

# The Return Of The Professional Flag-Ship

## BM850"a" Series

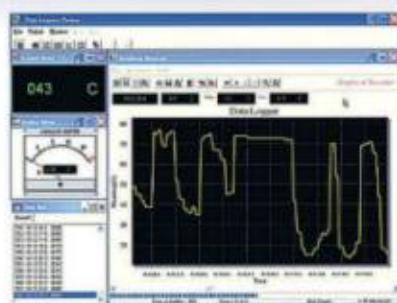
100kHz DC+AC TRMS...500,000 Counts DCV...Yet Only Accept The Best!



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



**BM850a Professional  
DMM Series**



BRUA-85Xa Interface Kit  
(optional purchase)

● **BM859CFa** ● **BM857a**

BM859CFa	BM857a	Functions & Features
●	●	6 Digits 999,999 Counts Mode For Hz With 0.002% Accuracy
●	●	5-4/5 Digits 500,000 Counts For DC Voltage Stable Mode
●	●	4-4/5 Digits 50,000 Counts For DC/AC Voltage/Current & OHM
●		T1-T2 Dual Channels Type-K Temperature -50°C To 1000°C
100kHz	20kHz	AC, AC+DC True RMS High Bandwidth Voltage Functions
●	●	Optically Isolated PC-COMM Interface Capability
●	●	BRUA-85Xa Interface Kit For Win 95/98/ME/NT4/2K/XP/Vista (Optional Purchase)
●	●	Audible & Visible BeepJack™ Input Warning Against Improper Plug In
●	●	RECORD Max, Min, Max-Min Readings, Auto-Ranging
●	●	CREST (Peak Hold) Max, Min, Max-Min Readings
●	●	Back-Lighted Large Easy To Read LCD Display
●	●	High Speed Analog Bar-Graph Updates 60/Sec
●	●	Intelligent Auto Power Off (APO)
●	●	Fast Data Measurement 5/Sec
●	●	High General Input Protection 600V for a-version (1kV for CFa-version)
0.02%	0.03%	High Basic DCV Accuracies
●	●	Fire Retarded Case
●	●	Relative Zero Mode
●	●	Data Hold
●	●	Diode Test
●	●	DC/AC Current 0.01µA To 15A
●	●	DC/AC Voltage 0.01mV To 1000V
●	●	Ohms 0.01Ω To 50MΩ
●	●	Capacitance 10pF To 9999µF
●	●	Fast Audible Continuity < 100µS
●	●	Duty-Cycle % Reading
●	●	Logic Level FREQUENCY 5Hz TO 2MHz
●	●	Line Level FREQUENCY With 4 Trigger Levels
●	●	%4-20mA Process Control Loop Current Reading
●	●	dBm Readings, 20 Selectable Impedance Values
●	●	High Energy HBC Fuses Protected 600V for a-version (1kV for CFa-version)
●	●	Replaceable And Washable Protective Rubber Holster
●	●	Transient Protection Up To 8kV 1.2/50µS Lightning Surge
●	●	LVD Meets EN61010-1 CAT III 1000V & CAT IV 600V
●	●	EMC EN61326-1:2006 (EN55022, EN61000-3-2/-3 & EN61000-4-2/-3/-4/-5/-6/-8/-11)

# Proven Accuracy... Certified Safety... Superb Performance

## Superb 0.02% Accuracy, Swift 60/Sec Bargraph + Swift Large-Cx Measurements

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

**FULLY AUTORANGING**  
SHORTENS THE TIME TO MEASURE  
AND INCREASES THE EASE OF USE

**CREST (PEAK HOLD)**  
CAPTURES INSTANTANEOUS PEAK  
READINGS AS SHORT AS 0.8ms IN DURATION

**MAX-MIN RECORD**  
RECORD MAX, MIN, MAX-MIN  
READINGS, AUTORANGING

**BACKLIGHTED LCD DISPLAY**  
FOR EASY VIEWING IN THE DARK

**LAST SET FUNCTION DEFAULT**  
LAST SET FUNCTION WILL BE SAVED AS  
POWER-UP DEFAULT FOR EASE OF USE

**RANGE**  
AUTORANGING WITH MANUAL-  
RANGING OVERRIDE

**T1-T2 TEMPERATURE**  
2 CHANNELS K-TYPE TEMPERATURE,  
SELECTABLE °C OR °F MEASUREMENTS

**DIGITAL SIGNAL Hz**  
FOR LOGIC LEVEL SIGNAL  
HIGH FREQUENCY MEASUREMENTS

**dBm FUNCTION**  
WITH 20 SELECTABLE  
IMPEDANCE VALUES

**1KV AC VOLTAGE MEASUREMENT**  
IMPROVED MEASURING CAPABILITIES

**INPUT WARNING**  
AUDIBLE AND VISIBLE WARNING  
AGAINST IMPROPER PLUG IN

**FIRE RETARDED CASE**  
FOR REINFORCED SAFETY

**HBC FUSE PROTECTED**  
HIGH BREAKING CAPACITY  
1000V (600V FOR BM857)  
CERAMIC FUSE PROTECTED

**PROTECTIVE HOLSTER**  
INCREASES PRODUCT DURABILITY.  
REPLACEABLE & WASHABLE

**DC+AC TRUE RMS**  
100kHz VOLTAGE BANDWIDTH TO  
MEASURES SIGNAL TRUE VALUE  
REGARDLESS OF WAVEFORMS  
(20kHz FOR BM857)

