



Digital Multimeter

Accurate High-speed Automated Captures of Engine-cranking Voltage Drops!

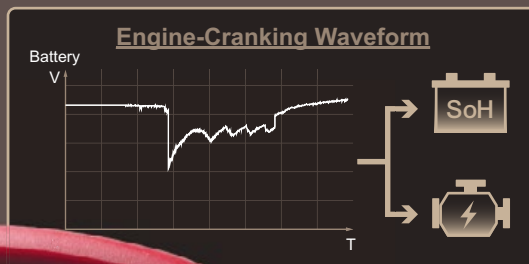
Quick & Inexpensive Lead-acid Battery SoH Estimations via Direct Cranking-V Field Tests!

BM2259

Versatile
Professional
Multimeter

CAT IV
300V

CAT III
600V





BM2259



BM2257



BM2251

BRUA-20X Interface Kit (Optional Purchase)



2259	2257	2251	FUNCTIONS & FEATURES
•			Lead-acid Battery Cranking-V Test; Rapid SoC & SoH Indications
•	•		AutoV Automatic Selection of ACV or DCV
•	•		LoZ Ghost-voltage-buster AutoV to Drain Ghost Voltages for Hard Signals
•	•		Capacitance; 7 Ranges @ 20.00nF to 10.00mF
•	•		Type-K Temperature from -40.0°C to 1000°C or -40.0°F to 1832°F; °C/°F Selectable
•	•		CREST Max/Min >5ms Peaks; Automatic iAPO Disable
•	•		REC Max/Min/Avg; Auto-ranging; Automatic iAPO Disable
•	•	•	3-5/6 Digits 6,000 Counts Large LCD Display
•	•	•	5/Sec Nominal Data Update; Fast Auto-Ranging & Measurements
•	•	•	60 Segment High-Resolution Analog Bar-graph Updates 40/Sec
•	•	•	Amber LED Warm Backlight LCD Display
•	•	•	AutoHold with Real-Read™ to Avoid "Blind" Measurements
•	•	•	Relative Zero for Readings Comparison & Offset
•	•	•	Display HOLD Freezes the Displaying Reading for Later Viewing
•	•	•	AC True RMS on Voltage and Current Functions
•	•	•	DCV Best Accuracy 0.2% + 3d; 3 Ranges @ 6.000V to 600V
•	•	•	ACV; 3 Ranges @ 6.000V to 600V
•	•	•	VFD_ACV with LPF; Range @ 600.0V
•	•	•	High-Resolution AC/DC mV; 2 Ranges @ 60.00mV to 600.0mV
•	•	•	AC/DC mA, mA, & A; 6 Ranges 600.0μA to 10.00A
•	•	•	Resistance; 6 Ranges @ 600.0Ω To 60.00MΩ
•	•	•	AC Line-level Hz via Test leads; 10Hz to 50kHz
•	•	•	Logic Level Hz from 10.00Hz to 200.0kHz
•	•	•	Fast BeepLit™ Continuity with Beep + Backlight Effects; Response Time <15ms
•	•	•	Diode with BeepLit™ (Continuity) & BeepPass™ (Short Beep) Features
•	•	•	EF-Detection for Identifying Live Lines; Selectable Hi/Lo Sensitivities
•	•	•	BeepJack™ Guards Against Improper Amp Terminals Plug-in
•	•	•	Auto Power Off (iAPO) Stays ON While in Measurements
•	•	•	PC-Comm Interface Capability; Optional Purchase USB Cable & PC Software Set
•	•	•	600V General Input Protection on All Functions and Ranges
•	•	•	High Breaking Capacity HBC Fuses Protected on μA mA & A Terminals
•	•	•	Transient Protection to 6kV 1.2/50μs + 8/20μs Combo Surges
•	•	•	Fire-retarded Housing with Battery Access Door
•	•	•	Protective Holster with Probe-Holders & Tilt-Stand; Washable & Replaceable
•	•	•	Rugged & Durable; Robust Enclosure and Premium Plated Low Leakage PCB
•	•	•	EMC Certified; Superior Immunity to Interferences
•	•	•	LVD with cULus Listed to CAT III 600V; UL, CSA, CE, and UKCA Compliance

Evaluate Lead-acid Battery Degradation with Automated SoH Estimations!

