# Individual Harmonics THD%, DF%, and Volts/Amps Readings! Dual-display Convenience!

Added DC Component Hdc Harmonics in AC+DC Mode!

3-Phase Power both Balanced and Unbalanced Loads!

BM099

AC+DC TRMS

Harmonic PowerClamp™



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# **FUNCTIONS & FEATURES**

- 3-5/6 digits 6000 counts / 4 digits 9999 counts + 999 counts Dual Display
- LARGE 51mm AmpTip® jaws for both large and slim conductors
- 1000A AC/DC Power Quality Clamp-on with Multimeter functions
- CAT III 1kV and CAT IV 600V AC/DC for utility applications
- AC and AC+DC True RMS on Voltage, Current, Harmonics, and Power functions
- Power readings of W (real power), VA (apparent power), and VAR (reactive power)
- Dual Display Volt/Amp+THD%, Volt/Amp+DF%, ~VA/W/VAR+PF, and AC+DC\_VA+DCA
- Unbalanced-Load 3-Phase Power Readings; Selectable 3-wire and 4-wire calculations
- Direct Single-Phase Power, 3-Phase Balanced-Load Power, and AC+DC Apparent Power
- H02 to H25 Individual Harmonics Volt/Amp, THD%, and DF% Readings in V/A AC mode
- Added Hdc DC component to Harmonics Readings in V/A AC+DC mode
- THD% (Total Harmonic Distortion) of V/A functions from 2% to 600%
- DF% (Total Distortion Factor) of V/A functions from 2% to 100.0%
- ACV (with Low Pass Filter) and DCV; @ 60.00V and 999.9V ranges
- AC+DCV; @ 999.9V range; Bandwidth up to 3kHz
- Regular ACA, AC+DCA, and DCA; @ 999.9A range
- AmpTip® Low-Current ACA, AC+DCA, and DCA; @ 40.00A range
- Clamp-jaw ACA-Hz and Test-lead Line Level ACV-Hz from 40.00Hz to 70.00Hz
- Fast BeepLit<sup>™</sup> Continuity; Beep sound with backlight effect for noisy environments
- Type-K temperature from -40.0 °C to 400.0 °C or -40.0 °F to 752.0 °F selectable
- Cx from 10.0µF to 999.9µF for start & run motor capacitors
- Diode test
- Non-Contact EF-Detection (NCV)
- Probe-Contact EF-Detection for more precise indication of live
- Ohms; @  $600.0\Omega$  and  $6.000k\Omega$  ranges
- Auto-Power-Off (APO)
- Relative-Zero mode and DC-Zero mode
- HOLD feature freezes the display reading for later viewing.
- REC MAX/MIN to compare and record extreme display readings
- Backlighted LCD display plus Working Flashlight
- Soft carrying pouch
- UL, UKCA, and CE compliance
- Transient protection 8kV 1.2/50µs lightning surge
- 1kV AC/DC general input protection on all functions
- Rugged fire retarded housing with battery access door

# AmpTip<sup>®</sup> Jaws PowerClamp™ + 25<sup>th</sup> Harmonics! 1000A with AC+DC TRMS for CAT-III 1kV!

BeepLit<sup>™</sup> Continuity, °C/°F, Cx, EF-Detection NCV, Clamp-on Hz, MinMax Record, Hold, and Relative Features!



Power analysis Applications for CAT III 1kV & CAT IV 600V Areas

Accuracy is  $\pm$ (% reading digits + number of digits) or otherwise specified, at  $23^{\circ}$ C  $\pm$  5°C & less than 75% relative humidity. Maximum crest factor < 1.56 : 1 at full scale & < 3.12 : 1 at half scale, and with frequency spectrum not exceeding the specified frequency bandwidth for non-sinusoidal waveforms.

