

Featuring Dual-Display Convenience + Added DCA Models!

Features VFD V/Hz,

Motor Cx,

In-rush Crest,

EF-Detection,

°C/°F and

Auto-Check™

on V/Ω!



BRUA-13X PC Interface Kit
(Optional Purchase)



BM189 & BM186

Versatile Clamp-on Multimeters

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



BM189

BM186

BM188

BM185

BM183

BM181

189	186	188	185	183	181	FUNCTIONS & FEATURES
●	●	●	●	●	●	VFD-V & Hz for fundamental V/Hz of most Variable-Frequency-Drives
●	●	●	●	●	●	Fully auto-ranging for ease of use; Fast measurement updates 5/sec
●	●	●	●	●	●	3-5/6 digits, 6,000 counts + 1,999 counts dual-display large LCD
●	●					600A DC/AC Clamp-on; 30mm conductor size Hall-effect jaws
●		●	●	●	●	600A AC Clamp-on; 26mm conductor size Ultra-slim jaws
●		AC		AC		AC, AC+DC True RMS voltage and current functions
●	●	●	●	●	●	600VAC/DC input protection on all functions
●	●	●	●	●	●	Dual Display ACA+Hz and ACV+Hz
●	●	●	●	●	●	High 0.5% DCV accuracy
●	●	●	●	●	●	Auto Power Off
●	●	●	●	●	●	Data HOLD
●	●	●	●	●	●	Soft carrying pouch
●	●	●	●	●	●	Non-Contact EF-Detection (NCV)
●	●	●	●	●	●	Relative Zero mode (Auto-ranging)
●	●	●	●	●	●	Fast 5ms Crest-MAX mode to capture in-rush currents
●	●	●	●	●	●	Probe-Contact EF-Detection for more precise indication of live
●	●	●	●	●	●	AutoCheck™ feature (Automatic DCV, ACV & Ohms selection)
●	●	●	●	●	●	Lo-Z volts to drain ghost voltages (AutoCheck™ feature)
●	●	●	●	●	●	Back-lighted easy-to-read LCD display
●	●	●	●	●	●	Type-K temperature -50°C to 1000 °C or -58°F to 1832°F selectable
●	●	●	●	●	●	DC μ A 2 ranges 600.0 μ A to 2000 μ A (via leads) for HVAC flame sensors
●	●	●	●	●	●	DCA 2 ranges 60.00A to 600.0A
●	●	●	●	●	●	ACA 2 ranges 60.00A to 600.0A
●	●	●	●	●	●	DCV 4 ranges 6.000V to 600V
●	●	●	●	●	●	ACV 4 ranges 6.000V to 600V
●	●	60M	60M	60M	60M	Ohm 6 ranges 600.0 Ω to 40.00M Ω
●	●	●	●	●	●	Cx 6 ranges 60.00nF to 2000 μ F for start & run motor capacitors
●	●	●	●	●	●	Diode test & Fast audible Continuity
●	●	●	●	●	●	Line-level ACV Frequency 10Hz to 1999Hz
●	●	●	●	●	●	Non-invasive ACA Frequency via clamp jaws 20Hz to 400Hz
●	●	●	●	●	●	Optional purchase USB cable set & software for Win98/2k/xp/Vista/Win7
●	●	●	●	●	●	Rugged fire retarded casing with battery access door
●	●	●	●	●	●	Transient protection 6kV 1.2/50 μ s lightning surge
●	●	●	●	●	●	LVD EN61010-2-032 & EN61010-1 CAT III 600V
●	●	●	●	●	●	EMC EN61326-1:2006 (EN55022, EN61000-3-2/-3 & EN61000-4-2/-3/-4/-5/-6/-8/-11)

DCA + Dual-Display VFD Clamp-ons For Electrical Professionals!

Ghost-Voltage-Buster, True-rms and PC-Comm Interface for Advanced Users!

