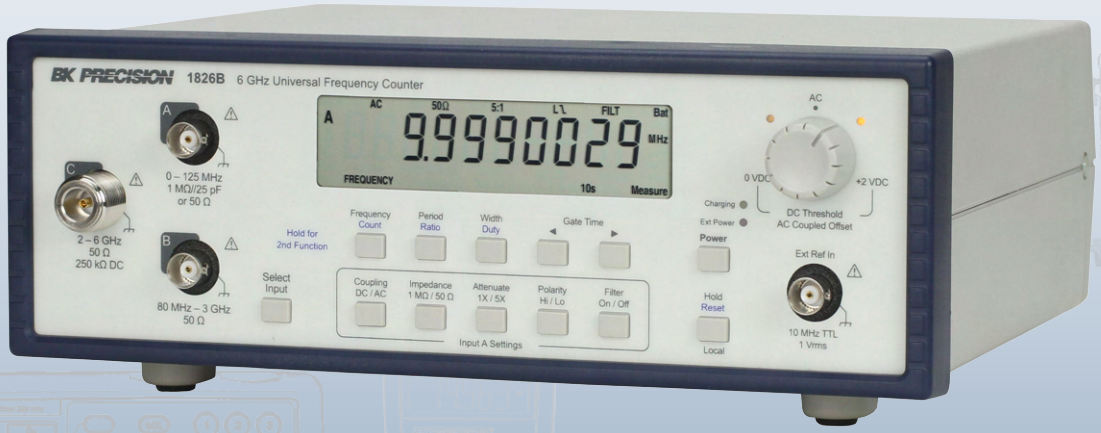
User Manual

1820B Series
Portable Bench Universal Frequency Counters



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Compliance Information

1.1 EMC

1.1.1 EC Declaration of Conformity - EMC

Compliance was demonstrated to the following specifications listed in the Official Journal of the European Communities: EMC Directive 2014/30/EU.

EN 61000-3-2: 2006 Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current <= 16 A per phase)

EN 61000-3-3: 1995+A1: 2001+A2: 2005 Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection

EN 61000-4-2 / -3 / -4 / -5 / -6 / -11 Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques:

- Electrostatic discharge immunity test
- Radiated, radio-frequency, electromagnetic field immunity test
- Electrical fast transient/burst immunity test
- Surge immunity test
- Immunity to conducted disturbances, induced by radio-frequency fields
- Voltage dips, short interruptions and voltage variations immunity tests

EN 61326-1: 2006 Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements

1.2 Safety

1.2.1 EC Declaration of Conformity - Low Voltage

Compliance was demonstrated to the following specification as listed in the Official Journal of the European Communities: Low Voltage Directive: 2006/95/EC.

EN61010-1: 2001 Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements

1.3 IEC Measurement Category & Pollution Degree Definitions

Measurement Category (CAT) - classification of testing and measuring circuits according to the types of mains circuits to which they are intended to be connected.

Measurement Category other than II, III, or IV: circuits that are not directly connected to the mains supply.

Measurement Category II (CAT II): test and measuring circuits connected directly to utilization points (socket outlets and similar prints) of the low-voltage mains installation.

Measurement Category III (CAT III): test and measuring circuits connected to the distribution part of a building's low-voltage mains installation.

Measurement Category IV (CAT IV): test and measuring circuits connected at the source of the building's low-voltage mains installation.

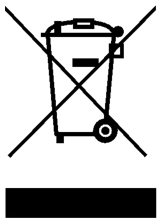
Mains Isolated: is for measurements performed on circuits not directly connected to a mains supply.

Pollution - addition of foreign matter, solid, liquid, or gaseous (ionized gases) that may produce a reduction of dielectric strength or surface resistivity.

Pollution Degree 2 (P2) - only non-conductive pollution occurs except that occasionally a temporary conductivity caused by condensation is expected.

1.4 Product End-of-Life Handling

The equipment may contain substances that could be harmful to the environment or human health if improperly handled at the product's end of life. To avoid release of such substances into the environment and to reduce the use of natural resources, we encourage you to recycle this product to an appropriate system that will ensure that most of the materials are reused or recycled appropriately.



