

# 5 Test Voltages 50V To 1kV for Insulation!

## 200mA High Test Current for Earth Continuity!

Helps To Determine The State Of Insulation Material And Earth Continuity For Preventive Maintenance!



### BM870 Series

### Insulation Multimeter



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





● **BM878**



● **BM877**



● **BM876**

| 878 | 877    | 876      | FUNCTIONS & FEATURES  |
|-----|--------|----------|---|
| ●   | ●      | ●        | 3-5/6 Digits 6,000 Counts Large Easy-To-Read LCD Display                          |
| ●   | ●      | ●        | Fast Measurements, 5/Sec; Fully Auto-Ranging                                      |
| ●   | ●      | ●        | 61 Segment Analog Bar-graph Updates 60/Sec  |
| ●   | ●      | ●        | AC True RMS Conversion  |
| ●   | ●      | ●        | Dual Digital Display  |
| ●   | ●      | ●        | Data Hold   |
| ●   | ●      | ●        | Auto Power Off (APO)  |
| ●   | ●      | ●        | Paper-White Back-Lighted Display  |
| ●   | ●      | ●        | Record Max/Min Readings; Auto-Ranging   |
| ●   | ●      | ●        | BeepJack™ Input Warning Against Improper Plug-In To ● <b>INS.</b> /mA Terminal    |
| ●   | ●      | ●        | VFD-V & VFD-Hz Measures Fundamental V & Hz Of Most Variable Frequency Drives      |
| ●   | 6.000V | 6.000V   | AC/DC Voltage Ranges 60.00mV To 1000V   |
| ●   | ●      | ●        | Ohms Ranges 600.0Ω To 60.00MΩ   |
| ●   | ●      | ●        | Fast Audible Continuity Tester  |
| ●   | ●      | ●        | Hz Line Level Frequency   |
| ●   | ●      | ●        | Diode Tester  |
| ●   |        |          | X-Speed Capacitance Ranges 3.000μF To 30.00mF                                     |
| ●   |        |          | Type-K Temperature -50.0°C To 537.0°C; Selectable °F Readings                     |
| ●   |        |          | AC/DC Current Ranges 60.00mA To 600.0mA; HBC 1kV Fuse Protected                   |
| ●   | ●      | ●        | Insulation Resistance; Selectable V <sub>N</sub> 50V, 100V, 250V, 500V & 1000V    |
| ●   | ●      | ●        | ↔ Earth Continuity; I <sub>N</sub> ≥200mA @ 2.000Ω Range and ≥90mA @ 20.00Ω Range |
|     | ●      | ●        | PI (Polarization Index) & DAR (Dielectric Absorption Ratios) Features             |
|     | ●      | ●        | PASS/FAIL Insulation Resistance Compare Feature; 12 Selectable Preset Values      |
| ●   | ●      | Optional | Remote Probe (For Insulation Resistance & Earth Continuity Test)                  |
| ●   | ●      | ●        | Optional Purchase Magnetic Hanger   |
| ●   | ●      | ●        | Rugged Fire Retarded Casing With Battery/Fuse Access Door                         |
| ●   | ●      | ●        | Replaceable Protective Holster With Probe-Holders & Tilt-Stand                    |
| ●   | ●      | ●        | 1kV General (Ohm, Capacitance, Diode ... etc.) Input Protection                   |
| ●   | ●      | ●        | HBC 1kV Fuse Protected On ↔ (To COM) Against Extraneous Overvoltages              |
| ●   | ●      | ●        | HBC 1kV Fuse Protected On ● <b>INS.</b> (To COM) Against Extraneous Overvoltages  |
| ●   | ●      | ●        | Transient Protection Up To 8kV 1.2/50μs Lightning Surge                           |
| ●   | ●      | ●        | LVD Meets EN61010-1/-2-030/-2-033 to Measurement CAT III 1000V & CAT IV 600V      |
| ●   | ●      | ●        | LVD Also Meets EN61557-1/-2 (Insulation Resistance)/-4 (Earth Continuity)         |
| ●   | ●      | ●        | EMC EN61326-1 (EN5022, EN61000-3-2/-3 & EN61000-4-2/-3/-4/-5/-6/-8/-11)           |



# Ultimate 3 In 1!

## Superior DMM + Insulation Tester + Earth-Continuity Tester!

Convenient Remote Probe. Test Inhibits On Live Circuits.  
Lock Feature For Continuous Testing.