**0.02% HIGH BASIC ACCURACY**  
WITH LARGE EASY TO READ DISPLAY

**INTELLIGENT AUTO POWER OFF**  
TO EXTEND BATTERY LIFE

**FAST MEASUREMENTS**  
DATA 5 TIMES / SEC  
BAR-GRAPH 60 TIMES / SEC

**RELATIVE ZERO MODE**  
FOR CONVENIENT READINGS  
COMPARISON & OFFSET

**HIGH RESOLUTION MODE**  
999,999 COUNTS IN Hz  
500,000 COUNTS IN DCV

**HIGH VOLTAGE Hz**  
FOR NOISY ELECTRICAL SIGNALS

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

**¼-20mA LOOP CURRENT**  
FOR PROCESS CONTROL

**DIODE TEST**  
FOR TESTING DIODES AND RECTIFIERS

**CAPACITANCE**  
AUTO-RANGING UP TO 9999µF WITH  
1000V (600V FOR BM857) PROTECTION

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

**EMC**  
MEETS EN61326(1997, 1998/A1),  
EN61000-4-2(1995), & EN61000-4-3(1996)

**TRANSIENT PROTECTION**  
UP TO 8kV 1.2/50µs LIGHTNING SURGE,  
MORE CONFIDENCE FOR SERIOUS USERS

**LVD**  
MEETS EN61010-1 2nd Ed.  
CAT III 1kV & CAT IV 600V



## BM859CFa & BM857a GENERAL SPECIFICATION

**Display:** 4-4/5 digits 50,000 counts. Selectable stable mode  
5-4/5 digits 500,000 counts for DC Voltage, & 6 digits 999,999 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;  
42 Segments Bar graph: 60 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 60°C, < 80% R.H. (with battery removed)

**Altitude:** Operating below 2000m

**Temperature Coefficient:** nominal 0.1 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 IEC61010-1 2nd Ed., EN61010-1 2nd Ed., UL61010-1 2nd Ed. & CAN/CSA C22.2 No.

61010.1-0.92 to Category III 1000V AC & DC and Category IV 600V AC & DC

BM857a Terminals (to COM) Measurement Category:

V : Category III 1000 Vac & Vdc and Category IV 600 Vac & Vdc.

## 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 < 5:1 at full scale & < 10:1 at half scale, and with frequency components within the specified frequency bandwidth for non-sinusoidal waveforms.

### DC Voltage

RANGE	BM859CFa	BM857a
<b>Accuracy</b>		
500.00 mV, 5.0000V, 50.000V	0.02% + 2d	0.03% + 2d
500.00V	0.04% + 2d	0.05% + 2d
1000.0V	0.05% + 2d	0.1% + 2d

NMR: >60dB @ 50/60Hz

CMRR: >120dB @ DC, 50/60Hz, Rs=1kΩ

Input Impedance: 10MΩ, 30pF nominal (80pF nominal for 500mV range)

### AC & AC+DC Voltage

RANGE	BM859CFa	BM857a
<b>Accuracy*</b>		
<b>20Hz - 45Hz</b>		
500.00mV, 5.0000V, 50.000V	1.5% + 60d	Unspec'd
500.00V, 1000.0V	Unspec'd	
<b>45Hz - 300Hz</b>		
500.00mV	0.3% + 20d	0.8% + 60d
5.0000V, 50.000V	0.8% + 20d	
500.00V, 1000.0V	0.4% + 40d	
<b>300Hz - 5kHz</b>		
500.00mV	0.3% + 10d	0.8% + 40d
5.0000V, 50.000V, 500.00V	0.4% + 40d	2.0% + 60d
1000.0V	0.8% + 40d (300Hz-1kHz)	1.0% + 40d
<b>5kHz - 20kHz</b>		<b>1kHz - 20kHz</b>
500.00mV	0.5% + 20d	1dB**
5.0000V, 50.000V	0.8% + 20d	2dB**
500.00V	0.5% + 20d	3dB**
1000.0V	Unspec'd	Unspec'd
<b>20kHz - 100kHz</b>		
500.00mV	2.5% + 40d	Unspec'd
5.0000V, 50.000V	4.0% + 40d**	
500.00V	Unspec'd	
1000.0V	Unspec'd	

\*From 5% to 10% of range:

accuracy % of reading (or in dB) + 80d

\*\*From 5% to 10% of range:

accuracy % of reading (or in dB) + 180d

\*\*From 10% to 15% of range:

accuracy % of reading (or in dB) + 100d

CMRR: >80dB @ DC to 60Hz, Rs=1kΩ

Input Impedance: 10MΩ, 30pF nominal (80pF nominal for 500mV range)

Residual reading less than 50 digits with test leads shorted.