This product is subject to Directive 2012/19/EU of the European Parliament and the Council of the European Union on waste electrical and electronic equipment (WEEE), and in jurisdictions adopting that Directive, is marked as being put on the market after August 13, 2005, and should not be disposed of as unsorted municipal waste. Please utilize your local WEEE collection facilities in the disposition of this product.

1.5 Terms and Symbols

1.5.1 Terms

CAUTION

A caution statement calls attention to an operating procedure, practice, or condition, which, if not followed correctly, could result in damage to or destruction of parts or the entire product.

WARNING

A warning statement calls attention to an operating procedure, practice, or condition, which, if not followed correctly, could result in injury or death to personnel.

NOTICE

A note statement calls attention to an operating procedure, practice, or condition, which, should be noted before proceeding.

1.5.2 Symbols



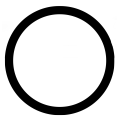
WARNING - HIGH VOLTAGE - possibility of electric shock.



CAUTION – Statements or instructions that must be consulted in order to find out the nature of the potential hazard and any actions which must be taken.



On (Supply). This is the AC mains connect/disconnect switch on the front of the instrument.



Off (Supply). This is the AC mains connect/disconnect switch on the front of the instrument.



Alternating current



Chassis (earth ground) symbol



Earth (ground) TERMINAL - Refer to the instructions accompanying this symbol in this manual.

Safety Notices

The following safety precautions apply to both operating and maintenance personnel and must be followed during all phases of operation, service, and repair of this instrument.

Before applying power to this instrument:

1. Read and understand the safety and operational information in this manual.
2. Apply all the listed safety precautions.
3. Verify that the voltage selector at the line power cord input is set to the correct line voltage. Operating the instrument at an incorrect line voltage will void the warranty.
4. Make all connections to the instrument before applying power.
5. Do not operate the instrument in ways not specified by this manual or by B&K Precision.

Failure to comply with these precautions or with warnings elsewhere in this manual violates the safety standards of design, manufacture, and intended use of the instrument. B&K Precision assumes no liability for a customer's failure to comply with these requirements.

2.1 Electrical Power

This instrument is intended to be powered from a CATEGORY II mains power environment. The mains power should be 115 V RMS or 230 V RMS. Use only the power cord supplied with the instrument and ensure it is appropriate for your country of use.



Do not use this instrument in an electrical environment with a higher category rating than what is specified in this manual for this instrument.



You must ensure that each accessory you use with this instrument has a category rating equal to or higher than the instrument's category rating to maintain the instrument's category rating. Failure to do so will lower the category rating of the measuring system.

2.2 Ground the Instrument

WARNING

To minimize shock hazard, the instrument chassis and cabinet must be connected to an electrical safety ground. This instrument is grounded through the ground conductor of the supplied, three-conductor AC line power cable. The power cable must be plugged into an approved three-conductor electrical outlet. The power jack and mating plug of the power cable meet IEC safety standards.

WARNING

Do not alter or defeat the ground connection. Without the safety ground connection, all accessible conductive parts (including control knobs) may provide an electric shock. Failure to use a properly-grounded approved outlet and the recommended three-conductor AC line power cable may result in injury or death.

WARNING

Unless otherwise stated, a ground connection on the instrument's front or rear panel is for a reference of potential only and is not to be used as a safety ground. Do not operate in an explosive or flammable atmosphere.

2.3 Environmental Conditions

This instrument is intended to be used in an indoor pollution degree 2 environment. The operating temperature range is 0°C to 40°C and 20% to 80% relative humidity, with no condensation allowed.

Measurements made by this instrument may be outside specifications if the instrument is used in non-office-type environments. Such environments may include rapid temperature or humidity changes, sunlight, vibration and/or mechanical shocks, acoustic noise, electrical noise, strong electric fields, or strong magnetic fields.

WARNING

Do not operate the instrument in the presence of flammable gases or vapors, fumes, or finely-divided particulates.