AUTO-POWER-OFF
EXTENDS BATTERY LIFE

LVD CAT III 600V SAFETY
MEETS EN61010-2-032, EN61010-1 & UL STANDARDS ON CAT III 600V

PC-COMM INTERFACE CAPABILITY
OPTIONAL PURCHASE RS232C+USB CABLES WITH DATA RECORDING PC SOFTWARE FOR WIN98/NT4/2K/XP/VISTA/WIN7

LIGHT WEIGHT & SMALL BODY
ALSO COMES WITH A SOFT POUCH FOR EASY CARRYING & PROTECTION

FULLY AUTO-RANGING DMM
SHORTENS THE TIME TO MEASURE AND INCREASES THE EASE OF USE

6000 + 1999 COUNTS DUAL DISPLAY
SIMULTANEOUS MEASUREMENTS OF ACA+Hz OR ACV+Hz

BACKLIGHTED LCD DISPLAY (BM189, 188 & 185 ONLY)
FOR EASY VIEWING IN THE DARK

AC+DC TRUE RMS MEASUREMENTS (BM189 ONLY)
FOR NON-SINUSOIDAL & COMPLEX WAVEFORMS OF VOLTAGES & CURRENTS

0.5% DCV BASIC ACCURACY
DCV 4 AUTO-RANGES TO 600V;
ACV 4 AUTO-RANGES TO 600V

TYPE-K TEMPERATURE (BM189, 188 & 185 ONLY)
SELECTABLE °C AND °F READINGS;
COMES WITH BKP60 BEAD PROBE

EMC
MEETS EN61326-1:2006 (EN55022, EN61000-3-2/-3 & EN61000-4-2/-3/-4/-5/-6/-8/-11)

TRANSIENT PROTECTION
UP TO 6kV 1.2/50µs LIGHTNING SURGE;
MORE CONFIDENCE FOR SERIOUS USERS

RUGGED & DURABLE
HIGH-IMPACT FIRE-RETARDED ENCLOSURE WITH BATTERY COMPARTMENT & ACCESS DOOR

SMALL HALL-EFFECT CLAMP JAWS (BM189 & 186 ONLY)
FOR EASY ACCESS TO TIGHT PLACES WITH DC & AC 600A CAPABILITY

5ms CREST-MAX
CAPTURES IN-RUSH PEAK SIGNALS OF ACA OR ACV AS SHORT AS 5ms IN DURATION

DATA HOLD
FREEZES THE DISPLAYING READING FOR LATER VIEW

EF-DETECTION
BOTH NON-CONTACT (NCV) & SINGLE-PROBE VOLTAGE DETECTION FOR IDENTIFYING LIVE LINES

RELATIVE ZERO MODE
FOR CONVENIENT READINGS COMPARISON & OFFSET

HIGH CURRENT (ACA) Hz
MEASURES NON-INVASIVE ACA FREQUENCY VIA CLAMP JAWS

HIGH VOLTAGE (ACV) Hz
MEASURES NOISY HIGH VOLTAGE ACV FREQUENCY VIA TEST LEADS

FAST AUDIBLE CONTINUITY
FOR QUICK OPEN-SHORT TESTS ON SWITCHES, FUSES, AND WIRES

CAPACITANCE
6 AUTO-RANGES UP TO 3000µF TO MEASURE MOTOR CAPACITORS

DIODE TEST
FOR TESTING DIODES & RECTIFIERS

VFD V & Hz FEATURE
MEASURES FUNDAMENTAL VOLTAGE & FREQUENCY OF MOST VARIABLE FREQUENCY DRIVES

RESISTANCE
6 AUTO-RANGES UP TO 60MΩ

AUTOCHECK™ FEATURE
AUTOMATIC SELECTION OF LoZ DCV, LoZ ACV & OHMS

GHOST-VOLTAGE-BUSTER
LoZ DRAINS GHOST/ STRAY VOLTAGES LEAVING ONLY HARD SIGNALS ON METER READINGS

BM186 & BM189 GENERAL SPECIFICATIONS

Display: 3-5/6 digits 6000 counts & 3-1/2 digits 1,999 counts for Hz
Polarity: Automatic
Update Rate: 5 per second nominal
Operating Temperature: 0°C to 40°C
Relative Humidity: Maximum relative humidity 80% for temperature up to 31°C decreasing linearly to 50% relative humidity at 40°C
Pollution degree: 2
Storage Temperature: -20°C to 60°C, < 80% R.H. (with battery removed)
Altitude: Operating below 2000m
Temperature Coefficient: nominal 0.15 x (specified accuracy) / °C @ (0°C - 18°C or 28°C - 40°C), or otherwise specified
Sensing: Average sensing for BM186; True RMS for BM189
Safety: Double insulation per IEC61010-1 2nd Ed., EN61010-1 2nd Ed., UL61010-1 2nd Ed. & CAN/CSA C22.2 No. 61010.1-0.92 to CAT III 600V and CAT IV

