⁾
600.0V	2.0% + 3d

Overload protection: 1100Vrms for AC & 660V for DC

¹⁾Not specified at <1VDC

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

Approximate input impedance (//164pF) for reference:

At direct input \leq 50Vdc (typical) from quiescence:

>8M Ω @ < 8Vdc (Protection clamping threshold)

25k Ω @ 9Vdc

13k Ω @ 10Vdc

2.6k Ω @ 50Vdc

At direct input >>50V (typical) from quiescence:

Initial impedance is approximately 2.1k Ω . Impedance increases abruptly within a fraction of a second as display voltage (hard signal) is much higher than 50V (typical). End-up impedances vs display voltages typically are:

12k Ω @100V

100k Ω @300V

240k Ω @600V

Ohm

RANGE ¹⁾	Accuracy
600.0 Ω , 6.000k Ω	0.3% + 3d
60.00k Ω , 600.0k Ω	0.5% + 3d
6.000M Ω ²⁾ , 60.00M Ω ³⁾	0.9% + 3d ⁴⁾

¹⁾Open Circuit Voltage: 1.6VDC typical

²⁾Constant Test Current: 0.2 μ A Typical

³⁾Constant Test Current: 0.02 μ A Typical

⁴⁾5%+20d @ >30M Ω

BeepLit™ Continuity Tester

Continuity Threshold: Between 30 Ω and 480 Ω

Continuity ON Response Time: <15ms

Audible Indication: Beep sound

Visible Indication: LCD Backlight

Capacitance (Models 237 & 239 only)

RANGE	Accuracy
2000nF, 20.00 μ F, 200.0 μ F, 2000 μ F	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 μ A & AC μ A (Model 239 only)

RANGE	Accuracy	Burden Voltage ¹⁾
DC μ A		
200.0 μ A, 2000 μ A	0.7% + 3d	2.5mV/ μ A
AC μ A (50Hz ~ 400Hz)		
200.0 μ A, 2000 μ A	1.0% + 3d	2.5mV/ μ A

¹⁾Combination PTC protective impedance is being used

DCA & ACA (Models 237 & 239 only)

RANGE	Accuracy	Burden Voltage
DCA		
6.000A, 10.00A ¹⁾	0.7% + 3d	0.04V/A
ACA (50Hz ~ 400Hz)		
6.000A ²⁾ , 10.00A ¹⁾	1.0% + 3d	0.04V/A

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

²⁾<5d non-zero residue may appear when backlight is on, which will not affect the specified measuring range and accuracy

Temperature (Model 239 only)

RANGE	Accuracy ¹⁾²⁾
-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	

¹⁾Accuracies assume meter interior and the ambient have reached the same temperature (isothermal stage) for a correct junction voltage compensation. Allow enough settling time for a significant change of ambient temperature. It can take up to an hour for changes > 5°C.

²⁾Type-K thermocouple range & accuracy not included

Line Frequency (Models 237 & 239 only)

Function	Sensitivity (Sine RMS)	Range
60mV, 600mV	50mV	10Hz - 50kHz
6V	5V	10Hz - 50kHz
60V	10V	10Hz - 50kHz
600V	50V	10Hz - 1kHz
1000V	500V	10Hz - 1kHz
VFD 600V	50V	10Hz - 1kHz
VFD 1000V	500V	10Hz - 1kHz
200 μ A ¹⁾ , 2000 μ A ¹⁾	500 μ A	10Hz - 5kHz
6A, 10A	8A	50Hz - 1kHz

¹⁾Available for Model 239 only

Accuracy: 0.03% + 2d

Non-Contact EF-Detection (Models 237 & 239 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.

Ⓜ & Ⓡ 3-Phase Rotation function

Hi-sensitivity mode Ⓜ

Voltage range: 0.4V ~ 1000V

Frequency range: 3Hz ~ 400Hz

Normal-sensitivity mode Ⓡ

Voltage range: 65V ~ 1000V

Frequency range: 35Hz ~ 400Hz



BRYMEN TECHNOLOGY CORPORATION

www.brymen.com

TEL: +886 2 2226 3396 (rep)

FAX: +886 2 2225 0025

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