For Variable Frequency Drives V/Hz With Slim-Jaws Design!

Features VFD V/Hz, Motor Cx, In-rush Crest, °C/°F, EF-Detection and Auto-Check™ on V/Ω!

CE

BM180 Series

Versatile Clamp-on Multimeters

BRYMEN®

BRIGHT PEOPLE'S CHOICE

http://www.brymen.com

BRUA-13X PC Interface Kit
(Optional Purchase)

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
●	●	●	●	Ultra-slim jaws to access tight places; 26mm conductor size
●	●	●	●	3-5/6 digits, 6,000 counts + 1,999 counts dual display
●	●	●	●	Light weight < 200gm & small body to fit your hand
●	●	●	●	600VAC/DC input protection on all functions
●	●	●	●	600A AC Clamp-on + Multimeter ranges
●	●	●	●	Dual Display ACA+Hz and ACV+Hz
●	●	●	●	High 0.5% DCV accuracy
●	●	●	●	Soft carrying pouch
●	●	●	●	Auto Power Off
●	●	●	●	Data HOLD
●	●	●	●	Relative Zero mode
●	●	●	●	Non-Contact EF-Detection (NCV)
●	●	●	●	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)
●		●		AC True RMS voltage and current functions
●	●			Back-lighted easy-to-read LCD display
●	●			Type-K temperature -50°C to 1000 °C or -58°F to 1832°F selectable
●	●			DCμA 2 ranges 600.0μA to 2000μA (via leads) for HVAC flame sensors
●	●	●	●	DCV 4 ranges 6.000V to 600V
●	●	●	●	ACV 4 ranges 6.000V to 600V
●	●	●	●	ACA 2 ranges 60.00A to 600.0A
●	●	●	●	Ohm 6 ranges 600.0Ω to 60.00MΩ
●	●	●	●	Cx 6 ranges 60.00nF to 3000μF 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 420Hz
●	●	●	●	Optional purchase USB cable set & software for Win98/2k/xp/Vista/Win7
●	●	●	●	Rugged fire retarded casing with battery access door
●	●	●	●	Transient protection 6kV 1.2/50μs 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)

Dual-Display VFD Clamp-ons For Electrical Professionals!

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

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

SMALL & ULTRA-SLIM CLAMP JAWS
FOR EASY ACCESS TO TIGHT PLACES WITH AC 600A CAPABILITY

AUTO-POWER-OFF
EXTENDS BATTERY LIFE

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

TRUE RMS MEASUREMENTS (BM183 & BM188 ONLY)
FOR NON-SINUSOIDAL WAVEFORMS OF AC VOLTAGES & AC CURRENTS

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 (BM185 & BM188 ONLY)
FOR EASY VIEWING IN THE DARK

TYPE-K TEMPERATURE (BM185 & BM188 ONLY)
SELECTABLE °C AND °F READINGS; COMES WITH BKP60 BEAD PROBE

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

DC μA FUNCTION (BM185 & BM188 ONLY)
FOR HVAC FLAME SENSORS TESTING VIA TEST LEADS WITH 600V PROTECTION

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

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

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

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

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 models 181 & 185; True RMS for models 183 & 188
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 + 100 digits
Performance above 3V/m is not specified
Power Supply: 1.5V AAA Size battery X 2
Power Consumption: 5.2mA typical
Low Battery: Below approx. 2.4V
APO Timing: Idle for 34 minutes
APO Consumption: 10μA typical
Dimension: L190mm X W63mm X H32mm
Weight: 179 gm
Accessories: Test leads (pair), user's manual, Bkp60 banana plug K-type thermocouple x 1 (BM185 & BM188 only)
Optional purchase accessories: USB interface kit BRUA-13X; BKB32 banana plug to type-K socket plug adaptor (BM185 & BM188 only)
Special Features: AutoCheck™ V&Ω; VFD-V & VFD-Hz; Backlighted LCD (BM185 & BM188 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 models 183 & 188 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	0.5%+5d

Input Impedance: 10MΩ, 50 pF nominal

AutoCheck™_DCV

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

AutoCheck™ Lo-Z DCV Threshold:
> +1.0VDC & < -1.0VDC nominal
AutoCheck™ Lo-Z DCV Input Impedance:
Initially approx. 2.5kΩ, 200pF 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	1.2% + 5d

Input Impedance: 10MΩ, 50 pF nominal

AutoCheck_ACV (with Low Pass Filter)

RANGE	Accuracy *
5Hz - 20Hz	
6.000V, 60.00V, 600.0V & 600V	3.0%+80d
20Hz -200Hz	
6.000V, 60.00V, 600.0V & 600V	2.0%+50d
200Hz - 420Hz **	
6.000V, 60.00V, 600.0V & 600V	6%-80d

*Not specified for fundamental frequency > 420Hz
**Accuracy linearly decreases from 2% + 50d @ 200Hz to 6% + 80d @ 420Hz
AutoCheck™ Lo-Z ACV Threshold:
> 1V(50/60Hz) nominal
AutoCheck™ Lo-Z ACV Input Impedance:
Initially approx. 2.5kΩ, 200pF 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
60.00MΩ	2.2%+5d

Open Circuit Voltage: 0.45VDC typical
1)AutoCheck™ Ohm Threshold:
< 10.00MΩ nominal

Capacitance

RANGE	Accuracy 1)
60.00nF, 600.0nF, 6.000μF	2.0%+5d
60.00μF,600.0uF	3.5%+5d 2)
3000μF	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)

Temperature (BM185 & BM188 only)

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

K type thermocouple range & accuracy not included

ACA Current (Clamp on)

RANGE	Accuracy1) 2) 3)
50Hz ~ 400Hz	
60.00A,600.0A	1.8%+3d

True RMS Models BM183/188
CREST Factor:
< 2.5 : 1 at full scale & < 5.0 : 1 at half scale
1)Add 12d to specified accuracy while reading is at 1 % to 10% of range
2)Induced error from adjacent current-carrying conductor: < 0.5A/A
3)Specified accuracy is from 1% to 100% of range and for measurements made at the jaw center. When the conductor is not positioned at the jaw center, position errors introduced are:
Add 1% to specified accuracy for measurements made WITHIN jaw marking lines (away from jaw opening)
Add 4% to specified accuracy for measurements made BEYOND jaw marking lines (toward jaws opening)

DCμA (BM185 & BM188 only)

RANGE	Accuracy	Burden Voltage
600.0μA, 2000μA	0.5%+5d	3.5 mV/uA

Audible Continuity Tester

Audible Threshold: Between 10Ω and 80Ω
Response time: 32ms approx.

Diode Tester

RANGE	Accuracy
1.000V	1.0% + 3d

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

Hz Line Level Frequency

Function	Sensitivity (Sine RMS)	Range
6V	1V	10Hz ~ 1999Hz
60V	6V	10Hz ~ 1999Hz
600V	60V	10Hz ~ 1999Hz
VFD 6V*	1V~2V	10Hz ~ 420Hz
VFD 60V*	6~20V	10Hz ~ 420Hz
VFD 600V*	60V~200V	10Hz ~ 420Hz
VFD 60A*	6A~20A	20Hz ~ 420Hz
VFD 600A*	60A~200A	20Hz ~ 420Hz

Accuracy: 0.03%+4d
*VFD sensitivity linearly decreases from 10% F.S. @ 200Hz to 40% F.S. @ 420Hz

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: Top-right end of the meter
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

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