

# 500,000 Counts High Performance! Innovative Features! User-Oriented!

5-4/5d DCV At 1 $\mu$ V Best Resolution, DC & AC in Dual Display, 100kHz DC+AC TRMS, Cat IV 1kV Safety...  
 USB PC-Comm, Paper-White Backlit, Bar-graph, BeepJack™, Crest (Peak), Rec (Min Max Avg), Relative...  
 Measures VFD V & Hz, X-Speed Large Cx, nS Conductance, 4-20mA, T1-T2, Line Level Hz, Duty %, dBm...  
 Ergonomic, Large LCD, Battery Access Cover, Magnetic Hanger, Holster, Probe Holders, Tilt stand Hanger...



**BM860s Series**  
Professional Multimeters



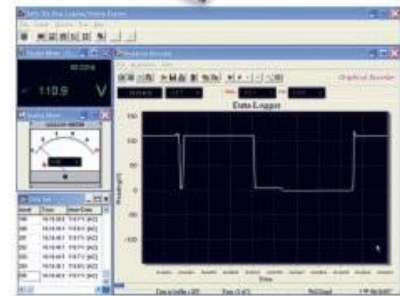
BRIGHT PEOPLE'S CHOICE  
<http://www.brymen.com>



● **BM869s**



● **BM867s**



**BU-86X Interface Kit  
(Optional Purchase)**

869s	867s	FUNCTIONS & FEATURES
●	●	<b>5-4/5 Digits 500,000 Counts Large Easy To Read LCD Display</b>
●	●	<b>Fast Measurements, 5/Sec; Fully Auto-Ranging</b>
●	●	<b>Dual Digital Display</b>
●	●	<b>41 Segment Analog Bar-graph Updates 60/Sec</b>
●	●	<b>Optional Purchase USB Cable &amp; Software For Win98/2k/xp/Vista/7/8</b>
●	●	<b>Intelligent Auto Power Off (I-APO) Resets On Significant Operation &amp; Readings</b>
●	●	<b>Data Hold</b>
●	●	<b>Relative Zero Mode</b>
●	●	<b>Audible &amp; Visible BeepJack™ Input Warning Against Improper Plug In</b>
●	●	<b>AC, AC+DC True RMS Conversion</b>
●	●	<b>100kHz AC, AC+DC Voltage Bandwidth</b>
●	●	<b>0.03% 0.02% High Basic DCV Accuracy</b>
●	●	<b>VFD-V &amp; VFD-Hz Measures Fundamental V &amp; Hz Of Most Variable Frequency Drives</b>
●	●	<b>T1-T2 Dual Type-K Temperature -50°C To 1000°C; Selectable °F Readings</b>
●	●	<b>Record Max/Min Readings; Calculates Average Reading over time; Auto-Ranging</b>
●	●	<b>Crest (Instantaneous Peak Hold) Max/Min Readings, Auto-Ranging</b>
●	●	<b>Paper-White Back-Lighted Large Easy To Read LCD Display</b>
●	●	<b>dBm Readings, 20 Selectable Impedance Values</b>
●	●	<b>DCV 0.001mV To 1000V</b>
●	●	<b>ACV 0.01mV To 1000V</b>
●	●	<b>AC+DCV 0.01mV To 1000V</b>
●	●	<b>DCA 0.01µA To 10A; 20A For 30 Seconds Per 5 Minutes Cooling</b>
●	●	<b>ACA 0.01µA To 10A; 20A For 30 Seconds Per 5 Minutes Cooling</b>
●	●	<b>AC+DCA 0.01µA To 10A; 20A For 30 Seconds Per 5 Minutes Cooling</b>
●	●	<b>Ohms 0.01Ω To 50MΩ</b>
●	●	<b>Conductance 0.01nS To 99.99nS</b>
●	●	<b>X-Speed Capacitance 50.00nF To 25mF</b>
●	●	<b>Line Level Frequency 10Hz To 200kHz</b>
●	●	<b>Logic Level Frequency 5Hz To 1MHz</b>
●	●	<b>Logic Level Duty Cycle Readings 0.1% To 99.99%</b>
●	●	<b>Diode Tester</b>
●	●	<b>Rugged Fire Retarded Casing With Battery Access Door</b>
●	●	<b>Replaceable Protective Holster With Probe-Holders &amp; Tilt-Stand</b>
●	●	<b>Optional Purchase Magnetic Hanger</b>
●	●	<b>1000V General (Ohm, Capacitance ... etc.) Input Protection</b>
●	●	<b>1000V High Breaking Capacity Fuses Protected On Current Inputs</b>
●	●	<b>Transient Protection Up To 12kV 1.2/50µs Lightning Surge</b>
●	●	<b>LVD Meets EN61010-1/61010-2-030/61010-2-033 to CAT IV 1000V</b>
●	●	<b>EMC EN61326-1 (EN55022, EN61000-3-2/3 &amp; EN61000-4-2/3/4/5/6/8/11)</b>

# The Ultimate Choice Of Resolution, Performance, Safety & Features!

Unbeatable 5-4/5d DCV Resolution, 100kHz DC+AC Performance, Cat IV 1kV Safety & New VFD Features!

