

# USB-2404 Series

24-Bit Devices for Voltage, Temperature, or Bridge-Based Sensors



## Features

- Four analog inputs
- 24-bit resolution
- Up to 50 kS/s simultaneous sampling
- Voltage measurements from  $\pm 125$  mV to  $\pm 60$  V
- USB-2404-UI also measures current, thermocouples, RTDs, resistance, and bridge-based sensors
- Built-in thermistors for cold-junction compensation (CJC) calculations
- 250 Vrms channel-to-channel and channel-to-ground isolation
- Anti-alias filter (USB-2404-10 and USB-2404-60)
- Detachable screw terminals
- No external power supply required



The USB-2404-UI offers simultaneous sampling on four, 24-bit channels of universal analog input. The device can measure voltage, current, thermocouples, RTDs, resistance, and bridge-based sensors.

## Software

- TracerDAQ® software for acquiring and displaying data and generating analog signals
- Universal Library includes support for Visual Studio® and Visual Studio® .NET, including examples for Visual C++®, Visual C#®, Visual Basic®, and Visual Basic® .NET
- InstaCal software utility for installing, configuring, and testing
- ULx for NI LabVIEW™
- Comprehensive drivers for DASyLab®

The USB-2404-UI is designed for multi-purpose testing, and can measure several signals from different sensors.

All USB-2404 Series devices include channel-to-channel isolation to protect the entire system from harmful voltage spikes and to eliminate measurement errors caused by ground loops

## Timebase-Controlled Sample Rates (USB-2404-10/2404-60 Only)

The USB-2404-10/2404-60 offer sample rates up to 50 kS/s.

A master timebase frequency ( $f_M$ ) controls the sample rate ( $f_s$ ) of these devices. Use the following equation to calculate the available sample rates of the USB-2404-10/2404-60:

$$\frac{(f_M \div 256)}{n}, \text{ where } n \text{ is any integer from } 1 \text{ to } 31.$$

Using the 12.8 MHz internal master timebase results in sample rates of 50 kS/s, 25 kS/s, 16.67 kS/s and so on down to 1.613 kS/s, depending on the value of  $n$ .

Refer to the USB-2404-10/2404-60 "[Analog Input](#)" specifications for more information about the sample rate range.

## Overview

The USB-2404-10 and USB-2404-60 are designed for both high-speed and accuracy. These devices are ideal general-purpose analog input devices because of their resolution, sample rate, and input range.

## Analog Input

Each USB-2404 Series device provides four simultaneous-sampling analog inputs, and 250 Vrms channel-to-channel and channel-to-ground isolation.

All devices can connect to either ground-referenced or floating signal sources.

USB-2404 Series Selection Chart						
Model	Analog Inputs	Sample Rate Per Channel	Measurement Types	Voltage Ranges	Isolation*	Anti-Alias Filter
USB-2404-10	4	Up to 50 kS/s	Voltage	$\pm 10$ V	✓	✓
USB-2404-60	4	Up to 50 kS/s	Voltage	$\pm 60$ V	✓	✓
USB-2404-UI	4	Up to 100 S/s	Voltage, Current, Thermocouples, RTDs, Resistance, and Bridge-Based Sensors	$\pm 60$ V, $\pm 15$ V, $\pm 4$ V, $\pm 1$ V, $\pm 125$ mV	✓	–

\* 250 Vrms channel-to-channel and channel-to-ground

# USB-2404 Series

## General Information

### Universal Analog Inputs

#### (USB-2404-UI Only)

The USB-2404-UI offers sample rates up to 100 S/s, and supports ranges of  $\pm 60$  V,  $\pm 15$  V,  $\pm 4$  V,  $\pm 1$  V, and  $\pm 125$  mV.

