

Innovative AmpTip™ Jaws for Slim-Conductors In CAT-III 1000V Areas

Deluxe All-In-One AC/DC 1000A,
3-Terminal RST Phase-Rotation,
HVAC, AC+DC TRMS



BM080 Series

AmpTip™ Jaws
Clamp-on DMMs

World-wide Patented:

D148257
1996509
D678091S
402011006274.7
M438628
2755507
13486915
202012102140.4
M429871
2359464
202011052429.9



BRIGHT PEOPLE'S CHOICE



BM089



BM088



BM086



BM083

089	086	083	FUNCTIONS & FEATURES
●	●	●	VFD-V & Hz for fundamental V/Hz of most Variable-Frequency-Drives
●	●	●	Fast measurement updates 3/sec
●	●	●	3-5/6 digits 6,000 counts display large LCD
●	●		51mm conductor size Hall-effect 1000A DC/AC jaws
		●	51mm conductor size Ultra-slim 1000A AC jaws
●	●	●	AmpTip™ Low-current-range calibrated at Jaw-tip for slim-conductors
●	●	AC	AC+DC, AC True RMS voltage and current functions
●	●	●	1000VAC/DC input protection on general functions
●	●	●	Auto Power Off
●	●	●	Data HOLD
●	●	●	Record MAX/MIN/AVG mode (Auto-ranging)
●	●	●	Relative mode (Auto-ranging) with DC-Zero mode on DCA, DC+ACA ranges
●	●	●	Fast 80ms PEAK-RMS mode to capture in-rush currents
●	●	●	5ms CREST mode to capture instantaneous +Peak & -Peak
●	●	●	Back-lighted easy-to-read LCD display
●	●		Flashlight for easy operation in dim areas
●	●	●	Non-Contact EF-Detection (NCV)
●	●	●	Probe-Contact EF-Detection for more precise indication of live
●		●	Ⓡ 3Φ-Rotation-R for MAINS supply (Probe-contact)
●		●	Ⓜ 3Φ-Rotation-M (Hi-sensitivity mode) for Motors (Probe-contact)
●		●	Type-K temperature -40.0°C to 400°C or -40.0°F to 752°F selectable
●		●	DCμA ranges 200.0μA to 2000μA (via leads) for HVAC flame sensors
●	●		DC+ACA ranges 60.00A to 1000A + AmpTip™ DC+ACA 60.00A range
●	●		DCA ranges 60.00A to 1000A + AmpTip™ DCA 60.00A range
●	●	●	ACA ranges 60.00A to 1000A + AmpTip™ ACA 60.00A range
●	●		DC+ACV ranges 600.0V to 1000V
●	●	●	DCV ranges 600.0V to 1000V
●	●	●	ACV ranges 600.0V to 1000V
●	●	●	Ohm ranges 600.0Ω to 60.00kΩ
●	●	●	Cx ranges 200.0μF to 2500μF for start & run motor capacitors
●	●	●	Diode test & Fast audible Continuity
●	●	●	Line-level ACV Frequency 5.00Hz to 999.9Hz
●	●	●	Soft carrying pouch
●	●	●	Rugged fire retarded casing with battery access door
●	●	●	Transient protection 8kV 1.2/50μs lightning surge
●	●	●	LVD EN61010-1/61010-2-032/61010-2-033 to CAT III 1000V & Cat IV 600V
●	●	●	EMC EN61326-1 (EN55022, EN61000-3-2/-3 & EN61000-4-2/-3/-4/-5/-6/-8/-11)

Patented AmpTip™ Jaws & Phase Rotation! DC+AC 1000A! CAT III 1kV!

Advanced Safety Compliance with IEC 61010-2-032 3rd Edition and IEC 61010-2-033 1st Edition

Investigated, Tested and Listed by UL, a global independent safety science company



GENERAL SPECIFICATIONS

Display: 3-5/6 digits 6000 counts.

Polarity: Automatic

Update Rate: 5 per second nominal;

Operating Temperature: -10°C to 50°C

Relative Humidity: Non condensing ($\leq 10^\circ\text{C}$)

$\leq 90\% \text{ RH}$ (at $10\sim 30^\circ\text{C}$)

$\leq 75\% \text{ RH}$ (at $30\sim 40^\circ\text{C}$)

$\leq 45\% \text{ RH}$ (at $40\sim 50^\circ\text{C}$)

Pollution degree: 2

Storage Temperature: -20°C to 60°C, < 80% R.H. (with battery removed)

Altitude: Operating below 2000m; Storage below 12000m

Temperature Coefficient: nominal $0.10 \times$ (specified accuracy) / °C @ (-10°C -- 18°C or 28°C -- 50°C), or otherwise specified

Sensing: True RMS

Safety: Double insulation per UL/IEC/EN61010-1 Ed. 3.0, IEC/EN61010-2-033 Ed. 1.0, CAN/CSA C22.2 No.

