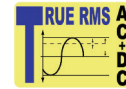


# Data Sheet

## True RMS Bench Multimeters 2831E and 5491B



### True RMS Bench Multimeters with Dual Display

The B&K Precision models 2831E and 5491B are versatile and dependable bench multimeters suitable for applications in education, service and repair, and manufacturing requiring basic and reliable measurements. Additionally, these instruments enhance your productivity with built-in math functions and USB connectivity, features not found in other bench meters in this price category. Math operations Rel, Max/Min, dBm, dB, %, and Hold provide educators with a convenient tool to teach basic math concepts.

| Model | Resolution |        |
|-------|------------|--------|
|       | Count      | Digits |
| 2831E | 20,000     | 4 1/2  |
| 5491B | 50,000     | 4 3/4  |

The 2831E and 5491B take typical multimeter measurements such as volts, ohms, and amps with great accuracy, stability, and basic VDC accuracy of 0.02% on the 5491B and 0.03% on the 2831E. The meters are also capable of measuring frequency, period, continuity, and performing diode tests. Readings can be taken at a maximum rate of 25 readings/sec with measurement rates selectable between slow, medium, and fast.

These multimeters were designed for cost-conscious users requiring a basic and dependable meter with a broad range of features offered at a value price.

### Features & benefits

- Up to 50,000 count display resolution
- Basic VDC accuracy of up to 0.02%
- Dual display to indicate two measurements simultaneously
- AC + DC True RMS
- Up to 25 readings per second measurement rate
- AC volt and amp measurement over wide frequency range (ACV 100 kHz/ACI 20 kHz)
- Limit mode for Pass/Fail testing
- Built-in math functions: Rel, Max/Min, dBm, dB, %, Hold, Compare
- CATI (1000 V)/CATII (300 V) Protection
- USB (Virtual Com) and RS232\* interface
- SCPI compatible

\*5491B only

## ▲ Versatile tools

### Dual Display



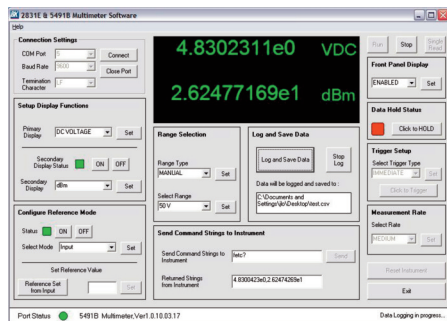
These meters offer a dual display allowing multiple measurements to be conveniently displayed at once. The display values could be two different measurements or one measurement expressed in different units. For example, you can simultaneously read an AC voltage and a frequency value or a DC voltage value expressed in volts and in dB.

### Limit Operation

The limit operation lets you set and control the values that determine a HI / IN / LO status of subsequent measurements. The meter can be configured to emit an audible alarm when readings are outside of the configured limit.