# DCV

RANGE	Accuracy
60.00V, 999.9V	0.5%+5d

Input Impedance: 2MΩ, 50pF nominal

# ACV (with Low-Pass Filter)

RANGE	Accuracy		
60.00V 1), 999.9V	@ 50Hz / 60Hz	@ 10Hz ~ 200Hz	@ 200Hz ~ 400Hz
60.00V <sup>17</sup> , 999.9V	0.5%+5d	4.0%+5d	14%+5d <sup>2)</sup>

Input Impedance: 2MΩ, 50pF nominal <sup>1</sup>Specified accuracy adds 40d @ <20Vac <sup>2</sup>Accuracy linearly decreases from 4%+5d @ 200Hz to 14%+5d @ 400Hz

RANGE	Accuracy		
999.9V	@ DC, 50Hz / 60Hz	@ 45Hz ~ 400Hz	@ 500Hz ~ 3kHz
999.91	0.5%+5d	2.5%+5d	3.5%+5d

Input Impedance: 2MΩ, 50pF nominal

## Regular Clamp-on DCA

RANGE	Accuracy 1) 2)
999.9A	2.0%+5d

<sup>1)</sup>Induced error from adjacent current-carrying conductor: <0.02A/A <sup>2)</sup>Specified with DC-Zero mode applied to offset the non-zero residual readings, if any

# npTip® Clamp-on DCA A

RANGE	Accuracy 1) 2) 3)
40.00A	2.0%+5d

<sup>1)</sup>Induced error from the adjacent current-carrying conductor: <0.02A/A <sup>2)</sup>Specified with DC-Zero mode applied to offset the non-zero residual readings, if any <sup>3)</sup>Add 15d to the specified accuracy @ <10A

# Hz Line Level Frequency

Function	Sensitivity (Sine RMS)	Range
999.9V	20V	40.00Hz ~ 70.00Hz
999.9A	2A	40.00Hz ~ 70.00Hz

Accuracy: 0.5%+5d

Audible Continuity Tester Audible Threshold: Between  $10\Omega$  and  $300\Omega$  Response time: 32ms approx.

# **GENERAL SPECIFICATIONS**

Display: 6000 counts / 9999 counts + 999 counts dual

Update Rate: 2 per second nominal

Operating Temperature: -10°C to 50°C

Relative Humidity: Maximum relative humidity 80% for temperature up to 31°C decreasing linearly to 50%

relative humidity at 50°C Pollution degree: 2

Storage Temperature: -20°C to  $60^{\circ}$ C, < 80% R.H. (with battery removed)

Altitude: Operating below 2000m

Temperature Coefficient: nominal 0.15 x (specified accuracy)/ °C @ (-10°C -- 18°C or 28°C -- 50°C), or otherwise specified

Sensing: AC & AC+DC True RMS Safety: Double insulation per IEC/UL/EN/BSEN 61010-1 Ed. 3.1, IEC/UL/EN/BSEN 61010-2-032 Ed. 4.0, IEC/UL/EN/BSEN 61010-031 Ed. 2.0 and the corresponding CAN/CSA-C22.2 regulations to Measurement Categories III 1000V AC & DC and

Category IV 600V AC & DC Transient Protection: 8.0kV (1.2/50us surge)

# Overload Protection:

Current via Clamp-on Jaws: 1000A rms at <400Hz Voltage via terminals: 1100V rms

Other functions via terminals: 1000V rms

E.M.C.: Meets EN61326-1

Power Supply: 1.5V AA Size (IEC LR6) battery X 2
Power Consumption: Typical 33mA for Current &
Power functions, and 22mA for others

Low Battery: Below approx. 2.5V APO Timing: Idle for 30 minutes APO Consumption: 25uA typical Dimension: L258mm X W94mm X H44mm

Weight: 394 am Jaw opening & Conductor diameter: 51mm max Accessories: Test lead set, User's manual, Soft carrying pouch, Bkp60 banana plug K-type

Optional purchase accessories: BKB32 banana plug

to type-K socket plug adaptor



# **BRYMEN TECHNOLOGY CORPORATION**



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Total Harmonic Distortion-THD% 1) of Regular Clamp-on ACA or AC+DCA

KANGE	Accuracy 2/3/	
2.0% ~ 600.0%	1.0%+5d	
NT-t-LLL	defended (Tetal III DMO /	

Total Harmonic Distortion-THD% is defined as (Total Harmonic RMS Fundamental RMS) x 100%

<sup>2)</sup>Fundamental frequency range: 45Hz ~ 70Hz <sup>3)</sup>Accuracy specified @ Total RMS ≥ 10A