**HIGH ACCURACY**  
0.02% BASIC DCV ACCURACY;  
1 $\mu$ VDC BEST RESOLUTION

**ANALOG BAR-GRAPH**  
FAST UPDATE RATE 60/SEC

**LARGE 500,000 COUNTS LCD DISPLAY**  
5/SEC FAST NOMINAL UPDATE RATE

**ASIC TECHNOLOGY**  
MORE FUNCTIONS & FEATURES  
AT AFFORDABLE PRICES

**AUTO & MANUAL-RANGING**  
AUTO-RANGING WITH  
MANUAL-RANGING OVERRIDE

**PAPER-WHITE DISPLAY BACKLIGHT**  
FOR EASY VIEWING IN THE DARK

**FUNCTION SELECTION**  
TOGGLE CONVENIENTLY BETWEEN  
PRIMARY & SECONDARY FUNCTIONS

**CREST (PEAK HOLD)**  
CAPTURES INSTANTANEOUS  
+PEAK & -PEAK, AUTO-RANGING

**LOGIC LEVEL DUTY%**  
MEASURES DIGITAL LOGIC LEVEL  
DUTY CYCLE % READINGS

**LOGIC LEVEL Hz**  
MEASURES DIGITAL LOGIC LEVEL  
FREQUENCIES UP TO 1MHz

**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 UP TO 200kHz  
IN DUAL DISPLAY

**dBm FUNCTION**  
WITH 20 SELECTABLE  
REFERENCE IMPEDANCE VALUES

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

**PC INTERFACE CAPABILITY**  
OPTIONAL PURCHASE USB CABLE  
WITH DATA RECORDING PC SOFTWARE  
FOR WIN98/NT4/2K/XP/VISTA

**BEEP-JACK™ AUDIBLE & VISIBLE WARNING**  
GUARDS AGAINST IMPROPER A-TERMINAL  
PLUG IN. DECREASES RISKS OF DAMAGE

**INTELLIGENT AUTO-POWER-OFF**  
TO EXTEND BATTERY LIFE. I-APO RESETS ON  
SIGNIFICANT OPERATION & MEASUREMENTS

**AC, AC+DC 100kHz TRUE RMS**  
FOR NON-SINUSOIDAL WAVEFORMS  
OF COMPLEX VOLTAGE OR CURRENT SIGNALS

**PROTECTIVE HOLSTER**  
WITH HOLDERS FOR PROBE STORAGE  
AND "THIRD HAND" FEATURE,  
REPLACEABLE & WASHABLE

**LVD SAFETY**  
MEETS EN61010-1 ED. 3.0,  
EN61010-2-030 ED. 1.0 &  
EN61010-2-033 ED. 1.0 to  
CAT IV 1kV

**DUAL DIGITAL DISPLAY**  
SIMULTANEOUSLY VIEW RELEVANT  
PARAMETERS IN COMPLEMENTARY DISPLAY

**T1-T2 TYPE-K TEMPERATURE**  
2 CHANNEL MEASUREMENTS,  
SELECTABLE °C & °F READINGS

**DIODE TEST**  
FOR CHECKING DIODES  
AND RECTIFIERS

**DATA HOLD**  
FREEZES THE DISPLAYING  
READING FOR LATER VIEW

**MAX MIN AVG RECORD**  
RECORD MAX, MIN & AVG  
READINGS; AUTO-RANGING

**nS CONDUCTANCE**  
nS=1/G $\Omega$  VIRTUALLY EXTENDS  
RESISTANCE MEASUREMENT TO  
THE ORDER OF G $\Omega$ . IT IS USEFUL  
FOR LEAKAGE MEASUREMENTS