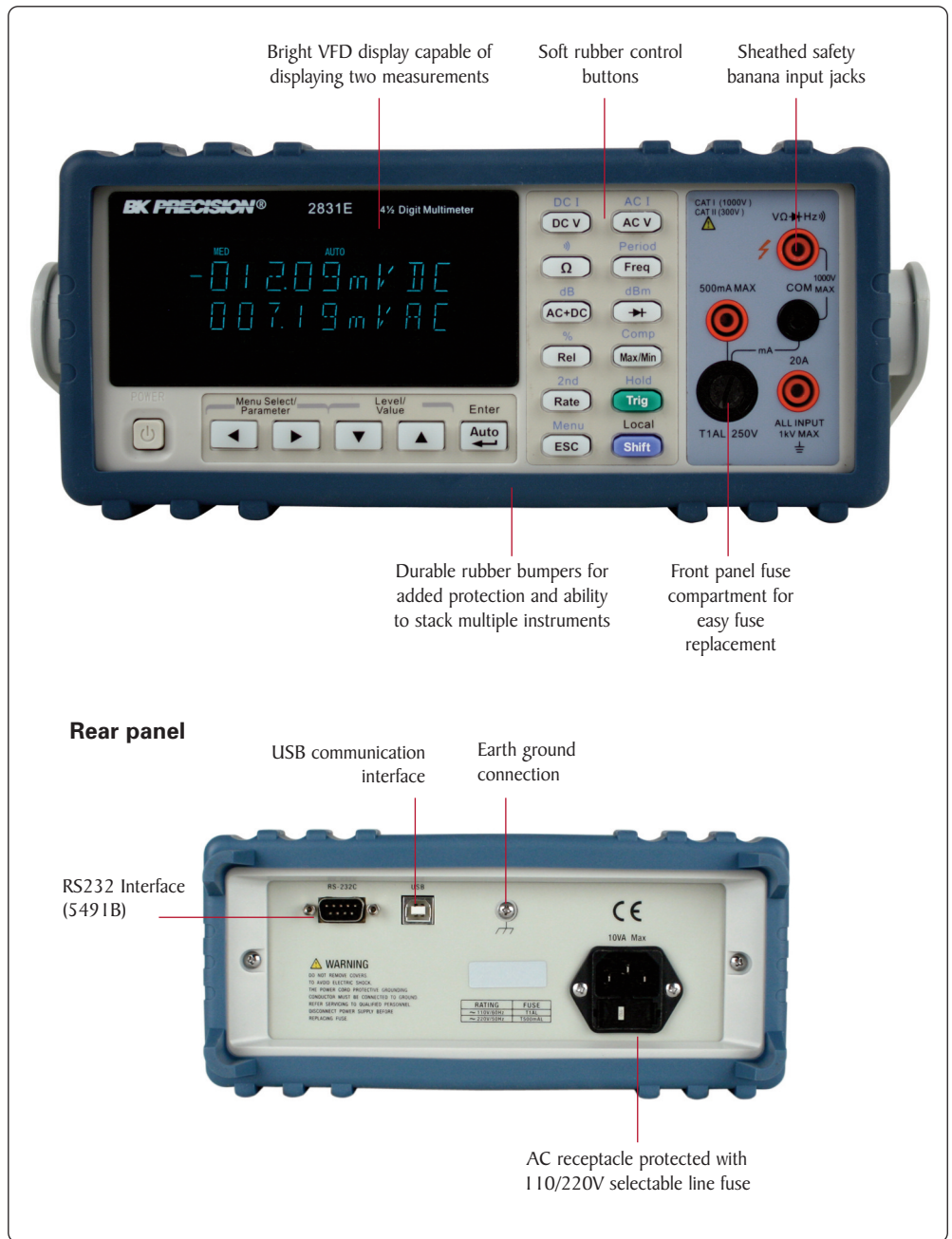
### Increase Productivity with PC Connectivity

The 2831E and 5491B are programmable via USB and RS232 (5491B only) interface using industry standard SCPI commands. Users can control and configure the instrument from a remote PC and retrieve measurement results for further analysis. The meters can also be remotely controlled using application software (downloadable from the B&K website), which supports front panel emulation and data logging of measurement results.