# Total Distortion Factor-DF% 1) of Regular Clamp-on ACA or AC+DCA

RANGE	Accuracy 2) 3)
2.0% ~ 100.0%	1.0%+5d

Total Distortion Factor-DF% is defined as (Total Harmonic RMS / Total RMS) x 100%

<sup>2</sup>Fundamental frequency range: 45Hz ~ 70Hz
<sup>3</sup>Accuracy specified @ Total RMS ≥ 10A

RANGE	Accuracy
600.0Ω, 6.000kΩ	1.0%+5d

# Open Circuit Voltage: 1.2VDC typical

Sapacitance		
RANGE	Accuracy 1)	
10.0uF ~ 999.9uF	3.0%+6d	

# Accuracies with film capacitor or better

RANGE	Accuracy
1.000V	1.0%+3d

Test Current: 0.3mA typically Open Circuit Voltage: < 1.2VDC typically

# Total Harmonic Distortion-THD% of ACV 5) or AC+DCV

Total Harmonic Distortion	RANGE	Accu	ıracy
	ACV, AC+DCV 60.00V 1), 999.9V	@ 50Hz / 60Hz	0.5%+5d
ACV, AC+DCV		@ 45Hz ~ 500Hz	2.5%+5d
		@ 500Hz ~ 3kHz	3.5%+5d
THD% 2) 3) 4)	2.0% ~ 600.0%	1.0%+5d	

Input Impedance: 2MΩ, 50pF nominal

\*Range available to ACV only. Specified accuracy adds 40d @ <20Vac

\*Total Harmonic Distortion-THD% is defined as (Total Harmonic RMS /
Fundamental RMS) x 100%

\*Fundamental frequency range: 45Hz ~ 70Hz

\*Accuracy specified @ Total RMS ≥ 70V

\*When the Harmonics-related feature is activated, the Low Pass Filter of

ACV tures of automatically for maximum passaying bandwidth.

ACV turns off automatically for maximum measuring bandwidth

# Total Distortion Factor-DF% of ACV 5) or AC+DCV

Total Distortion Factor	RANGE	Accu	ıracy
		@ 50Hz / 60Hz	0.5%+5d
ACV, AC+DCV	60.00V1), 999.9V	@ 45Hz ~ 500Hz	2.5%+5d
	-	@ 500Hz ~ 3kHz	3.5%+5d
DE% 2)3)4)	2.0% ~ 100.0%	1.0%	±5d

Input Impedance: 2M/Q, 50pF nominal 

Range available to ACV only. Specified accuracy adds 40d @ <20Vac 

Total Distortion Factor-DF% is defined as (Total Harmonic RMS / Total PARS), 1000.

4 lotal Distortion Factor-DF% is defined as ( lotal Harmonic RMS RMS) x 100%
3 Fundamental frequency range: 45Hz ~ 70Hz
⁴Accuracy specified @ Total RMS ≥ 70V
When the Harmonics-related feature is activated, the Low Pass Filter of ACV turns off automatically for maximum measuring bandwidth

Amp lip Clamp-on ACA		
RANGE	Accuracy 1) 2)	
50Hz	/ 60Hz	
40.00A	1.5%+5d	
45Hz~400Hz		
40.004	2 0%+5d	

 $^{ij}$  Induced error from the adjacent current-carrying conductor: <0.02A/A  $^{2i}$  Add 30d to the specified accuracy @ <10A

Regular Clamp-on ACA		
RANGE	Accuracy 1)	
501	Hz / 60Hz	
999.9A	2.0%+5d	
45Hz ~ 400Hz		
999.9A	2.5%+5d	

