

# User-Selectable Sensitivities To Work On Real-World Car Signals!



Selectable 4-stroke, 4-DIS/ 2-stroke, & 2-DIS engine RPM;  
Selectable Trig(+)/Trig- on % & ms readings;  
Selectable Sensitivity-Levels on RPM, Dwell, % & ms readings,  
Bar-graph indication, BeepJack warning, Backlit display,  
Display Hold... Full-Features!

## New BM310s Series Automotive Multimeter

**BRYMEN**<sup>®</sup>

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





**BM319s**



**BM315s**

| 319s | 315s     | FUNCTIONS & FEATURES   |
|------|----------|--|
| ●    | ●        | 3-5/6 Digits 6,000 Counts Large Easy-To-Read LCD Display                           |
| ●    | ●        | Fast Measurements, 5/Sec; Fully Auto-Ranging                                       |
| ●    | ●        | 24 Segment Analog Bar-graph Updates 40/Sec   |
| ●    |          | Display Backlight  |
| ●    | ●        | Beep-Jack™ Input Warning Guard Against Improper Amps-Terminal Plug In              |
| ●    | ●        | Auto Power Off   |
| ●    | ●        | Data Hold  |
| ●    | ●        | DCV 0.01mV To 1000V  |
| ●    | ●        | ACV 0.01mV To 1000V  |
| ●    | ●        | Ohms 0.1Ω To 60MΩ  |
| ●    | ●        | DCA 0.001A To 10A (10A continuous, 20A for 30sec per 5 minutes cool down interval) |
| ●    | ●        | ACA 0.001A To 10A (10A continuous, 20A for 30sec per 5 minutes cool down interval) |
| ●    |          | DCμA/mA 0.1μA To 600mA   |
| ●    |          | ACμA/mA 0.1μA To 600mA   |
| ●    |          | Capacitance 6.000μF To 2000μF  |
| ●    |          | Type-K Temperature Readings -50°C To 1000°C / -58°F To 1832°F                      |
| ●    | ●        | Line-Level Frequency 10Hz To 50kHz   |
| ●    | ●        | Diode Tester   |
| ●    | ●        | Continuity Beeper  |
| ●    | ●        | Dwell-Angle Function   |
| ●    | ●        | %-Duty Function  |
| ●    | ●        | ms-Fuel Injection Detector (Injection on-time) Function                            |
| ●    | ●        | IG-RPM Function (Primary-Signal via Test Leads)                                    |
| ●    | ●        | IP-RPM Function (Secondary-Signal via Inductive Pickup Clip)                       |
| ●    | Optional | Inductive pickup clip, Accessory for IP-RPM Function                               |
| ●    | ●        | Selectable 4-Stroke, 4-Stroke-DIS / 2-Stroke or 2-Stroke-DIS for RPM Functions     |
| ●    | ●        | Selectable 1, 2, 3, 4, 5, 6, 8, 10 or 12 Cylinders for Dwell and IG-RPM Functions  |
| ●    | ●        | 4 Selectable Trigger-Levels for IP-RPM, IG-RPM, Dwell, %-Duty and ms Functions     |
| ●    | ●        | Selectable Positive (+) or Negative (-) Trigger for %-Duty and ms Functions        |
| ●    | ●        | Rugged Fire-Retarded Casing  |
| ●    | ●        | Replaceable Protective-Holster with Probe-Holders & Tilt-Stand                     |
| ●    | ●        | Batteries And Fuses Access Door  |
| ●    | ●        | Optional Purchase Magnetic Hanger  |
| ●    | ●        | 1000V General (Ohm, Capacitance ... etc.) Input Protection                         |
| ●    | ●        | Transient Protection Up To 6kV 1.2/50μs Lightning Surge                            |
| ●    | ●        | LVD Meets EN61010-1/61010-2-030/61010-2-033 CAT II 1kV                             |
| ●    | ●        | EMC Meets EN61326-1  |



# Professional Choice Of Size & Functions For Automotive Industry!

**Both IP (inductive) & IG (contact) RPM; ms Fuel-injection on-time; % Duty-cycle; Dwell-angle; Line-Level Hz; Temperature; Capacitance; Diode... Full-Functions! Stream-line Ergonomic, Magnetic Hanger, Protective Holster, Probe Holders, Tilt stand, Batteries & Fuses Access Cover... User-Friendly!**