300V AC & DC
Transient Protection: 6.0kV (1.2/50µs surge)
Overload Protections:
 ACA Clamp-on jaws: AC 600A rms continuous
 * * * & COM Terminals (all other functions): 660VDC/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)
 In an RF field of 3V/m:
 Capacitance function is not specified
 Other function ranges:
 Total Accuracy = Specified Accuracy + 150 digits
 Performance above 3V/m is not specified
Power Supply: 1.5V AAA Size (NEDA 24A or IEC LR03) battery X 2
Power Consumption: Typical 13mA for Current functions, and 5.2mA for others
Low Battery: Below approx. 2.4V

APO Timing: Idle for 34 minutes
APO Consumption: 10µA typical
Dimension: L190mm X W63mm X H32mm
Weight: 227 gm
Jaw opening & Conductor diameter: 30mm max
Accessories: Test leads (pair), user's manual, Bkp60 banana plug K-type thermocouple x 1 (BM189 only)
Optional purchase accessories: USB interface kit BRUA-13X; BKB32 banana plug to type-K socket plug adaptor (BM189 only)
Special Features: AutoCheck™ V&Ω; VFD-V & VFD-Hz; Backlighted LCD (BM189 only); 5ms CREST-MAX Capture mode (Peak Hold); Auto-ranging Relative-Zero mode; Display Hold; EF-Detection (NCV); Interface capabilities with PC computers

Electrical Specifications

Accuracy is ±(% reading digits + number of digits) or otherwise specified, at 23°C ± 5°C & less than 75% relative humidity. True RMS model 189 voltage accuracies are specified from 5% to 100% of range or otherwise specified. Maximum Crest Factor < 1.65 : 1 at full scale & < 3.3 : 1 at half scale, and with frequency components within the specified frequency bandwidth for non-sinusoidal waveforms.

DC Voltage

RANGE	Accuracy
6.000V, 60.00V, 600.0V & 600V ¹⁾	0.5%+5d

¹⁾Added range to indicate instantaneous over-range voltage values
 Input Impedance: 10MΩ, 50 pF nominal

AutoCheck™ DCV

RANGE	Accuracy
6.000V, 60.00V, 600.0V & 600V ¹⁾	1.3% + 5d

¹⁾Added range to indicate instantaneous over-range voltage values
 AutoCheck™ Lo-Z DCV Threshold:

> +1.5VDC & < -1.5VDC nominal
 AutoCheck™ Lo-Z DCV Input Impedance:
 Initially approx. 2.5kΩ, 650pF 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:
 15kΩ @100V
 100kΩ @300V
 250kΩ @600V

AC Voltage

RANGE	Accuracy
50Hz ~ 400Hz	
6.000V, 60.00V, 600.0V & 600V ¹⁾	1.2% + 5d

¹⁾Added range to indicate instantaneous over-range voltage values
 Input Impedance: 10MΩ, 50 pF nominal

AC+DC Voltage (BM189 Only)

RANGE	Accuracy
DC, 50Hz ~ 400Hz	
6.000V, 60.00V, 600.0V & 600V ¹⁾	1.4% + 7d

¹⁾Added range to indicate instantaneous over-range voltage values
 Input Impedance: 10MΩ, 50 pF nominal

AutoCheck™ ACV (with Low Pass Filter)

RANGE	Accuracy ¹⁾
5Hz ~ 20Hz	
6.000V, 60.00V, 600.0V & 600V ²⁾	3.5%+80d
20Hz ~ 200Hz	
6.000V, 60.00V, 600.0V & 600V ²⁾	2.0%+60d
200Hz - 400Hz ³⁾	
6.000V, 60.00V, 600.0V & 600V ²⁾	7%+80d

¹⁾Not specified for fundamental frequency > 400Hz
²⁾ Added range to indicate instantaneous over-range voltage values
³⁾Accuracy linearly decreases from 2% + 50d @ 200Hz to 7% + 80d @ 400Hz

AutoCheck™ Lo-Z ACV Threshold:
 > 1.5V(50/60Hz) nominal
 AutoCheck™ Lo-Z ACV Input Impedance:
 Initially approx. 2.5kΩ, 650pF 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:
 15kΩ @100V

100kΩ @300V
 250kΩ @600V

CREST-MAX Capture Mode

Accuracy: Specified accuracy plus 250 digits for changes > 5ms in duration

AutoCheck™ Ohm

RANGE ¹⁾	Accuracy
600.0Ω, 6.000kΩ, 60.00kΩ	0.5%+5d
600.0kΩ	0.8%+5d
6.000MΩ	1.2%+5d
40.00MΩ	2.3%+5d

Open Circuit Voltage: 0.45VDC typical

¹⁾AutoCheck™ Ohm Threshold:
 < 10.00MΩ nominal

Audible Continuity Tester

Audible Threshold: Between 10Ω and 200Ω
 Response time: 32ms approx.

