

Data Sheet

True RMS Handheld Digital Multimeters 390B Series



The 390B Series True RMS multimeters offer a comprehensive solution for general purpose measurement applications. Bundled with a complete set of accessories, these multimeters provide technicians and engineers with accurate results, data logging capabilities, and measurement features for evaluating a variety of electronics or electrical systems.

The easy to read display features an analog style bar graph to help identify measurement trends or fluctuating signals. When working in low-light environments, the auto on/off backlight adjusts for best visibility while maximizing battery life. Dual line display capabilities enable two

measurements or one measurement and a math function to appear on screen simultaneously.

Advanced features like data logging records measurements to the meter's internal memory at a user-specified sampling interval. Model 390B features wireless connectivity for logging measurement data directly to a smartphone or tablet while in the field. All models in this series provide convenient measurement monitoring and recording from a PC connected to the meter's optical isolated USB interface. Additionally, measurements stored in the meter's internal memory can be exported using the provided PC application software.

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BK PRECISION

Features and benefits

- Measurement functions: DCV, ACV, AC+DC, DCI, ACI, resistance, capacitance, frequency, diode, temperature, & continuity test
- True RMS AC and AC+DC measurements
- Up to 100,000-count, dual display with analog style bar graph
- Temperature measurements using provided K-type thermocouple
- dB, dBm, limits, peak-hold, REL (Δ), MIN, MAX, and average math functions
- AutoV/LoZ mode automatically switches between AC or DC voltage measurements*
- HFR (High Frequency Rejection) mode applies a low pass filter for AC measurements (800 Hz cut-off)
- Bluetooth connectivity offers live data monitoring and logging from a mobile device*
- CAT III 1000 V / CAT IV 600 V protection
- Dirt and water-resistant housing with rubberized protective case
- Isolated USB interface with operating software for remote data logging

*Model 390B only

Model	390B	391B	393B
Display Count	40,000 count	40,000 count	100,000 count
DC Voltage Basic Accuracy	0.03%	0.03%	0.015%
Wireless Data logging	✓	-	-
Data Log Capacity	40,000 readings	20,000 readings	20,000 readings

Operation highlights



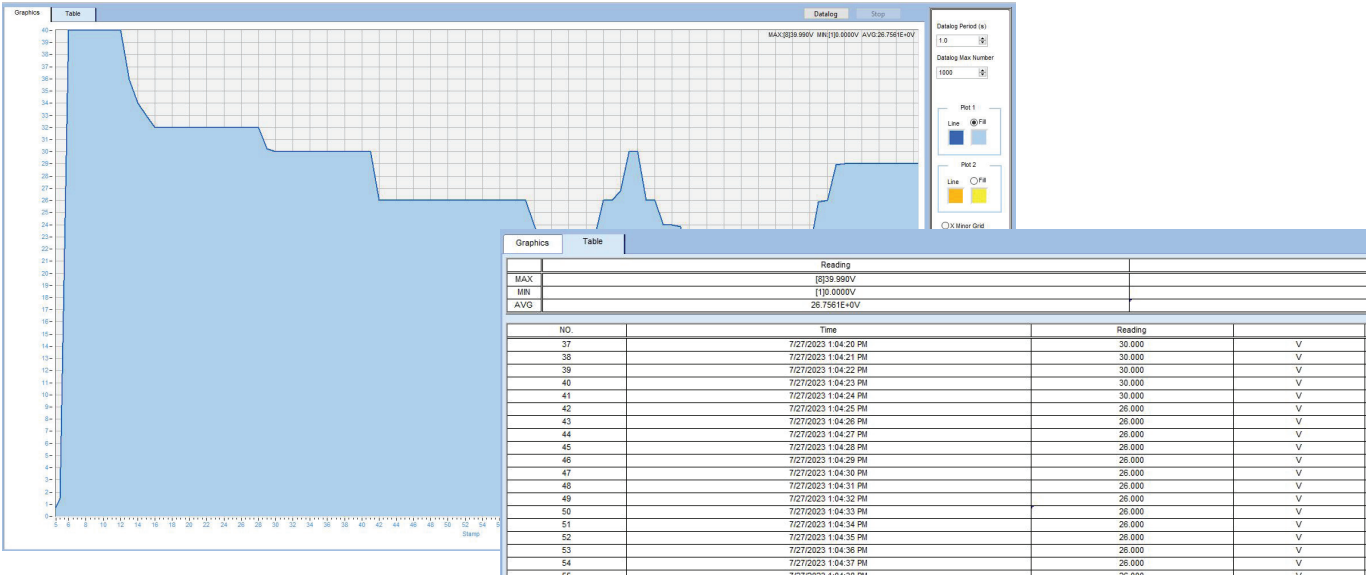
Features	390B	391B	393B
True RMS	AC, AC + DC voltage and current		
DCV Accuracy	± (0.03% + 10 digits)	± (0.03% + 20 digits)	± (0.015% + 20 digits)
Display Count	40,000	40,000	100,000
AutoV/LoZ	✓	-	-
Wireless Data logging	✓	-	-
Auto Backlit, Dual Display		✓	
Analog Style Bar Graph		✓	
Relative Mode (% and Δ)		✓	
Min/Max/Avg		✓	
dBm/dB measurement		✓	
Auto Hold, Peak Hold		✓	
Data Log Capacity	40,000 readings	20,000 readings	20,000 readings
Duty Cycle	-	✓	✓
Temperature Probe		✓	
Optical Isolated USB Interface		✓	