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

**%4-20mA LOOP CURRENT**  
FOR PROCESS CONTROL

**X-SPEED CAPACITANCE**  
X-SPEED MEASURES UP TO 25mF  
ONLY IN A FEW SECONDS; 1kV PROTECTION

**CURRENT & Hz**  
MEASURES CURRENT & FREQUENCIES,  
AC & DC IN DUAL DISPLAY

**ERGONOMIC STREAMLINE DESIGN**  
FITS COMFORTABLY IN ONE'S HAND

**TRANSIENT PROTECTION**  
UP TO 12kV 1.2/50 $\mu$ s LIGHTNING SURGE;  
SUPERB PROTECTION FOR SERIOUS USERS

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



## GENERAL SPECIFICATION

Display: 4-4/5 digits 50,000 counts fast mode. Selectable stable mode 5-4/5 digits 500,000 counts for DC Voltage & 5 digits 99,999 counts for Hz  
 Polarity: Automatic  
 Update Rate:  
 4-4/5 digits fast mode: 5 per second nominal  
 5-4/5 digits stable mode: 1.25 per second nominal  
 41 Segments Bar graph: 80 per second max  
 Operating Temperature: 0°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  
 Pollution degree: 2  
 Storage Temperature: -20°C to 80°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 - 45°C, or otherwise specified  
 Sensing: AC, AC+DC True RMS  
 Safety: Double insulation per IEC/UL/EN61010-1 Ed. 3.0, IEC/EN61010-2-030 Ed. 1.0, IEC/EN61010-2-033 Ed. 1.0.

## Electrical Specifications

Accuracy is ±(% reading digits + number of digits) or otherwise specified, at 23°C ± 5°C & less than 75% relative humidity.  
 True RMS voltage & current accuracies are specified from 5% to 100% of range or otherwise specified. Maximum Crest Factor < 2.1:1 at full scale & < 4.2:1 at half scale, and with frequency components within the specified frequency bandwidth for non-sinusoidal waveforms.

## DC Voltage

RANGE	889s	887s
Accuracy		
500.00mV, 5.0000V	0.02% + 2d	0.03% + 2d
50.000V	0.03% + 2d	0.04% + 2d
500.00V	0.04% + 2d	0.05% + 2d
1000.0V	0.15% + 2d	0.15% + 2d

Input Impedance: 10MΩ, 60pF nominal (80pF nominal for 500mV range)

## AC Voltage

RANGE	889s	887s
Accuracy*		
20Hz ~ 45Hz		
500.00mV, 5.0000V, 50.000V	1.2% + 40d	Unspec'd
500.00V, 1000.0V	Unspec'd	Unspec'd
45Hz ~ 300Hz		
500.00mV	0.3% + 20d	0.8%+60d
5.0000V, 50.000V	0.4% + 30d	
500.00V, 1000.0V	0.5% + 40d	
300Hz ~ 5kHz		
500.00mV	0.3% + 20d	0.8%+40d
5.0000V, 50.000V, 500.00V	0.4% + 40d	2.0%+60d
1000.0V	0.8% + 40d**	1.0%+40d
5kHz ~ 20kHz		
500.00mV	0.5%+30d	1dB***
5.0000V, 50.000V	0.7%+40d	2dB***
500.00V	0.5%+40d	3dB***
1000.0V	Unspec'd	Unspec'd
20kHz ~ 100kHz		
500.00mV	2.5%+40d	Unspec'd
5.0000V, 50.000V	4.0%+40d***	
500.00V, 1000.0V	Unspec'd	

\*From 5% to 10% of range: Specified accuracy + 80d

\*\*Specified bandwidth 300Hz ~ 1kHz

\*\*\*From 5% to 10% of range: Specified accuracy + 180d

From 10% to 15% of range: Specified accuracy + 100d

Input Impedance: 10MΩ, 60pF nominal

(80pF nominal for 500mV range)

Residual reading less than 50 digits with test leads shorted.

## DC AC & AC+DC AC Voltage

RANGE	889s	887s
Accuracy*		
20Hz ~ 45Hz		
500.00mV, 5.0000V, 50.000V	1.5% + 40d	Unspec'd
500.00V, 1000.0V	Unspec'd	
DC, 45Hz ~ 300Hz		
500.00mV	0.45% + 40d	0.8%+60d
5.0000V, 50.000V	0.7% + 80d	
500.00V, 1000.0V	0.7% + 40d	
300Hz ~ 5kHz		
500.00mV	0.8% + 40d	0.8%+40d
5.0000V, 50.000V, 500.00V	0.8% + 40d	2.0%+60d
1000.0V	1.0% + 40d**	1.0%+40d
5kHz ~ 20kHz		
500.00mV	1.0%+40d	1dB***
5.0000V, 50.000V	1.5%+40d	2dB***
500.00V	1.5%+40d	3dB***
1000.0V	Unspec'd	Unspec'd
20kHz ~ 40kHz		
500.00mV	3.5%+40d	Unspec'd
5.0000V, 50.000V	4.0%+40d***	
500.00V, 1000.0V	Unspec'd	