Application software screenshot

## ▲ Easy operation



# Specifications

## DC Voltage

| Resolution, Full Scale Reading and Accuracy ± (% of reading + % of range), 23 °C ± 5 °C |       |            |                    |                   |                         |           |
|-----------------------------------------------------------------------------------------|-------|------------|--------------------|-------------------|-------------------------|-----------|
| Rate                                                                                    | Range | Resolution | Full Scale Reading | Accuracy (1 year) | Typical Input Impedance |           |
| 2831E                                                                                   | Slow  | 200.00 mV  | 10 μV              | 210.00            | 0.03%+0.08% (1)         | > 10 MΩ   |
|                                                                                         |       | 2.0000 V   | 100 μV             | 2.1000            | 0.03%+0.05% (1)         | > 11.1 MΩ |
|                                                                                         |       | 20.000 V   | 1 mV               | 21.000            | 0.03%+0.06%             | > 10.1 MΩ |
|                                                                                         |       | 200.00 V   | 10 mV              | 210.00            | 0.03%+0.06%             | 10 MΩ     |
|                                                                                         |       | 1000.0 V   | 100 mV             | 1010.0 (2)        | 0.03%+0.06%             | 10 MΩ     |
| 5491B                                                                                   | Slow  | 500.00 mV  | 10 μV              | 510.00            | 0.02%+0.016% (1)        | > 10 MΩ   |
|                                                                                         |       | 5.0000 V   | 100 μV             | 5.1000            | 0.02%+0.008% (1)        | > 11.1 MΩ |
|                                                                                         |       | 50.000 V   | 1 mV               | 51.000            | 0.02%+0.008%            | > 10.1 MΩ |
|                                                                                         |       | 500.00 V   | 10 mV              | 510.00            | 0.02%+0.008%            | 10 MΩ     |
|                                                                                         |       | 1000.0 V   | 100 mV             | 1010.0 (2)        | 0.02%+0.008%            | 10 MΩ     |

(1) under REL status  
(2) 1% over-range (1010 V) is readable at 1000 V range

## AC Voltage

| Resolution, Full Scale Reading and Accuracy ± (% of reading + % of range), 23 °C ± 5 °C |       |            |                    |                                  |            |             |                 |                  |
|-----------------------------------------------------------------------------------------|-------|------------|--------------------|----------------------------------|------------|-------------|-----------------|------------------|
| Rate                                                                                    | Range | Resolution | Full Scale Reading | Accuracy(1 year)(1) 23 °C ± 5 °C |            |             |                 |                  |
|                                                                                         |       |            |                    | 20~50 Hz                         | 50~20 kHz  | 20~50 kHz   | 50~100 kHz      |                  |
| 2831E                                                                                   | Slow  | 200.00 mV  | 10 μV              | 210.00                           | 1.0%+0.2%  | 0.5%+0.15%  | 1.8% + 0.25%    | 3.0% + 0.75%     |
|                                                                                         |       | 2.0000 V   | 100 μV             | 2.1000                           | 1.0%+0.2%  | 0.4%+0.05%  | 1.5% + 0.1%     | 3.0% + 0.25%     |
|                                                                                         |       | 20.000 V   | 1 mV               | 21.000                           | 1.0%+0.2%  | 0.4%+0.05%  | 1.5% + 0.1%     | 3.0% + 0.25%     |
|                                                                                         |       | 200.00 V   | 10 mV              | 210.00                           | ----       | 0.8%+0.075% | 1.5% + 0.1%     | 3.0% + 0.25%     |
|                                                                                         |       | 750.0 V    | 100 mV             | 757.5(3)                         | ----       | 0.8%+0.075% | 1.5% + 0.1% (2) | 3.0% + 0.25% (2) |
| 5491B                                                                                   | Slow  | 500.00 mV  | 10 μV              | 510.00                           | 1.0%+0.08% | 0.5%+0.06%  | 1.5% + 0.1%     | 3.0% + 0.3%      |
|                                                                                         |       | 5.0000 V   | 100 μV             | 5.1000                           | 1.0%+0.08% | 0.35%+0.02% | 1% + 0.04%      | 3.0% + 0.1%      |
|                                                                                         |       | 50.000 V   | 1 mV               | 51.000                           | 1.0%+0.08% | 0.35%+0.02% | 1% + 0.04%      | 3.0% + 0.1%      |
|                                                                                         |       | 500.00 V   | 10 mV              | 510.00                           | ----       | 0.5%+0.03%  | 1% + 0.04%      | 3.0% + 0.1%      |
|                                                                                         |       | 750.0 V    | 100 mV             | 757.5(3)                         | ----       | 0.5%+0.03%  | 1% + 0.04% (2)  | 3.0% + 0.1% (2)  |