In addition to voltage, the USB-2404-UI can also measure:

- current ( $\pm 25$  mA)
- thermocouples (J, K, R, S, T, N, E, B type)
- RTDs (Pt100, Pt1000, 3-wire and 4-wire)
- resistance (2-wire and 4-wire)
- bridge-based sensors (quarter-, half-, and full-bridge) – used to measure load cells, pressure transducers, and strain gages

An excitation circuit is enabled for all analog input modes that require excitation. The ADC and excitation circuits are reconfigured in each mode to accommodate each sensor type. Refer to the USB-2404-UI "[Excitation](#)" specifications for more information about excitation levels.

The device also supports class II TEDS *smart* sensors.

The USB-2404-UI includes a built-in thermistor for cold-junction compensation (CJC).

### Anti-Alias Filtering

#### (USB-2404-10/2404-60 Only)

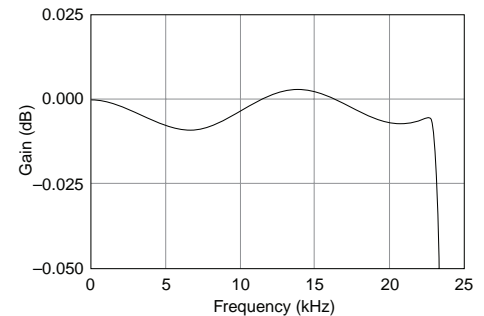
The USB-2404-10/2404-60 combine analog and digital filtering to accurately represent in-band signals while rejecting out-of-band signals. The filters discriminate between signals based on the frequency range, or *bandwidth*, of the signal. The passband, stopband, and alias-free bandwidths are important.

These devices represent signals within the passband frequency, as quantified primarily by passband ripple and phase nonlinearity.

All signals within the alias-free bandwidth are either unaliased signals or signals that have been filtered by at least the amount of the stopband rejection.

**Passband Bandwidth:** The signals within the passband bandwidth have frequency-dependent gain or attenuation. The small amount of variation in gain with respect to frequency is called the *passband flatness*. The device digital filters adjust the frequency range of the passband to match the data rate.

Therefore, the amount of gain or attenuation at a given frequency depends on the sample rate. A typical passband flatness for the 50 kS/s sample rate is shown below.



Typical passband response for 50 kS/s sample rate (USB-2404-10/2404-60)

**Stopband Bandwidth:** The filter significantly attenuates all signals above the stopband frequency ( $0.547 \cdot f_s$ , where  $f_s$  is the sample rate). The filter is used primarily to prevent aliasing. Therefore, the stopband frequency scales precisely with the sample rate.

The stopband rejection (100 dB) is the minimum amount of attenuation applied by the filter to all signals with frequencies within the stopband bandwidth.

**Alias-Free Bandwidth:** Signals that appear in the alias-free bandwidth of the USB-2404-10/2404-60 are not aliased artifacts of signals at a higher frequency. The alias-free bandwidth ( $0.453 \cdot f_s$ ) is defined by the ability of the filter to reject frequencies above the stopband frequency. The alias-free bandwidth equals the sample rate minus the stopband frequency.



The USB-2404-10 and USB-2404-60 (shown above) each provide four 24-bit simultaneous-sampling analog inputs with sample rates up to 50 kS/s per channel and up to 250 Vrms channel-to-channel and channel-to-ground isolation. The USB-2404-10 supports an input voltage range of  $\pm 10$  V, and the USB-2404-60 supports a range of  $\pm 60$  V.

# USB-2404 Series

## General Information



### Timing Options (USB-2404-UI Only)

The USB-2404-UI supports the following timing options, each of which is optimized for different types of applications by using different ADC conversion times.

- **High Speed** – Optimized for high-speed applications at the expense of noise rejection.
- **Best 60 Hz Rejection** – Optimized for rejection of 60 Hz noise.
- **Best 50 Hz Rejection** – Optimized for rejection of 50 Hz noise.
- **High Resolution** – Optimized for maximum overall noise rejection, and provides a good rejection of both 50 Hz and 60 Hz noise.

Refer to the analog input specifications for the conversion time and rejection ratio of each option.