Included accessories

These multimeters include test leads, K-type thermocouple, magnetic hanger strap, and USB communication cable.

Operation highlights

Provided application software



PC software is available for logging measurement data at specified intervals with date and time stamp. Log up to 100,000 data points in graph or table format. Measurement data recorded in the field can be exported using the software for analysis.

B&K Precision Link APP



Model 390B supports Bluetooth connectivity for wireless measurement monitoring and data logging from a compatible Android/iOS mobile device using the B&K Precision Link APP. Download the Link APP on your mobile device.

Specifications

Specifications are based on the following conditions/assumptions:

- Accuracy specifications: $\pm$ (% of reading + counts of least significant digit) at 23 °C $\pm$ 5 °C, with relative humidity less than 80% RH One year calibration cycle
- Temperature coefficient is 0.1 x (specified accuracy)/°C for T < 18 °C, T > 28°C
- AC Voltage and AC Current specifications are AC coupled, true RMS
- For non-sinusoidal waveforms:
 - Add 1.0% to accuracy specification for Crest Factor 1.0 to 2.0
 - Add 2.5% to accuracy specification for Crest Factor 2.0 to 2.5
 - Add 4.0% to accuracy specification for Crest Factor 2.5 to 3.0
- For best accuracy use REL (delta) function to compensate the offsets

DC Voltage

Model	Range	Resolution	Accuracy
390B	40.00 mV	1 μ V	0.03 + 3
	400.0 mV	10 μ V	0.03 + 1
	4.000 V	100 μ V	
	40.00 V	1 mV	
	400.0 V	10 mV	
	1000 V	100 mV	
391B	40.000 mV	1 μ V	0.040 + 40
	400.00 mV	10 μ V	0.035 + 20
	4.000 V	100 μ V	0.030 + 20
	40.000 V	1 mV	
	400.00 V	10 mV	
	1000.0 V	100 mV	
393B	100.000 mV	1 μ V	0.025 + 40
	1000.00 mV	10 μ V	0.020 + 20
	10.0000 V	100 μ V	0.015 + 20
	100.000 V	1 mV	
	1000.00 V	10 mV	

- Input Impedance: 10 M Ω , < 100 pF
- Overload Protection: AC/DC 1000 V

Continuity

Model	Range	Resolution	Accuracy
390B	400.0 Ω	0.1 Ω	0.2 + 2
391B & 393B	400.00 Ω	0.01 Ω	0.2 + 30

- Open Circuit Voltage: -1.2 V
- Short Test Current: -0.3 mA
- Threshold: Adjustable 10 Ω to 50 Ω
- Buzzer Response Time: < 10 ms

Diode Test

Model	Range	Resolution	Accuracy
390B	2.000 V	1 mV	1.5 + 2
391B & 393B	2.0000 V	100 μ V	1.5 + 20

- Open Circuit Voltage: 2.5 V
- Short Test Current: 1 mA

DC Current

Model	Range	Resolution	Accuracy
390B	40.00 mA	1 μ A	0.2 + 1
	400.0 mA	10 μ A	
	4.000 A	100 μ A	
	10.00 A	1 mA	0.2 + 2
391B	40.000 mA	1 μ A	0.2 + 40
	400.00 mA	10 μ A	
	4.0000 A	100 μ A	0.2 + 80
	10.000 A	1 mA	
393B	10.0000 mA	0.1 μ A	0.1 + 40
	100.000 mA	1 μ A	
	10.0000 A	100 μ A	0.1 + 80

- Burden Voltage: 2 mV/mA at mA inputs and 60 mV/A at A inputs
- Max. Continuous Measuring Time: 10 minutes at mA inputs, 1 minute at A inputs
- Min. Rest Time: 20 minutes after continuous measuring
- Overload protection: AC/DC 400 mA at mA inputs, AC/DC 10 A at A inputs