**Analog Bar-graph**  
Fast Update Rate 60/sec

**6,000 Counts Wide-view LCD Display**  
5/sec Fast Nominal Update Rate

**Dual Digital Display**  
Simultaneously View Relevant  
Parameters In Complementary Display

**ASIC Technology**  
Allows More Functions &  
Features At Affordable Prices

**Auto & Manual-ranging**  
Auto-ranging With  
Manual-ranging Override

**Smooth Mode**  
Smooth Out Unstable Insulation  
Resistance Readings

**High Accuracy**  
0.2% Basic DCV Accuracy

**Function Selection**  
Toggle Conveniently Between  
Primary & Secondary Functions

**Ergonomic Streamline Design**  
Fits Comfortably In One's Hand

**Paper-white Display Backlight**  
For Easy Viewing In The Dark

**LOCK Feature**  
For Two Handed Continuous  
Testing Without The Need  
To Press The TEST Button

**Logic Level Hz**  
Measures Digital Logic Level  
Frequencies Up To 100kHz

**Data Hold**  
Freezes The Displaying  
Reading For Later View

**60.00mV AC/DC Ranges**  
0.01mV High Resolution To  
Test Small Signal Changes

**Max Min Avg Record**  
Record Max, Min & Avg  
Readings; Auto-ranging

**Diode Test**  
For Checking Diodes  
And Rectifiers

**mA & Hz**  
Measures Currents &  
Frequencies In Dual Display

**Fast Audible Continuity**  
For Quick Open-short Tests  
On Switches, Fuses And Wires

**Earth Continuity Test**  
Test Currents:  
>200mA @ 2.000Ω Range  
And >90mA @ 20.00Ω Range

**High Impedance Voltages**  
1000VAC/DC Measuring Capabilities;  
High Input Impedance For  
Load Sensitive Circuits

**Insulation Resistance Test**  
5 Test Voltages:  
50V, 100V, 250V, 500V & 1000V.  
It Is Useful For Determining  
The State Of Insulation Material.

**Hz Of Line Level Voltage**  
Measures Noisy High Voltage  
ACV Frequencies In Dual Display

**Type-k Temperature**  
Measurements -50.0°C To 537.0°C,  
Selectable °C & °F Readings

**VFD V & Hz Feature**  
Measures Fundamental  
Voltage & Frequency Of Most  
Variable Frequency Drives  
In Dual Display

**X-speed Capacitance**  
X-speed Measures Up To 30mF  
In Only A Few Seconds; 1kV Protection

**Accepts Remote Probe**  
Convenient Activation For Insulation  
& Earth Continuity Tests. Full Silicone  
Leads To Minimize Insulation Test Error

**Resistance Function**  
Autoranging 600.0Ω To 60.00MΩ

**Beep-jack™ Audible & Visible Warning**  
Guards Against Improper "-INS. mA" Terminal  
Plug In. Decreases Risks Of Damage

**Transient Protection**  
Up To 8kV 1.2/50μs Lightning Surge;  
Superb Protection For Serious Users

**Intelligent Auto-power-off**  
To Extend Battery Life; Awake Resets On  
Significant Operation & Measurements

**LVD Safety**  
Meets EN61557-1/-2/-4,  
& EN61010-1/-2-030/-2-033  
CAT III 1kV & CAT IV 600V

**AC 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

**EMC**  
Meets EN61326-1:2006  
(En55022, EN61000-3-2/-3 &  
EN61000-4-2/-3/-4/-5/-6/-8/-11)





## GENERAL SPECIFICATION

**Display:** 3-5/6 digits 6,000 counts

**Polarity:** Automatic

**Update Rate:** 5 per second nominal

**61 Segments Bar graph:** 40 per second max

**Operating Temperature:** -10°C to 40°C

**Relative Humidity:** Maximum relative humidity 90% for temperature up to 28°C decreasing linearly to 50% relative humidity at 40°C