The instrument is designed to be used in office-type indoor environments. Do not operate the instrument:

- **In the presence of noxious, corrosive, or flammable fumes, gases, vapors, chemicals, or finely-divided particulates.**
- **In relative humidity conditions outside the instrument's specifications.**

WARNING

- **In environments where there is a danger of any liquid being spilled on the instrument or where any liquid can condense on the instrument.**
- **In air temperatures exceeding the specified operating temperatures.**
- **In atmospheric pressures outside the specified altitude limits or where the surrounding gas is not air.**
- **In environments with restricted cooling air flow, even if the air temperatures are within specifications.**
- **In direct sunlight.**

2.4 Do not operate instrument if damaged

WARNING

If the instrument is damaged, appears to be damaged, or if any liquid, chemical, or other material gets on or inside the instrument, remove the instrument's power cord, remove the instrument from service, label it as not to be operated, and return the instrument to B&K Precision for repair. Notify B&K Precision of the nature of any contamination of the instrument.

WARNING

Hazardous voltages may be present in unexpected locations in circuitry being tested when a fault condition in the circuit exists.

2.5 Clean the instrument only as instructed

WARNING

Do not clean the instrument, its switches, or its terminals with contact cleaners, abrasives, lubricants, solvents, acids/bases, or other such chemicals. Clean the instrument only with a clean dry lint-free cloth or as instructed in this manual. Not for critical applications.

2.6 Do not touch live circuits

WARNING

Instrument covers must not be removed by operating personnel. Component replacement and internal adjustments must be made by qualified service-trained maintenance personnel who are aware of the hazards involved when the instrument's covers and shields are removed. Under certain conditions, even with the power cord removed, dangerous voltages may exist when the covers are removed.

To avoid injuries, always disconnect the power cord from the instrument, disconnect all other connections (for example, test leads, computer interface cables, etc.), discharge all circuits, and verify there are no hazardous voltages present on any conductors by measurements with a properly-operating voltage-sensing device before touching any internal parts. Verify the voltage-sensing device is working properly

before and after making the measurements by testing with known-operating voltage sources and test for both DC and AC voltages.

Do not attempt any service or adjustment unless another person capable of rendering first aid and resuscitation is present.

2.7 General Safety

WARNING **Do not insert any object into an instrument's ventilation openings or other openings.**

WARNING **This instrument is not authorized for use in contact with the human body or for use as a component in a life-support device or system.**

2.8 Servicing

WARNING

Do not substitute parts that are not approved by B&K Precision or modify this instrument. Return the instrument to B&K Precision for service and repair to ensure that safety and performance features are maintained.

WARNING

Fuse replacement must be done by qualified service-trained maintenance personnel who are aware of the instrument's fuse requirements and safe replacement procedures. Disconnect the instrument from the power line before replacing fuses. Replace fuses only with new fuses of the fuse types, voltage ratings, and current ratings specified in this manual or on the back of the instrument. Failure to do so may damage the instrument, lead to a safety hazard, or cause a fire. Failure to use the specified fuses will void the warranty.

2.9 For continued safe use of the instrument

- Do not place heavy objects on the instrument.
- Do not obstruct cooling air flow to the instrument.
- Do not place a hot soldering iron on the instrument.
- Do not pull the instrument with the power cord, connected probe, or connected test lead.
- Do not move the instrument when a probe is connected to a circuit being tested.

Introduction

3.1 Overview

The 1820B series consists of the 1823B and 1826B models. These are high-performance, battery-powered universal counters featuring a high-contrast 10-digit, 0.5" LCD. They provide precise measurements for frequency, period, ratio, pulse width, and unit counting.

The series offers a wide frequency coverage from 0.001 Hz to over 6 GHz (model dependent). The internal temperature-compensated frequency reference is stable to within ±1 ppm, ensuring high accuracy even in portable field conditions with rapid warm-up times.

The instrument utilizes reciprocal counting technology to achieve high-resolution measurements across the entire frequency range. For remote operation and data logging, a USB interface is included. The device is powered by internal NiMH batteries, providing up to 24 hours of continuous operation, or via a USB power source.



