User Manual

1820B Series
Portable Bench Universal Frequency Counters

BK PRECISION

Contents

Compliance Information

1.1 EMC

EC Declaration of Conformity - EMC

Complies with EN61010-1, EN60950-1 (Adapter/charger) & EN61326-1. For details, request the EU Declaration of Conformity for this instrument.

EN 61010-1:2010 Safety requirements for electrical equipment for measurement, control, and laboratory use Part 1: General requirements

EN 60950-1:2010 Information technology equipment - Safety Part 1: General requirements

EN 61326-1:2010 Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements

1.2 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.

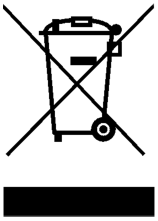
Mains Isolated : is for measurements performed on circuits not directly connected to a mains supply.

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

1.3 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.

1.4 Terms and Symbols

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

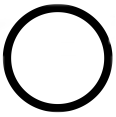
A note statement calls attention to an operating procedure, practice, or condition, which, should be noted before proceeding.

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:

- Read and understand the safety and operational information in this manual.
- Apply all the listed safety precautions.
- 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.
- Make all connections to the instrument before applying power.
- 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.

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.

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.

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.**

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.

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.

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.

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.

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.

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 includes the 1823B and 1826B models, which are portable, battery-powered universal counters with a 10-digit, 0.5" LCD display. They cover frequencies from below 0.001 Hz to over 6 GHz (up to 3 GHz for the 1823B) and support measurements such as frequency, period, ratio, pulse width, and count.

The instrument uses a temperature-compensated internal frequency reference, stable to within ±1 ppm, with a quick warm-up time for accurate measurements in portable conditions. Input A is configurable (AC/DC coupling, 1MΩ/50Ω impedance, adjustable threshold) and handles frequencies from 0.001 Hz to 125 MHz. Input B (50Ω) covers 80 MHz to 3 GHz, while Input C* (available on the 1826B) supports 1 GHz to over 6 GHz.

The device employs reciprocal counting for high-resolution measurements and displays up to 10 digits with minimal granularity. Indicators show input configuration, measurement status, and units (Hz, kHz, MHz, etc.). A USB interface allows remote control, and the device can draw power from a USB port or internal NiMH batteries, providing up to 24 hours of operation.

Figure 3.1 1820B Series

Model	Range	Resolution	Time Base Stability	Frequency	Period	Totalize	Noise Filter	Battery Power	Remote Interface
1823B	1 mHz to 3 GHz	10 digits	±1 ppm	✓	✓	✓	✓	24 Hours	USB (VCOM)
1826B	1 mHz to 6 Ghz								

Table 3.1 Models Overview

3.2 Features

- 3 GHz (1823B) and 6 GHz (1826B) models
- Dedicated microwave channel with N-type connector (1826B only)
- 10-digit display resolution with 0.5” LCD
- ±1 ppm time base stability
- Internal rechargeable batteries allow for up 24 hours of wireless operation
- Frequency ratio measurement function
- Time interval measurement
- Remote control with USB (VCOM) interface
- Selectable measurement time, 100 s, 10 s, 1 s, and 0.3 s

3.3 Package Contents

Please inspect the instrument mechanically and electrically upon receiving it. Unpack all items from the shipping carton, and check for any obvious signs of physical damage that may have occurred during transportation. Report any damage to the shipping agent immediately. Save the original packing carton for possible future reshipment. Every electronic load is shipped with the following contents:

- 1 x 8623B or 8626B
- 1 x Certificate of Calibration
- 1 x Universal AC adapter
- 1x Battery compliance Notice

NOTICE Verify that all items above are included in the shipping container. If anything is missing, please contact B&K Precision.

3.4 Dimensions

The 8620B series dimensions are approximately.