## RPM-4, RPM-2, RPM-2M

USER-SELECTABLE READINGS ON 4-STROKE, 4-STROKE-DIS / 2-STROKE, 2-STROKE-DIS ENGINES

## CYLINDER

SELECTION OF 1 TO 12 CYLINDERS FOR DWELL & IG-RPM READINGS

## CAPACITANCE

UP TO 2000 $\mu$ F WITH 1000V PROTECTION; AUTO-RANGING

## DISPLAY BACKLIGHT

FOR EASY VIEWING IN THE DARK

**LARGE 6000 COUNTS LCD DISPLAY**  
5/SEC FAST NOMINAL UPDATE RATE

## FUNCTION SELECTION

TOGGLE CONVENIENTLY BETWEEN PRIMARY & SECONDARY FUNCTIONS

**+/-TRIGGER**  
+/-TRIGGER POLARITY FOR USER-ACCUSTOMED READINGS

## IP-RPM READINGS

INDUCTIVE PICKUP RPM TEST ON SPARK-PLUG IGNITION HV WIRES

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

## DWELL-ANGLE & %-DUTY

TESTS CONVENTIONAL ENGINES; USER-SELECTABLE SENSITIVITIES

**ANALOG BAR-GRAPH**  
FAST UPDATE RATE 40/SEC

## ms-FUEL INJECTION DETECTOR

TESTS BOTH TBI & PFI ENGINES; USER-SELECTABLE SENSITIVITIES

**TRIGGER LEVEL**  
4 SENSITIVITIES FOR MORE VARIETY OF ENGINE SIGNALS

## IG-RPM READINGS

DIRECT RPM TEST ON FUEL-INJECTOR, DWELL OR MCU RPM SIGNALS VIA TEST LEADS

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

## Hz OF LINE LEVEL VOLTAGE

MEASURES NOISY HIGH VOLTAGE ACV FREQUENCIES

**TYPE-K TEMPERATURE**  
SELECTABLE °C & °F READINGS

## HIGH IMPEDANCE VOLTAGE

1000VAC/DC MEASURING CAPABILITIES; HIGH INPUT IMPEDANCE FOR LOAD SENSITIVE CIRCUITS

**mV FUNCTIONS**  
0.01mV X-HIGH RESOLUTION TO COPE BETTER WITH MOST SENSORS

## DIODE TEST

FOR CHECKING DIODES AND RECTIFIERS

**$\mu$ A/mA/A FUNCTIONS**  
CHECKS LEAKAGE CURRENT OR LOOP CURRENT CONSUMPTION

## FAST AUDIBLE CONTINUITY

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

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

## RESISTANCE

BEST RESOLUTION 0.1 $\Omega$ ; AUTO-RANGING; UP TO 60M $\Omega$  WITH 1000V PROTECTION

**TRANSIENT PROTECTION**  
UP TO 6kV 1.2/50 $\mu$ s LIGHTNING SURGE; SUPERB PROTECTION FOR SERIOUS USERS

## BEEP-JACK™ AUDIBLE WARNING

BEEPS AGAINST IMPROPER AMPS-TERMINAL PLUG IN. DECREASES RISKS OF DAMAGE

**LVD SAFETY**  
MEETS EN61010-1  
3RD EDITION CAT II 1KV

## BATTERIES & FUSES ACCESS DOOR

FOR EASY BATTERIES & FUSES CHECKING AND REPLACEMENT

## PROTECTIVE HOLSTER

WITH HOLDERS FOR PROBE STORAGE AND "THIRD HAND" FEATURE REPLACEABLE & WASHABLE

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

## RUGGED & DURABLE

HIGH-IMPACT FIRE-RETARDED ENCLOSURE FOR REINFORCED SAFETY & DURABILITY





## GENERAL SPECIFICATION

Display: 3-5/6 digits 6,000 counts  
 Update Rate: 5 per second nominal  
 24 Segments Bar graph: 40 per second max  
 Operating Temperature: 0°C to 40°C  
 Relative Humidity: Maximum relative humidity 80% for temperature up to 31°C decreasing linearly to 50% relative humidity at 40°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 @ (0°C ~ 18°C or 28°C ~ 40°C), or otherwise specified  
 Sensing: Average sensing  
 Pollution Degree: 2  
 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 II 1000V, CAT III 600V and CAT IV 300V AC & DC  
 Transient Protection: 6kV (1.2/50µs surge)  
 Terminals (to COM) Measurement Category:

V / mA/µA / A: CAT II 1000V, CAT III 600V and CAT IV 300V AC & DC.  
 E.M.C. : Meets EN61326-1:2013  
 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  
**Overload Protection:**  
 µA & mA : 0.4A/1000V DC/AC rms, IR 30kA, F fuse  
 A : 11A/1000V DC/AC rms, IR 20kA, F fuse  
 V : 1100V DC/AC rms  
 mV, Ohm & others : 1000V DC/AC rms  
**Low Battery:** Below approx. 2.3V  
**Power Supply:** 1.5V AAA Size battery X 2  
**Power Consumption (typical):** 4.3mA  
**APO Consumption (typical):** 10µA  
**APO Timing:** Idle for 34 minutes  
**Dimension:** 161\*80\*50mm L\*W\*H (With Holster)  
**Weight:** Approx. 340 gm (With Holster)  
**Special Features:**  
**Backlight LCD (BM319s only)**

±Trigger: Selectable positive & negative trigger slopes  
**Cylinder:** 9 Selectable number of cylinders (1, 2, 3, 4, 5, 6, 8, 10 & 12) in Dwell and IG-RPM functions  
**Hold:** Freezes the display data for later view  
**Range:** Manual & Auto-ranging selection  
**RPM (4):** For RPM of traditional 4-stroke engines which have 1 ignition on every 4 engine strokes  
**RPM (2):** For RPM of DIS & traditional 2-stroke engines which have 1 ignition on every 2 engine strokes  
**RPM (2M):** For RPM of 2-stroke waste ignition (on-board) engines which have 1 ignition on every single engine stroke  
**Accessories:** Test lead pair; batteries installed; user's manual; BKP60 banana plug type-K thermocouple (BM319s only); BP300 Inductive pickup clip (BM319s only; not certified by UL)  
**Optional purchase accessories:** Magnetic hanger BMH-01; BKB32 banana plug to type-K socket plug adaptor (BM319s only); BP300 Inductive pickup clip (BM319s only; not certified by UL)

## Electrical Specification

Accuracy is given as +/- (% of reading digits + number of digits) or otherwise specified @ 23°C +/- 5°C and less than 75% R.H.

### DC Voltage

| RANGE                  | Accuracy |
|------------------------|----------|
| 60.00mV                | 0.4%+3d  |
| 600.0mV                | 0.3%+3d  |
| 6.000V, 60.00V, 600.0V | 0.4%+3d  |
| 1000V                  | 0.7%+3d  |

Input Impedance: 10MΩ, 50 pF nominal

### AC Voltage

| RANGE                   | Accuracy  |
|-------------------------|-----------|
| 50Hz ~ 500Hz            |           |
| 60.00mV, 600.0mV        | 2.0% + 5d |
| 6.000V, 60.00V, 600.0V, |           |
| 1000V                   | 2.2% + 5d |

Input Impedance: 10MΩ, 50 pF nominal

### Ohm

| RANGE            | Accuracy |
|------------------|----------|
| 600.0Ω           | 0.5%+6d  |
| 6.000KΩ, 60.00KΩ | 0.5%+3d  |
| 600.0KΩ          | 0.8%+4d  |
| 6.000MΩ          | 1.0%+5d  |
| 60.00MΩ          | 1.5%+5d  |

Open Circuit Voltage: 0.45VDC typical

### Audible Continuity Tester

Audible Threshold: Between 10Ω and 200Ω  
 Response time: 32ms

### Capacitance (BM319s only)

| RANGE            | Accuracy |
|------------------|----------|
| 6.000µF          | 2.0%+5d  |
| 60.00µF, 600.0µF | 3.5%+5d  |
| 2000µF           | 4.0%+5d  |

Accuracies with film capacitor or better

### DC Current

| RANGE                 | Accuracy | Burden Voltage |
|-----------------------|----------|----------------|
| 600.0µA <sup>1)</sup> | 0.7%+3d  | 0.25 mV/µA     |
| 6000µA <sup>1)</sup>  | 0.5%+3d  |                |
| 60.00mA <sup>1)</sup> | 0.7%+3d  | 2.5 mV/mA      |
| 600.0mA <sup>1)</sup> | 0.5%+3d  |                |
| 6.000A                | 0.7%+3d  | 0.03V/A        |
| 10.00A <sup>2)</sup>  | 0.5%+3d  |                |

<sup>1)</sup> Ranges for BM319s only

<sup>2)</sup> 10A continuous, >10A to 20A for 30 sec. max with 5 minutes cool down interval