Max. crest factor: 3.0 at full scale  
(1) Specifications are for sine wave inputs >5% of range.  
(2) Limit at 40 kHz or ≤ 3 × 10<sup>7</sup> Volt-Hz for 750 V range  
(3) 1% over-range (757.50V) is readable at 750V range

## DC Current

| Resolution, Full Scale Reading and Accuracy ± (% of reading + % of range), 23 °C ± 5 °C |       |            |                    |                   |                                    |                 |
|-----------------------------------------------------------------------------------------|-------|------------|--------------------|-------------------|------------------------------------|-----------------|
| Rate                                                                                    | Range | Resolution | Full Scale Reading | Accuracy (1 year) | Burden Voltage(1) & Shunt Resistor |                 |
| 2831E                                                                                   | Slow  | 2.0000 mA  | 0.1 μA             | 2.1000            | 0.08%+0.025% (2)                   | <0.3 V / 100 Ω  |
|                                                                                         |       | 20.000 mA  | 1 μA               | 21.000            | 0.08%+0.02% (2)                    | <0.04 V / 1 Ω   |
|                                                                                         |       | 200.00 mA  | 10 μA              | 210.00            | 0.08%+0.02%                        | <0.3 V / 1 Ω    |
|                                                                                         |       | 2.0000 A   | 100 μA             | 2.1000            | 0.3%+0.025%                        | <0.05 V / 10 mΩ |
|                                                                                         |       | 20.000 A   | 1 mA               | 21.000 (3)        | 0.3%+0.025%                        | <0.6 V / 10 mΩ  |
| 5491B                                                                                   | Slow  | 5.0000 mA  | 0.1 μA             | 5.1000            | 0.05%+0.01% (2)                    | <0.6 V / 100 Ω  |
|                                                                                         |       | 50.000 mA  | 1 μA               | 51.000            | 0.05%+0.008% (2)                   | <0.06 V / 1 Ω   |
|                                                                                         |       | 500.00 mA  | 10 μA              | 510.00            | 0.05%+0.008%                       | <0.6 V / 1 Ω    |
|                                                                                         |       | 5.0000 A   | 100 μA             | 5.1000            | 0.25%+0.01%                        | <0.1 V / 10 mΩ  |
|                                                                                         |       | 20.000 A   | 1 mA               | 21.000 (3)        | 0.25%+0.01%                        | <0.6 V / 10 mΩ  |

(1) Typical voltage across the input terminals at full scale reading.  
(2) Use REL function  
(3) In 20 A range, >10~20 ADC is readable for 20 seconds maximum

## Specifications (cont.)

### AC Current (True RMS, AC Coupling)

| Resolution, Full Scale Reading and Accuracy ± (% of reading + % of range), 23 °C ± 5 °C |           |            |                    |                                  |            |          |
|-----------------------------------------------------------------------------------------|-----------|------------|--------------------|----------------------------------|------------|----------|
| Rate                                                                                    | Range     | Resolution | Full Scale Reading | Accuracy(1 year)(1) 23 °C ± 5 °C |            |          |
|                                                                                         |           |            |                    | 20~50 Hz                         | 50~2 kHz   | 2~20 kHz |
| 2831E<br>Slow                                                                           | 2.0000 mA | 0.1 μA     | 2.1000             | 1.5%+0.5%                        | 0.5%+0.3%  | 2%+0.5%  |
|                                                                                         | 20.000 mA | 10 μA      | 21.000             | 1.5%+0.5%                        | 0.5%+0.3%  | 2%+0.38% |
|                                                                                         | 200.00 mA | 100 μA     | 210.00             | 1.5%+0.5%                        | 0.5%+0.3%  | 2%+0.38% |
|                                                                                         | 2.0000 A  | 1 mA       | 2.1000             | 2.0%+0.5%                        | 0.5%+0.3%  | ----     |
|                                                                                         | 20.000 A  | 10 mA      | 21.000 (2)         | 2.0%+0.5%                        | 0.5%+0.3%  | ----     |
| 5491B<br>Slow                                                                           | 5.0000 mA | 0.1 μA     | 5.1000             | 1.5%+0.16%                       | 0.5%+0.08% | 2%+0.16% |
|                                                                                         | 50.000 mA | 10 μA      | 51.000             | 1.5%+0.16%                       | 0.5%+0.08% | 2%+0.12% |
|                                                                                         | 500.00 mA | 100 μA     | 510.00             | 1.5%+0.16%                       | 0.5%+0.08% | 2%+0.12% |
|                                                                                         | 5.0000 A  | 1 mA       | 5.1000             | 2.0%+0.16%                       | 0.5%+0.1%  | ----     |
|                                                                                         | 20.000 A  | 10 mA      | 21.000 (2)         | 2.0%+0.16%                       | 0.5%+0.1%  | ----     |