**Pollution Degree:** 2

**IP Rating:** IP40

**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 @ (-10°C ~ 18°C or 28°C ~ 40°C), or otherwise specified

**Sensing:** AC, 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, IEC/UL/EN61010-031 Ed. 1.1 and CAN/CSA-C22.2 No. 61010-1-12 Ed. 3.0 to Category III 1000 V AC & DC and Category IV 600V AC & DC

**Compliance to IEC/EN61557:2007** (Per CE requirements, not certified by UL or ETL): IEC/EN61557-1, IEC/EN61557-2 & IEC/EN61557-4 where applicable

**Overload Protections:**

Insulation Resistance & mA (BM878 only): 0.4A/1KV, IR 30kA or better

Earth Continuity Test (BM878 & BM877 only): 0.25A/1KV, IR 30kA or better

V: 1100Vrms

mV, Ω & Others: 1000 Vrms

**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:

Total Accuracy = Specified Accuracy + 25 digits

Performance above 3V/m is not specified

**Power Supply:** Four Alkaline AA batteries (IEC LR6)

**Power Consumption:** 4.5mA typical except the followings:

ACV <sup>Hz</sup> & VFD ACV <sup>Hz</sup>:

7.0mA

Earth Continuity Test:

110mA @20Ω Range

220mA @2.0Ω Range

*Tester can perform at least 3000 Earth Continuity Test measurements with new alkaline batteries at room temperature. These are standard tests of 1 Ω with a duty cycle of 5 seconds on and 25 seconds off.*

Insulation Resistance @1mA test current:

50V output voltage: 25mA

100V output voltage: 45mA

250V output voltage: 85mA

500V output voltage: 170mA

1000V output voltage: 440mA

*Tester can perform at least 950 insulation tests with new alkaline batteries at room temperature. These are standard tests of 1000 V into 1 MΩ with a duty cycle of 5 seconds on and 25 seconds off.*

**Low Battery:** approx. 4.6V

**APO Timing:** Idle for 20 minutes

**APO Consumption:** 50µA typical

**Dimension:** L208mm X W103mm X H64.5mm with holster

**Weight:** 635 gm with holster

**Accessories:** Test probe pair, Alligator clip pair, BRP21S2-C Remote probe (BM878 & BM877 only), Holster, User's manual, Bkp60 banana plug K-type thermocouple (BM878 only)

**Optional Accessories:** BRP21S2-C Remote probe (BM876 only), BKB32 banana plug to type-K socket plug adaptor (BM878 only), BMH-01 magnetic hanger

**Special Features:** Record MAX/MIN readings; Display Hold; Backlighted LCD; VFD V & Hz readings; Lock-Test mode for Insulation resistance & Earth Continuity Test (BM878 & BM877 only); Beep/Jack™ audible & visible input warning; P/DAR mode (BM877 & BM876 only); Compare mode (BM877 & BM876 only)

## Electrical Specifications

Accuracy is ±(% reading digits + number of digits) or otherwise specified, at 23°C ± 5°C & less than 80% relative humidity.

True RMS voltage & current accuracies are specified from 1% to 100% of range or otherwise specified. Maximum Crest Factor < 1.70:1 at full scale & < 3.4:1 at half scale, and with frequency components fall within the specified frequency bandwidth for non-sinusoidal waveforms.