\*From 5% to 10% of range: Specified accuracy + 80d

\*\*Specified bandwidth 300Hz ~ 1kHz

\*\*\*From 5% to 10% of range: Specified accuracy + 180d

From 10% to 15% of range: Specified accuracy + 100d

Input Impedance: 10MΩ, 60pF nominal

(80pF nominal for 500mV range)

Residual reading less than 50 digits with test leads shorted.

IEC/UL/EN61010-031 Ed. 1.1 and CAN/CSA-C22.2 No. 61010-1-12

Ed. 3.0 to Category IV 1000V AC & DC

Terminals (to COM) Measurement Category:

V / A / mA / μA : Category IV 1000 V<sub>ac</sub> & V<sub>dc</sub>

Overload Protection:

μA & mA : 0.44A/1000V DC/AC rms, IR 10kA, F fuse

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

V : 1100V DC/AC rms

mV, Ω & Others : 1000V DC/AC rms

Transient protection: 12kV (1.2/50μs surge)

E.M.C.: Meets EN61326-1:2008 (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 + 1000 digits

Performance above 3V/m is not specified

Power Supply: Single Alkaline 9V battery; NEDA1804A, JIS6AM8 or IEC6LF22

## Ohms

RANGE	889s	887s
Accuracy		
500.00Ω	0.07%+10d	0.1%+10d
5.0000kΩ	0.07%+2d	0.1%+6d
50.000kΩ	0.1%+2d	0.1%+6d
500.00kΩ	0.1%+2d	0.1%+6d
5.0000MΩ	0.3%+6d	0.4%+6d
50.000MΩ	2.0%+6d	2.0%+6d
99.99nS*	2.0%+10d	2.0%+10d

Open Circuit Voltage: < 1.3VDC (< 3VDC for 500Ω range)

\*From 0% to 10% of range: Specified accuracy + 30d

## Audible Continuity Tester

Audible threshold: between 20Ω and 200Ω

Response time < 100μs

## Crest mode (Instantaneous Peak Hold)

Resolution: 5000 counts

Accuracy: Specified accuracy ± 100 digits for changes > 0.8ms in duration

## VFD AC Voltage (Model 889s only)

RANGE	Accuracy*
5Hz ~ 20Hz	
5.0000V, 50.000V, 500.00V, 1000.0V	3% + 80d
20Hz ~ 200Hz	
5.0000V, 50.000V, 500.00V, 1000.0V	2% + 50d
200Hz ~ 440Hz	
5.0000V, 50.000V, 500.00V, 1000.0V	6% + 80d**

\*Not specified for fundamental frequency > 440Hz

\*\*Accuracy linearly decreases from 2% + 50d @ 200Hz to 6% + 80d @ 440Hz

## dBm

Range and accuracy are subjected to ACmV, ACV, and reference impedance selected. Typical 600Ω reference impedance ranges:

At ACmV: -29.83dBm to -03.80dBm

At ACV: -01.09dBm to 82.22dBm

Input Impedance: 10MΩ, 60pF nominal

Selectable reference impedance of 4, 8, 16, 32, 50, 75, 93, 110,

125, 135, 150, 200, 250, 300, 500, 800, 800, 900, 1000 & 1200Ω

## Diode Tester

RANGE	Accuracy	Test Current (Typical)	Open Circuit Voltage
2.0000V	1%+1d	0.4mA	< 3.5 VDC

## Capacitance

RANGE	Accuracy*
50.00nF	0.8% + 3d
500.0nF	0.8% + 3d
5.000μF	1.5% + 3d
50.00μF	2.5% + 3d
500.0μF**	3.5% + 5d
5.000mF**	5.0% + 5d
25.00mF**	6.5% + 5d

\*Accuracies with film capacitor or better

\*\*In manual-ranging mode, measurements not specified below

45.0μF/0.450mF/4.50mF (450 counts) for

500.0μF/5.000mF/25.00mF ranges respectively

## DC Loop Current %4-20mA

4mA = 0% (zero); 20mA = 100% (span)