Figure 3.1 1820B Series Handheld Universal Counter

Feature	1823B	1826B
Frequency Range	0.001 Hz to 3 GHz	0.001 Hz to 6 GHz
Input Channels	Inputs A and B	Inputs A, B, and C
Input B Range	80 MHz to 3 GHz	80 MHz to 3 GHz
Input C Range	N/A	1 GHz to 6 GHz

Table 3.1 Models Overview

3.2 Features

- 3 GHz (1823B) and 6 GHz (1826B) frequency measurement capabilities.
- Dedicated microwave channel with N-type connector (1826B only).
- 10-digit resolution with 0.5" LCD for high-clarity data readout.
- ±1 ppm high-stability time base.
- Internal rechargeable batteries providing up to 24 hours of wireless operation.
- Frequency ratio, period, pulse width, and unit count measurement functions.
- Remote control via USB (VCOM) interface.
- Selectable measurement (gate) times: 0.3 s, 1 s, 10 s, and 100 s.

3.3 Package Contents

Please inspect the instrument mechanically and electrically upon receipt. Unpack all items and check for physical damage. Report any shipping damage to the carrier immediately. It is recommended to save the original packing materials for future transport.
The 1820B series is shipped with the following items:

- 1 x 1823B or 1826B Universal Counter
- 1 x Universal AC Power Adapter
- 1 x Battery Compliance Notice

NOTICE **Verify that all listed items are included. If any components are missing, please contact B&K Precision customer support.**

3.4 Dimensions

The physical specifications for the 1820B series are as follows:

Dimensions (W x H x D)	10.3 x 8.5 x 3.5 inches (260 x 215 x 89.6 mm)
Weight	2.1 lbs (950 g)
AC Adapter Weight	0.4 lbs (170 g)

Table 3.2 Dimensions and Weight



Figure 3.2 1820B Series Dimensions

Getting Started

Before connecting and powering up the instrument, please review the instructions and safety guidelines in this chapter.

4.1 Input Power

The 1820B series is versatile and can be powered by three different sources: an internal rechargeable battery, DC input via the supplied AC adapter, or USB power from a PC.
The instrument features an intelligent power management system that prioritizes sources to prevent unintentional battery discharge:

- **Priority 1**: AC Adapter
- **Priority 2**: USB Power
- **Priority 3**: Internal Battery

WARNING

The 1820B series are Safety Class III instruments. When powered by the internal battery, AC adapter, or an ungrounded USB source, all accessible metal parts—including the N-type and BNC input sockets—are at the same potential. To ensure safety, do not connect inputs to voltages exceeding 30V DC or 30Vrms. Although inputs can briefly withstand higher voltages (up to 250Vrms), the user is at risk if the instrument's ground is connected to hazardous potentials.

4.1.1 Battery Operation

The instrument includes 2500 mAh rechargeable NiMH batteries, providing up to 24 hours of operation when fully charged.

Description: Indicators

- **"Bat"**: Appears on the display when the unit is running on battery power.
- **"Lo Bat"**: Replaces the battery indicator when approximately 10% of the battery life remains.

To toggle power during battery operation, press the **Power** key.

4.1.2 USB Power Operation

The instrument can be powered via a PC's USB host port using a standard USB cable. This allows the unit to operate even if the internal battery is completely flat.

NOTICE **USB power provides operational power but will not recharge the internal battery. Use the supplied AC adapter for charging.**

Description: Behavior

- USB power takes priority over the battery; "Bat" indicators will turn off.
- The instrument automatically powers on when connected to a live USB port and powers off when disconnected.
- The **Power** key remains functional while USB power is connected.

4.1.3 AC Adapter Operation

The AC adapter connects to the rear panel socket labeled **DC IN**.

Description: LED Status Indicators

- **EXT POWER (Red)**: Lights up when external power is detected.
- **CHARGING (Yellow)**: Lights up when the internal battery is being charged.

NOTICE **The instrument utilizes intelligent charging to optimize battery health. While it is safe to leave the adapter connected for long periods, it is recommended to disconnect it when the instrument is not in use for extended durations.**

WARNING **Only use the AC adapter supplied with the instrument.**

4.1.4 Power State

At power-on, the instrument defaults to the following state:

NOTICE **The threshold level is determined by the physical Threshold control knob on the front panel.**

Description: Diagnostic Modes

Function	Input A / Frequency
Coupling / Impedance	AC / 1 MΩ
Attenuation / Polarity	1:1 / Rising Edge
Filter / Hold	Off / Off
Measurement Time	0.3 s

Table 4.1 Default Power-On Settings

- **Full Display Check**: Hold the **Reset** key during power-on. The unit will show all segments, then the firmware revision for 2 seconds, followed by a continuous display check until the key is released.
- **Quick Start**: Pressing **Frequency**, **Period**, or **Width** while the unit is off will power it on directly into that function.
- **Auto Power Down**: If turned on via the Quick Start method and no keys are pressed for 15 seconds, the unit will power off to conserve battery.