AutoHold/ BeepLit™/ BeepPass™ Full Gen2 Features; Optional PC-Comm Cable!
18mm-Ø Alligator Clips for Secure Battery Post Connections!

3-5/6 Digits LCD Display

6,000 Counts Nominal;
19mm Height Large Digit

Relative Zero Mode

Convenient Readings
Comparison & Offset

Capacitance

Measures Small to Large Motor Capacitors;
7 Ranges @ 20.00nF to 10.00mF

Fast Measurements

5/Sec Nominal Data Update;
Fast Auto-Ranging & Measurements

Lead-acid Battery Cranking-V Test

≤13.5ms Automated Captures of Engine-cranking
Voltage Drops; Rapid SoC & SoH Indications

DCV Best Accuracy 0.2% + 3d

Measures DCV; 3 Ranges @ 6.000V to 600V

PC-Comm Interface Capability

Optional Purchase USB
Cable & PC Software Set

Fast Analog Bar-graph

60 Segment High-Resolution
Analog Bar-graph Updates 40/Sec

REC Max/Min/Avg Auto-ranging

Records Max, Min, and Calculates
Average Readings Over Time;
Auto-ranging; Automatic iAPO Disable

Warm Amber Backlight

Amber LED Warm
Backlight LCD Display

AutoV

Automatic Selection of ACV or
DCV Whichever Higher in Magnitude

LoZ Ghost-voltage-buster AutoV

Low Ramp-up Input Impedance to
Drain Ghost Voltages Leaving Meter
Readings on Hard Signals

BeepJack™ Input Warning

Guards Against Improper Amp Terminals
Plug-in for Voltage Measurements

VFD ACV with LPF

For Noisy Electrical and
VFD Signals; Range @ 600.0V

Detachable Protective Holster

Features Probe-Holders & Tilt-Stand;
Washable & Replaceable

Auto Power Off (iAPO)

Stays ON While in Measurements;
Intelligently Turns OFF to Extend Battery Life;
Power-up Disable option

HBC Fuses Protected

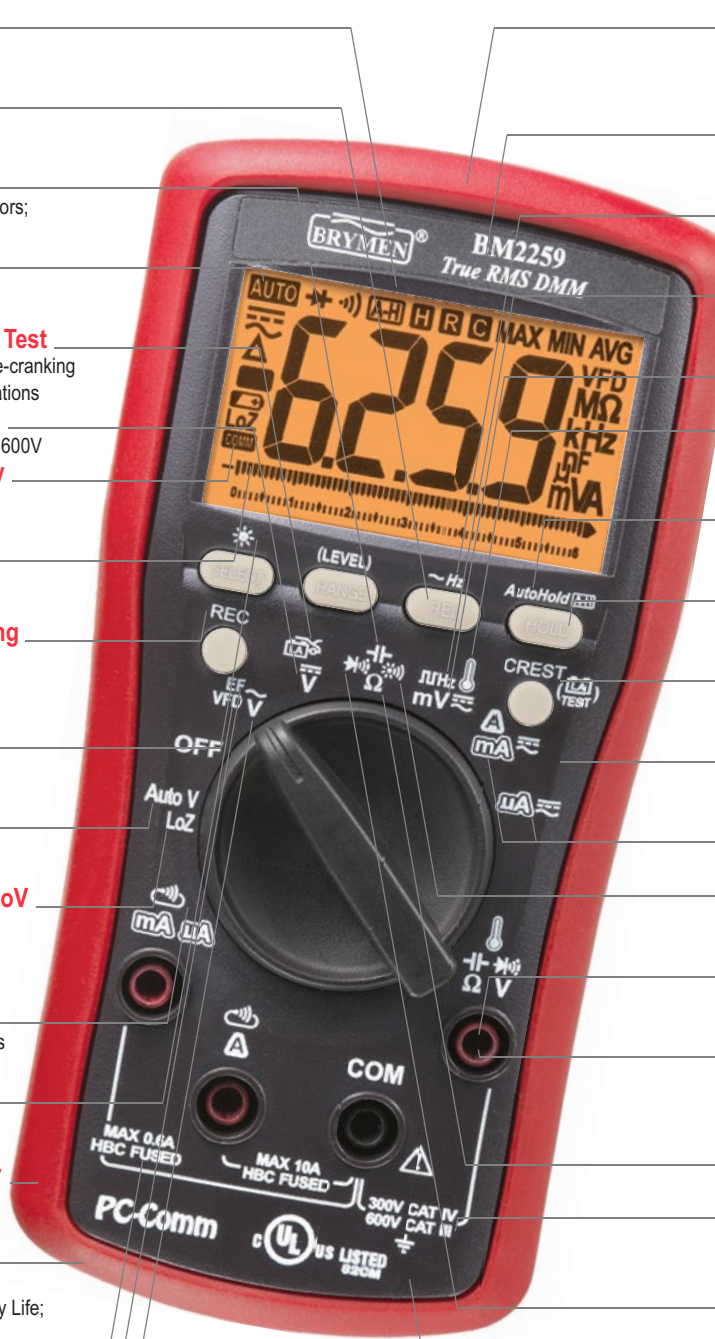
High Breaking Capacity Fuses
Protected on μ A mA & A Terminals