### AC Current

| RANGE                 | Accuracy | Burden Voltage |
|-----------------------|----------|----------------|
| 50Hz ~ 500Hz          |          |                |
| 600.0µA <sup>1)</sup> | 2.2%+5d  | 0.25 mV/µA     |
| 6000µA <sup>1)</sup>  | 2.0%+5d  |                |
| 60.00mA <sup>1)</sup> | 2.2%+5d  | 2.5 mV/mA      |
| 600.0mA <sup>1)</sup> | 2.0%+5d  |                |
| 6.000A                | 2.2%+5d  | 0.03V/A        |
| 10.00A <sup>2)</sup>  | 1.2%+5d  |                |

<sup>1)</sup> Ranges for BM319s only

<sup>2)</sup> 10A continuous, >10A to 20A for 30 sec. max with 5 minutes cool down interval

### Diode Tester

| RANGE  | Accuracy  |
|--------|-----------|
| 1.000V | 1.0% + 3d |

Test Current: 0.50mA typically

Open Circuit Voltage: < 1.8VDC typically

### Temperature (BM319s only)

| RANGE            | Accuracy  |
|------------------|-----------|
| -50 °C ~ 1000 °C | 0.5% + 3d |
| -58 °F ~ 1832 °F | 0.5% + 6d |

K type thermocouple range & accuracy not included

### IP-RPM<sup>1)</sup> (Inductive pickup type)

|        | RANGE          | Accuracy |
|--------|----------------|----------|
| RPM 4  | 240 -20000 RPM | 2 RPM    |
| RPM 2  | 120 -10000 RPM | 2 RPM    |
| RPM 2M | 60 -5000 RPM   | 2 RPM    |

<sup>1)</sup> Measurements via inductive pickup clip (optional purchase for Model 315s)

Four selectable trigger levels,

Sensitivity:

Level 1: 3.0V typically

Level 2: 4.5V typically

Level 3: 6.1V typically

Level 4: 8.1V typically

### IG-RPM<sup>1)</sup> (Contact signal type)

|        | RANGE         | Accuracy |
|--------|---------------|----------|
| RPM 4  | 60 -20000 RPM | 2 RPM    |
| RPM 2  | 30 -10000 RPM | 2 RPM    |
| RPM 2M | 15 -5000 RPM  | 2 RPM    |

<sup>1)</sup> Measurements via test leads on Dwell, Fuel injection-ms and Ignition primary signals

Nine selectable Cylinders: 1, 2, 3, 4, 5, 6, 8, 10 & 12

Four selectable trigger levels,

Sensitivity:

Level 1: 0.8V typically

Level 2: 1.85V typically

Level 3: 3.75V typically

Level 4: 6V typically

### DWELL

| RANGE                       | Accuracy          |
|-----------------------------|-------------------|
| 0.0° ~ 360.0° <sup>1)</sup> | 1.2° /krpm+1d     |
| 0.0%~100.0%                 | 0.04%/krpm/cyl+2d |

Specified ranges depend on engine rpm and number of Cylinders (cyl)

<sup>1)</sup> Nine selectable Cylinders: 1, 2, 3, 4, 5, 6, 8, 10 & 12

Four selectable trigger levels,

Sensitivity:

Level 1: 0.8V typically

Level 2: 1.85V typically

Level 3: 3.75V typically

Level 4: 6V typically

### Fuel injection-ms detector

| RANGE <sup>1)</sup>                 | Accuracy           |
|-------------------------------------|--------------------|
| <b>PFI / Multi Point Injection</b>  |                    |
| 0.05ms ~ 250.0ms                    | 0.05ms+1d          |
| 0.0%~100.0%                         | 0.04%/krpm +2d     |
| <b>TBI / Single Point Injection</b> |                    |
| 0.05ms ~ 250.0ms                    | 0.05ms+1d          |
| 0.0%~100.0%                         | 0.04%/krpm/cyl +2d |

<sup>1)</sup> Specified range depends on engine rpm Selectable ± trigger slopes

Four selectable trigger levels,

Sensitivity:

Level 1: 0.8V typically

Level 2: 1.85V typically

Level 3: 3.75V typically

Level 4: 6V typically

### Hz (Line-level) @ ACV & DCV

| Function | Sensitivity (Sine RMS) | Range        |
|----------|------------------------|--------------|
| 6V       | 0.5V                   | 10Hz - 10kHz |
| 60V      | 5V                     | 10Hz - 50kHz |
| 600V     | 50V                    | 10Hz - 50kHz |
| 1000V    | 500V                   | 45Hz - 1kHz  |

Accuracy: 0.1%+3d

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