Front Panel Operation

Upon power-on, the instrument defaults to front-panel operation mode. All measurement parameters and system configurations are accessible via the dedicated keys and the threshold control knob.

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5.1 Input Selection

The 1820B series provides multiple input channels for various frequency ranges. Channels are toggled by pressing the **Select Input** key; the active input is indicated by the A, B, or C annunciator on the LCD.

Description: Input Channel Mapping

- **Input A**: 0.001 Hz to 125 MHz (Universal measurements).
- **Input B**: 80 MHz to 3 GHz (High-frequency measurements).
- **Input C**: 1 GHz to 6 GHz (Microwave measurements—1826B only).

5.1.1 Input A Configuration

Input A is the primary universal channel. It features adjustable impedance, coupling, and filtering to handle a wide variety of waveforms.

- **Coupling (DC/AC)**:
  - **AC (Default)**: Used for most signals. The display resets to zero if no transition occurs within 1 second.
  - **DC**: Required for very low frequencies (<30 Hz) or signals with low duty cycles.
- **Impedance (1 MΩ/ 50 Ω)**:
  - **1 MΩ(Default)**: Standard high-impedance mode for general probing.
  - **50 Ω**: Used for high-frequency signals or when impedance matching with a 50 Ωsource is required to reduce reflections.
- **Attenuation (1X / 5X)**:
  - **1X (Default)**: Standard sensitivity.
  - **5X**: Reduces the signal level by a factor of 5. Useful for noise reduction and handling logic signals above 2.5 V.
- **Polarity (Rising / Falling)**:
  - **Rising Edge (Default)**: Frequency and period measurements trigger on the positive-going edge.
  - **Falling Edge**: Useful for waveforms with slow rise times but fast fall times to improve trigger stability.
- **Filter (On / Off)**:
  - **Off (Default)**: Full bandwidth.
  - **On**: Enables a 50 kHz low-pass filter to eliminate high-frequency noise on low-frequency signals.

Trigger Threshold

Adjust the trigger sensitivity using the **Threshold** knob. Two yellow LEDs indicate the trigger balance:

- In **AC coupling**, center the control for most standard waveforms.
- In **DC coupling**, the control allows for a direct threshold adjustment up to ±2 V (at 1X) or ±10 V (at 5X).

5.1.1 Input B (High Frequency)

Input B is optimized for 80 MHz to 3 GHz measurements with a fixed 50 Ωimpedance.

WARNING **The maximum input voltage for Input B is 1 Vrms. Signals over 250 mVrms are diode-clipped for protection.**

Description: Optimization Tips

To ensure accuracy, use a 50 Ωsource and a high-quality, short 50 Ωcoaxial cable. If spurious readings occur due to wideband noise, external attenuation or a high-pass filter may be necessary.

5.1.2 Input C (Microwave — 1826B only)

Input C covers 2 GHz to 6 GHz (typically counting from 1.8 GHz to 7.5 GHz).

Description: Hardware Protection

This channel includes a PIN diode limiter. The maximum input for correct counting is 1.5 Vrms (+16 dBm). The damage threshold is 4 Vrms (+25 dBm).

5.2 Functions

Select functions using the primary keys. Holding a key for more than 1 second activates the secondary function listed above the key.