Model	1823B	1826B
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) plus 0.4 lbs (170 g) AC adapter	

Table 3.2 Dimensions and Weight

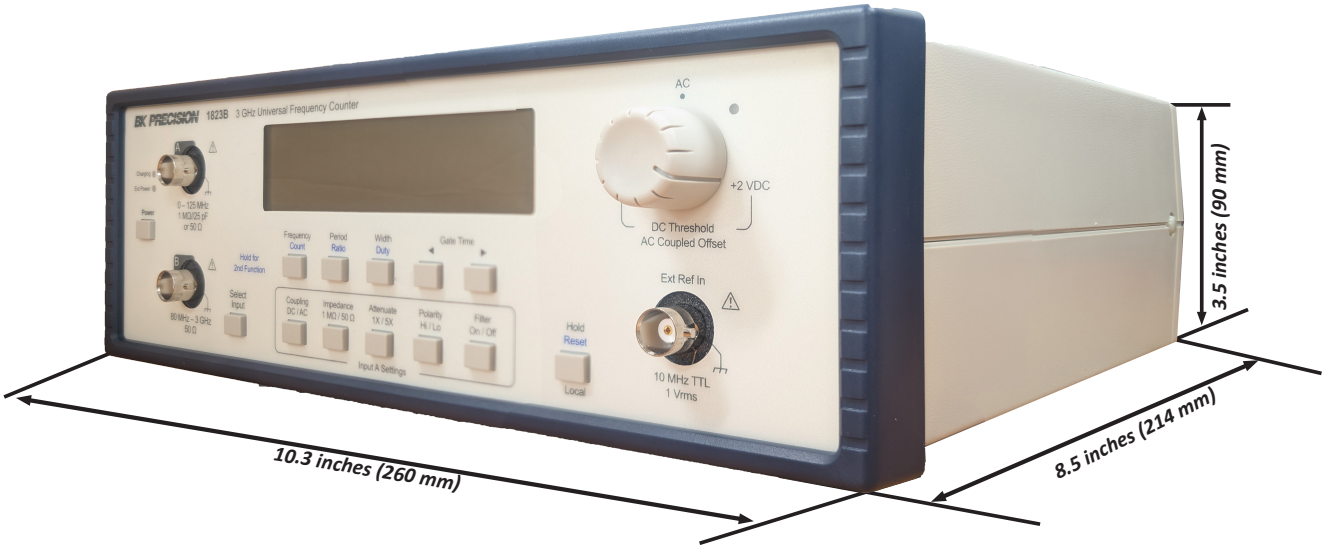


Figure 3.2 1820B Dimensions

Getting Started

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

4.1 Input Power

The 1820B series instruments can be powered by three sources: an internal rechargeable battery, DC input from the supplied AC adaptor, or USB power from a desktop or portable PC. The AC adaptor takes priority over USB or battery power; if the AC adaptor is not connected, USB power is used before the battery. The instrument's software intelligently manages power loss to prevent unintentional battery discharge.

The 1820B series are safety class III instruments. When powered by the internal battery, AC adaptor, or USB from an ungrounded PC, all accessible parts are at the same voltage as the outer N-type and BNC input sockets. To ensure user safety, do not connect inputs to voltages exceeding 30V DC or 30Vrms. While inputs can briefly withstand accidental connection to AC line voltage up to 250Vrms, users are at risk if the instrument's ground is connected to hazardous voltages.

4.1.1 Battery Operation

The instrument is equipped with 2500mAh rechargeable NiMH batteries, providing up to 24 hours of use when fully charged. Charging is done via the supplied AC adaptor.

A **"Bat"** indicator appears on the display when using battery power, changing to **"Lo Bat"** when around 10% of battery life remains. To turn the instrument on or off 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, even if the battery is flat, however the USB power will not recharge the battery. Connect the instrument to the PC using a standard USB cable. Windows will automatically detect the new hardware, and if needed, prompt for driver installation.

USB power takes priority over the battery, and the "Bat" or "Lo Bat" indicators will turn off to reflect this. The instrument will automatically turn on when connected via USB, and turn off when USB power is

removed. The **Power** key can be used to turn the instrument on or off while USB power is connected. USB power is available even without using the connection for remote control.

4.1.3 AC Adaptor Operation

The AC adaptor connects to the rear panel socket labeled **DC IN**. When connected, the red **EXT POWER** LED lights up, indicating power, and the yellow **CHARGING** LED shows if the battery is charging.

NOTICE

The instrument features intelligent charging for optimal battery performance and protection. It's safe to leave the adaptor connected for extended periods, but it's good practice to disconnect it when not in use.