Capacitance

RANGE	Accuracy ¹⁾
60.00nF, 600.0nF, 6.000µF	2.0%+5d
60.00µF, 600.0µF	3.5%+5d ²⁾
2000µF	4.0%+5d ²⁾

¹⁾Accuracies with film capacitor or better
²⁾Temperature Coefficient: 0.25 x (specified accuracy) / °C @ (0°C - 18°C or 28°C - 40°C)

Diode Tester

RANGE	Accuracy
1.000V	1.0% + 3d

Test Current: 0.56mA typically
 Open Circuit Voltage: < 1.8VDC typically

DCA Current (Clamp on)

RANGE	Accuracy ^{1) 2)}
60.00A ³⁾	1.5%+8d
600.0A	1.5%+5d

¹⁾Induced error from adjacent current-carrying conductor:<0.01A/A
²⁾Specified with Relative Zero Δ mode applied to offset the non-zero residual readings, if any
³⁾Below 16% of range, add 10d to the specified accuracy

ACA Current (Clamp on)

RANGE	Accuracy ¹⁾
50Hz ~ 60Hz	
60.00A ²⁾ , 600.0A	1.5%+6d
40Hz ~ 400Hz	
60.00A ²⁾ , 600.0A	2%+6d

True RMS Crest Factor (Model 189 only):

< 1.7 : 1 at full scale & < 3.4 : 1 at half scale

¹⁾Induced error from adjacent current-carrying conductor: < 0.01A/A
²⁾Below 16% of range, add 10d to the specified accuracy

DC+ACA Current (Clamp on) (BM189 Only)

RANGE	Accuracy ^{1) 2)}
DC, 40Hz ~ 400Hz	
60.00A ³⁾ , 600.0A	2.2%+10d

True RMS Crest Factor:

< 1.7 : 1 at full scale & < 3.4 : 1 at half scale

¹⁾Induced error from adjacent current-carrying conductor: < 0.01A/A

²⁾Specified with Relative Zero Δ mode applied to offset the non-zero residual readings, if any

³⁾Below 16% of range, add 10d to the specified accuracy

Temperature (BM189 only)

RANGE	Accuracy
-50 °C ~ 1000 °C	0.3% +4d
-58 °F ~ 1832 °F	0.3% + 6d

K-type thermocouple range & accuracy not included

Hz Line Level Frequency

Function	Sensitivity (Sine RMS)	Range
6V	1V	10Hz ~ 1999Hz
60V	10V	10Hz ~ 1999Hz
600V	60V	10Hz ~ 1999Hz
60A	6A	20Hz ~ 400Hz
600A	60A	20Hz ~ 400Hz
VFD 6V ¹⁾	1V-2V	10Hz ~ 400Hz
VFD 60V ¹⁾	6-20V	10Hz ~ 400Hz
VFD 600V ¹⁾	60V-200V	10Hz ~ 400Hz

Accuracy: 0.1%+4d

¹⁾VFD sensitivity linearly decreases from 10% F.S. @ 200Hz to 40% F.S. @ 400Hz

Non-Contact EF-Detection

Typical Voltage	Bar-Graph Indication
20V (tolerance: 10V ~ 36V)	-
55V (tolerance: 23V ~ 85V)	---
110V (tolerance: 59V ~ 600V)	-----

Indication: Bar-graph segments & audible beep tones proportional to the field strength

Detection Frequency: 50/60Hz

Detection Antenna: 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 the Red (+) test probe for direct contact measurement

BRYMEN TECHNOLOGY CORPORATION

http://www.brymen.com

TEL: +886 2 2226 3396 (rep)

FAX: +886 2 2225 0025

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REGIONALNE BIURO HANDLOWE
 03-450 WARSZAWA, Ratuszowa 11 p.68
 tel.: +48 22 211-13-03;
 kom. +48 505 107 957
 e-mail: warszawa@biall.com.pl

SIEDZIBA GŁÓWNA, SPRZEDAŻ
 80-174 GDAŃSK,
 Słoneczna 43, Otomin
 tel./fax: +48 58 322-11-91,92, 93
 e-mail: biall@biall.com.pl

BIALL Sp. z o.o.
 www.biall.com.pl