### AC Voltage

| RANGE                         | Accuracy    |
|-------------------------------|-------------|
| 50Hz ~ 60Hz                   |             |
| 6.000V, 60.00V, 600.0V, 1000V | 1% + 3d     |
| 60Hz ~ 1kHz                   |             |
| 6.000V, 60.00V, 600.0V, 1000V | 2% + 3d     |
| 1kHz ~ 3kHz                   |             |
| 6.000V, 60.00V                | 2% + 3d     |
| 600.0V, 1000V                 | Unspecified |
| 3kHz ~ 5kHz                   |             |
| 6.000V, 60.00V                | 4% + 5d     |
| 600.0V, 1000V                 | Unspecified |

Input impedance: 10MΩ, 110pF nominal

### VFD AC Voltage

| RANGE         | Accuracy <sup>1)</sup> |
|---------------|------------------------|
| 10Hz ~ 45Hz   |                        |
| 600.0V        | 4% + 5d                |
| 45Hz ~ 200Hz  |                        |
| 600.0V        | 2% + 5d                |
| 200Hz ~ 440Hz |                        |
| 600.0V        | 7% + 5d <sup>2)</sup>  |

<sup>1)</sup>Unspecified for fundamental frequency > 440Hz

<sup>2)</sup>Accuracy linearly decreases from 2% + 5d @200Hz to 7% + 5d @440Hz

Input impedance: 10MΩ, 110pF nominal

### DC Voltage

| RANGE                  | Accuracy  |
|------------------------|-----------|
| 6.000V, 60.00V, 600.0V | 0.2% + 3d |
| 1000V                  | 0.3% + 3d |

Input impedance: 10MΩ, 110pF nominal

### Ohms

| RANGE                     | Accuracy  |
|---------------------------|-----------|
| 600.0Ω                    | 0.9% + 5d |
| 6.000kΩ, 60.00kΩ, 600.0kΩ | 0.9% + 2d |
| 6.000MΩ                   | 1.2% + 3d |
| 60.00MΩ                   | 3.0% + 6d |

Open Circuit Voltage: < 1.5VDC typical

### Audible Continuity Tester

Audible threshold: between 20Ω and 200Ω

Response time < 30ms

### Diode Tester

| Range  | Accuracy  | Test Current (Typical) | Open Circuit Voltage |
|--------|-----------|------------------------|----------------------|
| 2.000V | 1.5% + 4d | 0.5mA                  | < 2.8 VDC            |

### Capacitance (BM878 only)

| RANGE  | Accuracy <sup>1)</sup> |
|--|------------------------|
| 3.000µF <sup>2)</sup> , 30.00µF, 300.0µF, 3000µF | 1.5% + 5d              |
| 30.00mF  | 10% + 5d               |

<sup>1)</sup>Accuracies with film capacitor or better

<sup>2)</sup>Readings not available below 200nF

### DCmV (BM878 only)

| RANGE   | Accuracy  |
|---------|-----------|
| 60.00mV | 0.5% + 3d |
| 600.0mV | 0.1% + 3d |

Input impedance: 10MΩ, 140pF nominal

### ACmV (BM878 only)

| RANGE            | Accuracy    |         |
|------------------|-------------|---------|
| 60.00mV, 600.0mV | 50Hz ~ 60Hz | 1% + 3d |
|                  | 60Hz ~ 3kHz | 2% + 3d |
|                  | 3kHz ~ 5kHz | 3% + 5d |

Input impedance: 10MΩ, 140pF nominal

### Temperature (BM878 only)

| RANGE             | Accuracy <sup>1)</sup> |
|-------------------|------------------------|
| -50.0°C ~ 0.0°C   | 2% + 3°C               |
| 0.0°C ~ 50.0°C    | 2.2°C                  |
| 50.0°C ~ 537.0°C  | 2% + 2°C               |
| -58.0°F ~ 32.0°F  | 2% + 6°F               |
| 32.0°F ~ 122.0°F  | 4.4°F                  |
| 122.0°F ~ 999.0°F | 2% + 4°F               |