Max. crest factor: 3.0 at full scale

(1) Specifications are for sine wave inputs >5% of range.

(2) In 20 A range, >10~20 A AC is readable for 20 seconds maximum

### Resistance

| Resolution, Full Scale Reading and Accuracy ± (% of reading + % of range), 23 °C ± 5 °C |           |            |                    |              |                   |
|-----------------------------------------------------------------------------------------|-----------|------------|--------------------|--------------|-------------------|
| Rate                                                                                    | Range (1) | Resolution | Full Scale Reading | Test current | Accuracy (1 year) |
| 2831E<br>Slow                                                                           | 200.00 Ω  | 10 mΩ      | 210.00             | 0.5 mA       | 0.10%+0.05% (2)   |
|                                                                                         | 2.0000 kΩ | 100 mΩ     | 2.1000             | 0.45 mA      | 0.10%+0.025% (2)  |
|                                                                                         | 20.000 kΩ | 1 Ω        | 21.000             | 45 μA        | 0.10%+0.025% (2)  |
|                                                                                         | 200.00 kΩ | 10 Ω       | 210.00             | 4.5 μA       | 0.10%+0.025%      |
|                                                                                         | 2.0000 MΩ | 100 Ω      | 2.1000             | 450 nA       | 0.15%+0.025%      |
|                                                                                         | 20.000 MΩ | 1 kΩ       | 21.000             | 45 nA        | 0.3%+0.05%        |
| 5491B<br>Slow                                                                           | 500.00 Ω  | 10 mΩ      | 510.00             | 0.5 mA       | 0.10%+0.01% (2)   |
|                                                                                         | 5.0000 kΩ | 100 mΩ     | 5.1000             | 0.45 mA      | 0.10%+0.008% (2)  |
|                                                                                         | 50.000 kΩ | 1 Ω        | 51.000             | 45 μA        | 0.10%+0.008% (2)  |
|                                                                                         | 500.00 kΩ | 10 Ω       | 510.00             | 4.5 μA       | 0.10%+0.008%      |
|                                                                                         | 5.0000 MΩ | 100 Ω      | 5.1000             | 450 nA       | 0.15%+0.008%      |
|                                                                                         | 50.000 MΩ | 1 kΩ       | 51.000             | 45 nA        | 0.3%+0.01%        |

(1) In order to eliminate the noise interference, which might be induced to the test leads, it is recommended to use a shielded test cable for measuring resistance above 100 kΩ.