A / mAμA : Category III and Category IV 600 Vac and 300 Vdc.

BM859CFa Terminals (to COM) Measurement Category:

V / A / mAμA : Category III 1000 Vac & Vdc and Category IV 600 Vac & Vdc.

**Overload Protections:**

BM857a:

μA & mA: 1A/600V, IR 10kA or better, F fuse

A: 10A/600V, IR 100kA or better, F fuse

V: 1050Vrms, 1450Vpeak

mV, Ω, & Others: 600 Vdc & Vac rms

BM859CFa

μA & mA: 0.44A/1000V, IR 10kA or better, F fuse

A: 11A/1000V, IR 20kA or better, F fuse

V, mV, Ω, & Others: 1050Vrms, 1450Vpeak

**Transient protection:** 8kV (1.2/50μs surge)

**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:** Single Alkaline 9V battery; NEDA1604A,

### dBm

At 600Ω, -11.76dBm to 54.25dBm

Accuracy: ± 0.25dB + 2d (@40Hz - 20kHz)

Input Impedance: 10kΩ, 30pF nominal

Selectable reference impedance of 4, 8, 16, 32, 50, 75, 93, 110, 125, 135, 150, 200, 250, 300, 500, 600, 800, 900, 1000, 1200Ω

### Ohms

RANGE	BM859CFa	BM857a
<b>Accuracy</b>		
500.00Ω	0.07% + 10d	0.1% + 6d
5.0000kΩ	0.07% + 2d	
50.000kΩ		
500.00kΩ		
5.0000MΩ	0.2% + 6d	0.4% + 6d
50.000MΩ	2.0% + 6d	2.0% + 6d

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

### ⊘ Audible Continuity Tester

Audible threshold: between 20Ω and 200Ω Response time < 100μs

### ⚡ Diode Tester

Range	Accuracy	Test Current (Typical)	Open Circuit Voltage
5.0000V	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
9999μF**	5.0% + 5d

\*Accuracies with film capacitor or better

\*\*In manual-ranging mode, measurements not specified below 50.0μF and 540μF for 500.0μF and 9999μF ranges respectively

### DC Loop Current %4-20mA

4mA = 0% (zero)

20mA = 100% (span)

Resolution: 0.01%

Accuracy: ± 25d

### Crest mode (Instantaneous Peak Hold)

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

### 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	0.1% + 30d	3.3mV/mA
5.0000A	0.5% + 20d	45mV/A
10.000A*	0.5% + 20d	45mV/A

\*10A continuous, >10A to 15A (to 20A for BM859CFa) for 30 second max with 5 minutes cool down interval

JIS6AM6 or IEC6LF22

**Power Consumption:** 6mA typical

**Low Battery:** Below approx. 7V

**APO Timing:** Idle for 17 minutes

**APO Consumption:** 55μA typical for BM857a; 30μA typical for BM859CFa

**Dimension:** L166mm X W87mm X H35.5mm; L198mm X W97mm X H55mm with holster

**Weight:** 390 gm; 500 gm with holster

**Accessories:** Test leads (pair), holster, battery installed, user's manual, Bkp60 banana plug K-type thermocouple x 1 (BM859a only)

**Optional Accessories:** BRUA-85Xa PC interface kit (BC-85Xa RS232 optical adapter cable + Bs85X software CD + BUA-2303 USB-to-Serial adaptor), Bkb32 banana pins to K-type socket plug adapter

**Special Features:** Record MAX, MIN, MAX-MIN readings. Crest (Instantaneous Peak hold) MAX, MIN, MAX-MIN readings. Relative zero mode. 500,000 counts high resolution stable reading mode. Backlighted display. dBm readings. T1-T2 differential temperature readings (BM859CFa only). %4-20mA loop current readings. High noise rejection filtered Line Level Frequency mode. Data Hold. Audible & visible input warning.

### AC & AC+DC Current

RANGE	BM859CFa	BM857a	Burden Voltage
<b>Accuracy</b>			
<b>50Hz - 60Hz</b>			
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
10.000A*			45mV/A
<b>40Hz - 1kHz</b>			
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
10.000A*			45mV/A
<b>1kHz - 10kHz</b>			
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			45mV/A
10.000A*			45mV/A

\*10A continuous, >10A to 15A (to 20A for BM859CFa) for 30 second max with 5 minutes cool down interval

### T1-T2 Dual Temperature (BM859CFa only)

RANGE	Accuracy
-50.0°C to 1000.0°C	0.3% + 1°C
-58.0°F to 1832.0°F	0.3% + 2°F

Thermocouple range & accuracy not included

### ~ Hz Line Level Frequency

Function RANGE	Sensitivity (Sine RMS)	Range
500mV	100mV	10Hz - 200kHz
5V	1V	10Hz - 200kHz
50V	10V	10Hz - 100kHz
500V	100V	10Hz - 100kHz
1000V	900V	10Hz - 10kHz

Accuracy: 0.02% + 4d

### ⊖ Hz Logic Level Frequency

RANGE	Accuracy
5.0000Hz - 2.0000MHz	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

## BRYMEN TECHNOLOGY CORPORATION

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