

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!

BM310s SERIES

Automotive
Multimeters





BM319s



BM315s

319s	315s	FUNCTIONS & FEATURES
•		Display Backlight
•		DC/AC μ A/mA 0.1 μ A To 600mA
•		Capacitance 6.000 μ F To 2000 μ F
•		Type-K Temperature Readings -50°C To 1000°C / -58°F To 1832°F
•	Optional	Inductive pickup clip, Accessory for IP-RPM Function
•	•	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
•	•	Beep-Jack™ Input Warning Guard Against Improper Amps-Terminal Plug In
•	•	Auto Power Off
•	•	Data Hold
•	•	DC/AC V 0.01mV To 600V
•	•	Ohms 0.1 Ω To 60M Ω
•	•	DC/AC A 0.001A To 10A (>10A ~ 20A for 30s / 5 mins cool down)
•	•	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)
•	•	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
•	•	Transient Protection Up To 6kV 1.2/50 μ s Lightning Surge
•	•	LVD: EN61010-1/61010-2-033 CAT-III 600V & CAT-IV 300V
•	•	EMC: 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!

CYLINDER

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

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

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

IP-RPM READINGS

INDUCTIVE PICKUP RPM TEST ON SPARK-PLUG IGNITION HV WIRES

DISPLAY BACKLIGHT

FOR EASY VIEWING IN THE DARK

FUNCTION SELECTION

TOGGLE CONVENIENTLY BETWEEN PRIMARY & SECONDARY FUNCTIONS

ms-FUEL INJECTION DETECTOR

TESTS BOTH TBI & PFI ENGINES; USER-SELECTABLE SENSITIVITIES

DWELL-ANGLE & %-DUTY

TESTS CONVENTIONAL ENGINES; USER-SELECTABLE SENSITIVITIES

IG-RPM READINGS

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

Hz OF LINE LEVEL VOLTAGE

MEASURES NOISY HIGH VOLTAGE ACV FREQUENCIES

HIGH IMPEDANCE VOLTAGE

600VAC/DC MEASURING CAPABILITIES; HIGH INPUT IMPEDANCE FOR LOAD SENSITIVE CIRCUITS

DIODE TEST

FOR CHECKING DIODES AND RECTIFIERS

BEEP-JACK™ AUDIBLE WARNING

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

RESISTANCE

BEST RESOLUTION 0.1Ω; AUTO-RANGING; UP TO 60MΩ WITH 600V PROTECTION

BATTERIES & FUSES ACCESS DOOR

FOR EASY BATTERIES & FUSES CHECKING AND REPLACEMENT

FAST AUDIBLE CONTINUITY

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



CAPACITANCE

UP TO 2000μF WITH 600V PROTECTION; AUTO-RANGING

+/-TRIGGER

+/-TRIGGER POLARITY FOR USER-ACCUSTOMED READINGS

DATA HOLD

FREEZES THE DISPLAYING READING FOR LATER VIEW

TYPE-K TEMPERATURE

SELECTABLE °C & °F READINGS

LARGE 6000 COUNTS LCD DISPLAY

5/SEC FAST NOMINAL UPDATE RATE

TRIGGER LEVEL

4 SENSITIVITIES FOR MORE VARIETY OF ENGINE SIGNALS

AUTO & MANUAL-RANGING

AUTO-RANGING WITH MANUAL-RANGING OVERRIDE

ANALOG BAR-GRAPH

FAST UPDATE RATE 40/SEC

mV FUNCTIONS

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

μA/mA/A FUNCTIONS

CHECKS LEAKAGE CURRENT OR LOOP CURRENT CONSUMPTION

ERGONOMIC STREAMLINE DESIGN

FITS COMFORTABLY IN ONE'S HAND

TRANSIENT PROTECTION

UP TO 6kV 1.2/50μs LIGHTNING SURGE; SUPERB PROTECTION FOR SERIOUS USERS

LVD SAFETY

MEETS EN61010-1/61010-2-033 CAT III 600V & CAT IV 300V

AUTO-POWER-OFF

TO EXTEND BATTERY LIFE

RUGGED & DURABLE

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

PROTECTIVE HOLSTER

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

GENERAL SPECIFICATIONS

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: Certified per IEC/UL/EN61010-1 Ed. 3.1, IEC/UL/EN61010-2-033 Ed. 2.0, IEC/UL/EN61010-031 Ed. 2.0 and the corresponding CAN/CSA-C22.2 regulations to Measurement Categories:
 CAT III 600V and CAT IV 300V AC & DC
Transient Protection: 6kV (1.2/50µs surge)
Terminals (to COM) Measurement Category:
 V / mAµA / A: CAT III 600V and CAT IV 300V AC & DC.
E.M.C. : Meets EN61326-1
 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 : 660Vdc / 1100Vac rms
 mV, Ohm & others : 600Vdc/Vac 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:
 Backlighted LCD (Model 319 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 (Model 319 only); BP300 Inductive pickup clip (Model 319 only; not certified by UL)
Optional purchase accessories: Magnetic hanger BMH-01; BKB32 banana plug to type-K socket plug adaptor (Model 319 only); BP300 Inductive pickup clip (Model 315 only; not certified by UL)

ELECTRICAL SPECIFICATIONS

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 ¹⁾	0.4%+3d
600.0mV ¹⁾	0.3%+3d
6.000V ²⁾ , 60.00V ²⁾ , 600.0V ²⁾	0.4%+3d

Input Impedance: 10MΩ, 50 pF nominal

¹⁾Overload protection: 600Vrms AC/DC

²⁾Overload protection: 1100Vrms for AC & 660V for DC

AC Voltage

RANGE	Accuracy
50Hz ~ 500Hz	
60.00mV ¹⁾ , 600.0mV ¹⁾	2.0% + 5d
6.000V ²⁾ , 60.00V ²⁾ , 600.0V ²⁾	

Input Impedance: 10MΩ, 50 pF nominal

¹⁾Overload protection: 600Vrms AC/DC

²⁾Overload protection: 1100Vrms for AC & 660V for DC

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 (Model 319 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 ¹⁾	0.7%+3d	0.25 mV/µA
6000µA ¹⁾	0.5%+3d	
60.00mA ¹⁾	0.7%+3d	2.5 mV/mA
600.0mA ¹⁾	0.5%+3d	
6.000A	0.7%+3d	0.03V/A
10.00A ²⁾	0.5%+3d	

¹⁾Ranges for Model 319 only

²⁾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 ¹⁾	2.2%+5d	0.25 mV/µA
6000µA ¹⁾	2.0%+5d	
60.00mA ¹⁾	2.2%+5d	2.5 mV/mA
600.0mA ¹⁾	2.0%+5d	
6.000A	2.2%+5d	0.03V/A
10.00A ²⁾	1.2%+5d	

¹⁾Ranges for Model 319 only

²⁾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: < 1.6VDC typically

Temperature (Model 319 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-RPM¹⁾ (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

¹⁾Measurements via inductive pickup clip (optional purchase for Model 315)

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-RPM¹⁾ (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

¹⁾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° ¹⁾	1.2° /krpm+1d
0.0%~100.0%	0.04%/krpm/cyl+2d

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

¹⁾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 ¹⁾	Accuracy
PFI / Multi Point Injection	
0.05ms ~ 250.0ms	0.05ms+1d
0.0%~100.0%	0.04%/krpm +2d
TBI / Single Point Injection	
0.05ms ~ 250.0ms	0.05ms+1d
0.0%~100.0%	0.04%/krpm/cyl +2d

¹⁾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

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



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