EF-Detection with Hi/Lo Sensitivities

Features Non-Contact (NCV) &
Single-Pole Contact Voltage Detections;
Selectable Hi/Lo Sensitivities

ACV

Measures ACV;
3 Ranges @ 6.000V to 600V



EMC Certified

Superior Immunity to Interferences;
Reliable Operations and Readings;
EN61326-1 Certified

AC True RMS

Ideal for Non-sinusoidal & Complex Waveforms
on Voltage and Current Functions

AC Line-level Hz

Measures Noisy High Voltage Frequency
via Test leads; 10Hz to 50kHz

Logic Level Hz

Measures Digital Logic Level Frequencies
from 10.00Hz to 200.0kHz

High-Resolution AC/DC mV

2 Ranges @ 60.00mV to 600.0mV

Type-K Temperature

Measures from -40.0°C to 1000°C or -40.0°F
to 1832°F; °C/°F Selectable

AutoHold with Real-Read™

Shows Real-time Readings and Automatically
Latches the Last Stable Reading for Later Viewing

Display HOLD

Freezes the Displaying
Reading for Later Viewing

CREST Max/Min >5ms Peaks

Fast Captures +/- Peak Extremes at
Durations > 5ms; Automatic iAPO Disable

Rugged & Durable

Robust Enclosure, Premium Plated Low
Leakage PCB, and Reliable Rotary Switch

AC/DC μ A, mA, & A

6 Ranges @ 600.0 μ A to 10.00A

Fast BeepLit™ Continuity

Fast Captures +/- Peak Extremes at
Durations > 5ms; Automatic iAPO Disable

600V General Input Protection

Superb Protection for Misinput on All
Functions and Ranges

Transient Protection to 6kV

1.2/50 μ s + 8/20 μ s Combo Surges;
Fully Certified by Independent Test Lab;
Years of Credibility for Serious Users

Resistance

6 Ranges @ 600.0 Ω To 60.00M Ω

LVD with cULus

Listed to CAT III 600V; UL, CSA, CE,
and UKCA Compliance

Diode with BeepLit™ & BeepPass™

Continuous Beep + Backlight
Effects on Shorted Diodes;
Short-Beep Alerts on Good Diodes

Battery Access Door

Fire-retarded Housing with
Battery Access Door

GENERAL SPECIFICATIONS

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

Update Rate:

3-5/6 digits: Max 5 per second nominal

60 Segment Bar-graph: 40 per second max

Operating Temperature: -10°C to 50°C continuous operating (except on A function, see Electrical Specifications below for more details)