WARNING

Only use the supplied adaptor.

The **Power** key can turn the instrument on or off while using AC power. If powered off via the **Power** key, it remains off when AC power is removed and reapplied. However, if turned off by removing the AC power, the instrument automatically powers on when AC is reconnected. When switching from battery or USB power to AC, the AC adaptor takes priority, but the instrument will switch back to battery or USB if AC power is removed.

4.1.4 Power State

The instrument can be turned on or off using the **Power** key, regardless of the power source. At power-on, the default settings are: Input A, Frequency, AC coupling, 1MΩ impedance, 1:1 attenuation, rising edge polarity, no filter, 0.3s measurement time, and no measurement hold.

NOTICE

The threshold is set by the Threshold control, and the relevant indicators will be shown on the display.

If the **Reset** key is held while powering on, the display will show all indicators, followed by the firmware revision number for 2 seconds. Afterward, a full display check will occur until the **Reset** key is released.

When the instrument is off, pressing the **Frequency**, **Period**, or **Width** switches will turn it on and select the respective function, with all other settings defaulted. The instrument will operate normally, responding to all key presses. If no keys are pressed for about 15 seconds, the instrument will automatically power down to conserve battery life.

Front Panel Operation

At power-on, the power supply will automatically enter the front-panel operation mode and the instrument can be controlled via the front panel keys and knob.

5.1 Input

Inputs A, B, or C (1826B only) are selected by pressing the **Select Input** key, with an indicator showing the active input.

5.1.1 Input A Configuration

Input A handles frequencies from 0.001Hz to over 125MHz and offers various configuration options for different waveforms and amplitudes. The maximum input voltage and clipping thresholds depend on coupling, attenuation, and impedance settings (see specifications). Input A is also protected against accidental connection to mains voltages up to 250Vrms at 50/60Hz.

At power-on, the default settings for Input A are: AC coupling, 1MΩ input impedance, 1:1 attenuation, rising edge polarity, and no filter. These defaults generally work for most waveforms, but adjustments may be needed for specific signals, such as using DC coupling and a low-pass filter for low frequencies.

- **Coupling DC/AC:** AC is the default, ideal for general use. For very low frequencies (<30Hz) or low duty cycle signals, select DC coupling. AC coupling automatically resets the display to 0.0 if no signal transition occurs after 1 second, while DC coupling waits indefinitely for input transitions.
- **Impedance 1MΩ/50Ω:** 1MΩis the default and works well with both AC and DC coupling. Use 50Ω for high frequencies or when matching a 50Ω signal source.
- **Attenuation 1X/5X:** 1:1 is the default setting. Use 5:1 for larger signals or noise reduction, particularly for logic signals above 2.5V.
- **Polarity Hi/Lo:** Rising edge is the default. Frequency and period measurements start on the rising edge. Use falling edge if the waveform has a slow rise and fast fall to reduce jitter.
- **Filter On/Off:** The default is no filter. When enabled, the 50kHz filter is ideal for low-frequency signals but can be useful for signals up to 200kHz.
- **Trigger Threshold:** Adjust using the yellow LEDs that show the balance between the input signal and trigger level.
  - In AC coupling (default), set the control to mid-position for most signals.
  - For DC coupling, the control directly adjusts the threshold up to 2V (1:1) or 10V (5:1).
  - Fine adjustments may be needed for stability, particularly with small signals.

5.1.2 Input B

Input B is for frequency measurements from 80MHz to over 3GHz with a nominal 50Ω impedance. The maximum input voltage is 1Vrms, and the input is diode-clipped for signals over 250mVrms. It is protected against accidental connection to mains voltages up to 250Vrms at 50/60Hz.

To avoid spurious results, use a signal with 50Ω source impedance and a short 50Ω coaxial cable. Due to the wide bandwidth, signals mixed with noise or interference may cause incorrect readings. External attenuation or filtering may help, especially for small signals above 2GHz, where an external high-pass filter may be necessary. For better performance above 3GHz, use the C* input.