### ACC-160 and ACC-176 Backshell Kits for High-Voltage Applications

MCC recommends using the ACC-160 backshell with the USB-2404-10/2404-60 and the ACC-176 with the USB-2404-UI for high-voltage applications to ensure that the terminals are not accessible. The backshell also provides strain relief to protect the screw terminals.



ACC-160



ACC-176

### Status LED

Each USB-2404 Series device has an onboard LED to indicate if the device is initialized and receiving power

### Terminal Connectors

The USB-2404-10/2404-60 both have four 2-position detachable screw terminals for connection to four isolated analog inputs. Ten additional two-position connectors are available with the optional ACC-102 connector kit.

The USB-2404-UI has four 6-position detachable spring connectors that provide connections to four analog input channels. Four additional six-position connectors are available with the optional ACC-164 connector kit.

### MCC DAQ Software

USB-2404 Series devices ship with the MCC DAQ software CD, which includes the InstaCal software utility for installing, configuring, and testing Measurement Computing hardware.

In addition to InstaCal, MCC DAQ software also includes the following software packages:

### TracerDAQ

TracerDAQ is an out-of-the-box application that can generate, acquire, analyze, display, and export data within seconds of installing Measurement Computing data acquisition hardware. TracerDAQ includes a strip chart, an oscilloscope, a function generator, and a rate generator, all of which are accessed through a common, easy-to-use interface.



TracerDAQ provides four virtual instrument applications used to graphically display and store input data.

### Universal Library

The Universal Library (UL) is a set of programming libraries for developing applications with Visual Studio programming languages (and others) for use with Measurement Computing hardware. UL includes a complete function library that simplifies the configuration and operation of your measurement device. UL supports Visual Studio and Visual Studio .NET, and includes 32- and 64-bit driver support for Windows 8/7/Vista/XP.

### ULx for NI LabVIEW

ULx for NI LabVIEW is a comprehensive library of graphical functions and example programs comprising all the power of the Universal Library and InstaCal. ULx for NI LabVIEW is compatible with LabVIEW 8.5 and later, and allows quick development of LabVIEW instrumentation, acquisition, and control applications with Measurement Computing hardware.

# USB-2404 Series

## General Information & Specifications (USB-2404-UI)



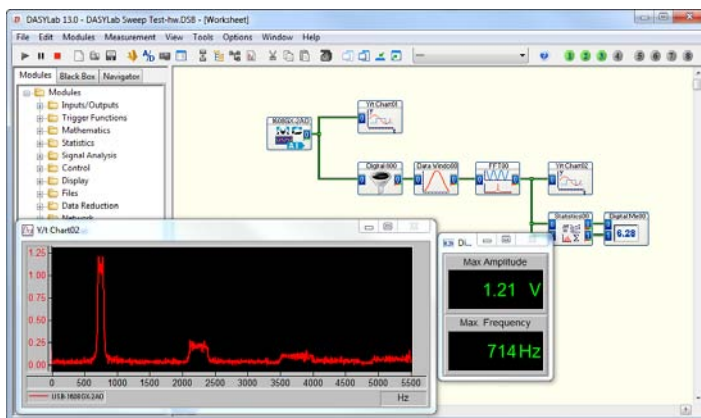
### Software Available Separately

#### TracerDAQ Pro

TracerDAQ Pro is available as a purchased upgrade to TracerDAQ, and supports more active channels, more samples per channel, and a selection of options and enhancements designed to address many test and measurement applications.

#### DASYLab

DASYLab is an icon-based data acquisition, graphics, control, and analysis software package offering real-time analysis and control. DASYLab lets you create custom graphical user interfaces without programming. Compared to other graphical programming environments, DASYLab has a very short user-learning curve. Many applications can be configured in a few minutes, rather than days or weeks.



*DASYLab gives users the ability to create applications by simply dragging-and-dropping functional icons on a worksheet, connecting the icons together, and running the program. DASYLab supports most MCC data acquisition hardware.*

### Specifications

All specifications are subject to change without notice.  
 Typical for the range 0 °C to 60 °C unless otherwise noted.  
 All voltages are relative to the CH- signal on each channel unless otherwise noted.