Relative Humidity: Maximum relative humidity 80% for temperature up to 31°C decreasing linearly to 50% relative humidity at 50°C

Altitude: Operating below 2000m

Storage Temperature: -20°C ~ 60°C, < 80% R.H. (with battery removed)

Temperature Coefficient: Nominal 0.15 x (specified accuracy)/°C @ (-10°C ~ 18°C or 28°C ~ 50°C), or otherwise specified

Sensing: True RMS sensing

Ingress Protection: IP40

Pollution Degree: 2

Safety: Certified per IEC/UL/EN/BSEN 61010-1

Ed. 3.1, IEC/UL/EN/BSEN 61010-2-033 Ed. 3.0, IEC/UL/EN/BSEN 61010-031 Ed. 3.0 and the

corresponding CAN/CSA-C22.2 regulations to Measurement Categories:

CAT III 600V and CAT IV 300V AC & DC

Transient Protection: 6.0kV (1.2/50µs surge)

E.M.C. : Meets EN61326-1

In an RF field of 3V/m:

Temperature function is not specified

Ohm function:

Total Accuracy = Specified Accuracy + 15 digits

Other functions:

Total Accuracy = Specified Accuracy

Performance above 3V/m is not specified

Overload Protection:

µA & mA: 0.63A/1000V DC/AC rms, IR 30kA, F fuse; or better

A: 12A/600V, IR 50kA for Vdc & 100kA for Vac, F fuse; or 11A/1000V DC/AC rms, IR 30kA, F fuse; or better

V & AutoV: 1100V AC rms & 660V DC

mV, Ohm & others: 600V DC/AC rms

Low Battery: Below approx. 2.5V

Power Supply: 1.5V AAA size battery X 2

Power Consumption (typical): 5mA

iAPO Consumption (typical): 20µA

iAPO Timing: Idle for 30 minutes

Dimension: 161*80*50mm L*W*H (With Holster)

Weight: Approx. 334 gm (With Holster)

Special Features: AutoHold; AutoV (LoZ); VFD-ACV

& VFD-Hz; Hi/Lo EF-Detection (NCV & Single pole);

BeepLit™ Diode w/BeepPass™ indication; BeepLit™

Continuity; Auto-ranging REC MAX/MIN/AVG; Auto-

-ranging CREST (Instantaneous Peak) MAX/MIN;

Backlighted LCD; Auto-ranging Relative-zero; Display

Hold; BeepJack™ audible & visible input warning

Accessories: Test lead pair; Batteries; User's manual;

BKP60 banana plug type-K thermocouple (Models 2259

& 2257 only); BACL315 Alligator Clip Pair (Model 2259

only); BCLZ4MP4 Connection Lead Pair (Model 2259

only)

Optional Purchase Accessories: BMH-01 magnetic

hanger; USB interface kit BRUA-20X

ELECTRICAL SPECIFICATIONS

Accuracy is given as ±(% of reading digits + number of digits) or otherwise specified @ 23°C ± 5°C
ACV & ACA accuracies are specified from 1 % to 100 % of range or otherwise specified; Maximum Crest Factor <2:1 at full scale & <4:1 at half scale, and with frequency spectrum limited to the specified bandwidth of the AC functions for non-sinusoidal waveforms

ACV

RANGE	Accuracy
50Hz ~ 60Hz	
6.000V, 60.00V, 600.0V	0.7% + 3d
45Hz ~ 500Hz	
6.000V, 60.00V, 600.0V	1.0% + 5d

Input Impedance: 10MΩ, 54pF nominal

Overload protection: 1100Vrms for AC; 660V for DC

ACmV

RANGE	Accuracy
40Hz ~ 500Hz	
60.00mV ¹⁾ , 600.0mV ²⁾	1.0% + 3d
500Hz ~ 1kHz	
60.00mV ¹⁾ , 600.0mV ²⁾	2.0% + 3d