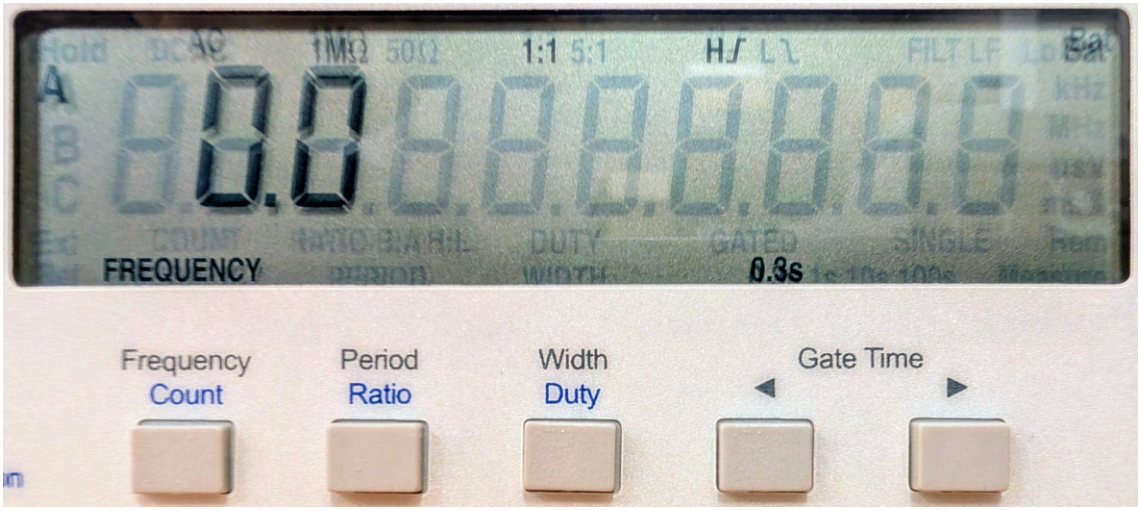

Figure 5.1 Function Selection and Display Annunciators

5.2.1 Input A Function Selection

Frequency / Period	Standard time-domain measurements.
Count	Totals pulses. Use **HOLD** to freeze the display; **RESET** to restart.
Width	Measures High or Low pulse time based on Polarity setting.
Ratio (H:L)	Displays the ratio of High time to Low time.
Duty	Displays the High/Low time as a percentage of the total period.

Table 5.1 Input A Functions

5.2.2 Input B and C Function Selection

For Inputs B and C, only **Frequency** and **Period** are available.

- **Ratio B:A**: Available when Input B is selected by holding the **Period** key. This compares the frequency of Input B against Input A.
- **Note**: Input C does not support the Ratio function.

5.3 Gate Time

Gate time (measurement time) determines the resolution and accuracy of the result. Accuracy increases with longer gate times.

Gate Time	0.3 s	1.0 s	10 s
Resolution	7 Digits	8 Digits	9 Digits

100 s 10 Digits

Table 5.2 Gate Time vs. Resolution

Description: Display Controls

- **Hold**: Freezes the current display. Measurements continue in the background.
- **Reset (2nd function of Hold)**: Clears the current running average and starts a new measurement cycle immediately.

Measurement Fundamentals

6.1 Frequency and Period Measurements

The instrument utilizes **reciprocal counting** to perform time-domain measurements. Unlike traditional counters that count cycles over a fixed gate, this method measures the time duration of a whole number of input cycles. The instrument waits for the current cycle to complete before capturing data, then divides the total time by the number of cycles to calculate the average period and derive the frequency.

Description: Key Advantages

- **High Resolution**: Provides significantly higher accuracy at low frequencies compared to traditional counting.
- **Capture and Continue**: There is no "dead time" between gate intervals, allowing for rolling updates that reflect a continuous average of the input signal.

For frequency-modulated (FM) signals, the display represents the average frequency over the gate time. For amplitude-modulated (AM) signals, ensure the signal troughs remain above the trigger threshold to maintain a consistent count.

6.2 Width, Duty, Cycle, and Ratio Measurements

Pulse width measurements use a sampling technique to accommodate signal gaps. The instrument samples individual cycles at up to 1,000 samples per second, collecting up to 50 samples within the selected gate time.

Description: Calculation and Resolution

- **Resolution**: Each sample has a 20 ns resolution; the averaged result is displayed with up to 1 ns resolution.
- **Derived Values**: Duty cycle and the High-to-Low ratio (H:L) are mathematically derived from the average width and the measured period.

6.3 Ratio B:A

This mode compares the frequency of Input B against Input A. It is activated by holding the **Width/Ratio** key while Input B is selected.

The instrument captures both signals as simultaneously as possible. This method essentially uses the signal at Input A as a reference timebase to measure the frequency at Input B.