5.1.3 Input C

Input C is for frequency measurements from 2GHz to over 6GHz, with typical counting from 1.8GHz to 7.5GHz. It has a nominal 50Ω impedance and includes a coupling capacitor, resistive attenuator, and PIN diode limiter. The maximum input for correct counting is 1.5Vrms (+16dBm), with a damage threshold of 4Vrms (+25dBm). A 250kΩ DC bleed resistor minimizes static build-up.

The signal should have a 50Ω source impedance, with a short 50Ω coaxial cable to avoid spurious results. Input C offers superior noise immunity and large signal handling compared to Input B and should be preferred for frequencies above 2GHz, unless Ratio B:A is required.

5.2 Functions

Functions are selected using the keys located below the display, with annunciators indicating the current settings.

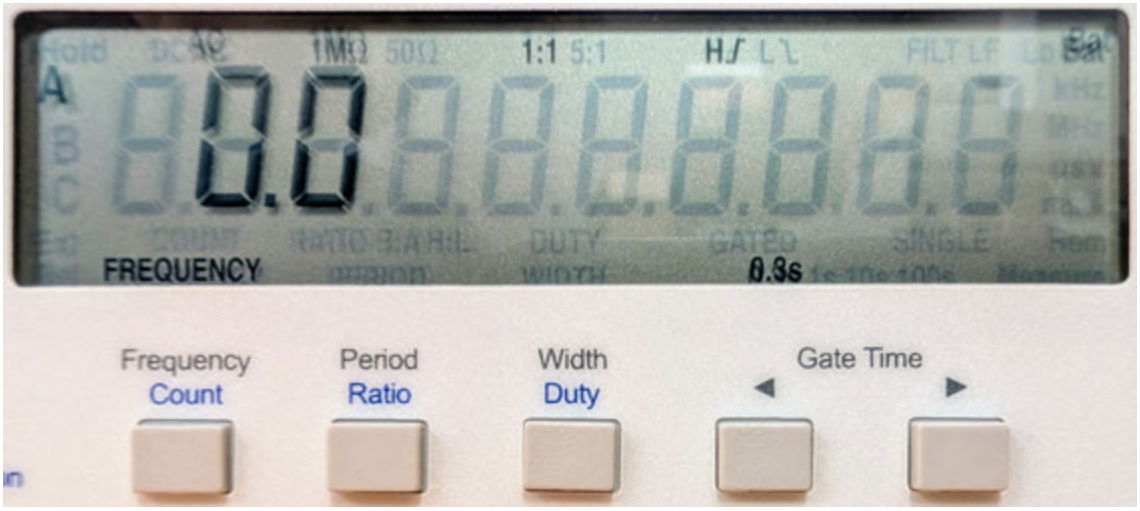


Figure 5.1 Function Selection and Annunciator

5.2.1 Input A Function Selection

Pressing the **Frequency**, **Period**, or **Width** key sets the instrument to the corresponding function. Holding the key for more than 1 second switches to the secondary function: **Count**, **Ratio**, or **Duty**, with the selected function indicated on the display.

- **Frequency** and **Period** measurements are shown in their respective units.
- **Count** totals pulses, with the option to freeze the display using HOLD, while counting continues. RESET restarts the count.
- **Width** measures High or Low time based on the polarity setting.
- **Ratio** shows the ratio of High time to Low time (Ratio H:L) or vice versa.
- **Duty** displays High/Low time as a percentage of the period.

5.2.2 Input B Function Selection

With Input B (80MHz–3GHz) selected, only **Frequency** and **Period** functions are available. Attempts to select **Width Count**, or **Duty** will be ignored, indicated by a brief flash of the B annunciator.

Selecting **Ratio** (by holding the Period key) activates **Ratio** B:A mode, which compares the frequency of Input B to Input A. The result is as accurate as the frequency measurements, and if the ratio is too large for the display, it will be shown with six digits and an exponent.

5.2.3 Input C Function Selection

With Input C (2GHz–6GHz) selected, only **Frequency** and **Period** functions are available. Attempts to select **Width**, **Count**, **Ratio**, or **Duty** will be ignored, with the C annunciator flashing briefly. **Ratio** is not available for Input C.