Input Impedance: 10MΩ, 54pF nominal

¹⁾Signal peak absolute values, including DC bias, less than 130mV_{peak}

²⁾Signal peak absolute values, including DC bias, less than 1300mV_{peak}

VFD_ACV (with Low Pass Filter)

RANGE	Accuracy ¹⁾
10Hz ~ 100Hz	
600.0V	1.0% + 3d
100Hz ~ 400Hz	
600.0V	10% + 3d ²⁾

Overload protection: 1100Vrms for AC; 660V for DC

¹⁾Not specified for fundamental frequency > 400Hz

²⁾Accuracy linearly decreases from 1% + 3d @ 100Hz to 10% + 3d @ 400Hz

AutoV_ACV (N/A for Model 2251)

RANGE	Accuracy ¹⁾
50Hz ~ 60Hz	
6.000V, 60.00V, 600.0V	1.0% + 5d

Overload protection: 1100Vrms for AC; 660V for DC

¹⁾Not specified at <1.5VAC

Threshold: > 1.5VAC nominal

Input Impedance:

Initially approx. 2.1kΩ, 164pF 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:

12kΩ @ 100V
100kΩ @ 300V
240kΩ @ 600V

DCV

RANGE	Accuracy
6.000V	0.3% + 4d
60.00V	0.4% + 3d
600.0V	0.2% + 3d

Overload protection: 1100Vrms for AC; 660V for DC

Input Impedance: 10MΩ, 54pF nominal

DcMv

RANGE	Accuracy
60.00mV, 600.0mV	0.3% + 4d

Input Impedance: 10MΩ, 54pF nominal

AutoV_DCV (N/A for Model 2251)

RANGE	Accuracy ¹⁾
6.000V, 60.00V, 600.0V	1.0% + 4d

Overload protection: 1100Vrms for AC; 660V for DC

¹⁾Not specified at <1.5VDC

Threshold: > +1.5VDC or < -1.5VDC nominal

Input Impedance:

Initially approx. 2.1kΩ, 164pF 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:

12kΩ @ 100V
100kΩ @ 300V
240kΩ @ 600V

CREST mode (Instantaneous Peak Hold)

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

Availability: Voltage and Current functions

Resolution: 6000 counts

AutoHold Real-Read™

Accuracy: Specified accuracy ± 50 digits

Availability: Resistance, Continuity, LoZ AutoV, VFD Volts, Voltage and

Current functions

Ohm

RANGE ¹⁾	Accuracy
600.0Ω, 6.000kΩ, 60.00kΩ, 600.0kΩ	0.5% + 4d
6.000MΩ ²⁾	0.7% + 4d
60.00MΩ ³⁾	2.0% + 4d ⁴⁾

¹⁾Open Circuit Voltage: 1.6VDC typical

²⁾Constant Test Current: 0.2µA typical

³⁾Constant Test Current: 0.02µA typical

⁴⁾5%+20d @ >30MΩ

BeepLit™ Continuity Tester

Continuity Threshold: Between 30Ω and 480Ω

Continuity ON Response Time: <15ms

Audible Indication: Beep sound

Visible Indication: LCD Backlight

Capacitance (N/A for Model 2251)

RANGE	Accuracy
20.00nF, 200.0nF	1.5% + 8d
2000nF, 20.00µF, 200.0µF, 2000µF	1.5% + 2d
10.00mF	4.5% + 10d

Accuracies with film capacitor or better

BeepLit™ Diode Tester

RANGE	Accuracy	Test Current (Typical)	Open Circuit Voltage
3.0000V	1.0% + 3d	0.3mA	< 3.2 VDC

BeepPass™ Indication (Short-beep): Drop Across 0.850V

BeepLit™ Indication (Continuity) Threshold: < 0.100V

Audible Indication: Beep Sound

Visible Indication: LCD Backlight

DC Current

RANGE	Accuracy	Burden Voltage
600.0µA, 6000µA		0.1mV/µA
60.00mA, 600.0mA	0.5% + 5d	1.9mV/mA
6.000A, 10.00A ¹⁾	1.0%+5d	0.04V/A