<sup>1)</sup>Type-K thermocouple range & accuracy not included

### DCmA (BM878 only)

| RANGE            | Accuracy  | Burden Voltage |
|------------------|-----------|----------------|
| 60.00mA, 600.0mA | 0.5% + 3d | 3.0mV/mA       |

### ACmA (BM878 only)

| RANGE            | Accuracy    | Burden Voltage |
|------------------|-------------|----------------|
| 60.00mA, 600.0mA | 50Hz ~ 1kHz |                |
|                  | 1.5% + 3d   | 3.0mV/mA       |

### Earth Continuity Test (BM878 & BM877 only)

| RANGE  | Test Current | Accuracy | Measuring Range <sup>1)</sup> |
|--------|--------------|----------|-------------------------------|
| 2.000Ω | > 200mA      | 1.5%+3d  | 0.015Ω ~ 2.199Ω               |
| 20.00Ω | > 90mA       |          | 0.15Ω ~ 21.99Ω                |

Open Circuit Voltage: > 4VDC

Live Circuit Detector: Inhibit test if terminal voltage > 2V prior to initialization of test.

<sup>1)</sup>Specified measuring range at percentage operating uncertainty B[%] ≤ ±30% per IEC/EN61557-4 requirements

### ~ Hz Line Level Frequency

| Function RANGE      | Sensitivity (Sine RMS)   | Range         |
|---------------------|--------------------------|---------------|
| 60mV <sup>1)</sup>  | 6mV                      | 10Hz ~ 50kHz  |
| 600mV <sup>1)</sup> | 60mV                     | 10Hz ~ 100kHz |
| 6V                  | 0.6V                     | 10Hz ~ 20kHz  |
| 60V                 | 6V                       | 10Hz ~ 20kHz  |
| 600V                | 60V                      | 10Hz ~ 3kHz   |
| 1000V               | 600V                     | 10Hz ~ 3kHz   |
| VFD 600V            | 60V ~ 240V <sup>2)</sup> | 10Hz ~ 440Hz  |
| 60mA <sup>1)</sup>  | 6mA                      | 10Hz ~ 5kHz   |
| 600mA <sup>1)</sup> | 60mA                     | 10Hz ~ 5kHz   |

Accuracy: 0.02%+4d

<sup>1)</sup>Model 878 Only

<sup>2)</sup>VFD sensitivity linearly decreases from 10% F.S. @ 200Hz to 40% F.S. @ 440Hz

### Insulation Resistance

| Test Voltage <sup>1)</sup> | Range                              | Test Current | Accuracy |
|----------------------------|------------------------------------|--------------|----------|
| 50V                        | 3.000MΩ, 30.00MΩ, 55.0MΩ           | 1mA @50kΩ    | 1.5%+5d  |
|                            | 3.000MΩ, 30.00MΩ, 110.0MΩ          | 1mA @100kΩ   |          |
| 100V                       | 3.000MΩ, 30.00MΩ, 275.0MΩ          | 1mA @250kΩ   | 1.5%+5d  |
|                            | 3.000MΩ, 30.00MΩ, 300.0MΩ          | 1mA @500kΩ   |          |
| 500V                       | 3.000MΩ, 30.00MΩ, 300.0MΩ, 550.0MΩ | 1mA @1MΩ     | 1.5%+5d  |
|                            | 3000MΩ                             |              | 2.0%+5d  |
|                            | 25.0GΩ                             |              | 10%+5d   |

<sup>1)</sup>Actual output voltage: 100% ~ 120% of Test Voltage

Live Circuit Detector: Inhibit test and display voltage reading instead if terminal voltage > 30V prior to initialization of test. Display voltage accuracies:

DCV: 1.5% + 5d

ACV: 3.0% + 5d @50Hz ~ 60Hz (for Models 877 & 876, unspecified @ > 600Vac)

Specified measuring range is 0.020MΩ ... 25.0GΩ for percentage operating uncertainty B[%] ≤ ±30% per IEC/EN61557-2 requirements

## BRYMEN TECHNOLOGY CORPORATION

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