Resolution: 0.01% Accuracy: ± 25d

## DC Current

RANGE	Accuracy	Burden Voltage
500.00μA	0.15%+20d	0.15mV/μA
5000.0μA	0.1%+20d	0.15mV/μA
50.000mA	0.15%+20d	3.3mV/mA
500.00mA	0.15%+30d	3.3mV/mA
5.0000A	0.5%+20d	45mV/A
10.0000A*	0.5%+20d	45mV/A

\*10A continuous, >10A to 20A for 30 second max with 5 minutes cool down interval

Power Consumption: 6.5mA typical; 8mA for VFD ranges (BM869s only)

Low Battery: Below approx. 7V

APO Timing: Idle for 17 minutes

APO Consumption: 70μA typical

Dimension: L208mm X W103mm X H84.5mm with holster

Weight: 635 gm with holster

Accessories: Test leads (pair), holster, battery installed, user's manual, Bkp60 banana plug K-type thermocouple x 1 (Model 889s only)

Optional Accessories: BU-86K PC interface kit, Bkb32 banana pins to K-type socket plug adapter (Model 889s only)

Special Features: Record MAX, MIN & AVG readings; Crest (Instantaneous Peak hold) MAX & MIN readings; Relative zero mode;

500,000 counts stable DCV mode; Paper-White Backlit display; dBm readings; %4-20mA loop current readings; Data Hold; BeepJack™

Audible & visible input warning; T1-T2 differential temperature readings (Model 889s only); VFD V & Hz readings (Model 889s only)

## AC, DC AC & AC+DC AC Current

RANGE	889s	887s	Burden Voltage
DC, 50Hz ~ 60Hz			
500.00μA	0.5% + 50d	1.0% + 40d	0.15mV/μA
5000.0μA			0.15mV/μA
50.000mA			3.3mV/mA
500.00mA			3.3mV/mA
5.0000A			45mV/A
10.0000A*			45mV/A
40Hz ~ 1kHz			
500.00μA	0.7% + 50d	1.0% + 40d	0.15mV/μA
5000.0μA			0.15mV/μA
50.000mA			3.3mV/mA
500.00mA			3.3mV/mA
5.0000A			45mV/A
10.0000A*			45mV/A
1kHz ~ 20kHz			
500.00μA	2.0% + 50d	Unspec'd	0.15mV/μA
5000.0μA			0.15mV/μA
50.000mA			3.3mV/mA
500.00mA			3.3mV/mA
5.0000A, 10.0000A*			45mV/A
20kHz ~ 100kHz			
500.00μA	5.0% + 50d	Unspec'd	0.15mV/μA
5000.0μA			0.15mV/μA
50.000mA			3.3mV/mA
500.00mA			3.3mV/mA
5.0000A, 10.0000A*			45mV/A

\*10A continuous, >10A to 20A for 30 second max with 5 minutes cool down interval

## ~ Hz Line Level Frequency

AC Function RANGE	Sensitivity (Stn RMS)	Range
500mV	100mV	10Hz ~ 200kHz
5V	0.6V	10Hz ~ 100kHz
50V	6V	10Hz ~ 100kHz
500V	50V	10Hz ~ 100kHz
1000V	800V	10Hz ~ 10kHz
VFD 5V	0.5V ~ 2V*	10Hz ~ 440Hz
VFD 50V	5V ~ 20V*	10Hz ~ 440Hz
VFD 500V	50V ~ 200V*	10Hz ~ 440Hz
500μA	50μA	10Hz ~ 10kHz
5000μA	500μA	10Hz ~ 10kHz
50mA	5mA	10Hz ~ 10kHz
500mA	50mA	10Hz ~ 10kHz
5A	1A	10Hz ~ 3kHz
10A	10A	10Hz ~ 3kHz

Accuracy: 0.02%+4d

\*VFD sensitivity linearly decreases from 10% F.S. @ 200Hz to 40% F.S. @ 440Hz

## Hz Logic Level Frequency

RANGE	Accuracy
5.000Hz ~ 1.0000MHz	0.002%+4d

Sensitivity: 2.5Vp square wave

## %Duty Cycle

RANGE	Accuracy
0.1% ~ 99.99%	3d/kHz+2d

Input Frequency: 5Hz ~ 500 kHz, 5V Logic Family

## T1-T2 Type-K Temperature (Model 889s only)

RANGE	Accuracy
-50.0°C to 1000.0°C	0.3%+1.5°C
-58.0°F to 1832.0°F	0.3%+3.0°F

Type-K thermocouple range & accuracy not included

## BRYMEN TECHNOLOGY CORPORATION

http://www.brymen.com

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