Resistance

Model	Range	Resolution	Accuracy
390B	400.0 Ω	0.1 Ω	0.2 + 2
	4.000 k Ω	1 Ω	0.2 + 1
	40.00 k Ω	10 Ω	
	400.0 k Ω	100 Ω	
	4.000 M Ω	1 k Ω	1.0 + 1
	40.00 M Ω	10 k Ω	2.0 + 20
391B	400.00 Ω	0.01 Ω	0.2 + 30
	4.0000 k Ω	0.1 Ω	
	40.000 k Ω	1 Ω	
	400.00 k Ω	10 Ω	0.3 + 30
	4.0000 M Ω	100 Ω	1.0 + 30
	40.000 M Ω	1 k Ω	1.5 + 30
393B	1000.00 Ω	0.01 Ω	0.050 + 30
	10.0000 k Ω	0.1 Ω	0.025 + 30
	100.000 k Ω	1 Ω	
	1000.00 k Ω	10 Ω	0.3 + 30
	10.0000 M Ω	100 Ω	1.0 + 30
	40.000 M Ω	1 k Ω	1.5 + 30

Specifications

True RMS AC Voltage

Model	Range	Frequency	Accuracy
390B	40.00 mV ⁽¹⁾ , 400.0 mV ⁽¹⁾ , 4.000 V, 40.00 V, 400.0 V ⁽¹⁾ , 1000 V ⁽²⁾	40 Hz to 70 Hz ⁽³⁾	0.5 + 2
		70 Hz to 1 kHz ⁽³⁾	1.5 + 4
		1 kHz to 5 kHz ⁽³⁾	3.0 + 4
		5 kHz to 100 kHz ^{(4) (5)}	5.0 + 20
391B	40.000 mV, 400.00 mV	40 Hz to 65 Hz	1.00 + 50
		65 Hz to 1 kHz	3.00 + 50
		1 kHz to 3 kHz	5.00 + 50
	4.0000 V, 40.000 V	40 Hz to 45 Hz	1.50 + 50
		45 Hz to 65 Hz	0.70 + 50
		65 Hz to 1 kHz	1.50 + 50
		1 kHz to 10 kHz	3.00 + 50
		10 kHz to 50 kHz	5.00 + 50
		50 kHz to 100 kHz	10.0 + 50
	400.00 V, 1000.0 V	40 Hz to 45 Hz	1.50 + 50
		45 Hz to 65 Hz	0.70 + 50
		65 Hz to 1 kHz	1.50 + 50
393B	100.000 mV, 1000.00 mV	40 Hz to 65 Hz	0.70 + 50
		66 Hz to 1 kHz	1.50 + 50
		1 kHz to 3 kHz	3.00 + 50
	10.0000 V, 100.000 V	40 Hz to 45 Hz	1.00 + 50
		45 Hz to 65 Hz	0.40 + 50
		65 Hz to 1 kHz	1.00 + 50
		1 kHz to 10 kHz	2.00 + 50
		10 kHz to 20 kHz	3.00 + 50
		20 kHz to 50 kHz	5.00 + 50
		50 kHz to 100 kHz	10.0 + 50
	1000.00 V	40 Hz to 45 Hz	1.00 + 50
		45 Hz to 65 Hz	0.40 + 50
		65 Hz to 1 kHz	1.00 + 50

(1) The bandwidth is 40 Hz to 5 kHz
(2) The bandwidth is 40 Hz to 1 kHz

(3) Below 10% of range, add 2 digits to accuracy
(4) Below 10% of range, add 10 digits to accuracy, < 50 kHz

(5) Below 10% of range, add 20 digits to accuracy, > 50 kHz

True RMS AC Current

Model	Range	Frequency	Accuracy
390B	40.00 mA, 400.0 mA, 4.000 A, 10.00 A	40 Hz to 70 Hz	0.8 + 2
		70 Hz to 1 kHz	2.0 + 4
		1 kHz to 10 kHz	
391B	40.000 mA, 400.00 mA, 4.0000 A, 10.000 A	40 Hz to 65 Hz	0.8 + 80
		65 Hz to 1 kHz	3.0 + 80
393B	10.0000 mA, 100.000 mA, 10.0000 A	40 Hz to 65 Hz	0.7 + 80
		65 Hz to 1 kHz	2.0 + 80

- Below 5% of range, add 70 digits to accuracy
- Max. Continuous Measuring Time: 10 minutes at mA inputs, 1 minute at A inputs

- Min. Rest Time: 20 minutes after continuous measuring
- Overload Protection: AC/DC 400 mA at mA inputs, AC/DC 10 A at A inputs

Specifications

Frequency

Model	Range	Resolution	Accuracy
390B	400.0 Hz	0.1 Hz	1 digit (3 3/4-digit mode) 5 digit (4 3/4-digit mode)
	4.000 kHz	1 Hz	
	40.00 kHz	10 Hz	
	100.0 kHz	100 Hz	
391B & 393B	40.000 Hz	0.001 Hz	0.1 + 10
	400.00 Hz	0.01 Hz	
	4.0000 kHz	0.1 Hz	
	40.000 kHz	1 Hz	
	100.00 kHz	10 Hz	

