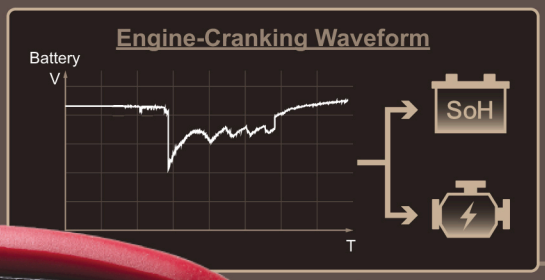
Digital Multimeter

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

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

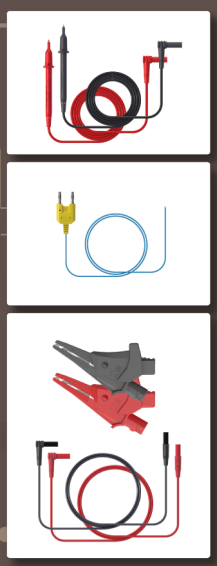


BM2259

Versatile
Professional
Multimeter

- CAT IV 300V
- CAT III 600V





CE
UKCA
cULus

www.brymen.eu

BRYMEN®
Bright People's Choice


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 µAmA & 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 µAmA & 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 µA, mA, & A
6 Ranges @ 600.0µA 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
1.2/50µs + 8/20µs Combo Surges;
Fully Certified by Independent Test Lab;
Years of Credibility for Serious Users

Resistance
6 Ranges @ 600.0Ω To 60.00MΩ

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

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BRYMEN TECHNOLOGY CORPORATION
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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	0.5% + 5d	0.1mV/µA
60.00mA, 600.0mA		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	1.0% + 5d	0.1mV/µA
60.00mA, 600.0mA		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	3Vpeak

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	
µA	0	40µA	10Hz - 5kHz
	1	400µA	
mA	0	4mA	
	1	40mA	
A	0	0.6A	50Hz - 1kHz
	1	6A	

Accuracy: 0.03% + 3d

Non-Contact EF-Detection

Bar-segment Indication	EF-H (Hi Sensitivity)	EF-L (Lo Sensitivity)
	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	Cool/Excellent	6	>10.80V	>21.60V
Grt	Great	5	>9.81V	>19.62V
Good	Good	4	>9.00V	>18.00V
Fair	Fair	3	>8.00V	>16.00V
Attn	Attention	2	>7.20V	>14.40V
FAIL	Failed	1	>5.99V	>11.98V
bAd	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_{drop} to Specified DCV Accuracy
Battery Voltage Reading Threshold:
b.t.12v Mode: 6.00Vdc
b.t.24v Mode: 12.00Vdc
Charging Reminder "Chrg" Threshold:
b.t.12v Mode: ≤12.50Vdc
b.t.24v Mode: ≤25.00Vdc