61010-1 Ed. 3.0, IEC/EN61010-2-032 Ed. 3.0 & IEC/EN61010-031 Ed. 1.1 to CAT III 1000V and CAT IV 600V AC & DC

Electrical Specifications

Accuracy is $\pm(\% \text{ reading digits} + \text{number of digits})$ or otherwise specified, at $23^\circ\text{C} \pm 5^\circ\text{C}$.

Maximum Crest Factor < 2.5 : 1 at full scale & < 5 : 1 at half scale or otherwise specified, and with frequency spectrum not exceeding the specified frequency bandwidth for non-sinusoidal waveforms.

DC Voltage

RANGE	Accuracy
600.0V, 1000V	0.8% + 5d

Input Impedance: 10M Ω , 100 pF nominal

AC Voltage (with Digital Low-Pass Filter)

RANGE	Accuracy
50Hz ~ 60Hz	
600.0V, 1000V	0.8% + 5d
20Hz ~ 200Hz	
600.0V, 1000V	1.5% + 5d
200Hz ~ 400Hz	
600.0V, 1000V	10% + 5d

Input Impedance: 10M Ω , 100 pF nominal

DC+AC Voltage (with Digital Low-Pass Filter) (BM089 & BM088 Only)

RANGE	Accuracy
50Hz ~ 60Hz	
600.0V, 1000V	1.0% + 7d
DC, 40Hz ~ 200Hz	
600.0V, 1000V	1.8% + 7d
200Hz ~ 400Hz	
600.0V, 1000V	12% + 7d

Input Impedance: 10M Ω , 100 pF nominal

PEAK-rms (ACV & ACA of Models 089, 088 & 086 only)

Response: 80ms to > 90%

CREST (Peak-Hold)

Accuracy: Add 250 digits to specified accuracy for changes > 5ms

Audible Continuity Tester

Audible Threshold: At between 10 Ω and 250 Ω

Response time: 32ms approx.

Ohm

RANGE	Accuracy
600.0 Ω , 6.000K Ω , 60.00K Ω	1.0% + 5d

Open Circuit Voltage: 1.0VDC typical

Capacitance

RANGE	Accuracy ¹⁾
200.0 μF , 2500 μF	2.0% + 4d

¹⁾Accuracies with film capacitor or better

Diode Tester

RANGE	Accuracy
2.000V	1.5% + 5d

Test Current: 0.3mA typically

Open Circuit Voltage: < 3.5VDC typically

DC μA (BM089 & BM086 only)

RANGE	Accuracy	Burden Voltage
200.0 μA , 2000 μA	1.0% + 5d	3.5mV/ μA

Transient Protection: 8.0kV (1.2/50 μs surge)

Overload Protections:

Current & Hz functions via jaws: 1000ADC/AAC rms at <400Hz

Voltage & 3-Phase Rotation functions via terminals: 1100VDC/VAC rms

Other functions via terminals: 1000VDC/VAC rms

E.M.C.: Meets EN61326-1:2006 (EN55022,

EN61000-3-2, EN61000-3-3, EN61000-4-2,

EN61000-4-3, EN61000-4-4, EN61000-4-5,

EN61000-4-6, EN61000-4-8, EN61000-4-11):

ACA, DCA & DC+ACA Functions, in an RF field of 1V/m:

Total Accuracy = Specified Accuracy + 60 digits at

around 200MHz~350MHz

Ohm and DC μA Functions, in an RF field of 1V/m:

Total Accuracy = Specified Accuracy + 80 digits

Other Functions, in an RF field of 3V/m:

Total Accuracy = Specified Accuracy + 20 digits

Power Supply: 1.5V AA Size battery X 2

Power Consumption: Typical 13mA for Current

functions of BM089 & BM088; 4.3mA for others

Low Battery: Below approx. 2.85V for Capacitance & Hz;

Below approx. 2.5V for other functions

AP0 Timing: Idle for 32 minutes

AP0 Consumption: 5 μA typical

Dimension: L258mm X W94mm X H44mm

Weight: 392gm for BM088 & BM089; 312gm for BM083 & BM086

Jaw opening & Conductor diameter: 51mm max

Accessories: Test lead set, User's manual, Soft carrying pouch, Bkp60 banana plug K-type thermocouple (BM089 & BM086 only), Alligator clip set (BM089 & BM086 only)

Optional purchase accessories: BKB32 banana plug

to type-K socket plug adaptor (BM089 & BM086 only)

Special Features: AmpTip™ low-current range;

MAX/MIN/AVG Recording mode; Display Hold;

EF-Detection (NCV); Backlight LCD; Flashlight

(BM089 & BM088 only); 80ms Peak-RMS mode for

inrush current (BM089, BM088 & BM086 only); 5ms

Crest (Instantaneous Peak-Hold) mode (BM089, BM088

& BM086 only); Relative-Zero, 3-Phase Rotation

detection (BM089 & BM086 only)

Temperature (BM089 & BM086 only)