1)Induced error from the adjacent current-carrying conductor: <0.02A/A

Active Power (W)				
RANGE	Accuracy 1)			
	@  PF	≥0.5; ≤1.0	≥0.31; <0.5	≥0.2; <0.31
0010 W ~ 9999 W	@ACA≥20A	2%+2d		
10.00 kW ~ 99.99 kW 100.0 kW ~ 999.9 kW	@ACA < 20A; ≥3A	4%+5d	5%+5d	8%+5d
	@ACA < 3A; ≥1A 20%+8d			
	Apparent I	Power (VA)		
RANGE			racy 1)	
	@ACA≥20A	2%+2d		
0010 VA ~ 9999 VA 10.00 kVA ~ 99.99 kVA 100.0 kVA ~ 999.9 kVA	@ACA < 20A; ≥3A	4%+5d		
	@ACA<3A; ≥1A			
	Reactive P	ower (Var)		
RANGE		Accu	racy 1)	
	@  PF	≤0.8; ≥0.0		≤0.98; >0.9
	@ACA≥10A		3%+5d	8%+5d
0010 Var ~ 9999 Var 10.00 kVar ~ 99.99 kVar 100.0 kVar ~ 999.9 kVar	@ACA < 10A; ≥6A	2%+2d	7%+5d	10%+5d <sup>2)</sup>
	@ACA<6A; ≥3A	7%+5d	7 70+3u	1076+30-7
	@ACA<3A; ≥1A	20%+8d	N/A	N/A
Power Factor (PF)				
RANGE	Accuracy 3)			
0.51 ~ 1.00	30/+14			

	≥1A			
Power Factor (PF)				
RANGE		Accu	racy 3)	
0.51 ~ 1.00	3%+4d			
0.21 ~ 0.50	5%+4d			
0.00 ~ 0.20	10%+4d			

"Accuracy specified from Fundamental\_ACA ≥ 1A and Fundamental\_ACV ≥ 66V; Fundamental frequency @ 50/60Hz 
"Specified from @PF ≤0.95; >0.9 @ACA < 6A; ≥ 3A 
"Accuracy specified from Fundamental\_ACA ≥ 3A and Fundamental\_ACV ≥ 66V; Fundamental @ 50/60Hz

Amp rip* Clamp-on AC+DCA		
RANGE	Accuracy 1) 2) 3)	
С	OC	
40.00A	2.0%+5d	
50Hz / 60Hz		
40.00A	1.5%+5d	
45Hz ~ 400Hz		
40.00A	2.0%+5d	

Induced error from the adjacent current-carrying conductor: <0.02A/A 2Specified with DC-Zero mode applied to offset the non-zero residual readings, if any 3Add 30d to the specified accuracy @ <10A

Regular Clamp-on AC+DCA		
RANGE	Accuracy 1) 2)	
D	C	
999.9A	2.0%+5d	
50Hz / 60Hz		
999.9A	2.0%+5d	
45Hz ~ 400Hz		
999.9A	2.5%+5d	

Induced error from the adjacent current-carrying conductor: <0.02A/A 2Specified with DC-Zero mode applied to offset the non-zero residual readings, if any

# Individual Harmonic order of ACV 7) or AC+DCV

Parameter	RANGE	Accuracy 1) 2) 3)		
Individua	Individual Harmonic order: Hdc, H01 ~ H10			
Vrms	999.9V	2.0%+5d <sup>4)</sup>		
THD% 5)	0.0% ~ 600.0%	15d		
DF% 6)	0.0% ~ 100.0%	15d		
Individual Harmonic order: H11 ~ H25				
Vrms	999.9V	3.0%+5d <sup>4)</sup>		
THD% 5)	0.0% ~ 600.0%	20d		
DF% 6)	0.0% ~ 100.0%	20d		

"Fundamental frequency range: 45Hz ~ 70Hz
"Accuracy specified @ Total RMS ≥ 70V
"Unspecified @ Harmonic Order Voltage < 2V
"Specified accuracy adds 3% @ DF% < 10%
"Individual Harmonic-THO% is defined as (Harmonic order RMS / Fundamental RMS) x 100%
"Individual Distortion Factor-DF% is defined as (Harmonic order RMS / Total RMS) x 100%
"Official RMS) x 100%

onics-related feature is activated, the Low Pass Filter of

individual Harmonic orders of Regular Clamp-on ACA of AC+DCA			
Parameter RANGE		Accuracy 1) 2) 3) 4) 5)	
Individual Harmonic order: Hdc, H01 ~ H10			
Current RMS	999.9A	2.0%+5d <sup>6)</sup>	
THD% 7)	0.0% ~ 600.0%	+/- 15d	
DF% 8)	0.0% ~ 100.0%	+/- 15d	
Individual Harmonic order: H11 ~ H25			
Current RMS	999.9A	5.0%+5d <sup>6)</sup>	
THD% 7)	0.0% ~ 600.0%	+/- 20d	
DF% 8)	0.0% ~ 100.0%	+/- 20d	