5.3 Gate Time

Measurement time is adjusted using the **Gate Time** keys, with the selected time displayed. When a signal is detected, the Measure indicator flashes until a valid result is displayed, then stays on. Updates reflect the running average over the last 0.3s, 1s, 10s, or 100s, depending on the selected time.

Results improve in accuracy with longer measurement times: 7 digits after 0.3s, 8 after 1s, 9 after 10s, and 10 digits after 100s. Units and decimal points are automatically adjusted for convenience.

Pressing **Hold** freezes the display while the measurement continues in the background. Switching between related functions (e.g., Frequency and Period) immediately converts the current measurement. **Reset** (second function of **Hold**) starts a new measurement without changing the function or time.

Measurement Fundamentals

6.1 Frequency and Period Measurements

The instrument uses **reciprocal counting** for measurements. After each gate time, it waits for the current input cycle to finish before capturing the count data. By measuring the total time for a whole number of cycles and dividing it by the number of cycles, it calculates the signal's average period and derives the frequency. This method provides greater accuracy at low frequencies compared to traditional counting.

The instrument employs "capture and continue" counting, ensuring no dead time between gate intervals and allowing rolling updates faster than the gate time. Each update reflects the average frequency over the previous gate time.

For signals with frequency modulation, the display shows the average over the gate time, leading to small variations. For amplitude modulation, the signal's trough must exceed the input sensitivity threshold, requiring careful trigger adjustment for deeply modulated signals.

6.2 Width, Duty, Cycle, and Ratio Measurements

In P**Width** mode, the instrument uses a different method to measure the active part of the signal, as the inactive state causes gaps. It samples individual signal cycles at up to 1000 samples per second, collecting up to 50 samples over the selected gate time. The average width is calculated and displayed, with each sample having a 20ns resolution, and the average shown with up to 1ns resolution. **Duty cycle** and **ratio H:L** (active:inactive) are derived from the average width and known period. The displayed resolution reflects the likely measurement accuracy.

6.3 Ratio A:B

This mode is activated by holding the **Width/Ratio** key with Input B selected. It captures measurements of both input signals as simultaneously as possible, though they may not be exactly aligned unless the signals are synchronized. This minor timing difference is usually irrelevant unless the signals are heavily frequency modulated.

This method uses the A signal as a reference timebase to count the B input.

Accuracy Considerations

7.1 Internal Oscillator

The instrument features an internal temperature-compensated crystal oscillator (TCXO), calibrated to within ±0.2ppm at 21ºC using a Rubidium reference. At temperatures between 5ºC and 40ºC, the additional error is less than ±1ppm. The oscillator's aging rate is under ±1ppm in the first year and decreases over time. A yearly calibration is recommended.

7.2 External References

For higher accuracy than the TCXO provides, an external 10MHz frequency standard can be connected to the External Reference input. The signal must be a TTL, 3Vpp to 5Vpp CMOS, or 1–2Vrms sinewave. This external reference locks the internal oscillator and must be a precise 10MHz signal—non-standard signals cannot be used for ratiometric measurements.

The instrument automatically detects the external signal and locks to it, showing the "Ext Ref" indicator. An improper signal will disrupt the internal oscillator and reduce measurement accuracy.

7.3 Noise

When measuring low-amplitude, low-frequency sinewaves, noise can cause fluctuations in the displayed result. To minimize this, maximize the signal amplitude. The instrument's internal noise is random, with a low-frequency component. Using a longer gate time helps reduce noise effects and shows the variation range, allowing you to estimate an average. However, this method is less effective for signals with intermittent or non-random noise, such as supply frequency interference.

7.4 Signal Level

When a signal is too small for reliable counting, it's usually apparent from display variations. However, on Input B above 2GHz and Input C* above 5GHz, insufficient signal can cause subtle errors, like a consistent issue in the eighth digit, which may not be easily noticed. For accurate measurements, ensure the signal level meets the published specifications, even though the instrument is generally more sensitive than required.

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

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, certificate of calibration, and battery compliance notice	

Service Information

Warranty Service: Please go to the support and service section on our website 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 to obtain an RMA #. Return the product in the original packaging to the address. 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.

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 **three years** 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.

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.

B&K Precision Corp.

Version: November 6, 2024