Accuracy Considerations

7.1 Internal Oscillator

The instrument is equipped with a high-stability Temperature-Compensated Crystal Oscillator (TCXO).

Description: Specifications

- **Calibration**: Adjusted to within ±0.2 ppm at 21°C.
- **Temperature Stability**: Additional error is less than ±1 ppm between 5°C and 40°C.
- **Aging**: Under ±1 ppm in the first year, decreasing thereafter.

A yearly calibration is recommended to maintain these specifications.

7.2 External References

For applications requiring precision beyond the internal TCXO, an external 10 MHz frequency standard can be connected to the rear-panel External Reference input.

Description: Signal Requirements

The input accepts:

- TTL or CMOS (3 Vpp to 5 Vpp).
- Sinewave (1 Vrms to 2 Vrms).

The instrument automatically detects the external signal and displays the **"Ext Ref"** annunciator.

WARNING **Non-standard reference frequencies cannot be used. An improper or unstable signal will disrupt the internal oscillator and degrade measurement accuracy.**

7.3 Noise

Noise can cause fluctuations when measuring low-amplitude, low-frequency sinewaves. To improve stability:

- Maximize the signal amplitude where possible.
- Use a longer gate time to average out random noise.

7.4 Signal Level

While insufficient signal levels usually result in obvious display variations, high-frequency inputs (Input B >2 GHz and Input C >5 GHz) can exhibit subtle errors, such as a consistent offset in the eighth digit.

NOTICE **Always ensure your input signal levels meet the published sensitivity specifications to guarantee 10-digit accuracy.**

Specifications

Model		1823B	1826B
Input specifications			
Input A[1]	Input coupling	AC or DC	
	Input impedance	1 MΩ or 50 Ω	
	Attenuation	1x or 5x	
	Active edge	Rising or falling, or width high or low	
	Low pass filter	Filter in (~50 kHz cut-off) or Out	
	Trigger threshold	DC coupled: 0 to 2 V (1:1 attenuation) or 0 to 10 V (5:1 attenuation) AC coupled: Average ± 50 mV (1:1 attenuation) or ±250 mV (5:1 attenuation)	
	Frequency range	< 0.001Hz to >125MHz (1MΩ, DC coupled) < 30Hz to > 125MHz (1MΩ, AC coupled) < 500kHz to > 125MHz (50Ω, AC coupled)	
	Sensitivity (sinewave)	15 mVrms 30 Hz to 100 MHz, 25 mV to 125 MHz at optimum threshold adjustment	
	Signal Range	1MΩ: DC - 0 to 3.3V (1:1) or 1 to 12V (5:1); AC - up to 1Vrms (3Vpp) (1:1) or up to 4Vrms (12Vpp) (5:1) 50Ω: AC - up to 1V rms above 300kHz	
Input B[1]	Input impedance	50 Ω nominal (AC coupled)	
	Frequency range	< 80 MHz to > 3 GHz	
	Sensitivity (sinewave)	12 mVrms 80 MHz to 2 GHz, 25 mVrms to 2.5 GHz, 50 mVrms to 3 GHz	
	Input signal range	< 0 dBm recommended, + 13 dBm (1 Vrms) maximum	
Input C	Input impedance	-	50 Ω nominal (Ac coupled) in-band. 250 k Ω at DC
	Frequency range	-	2 GHz to 6 GHz (typically 1.8 GHz to 7.5 GHz)
	Sensitivity	-	25 mVrms (-19 dBm) 2 GHz to 6 GHz
	Maximum input signal	-	< + 16 dBm (1.5 Vrms); damage level + 25 dBm
External Reference Input	Input impedance	> 100 kΩ, AC coupled	
	Frequency	10 MHz	
	Signal level	TTL, 3 Vpp to 5 Vpp CMOS or 1 to 2 Vrms sinewave	
Timebase	Measurement clock	50 MHz	
	Internal reference	10 MHz TCXO with electronic calibration adjustment (> ± 8 ppm)	
	Temperature stability	Better than ± 1 ppm over rated temperature range	
	Initial error	< ± 0.2 ppm at 21 °C	
	Aging rate	< ± 1 ppm first year	

(1) Input A and B maximum input voltage: 30 VDC; 30 Vrms 50/60 Hz with respect to earth ground

Specifications (cont.)