RANGE	Accuracy
-40.0°C ~ 99.9°C	1.0% + 0.8°C
100°C ~ 400°C	1.0% + 1°C
-40.0°F ~ 211.8°F	1.0% + 1.5°F
212°F ~ 752°F	1.0% + 2°F

K-type thermocouple range & accuracy not included

AmpTip™ clamp-on ACA

RANGE	Accuracy ^{1) 2) 3)}
40Hz ~ 100Hz	
60.00A	1.5% + 5d
100Hz ~ 400Hz	
60.00A	2.0% + 5d

¹⁾Induced error from adjacent current-carrying conductor:

<0.02A/A

²⁾Specified with Relative Zero Δ mode applied to offset

the non-zero residual readings, if any

³⁾Add 10d to the specified accuracy @ < 4A

AmpTip™ clamp-on DCA (BM089 & BM088 only)

RANGE	Accuracy ^{1) 2) 3)}
60.00A	1.5% + 5d

¹⁾Induced error from adjacent current-carrying conductor:

<0.02A/A

²⁾Specified with DC-Zero mode applied to offset the

non-zero residual readings, if any

³⁾Add 10d to the specified accuracy @ < 4A

AmpTip™ clamp-on DC+ACA (BM089 & BM088 only)

RANGE	Accuracy ^{1) 2) 3)}
DC, 40Hz ~ 100Hz	
60.00A	2.0% + 7d
100Hz ~ 400Hz	
60.00A	2.2% + 7d

¹⁾Induced error from adjacent current-carrying conductor:

<0.08A/A

²⁾Specified with DC-Zero mode applied to offset the

non-zero residual readings, if any

³⁾Add 10d to the specified accuracy @ < 4A

Regular Clamp-on ACA

RANGE	Accuracy ^{1) 2)}
40Hz ~ 100Hz	
60.00A ^{3) 4)} , 600.0A, 1000A ⁵⁾	1.8% + 5d
100Hz ~ 400Hz	
60.00A ^{3) 4)} , 600.0A, 1000A ⁵⁾	2.2% + 5d

¹⁾Induced error from adjacent current-carrying conductor:

< 0.02A/A for Models 089 & 088

< 0.05A/A for Models 086 & 083

²⁾For Models 086 & 083, specified accuracy is for

measurements made at the jaw center. When the conductor

is not positioned at the jaw center, add 2% to specified

accuracy for position errors

³⁾For Models 086 & 083, add 10d to specified accuracy @ <

6A

⁴⁾For Models 089 & 088, add 10d to the specified accuracy

@ < 9A

⁵⁾Maximum Crest Factor < 1.4 : 1 at full scale & < 2.8 : 1 at

half scale

Regular Clamp-on DCA (BM089 & BM088 only)

RANGE	Accuracy ^{1) 2)}
60.00A ³⁾ , 600.0A, 1000A	1.8% + 5d

¹⁾Induced error from adjacent current-carrying conductor:

<0.02A/A

²⁾Specified with DC-Zero mode applied to offset the

non-zero residual readings, if any

³⁾Add 10d to the specified accuracy @ < 9A

Regular Clamp-on DC+ACA (BM089 & BM088 only)

RANGE	Accuracy ^{1) 2)}
DC, 40Hz ~ 100Hz	
60.00A ³⁾ , 600.0A, 1000A ⁴⁾	2.2% + 7d
100Hz ~ 400Hz	
60.00A ³⁾ , 600.0A, 1000A ⁴⁾	2.5% + 7d

¹⁾Induced error from adjacent current-carrying conductor: <

0.08A/A

²⁾Specified with DC-Zero mode applied to offset the

non-zero residual readings, if any

³⁾Add 10d to the specified accuracy @ < 9A

⁴⁾Maximum Crest Factor < 1.4 : 1 at full scale & < 2.8 : 1 at

half scale

Hz Line Level Frequency

Function	Sensitivity ¹⁾ (Sine RMS)	Range
600V, 1000V	50V	5.00Hz ~ 999.9Hz
60A (AmpTip™)	40A	40.00Hz ~ 400.0Hz
60A, 600A, 1000A	40A	40.00Hz ~ 400.0Hz

Accuracy: 1%+5d

¹⁾DC-bias, if any, not more than 50% of Sine RMS

Non-Contact EF-Detection

Typical Voltage	Bar-Graph Indication
20V (tolerance: 10V ~ 36V)	-
55V (tolerance: 23V ~ 83V)	--
110V (tolerance: 59V ~ 165V)	---
220V (tolerance: 124V ~ 330V)	----
440V (tolerance: 250V ~ 1000V)	-----

Indication: Bar-graph segments & audible beep tones

proportional to the field strength

Detection Frequency: 50/60Hz

Detection Antenna: Inside the top side of the stationary jaw

Probe-Contact EF-Detection: For more precise indication of

live wires, such as distinguishing between live and ground

connections, use one single probe to test via terminal COM

for direct contact EF-Detection with best sensitivity.