Dinduced error from the adjacent current-carrying conductor: <0.02A/A Decified with DC-Zero mode applied to offset the non-zero residual

<sup>8</sup>Specified with DC-Zero mode applied to offset the non-zero residual readings, if any "Fundamental frequency range: 45Hz ~ 70Hz "Accuracy specified @ Iotal RMS ≥ 10A "Unspecified @ Harmonic Order Current < 2A "Specified accuracy adds 3% @ DF% < 10% "Individual Harmonic.\*THD% is defined as (Harmonic order RMS / Fundamental RMS) x 100% "Individual Histotrion Factor-DF% is defined as (Harmonic order RMS / Total RMS) x 100%</p>

AC+DC Power (VA)

AO-DOTOWER (VA)		
Power (VA)		
RANGE	Accuracy a) b) c)	
0010 VA ~ 9999 VA		
10.00 kVA ~ 99.99 kVA	2.0%+2d <sup>1-9)</sup>	
100.0 kVA ~ 999.9 kVA		
DC Current		
RANGE	Accuracy	
9.99A	2.0%+40d	
99.9A	2.0%+5d	
999A	2.0%+5d	

a)AC accuracy specified from Fundamental\_ACA ≥ 3A and Fundamental\_ACV ≥ 3V for AC signals with no DC component; Fundamental @ 50/60 Hz:

"Best 2%+2d @ ACA ≥ 20A and ACV ≥ 15V

26%+4d instead @ either 12A ≤ ACA < 20A or 9V ≤ ACV < 15V

312%+5d instead @ either 5A ≤ ACA < 12A or 5V ≤ ACV < 9V

20%+5d instead @ either 3A ≤ ACA < 5A or 3V ≤ ACV < 5V

"DC accuracy specified from DCA ≥ 1A and DCV ≥ 3V for DC signals with no AC component."

°DC accuracy specified from DCA ≥ 1A and DCV ≥ 3V for DC signals with no AC component:

°Best 2%+2d @ DCA ≥ 6A and DCV ≥ 20V

°6%+4d instead @ either 3A ≤ DCA < 6A or 5V ≤ DCV < 20V

°10%+5d instead @ either 1A ≤ DCA < 3A or 3V ≤ DCV < 5V

°AC+DC accuracy specified from Fundamental  $AC+DCA \ge 12A$  and Fundamental  $AC+DCC \ge 9$  for AC+DC composite signals;

Fundamental  $AC+DCV \ge 9$  for AC+DC composite signals;

Fundamental @ 50/60Hz:

°Best 2%+8d @ ACA ≥ 12A & DCA ≥ 20A and ACV ≥ 9V & DCV ≥ 15V

°6%+8d instead @ either ACA ≥ 12A & 1A ≤ DCA ≤ 20A or ACV ≥ 9V & 3V ≤ DCV < 15V

remperature		
RANGE	Accuracy 1) 2)	
-40.0 °C ~ 400.0 °C	1.0%+2 °C	
-40.0 °F ~ 752.0 °F	1.0%+3 °F	

"Naccuracies assume meter interior has the same temperature (isothermal stage) of the ambient for a correct junction voltage compensation. Allow the meter and the type-K probe set to reach the isothermal stage for a significant change of ambient temperature. It can take up to an hour for changes > 5°C.

changes > 5°C.

Type-K thermocouple range & accuracy not included

Non-Contact EF-Detection	
Typical Voltage (Tolerance)	Bar-segment Indication
70V (10V ~ 150V)	-
140V (50V ~ 250V)	
200V (100V ~ 350V)	
250V (150V ~ 450V)	
350V (200V ~ 1000V)	

Indication: Display bar-segments & audible beep tones in proportion to the field strength
Detection Frequency: 50/60Hz
Detection Antenna: Top side of the stationary jaw
Probe-Contact EF-Detection: For more precise indications of live wires, such as distinguishing between live and ground connections, used great contact testing with one single test probe via the input terminal COM or V. The COM terminal (Black) has the best sensitivity.