Model		1823B	1826B
Measurement functions			
Measurement accuracy		Measurement accuracy is timebase accuracy + measurement resolution + 2 counts.	
Frequency range and period	Input A range	Frequency: 0.001 Hz (DC coupled) to 125 MHz; Period: 8 ns to 100 s (DC coupled)	
	Input B range	Frequency: 80 MHz to 3000 MHz; Period: 333 ps to 12.5 ns	
	Resolution	The displayed resolution (up to 10 digits) depends on the measurement time and input frequency. The resolution of period is 8 digits per 2 seconds. Frequency resolution is the reciprocal of period resolution.	
Pulse width range (Input A only)	Functions	Width high, width low, ratio H:L (high time to low time) and duty cycle 40ns to 1000s	
	Pulse width range	40ns to 1000s	
	Averaging	Automatic within measurement time selected, up to 50 pulses	
	Resolution	20ns for one pulse; up to 1ns or 10 digits with multiple pulse averaging	
Total count (Input A only)	Count range	1 to 9 999 999 999	
	Minimum Width	8ns	
Frequency ratio B:A	Resolution	If the ratio exceeds 10 digits, 6 digits and the exponent are displayed	
General			
Interface		USB (VCOM)	
Display		No. of Digits: 10 digits, Size: 0.5 in (12.5 mm)	
Battery		2500 mAh NiMH cells (x3), Last 24 hours per full charge (typical), Recharge > 4 hours	
AC Adapter		85 to 240 V, 50 or 60 Hz	
Power Consumption		5W max at DC input to unit; 15VA max at AC adapter input (charging)	
Operating Range		+5°C to +40°C, 20% to 80% RH	
Electrical safety		Complies with EN61010-1	
EMC		Complies with EN61326	
Weight		2.1 lbs (950 g) plus 0.4 lbs (170 g) AC adapter	
Dimensions (W x H x D)		10.2 in x 3.5 in x 9.3 in (260 x 88 x 235 mm)	
Warranty		3 years	
Standard Accessories		Universal AC adapter, and battery compliance notice	

Service Information

Warranty Service: Please go to the support and service section on our website at bkprecision.com to obtain an RMA #. Return the product in the original packaging with proof of purchase to the address below. Clearly state on the RMA the performance problem and return any leads, probes, connectors and accessories that you are using with the device.

Non-Warranty Service: Please go to the support and service section on our website at bkprecision.com to obtain an RMA #. Return the product in the original packaging to the address below. Clearly state on the RMA the performance problem and return any leads, probes, connectors and accessories that you are using with the device. Customers not on an open account must include payment in the form of a money order or credit card. For the most current repair charges please refer to the service and support section on our website.
Return all merchandise to B&K Precision Corp. with prepaid shipping. The flat-rate repair charge for Non-Warranty Service does not include return shipping. Return shipping to locations in North America is included for Warranty Service. For overnight shipments and non-North American shipping fees please contact B&K Precision Corp.

Include with the returned instrument your complete return shipping address, contact name, phone number and description of problem.

B&K Precision Corp.
22820 Savi Ranch Parkway
Yorba Linda, CA 92887
bkprecision.com
714-921-9095

LIMITED THREE-YEAR WARRANTY

B&K Precision Corp. warrants to the original purchaser that its products and the component parts thereof, will be free from defects in workmanship and materials for a period of **13years** from date of purchase.

B&K Precision Corp. will, without charge, repair or replace, at its option, defective product or component parts. Returned product must be accompanied by proof of the purchase date in the form of a sales receipt.

To help us better serve you, please complete the warranty registration for your new instrument via our website www.bkprecision.com

Exclusions: This warranty does not apply in the event of misuse or abuse of the product or as a result of unauthorized alterations or repairs. The warranty is void if the serial number is altered, defaced or removed.
B&K Precision Corp. shall not be liable for any consequential damages, including without limitation damages resulting from loss of use. Some states do not allow limitations of incidental or consequential damages. So the above limitation or exclusion may not apply to you.
This warranty gives you specific rights and you may have other rights, which vary from state-to-state.

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Version: July 20, 2026