¹⁾10A continuous up to ambient 40°C only, and is <3 mins on per >15 mins

off @ 40°C ~ 55°C; >10A to 20A for <30 seconds on per >15 mins off

AC Current

RANGE	Accuracy	Burden Voltage
50HZ ~ 400HZ		
600.0µA, 6000µA		0.1mV/µA
60.00mA, 600.0mA	1.0% + 5d	1.9mV/mA
6.000A, 10.00A ¹⁾		0.04V/A

¹⁾10A continuous up to ambient 40°C only, and is <3 mins on per >15 mins

off @ 40°C ~ 55°C; >10A to 20A for <30 seconds on per >15 mins off

Temperature (N/A for Model 2251)

RANGE	Accuracy ^{1) 2)}
-40.0°C ~ 99.9°C	1.0% + 1°C
100°C ~ 1000°C	0.3%+3°C
-40.0°F ~ 99.9°F	1.0% + 2°F
100°F ~ 1832°F	0.3%+6°F

¹⁾Accuracies assume the meter interior and the ambient have reached the same temperature (isothermal stage) for a correct junction voltage compensation. Allow enough settling time for a significant change in ambient temperature. It can take up to an hour for changes > 5°C.

²⁾Type-K thermocouple range & accuracy not included

Logic Level Hz (DCmV Function)

RANGE	Sensitivity (Square wave)
10.00 Hz ~ 200.0 kHz	3V _{peak}

Accuracy: 0.03% + 3d

Line Frequency

Available Function	Trigger Level	Sensitivity (Sine RMS)	Range
ACV/DCV	0	1V	10Hz - 50kHz
	1	4V	
	2	40V	10Hz - 1kHz
	3	400V	
VFD-ACV	2	40V	10Hz - 1kHz
	3	400V	
	0	40µA	10Hz - 5kHz
µA	1	400µA	
	0	4mA	
mA	1	40mA	
	0	0.6A	50Hz - 1kHz
A	1	6A	

Accuracy: 0.03% + 3d

Non-Contact EF-Detection

Bar-segment Indication	EF-H (Hi Sensitivity)	EF-L (Lo Sensitivity)
	Typical Voltage (Tolerance)	Typical Voltage (Tolerance)
-	10V (3V ~ 19V)	40V (16V ~ 71V)
--	20V (10V ~ 38V)	80V (32V ~ 142V)
---	40V (21V ~ 79V)	160V (63V ~ 285V)
----	80V (40V ~ 156V)	300V (105V ~ 608V)
-----	160V (>80V)	500V (>300V)

Indication: Display bar-segments, backlight flashing, & beep tones in

proportion to the field strength

Detection Frequency: 50/60Hz

Detection Antenna: Top-right end of the meter

Probe-Contact EF-Detection: For more precise indications of live wires, such as distinguishing between live and ground connections, use direct contact testing with one single test-probe via the input terminal COM or V. The COM terminal (Black) has the best sensitivity.

Lead-acid Battery Cranking-V Test (Model 2259 only)

Rapid-SoH Estimation (RSE)	Battery Condition	Bargraph Level	12V System RSE Threshold	24V System RSE Threshold
	Cool/Excellent	6	>10.80V	>21.60V
	Great	5	>9.81V	>19.62V
	Good	4	>9.00V	>18.00V
	Fair	3	>8.00V	>16.00V
	Attention	2	>7.20V	>14.40V
	Failed	1	>5.99V	>11.98V
	Bad	0	≤5.99V	≤11.98V

Range Specified:

DC 60.00V

Nominal Capture Duration:

Cumulative: 13.5ms

+ Pre-trigger Blanking: 3.5ms

Accuracy:

Add ± 3% of Cranking-V_{avg} to Specified DCV Accuracy

Battery Voltage Reading Threshold:

b.t.12v Mode: 6.00Vdc

b.t.124v Mode: 12.00Vdc

Charging Reminder "Chrg" Threshold:

b.t.12v Mode: ≤12.50Vdc

b.t.124v Mode: ≤25.00Vdc



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