Temperature

Model	Range	Resolution	Accuracy
390B	-200 °C to 1200 °C	0.1 °C	1.0 + 10
	-328 °F to 2192 °F	0.1 °F	1.0 + 18
391B & 393B	-200 °C to 10.0 °C	0.1 °C	1.0 + 2 °C
	-10.1 °C to 1200 °C	0.1 °C	1.0 + 1 °C
	-328 °F to 50.0 °F	0.1 °F	1.0 + 4 °F
	-50.1 °F to 2192 °F	0.1 °F	1.0 + 2 °F

- Specified after 60 minutes of warm-up time
- Specification does not include error of the thermocouple probe

Supplementary Functions

Model	Function	Range	Accuracy
390B	AC + DC	Same as voltage and current	AC accuracy $\pm 1.0\%$
	HFR		AC accuracy $\pm 1.0\%$ for 40 Hz to 400 Hz
	Peak Hold		AC accuracy $\pm (3.0\% + 200 \text{ digits})$ for 40 Hz to 1 kHz
391B & 393B	AC + DC	Same as AC function	AC accuracy $\pm 1.0\%$
	HFR	Same as AC function	AC accuracy $\pm 1.0\%$ for 40 Hz to 400 Hz
	Peak Hold	391B: Same as AC function $\times 1.25$ 393B: Same as AC function $\times 0.125$	AC accuracy $\pm (3.0\% + 100 \text{ digits})$ for 40 Hz to 500 Hz
	dB	120.00 dB	Not specified
	dBm (600 Ω)	120.00 dBm	Not specified

Specifications

Capacitance

Model	Range	Resolution	Accuracy
390B	40.00 nF	10 pF	0.9 + 20
	400.0 nF	100 pF	0.9 + 10
	4.000 μ F	1 nF	0.9 + 2
	40.00 μ F	10 nF	
	400.0 μ F	100 nF	
	4.000 mF	1 μ F	0.9 + 10
	40.00 mF	10 μ F	0.9 + 20
391B & 393B	4.0000 nF	0.1 pF	Not specified
	40.000 nF	1 pF	1.2 + 200
	400.00 nF	10 pF	0.8 + 20
	4.0000 μ F	100 pF	
	40.000 μ F	1 nF	
	400.00 μ F	10 nF	1.2 + 200
	4.0000 mF ⁽¹⁾	100 nF	
	40.000 mF ⁽¹⁾	1 μ F	

(1) Available in manual range selection only

General

Model		390B	391B	393B
Display		4,000 / 40,000 count		10,000 / 100,000 count
Measurement Speed		10 times per second	3 times per second	
Data Log Capacity		40,000 measurements	20,000 measurements	
Connectivity		IR-USB and Bluetooth (class 2)	IR-USB	
Power		4 x 1.5 V AA size batteries		
Battery Life (typical)		50 hours	100 hours	
Auto Power Off		Adjustable up to 30 minutes or never		
Low Battery Indicator		√		
Overrange		OL or -OL is displayed		
Temperature	Operating	14 °F to 122 °F (-10 °C to 50 °C) at ≤ 80% relative humidity		
	Storage	-4 °F to 140 °F (-20 °C to 60 °C)		
Safety		EN61010-I to 600 V CAT IV / 1000 V CAT III		
Electromagnetic Compatibility		EMC Directive 2014/30/EU, EN61326-1:2013		
Dimensions (W x H x D), without case		3.8" x 8.2" x 2" (95 mm x 207 mm x 52 mm)		
Weight		1.4 lbs (630 g)		
Warranty		3 Years		
Standard Accessories		Test leads, K-type thermocouple adapter, protective case, optical-isolated USB cable, magnetic hanging kit, alkaline batteries		

About B&K Precision

For more than 70 years, B&K Precision has provided reliable and value-priced test and measurement instruments worldwide.

Our headquarters in Yorba Linda, California houses our administrative and executive functions as well as sales and marketing, design, service, and repair. Our European customers are most familiar with B&K through our French subsidiary, Sefram. Engineers in Asia know us through our B&K Precision Taiwan operation. The independent service centers in Singapore and Brasil service customers in Singapore, Malaysia, Vietnam, Indonesia and South America, respectively.



● B&K Precision group member ● Independent service center ● Service center location

Quality Management System

B&K Precision Corporation is an ISO9001 registered company employing traceable quality management practices for all processes including product development, service, and calibration.

ISO9001:2015

Certification body NSF-ISR
Certificate number 6Z241-IS8



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