(2) Using REL function

### Continuity

| Resolution, Full Scale Reading and Accuracy ± (% of reading + % of range), 23 °C ± 5 °C |            |                    |              |                                   |
|-----------------------------------------------------------------------------------------|------------|--------------------|--------------|-----------------------------------|
| Range                                                                                   | Resolution | Full Scale Reading | Test current | Accuracy (1 year)<br>23 °C ± 5 °C |
| 200 Ω                                                                                   | 100 mΩ     | 999.9              | 0.5 mA       | 0.1%+0.1%                         |
| 500 Ω                                                                                   | 100 mΩ     | 999.9              | 0.5 mA       | 0.1%+0.04%                        |

Open circuit voltage: <5.5 VDC

Test current: around 0.5 mA DC

## Specifications (cont.)

### Diode

| Resolution, Full Scale Reading and Accuracy ± (% of reading + % of range), 23 °C ± 5 °C |          |            |                    |                  |
|-----------------------------------------------------------------------------------------|----------|------------|--------------------|------------------|
| Rate                                                                                    | Range    | Resolution | Full Scale Reading | Test current     |
| Med                                                                                     | 2.0000 V | 100 μV     | 2.3000 V           | 0.5 mA (Approx.) |

### Frequency

| Resolution, Full Scale Reading and Accuracy ± (% of reading + % of range), 23 °C ± 5 °C |                 |                 |                    |              |                               |
|-----------------------------------------------------------------------------------------|-----------------|-----------------|--------------------|--------------|-------------------------------|
| ACV Range                                                                               | Frequency Range | Best Resolution | Full Scale Reading | Accuracy     | Input Sensitivity (Sine Wave) |
| 200 mV<br>(500 mV*)<br>to 750V                                                          | 10 Hz           | 100 μHz         | 9.9999             | 0.05%+0.02%  | 200 mV rms                    |
|                                                                                         | 10~100 Hz       | 1 mHz           | 99.999             | 0.01%+0.02%  | 300 mV rms                    |
|                                                                                         | 100~100 kHz     | 10 mHz          | 999.99             | 0.01%+0.008% | 300 mV rms                    |
|                                                                                         | 100k~1 MHz      | 10 Hz           | 999.99             | 0.01%+0.008% | 500 mV rms                    |

\* Model 5491B

### Period

| Resolution, Full Scale Reading and Accuracy ± (% of reading + % of range), 23 °C ± 5 °C |                 |                 |                    |              |                               |
|-----------------------------------------------------------------------------------------|-----------------|-----------------|--------------------|--------------|-------------------------------|
| ACV Range                                                                               | Frequency Range | Best Resolution | Full Scale Reading | Accuracy     | Input Sensitivity (Sine Wave) |
| 200 mV<br>(500 mV*)<br>to 750V                                                          | 1~10 μs         | 0.1 ns          | 9.9999             | 0.01%+0.008% | 500 mV rms                    |
|                                                                                         | 10 μs~10 ms     | 1 ns            | 9.9999             | 0.01%+0.008% | 300 mV rms                    |
|                                                                                         | 10 ms~100 ms    | 1 μs            | 99.999             | 0.01%+0.02%  | 300 mV rms                    |
|                                                                                         | 100 ms          | 10 μs           | 199.99             | 0.05%+0.02%  | 200 mV rms                    |

\* Model 5491B

### General

| AC Input                                                      | Power Consumption                                                                             | Operating Environment      | Storage Environment | Warm-up             | Dimensions (W×H×D)                             | Net Weight         |
|---------------------------------------------------------------|-----------------------------------------------------------------------------------------------|----------------------------|---------------------|---------------------|------------------------------------------------|--------------------|
| 110/220 V ± 10%,<br>50/60 Hz ± 5%                             | ≤ 10VA                                                                                        | 0 °C to 40 °C,<br>≤ 90 %RH | -40 °C to 70 °C     | at least 30 minutes | 225 mm×100 mm×355 mm<br>8.85" x 3.93" x 13.97" | 2.5 kg<br>5.51 lbs |
| <b>One-Year Warranty (2831E), Three-Year Warranty (5491B)</b> |                                                                                               |                            |                     |                     |                                                |                    |
| Included Accessories                                          | Test leads, Power cord, Spare fuse, Operation Manual, Calibration certificate and test report |                            |                     |                     |                                                |                    |



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

**Телефон:** 8 (812) 309 58 32 (многоканальный)

**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.