#### USB-2404-UI

##### Analog Input

- Number Of Channels: 4
- A/D Converter Resolution: 24-bit
- A/D Converter Type: Delta-Sigma with analog pre-filtering
- Sampling Mode: Simultaneous
- TEDS Sensor Type Supported: IEEE 1451.4 TEDS Class II (interface)
- Input Modes: Voltage, current, resistance (4-wire and 2-wire), RTD (3-wire and 4-wire), thermocouple, quarter-bridge, half-bridge, full-bridge
- Conversion Time (No Channels in TC Mode)
  - High Speed: 10 ms for all channels
  - Best 60 Hz Rejection: 110 ms for all channels
  - Best 50 Hz Rejection: 130 ms for all channels
  - High Resolution: 500 ms for all channels
- Conversion Time (One Or More Channels In TC Mode)
  - High Speed: 20 ms for all channels
  - Best 60 Hz Rejection: 120 ms for all channels
  - Best 50 Hz Rejection: 140 ms for all channels
  - High Resolution: 510 ms for all channels
- Overvoltage Protection
  - Terminals 1 and 2:  $\pm 30$  V
  - Terminals 3 Through 6, Across Any Combination:  $\pm 60$  V
- Input Impedance
  - Voltage Mode ( $\pm 60$  V,  $\pm 15$  V,  $\pm 4$  V): 1 M $\Omega$
  - Current Mode: <40  $\Omega$
  - All Other Modes: >1 G $\Omega$
- Input Bias Current: <1 nA
- Integral Non-Linearity (INL):  $\pm 15$  ppm
- Common Mode Rejection Ratio ( $f_{in} = 60$  Hz): >100 dB
- Rejection: 90 dB at 60 Hz
- Best 50 Hz Rejection: 80 dB at 50 Hz
- High Resolution: 65 dB at 50 Hz and 60 Hz

Input Mode Ranges		
Input Mode	Nominal Ranges	Actual Ranges
Voltage	$\pm 60$ V, $\pm 15$ V, $\pm 4$ V, $\pm 1$ V, $\pm 125$ mV	$\pm 60$ V, $\pm 15$ V, $\pm 4$ V, $\pm 1$ V, $\pm 125$ mV
Current	$\pm 25$ mA	$\pm 25$ mA
4- and 2-Wire Resistance	10 k $\Omega$ , 1 k $\Omega$	10.5 k $\Omega$ , 1.05 k $\Omega$
Thermocouple	$\pm 125$ mV	$\pm 125$ mV
4- and 3-Wire RTD	Pt 1000, Pt 100	5.05 k $\Omega$ , 505 $\Omega$
Quarter-Bridge	350 $\Omega$ , 120 $\Omega$	390 $\Omega$ , 150 $\Omega$
Half-Bridge	$\pm 500$ mV/V	$\pm 500$ mV/V
Full-Bridge	$\pm 62.5$ mV/V, $\pm 7.8$ mV/V	$\pm 62.5$ mV/V, $\pm 7.8125$ mV/V

# USB-2404 Series

## Specifications (USB-2404-UI)



Accuracy		
Mode, Range	Gain Error (% of Reading)	Offset Error (PPM of Range)
	25 °C, ±5 °C Typical, -40 °C to 70 °C Maximum	
Voltage, ±60 V	±0.3, ±0.4	±20, ±50
Voltage, ±15 V	±0.3, ±0.4	±60, ±180
Voltage, ±4 V	±0.3, ±0.4	±240, ±720
Voltage, ±1 V	±0.1, ±0.18	±15, ±45
Voltage/Thermocouple, ±125 mV	±0.1, ±0.18	±120, ±360
Current, ±25 mA	±0.1, ±0.6	±30, ±100
4- and 2-Wire* Resistance, 10 kΩ	±0.1, ±0.5	±120, ±320
4- and 2-Wire* Resistance, 1 kΩ	±0.1, ±0.5	±1200, ±3200
4- and 3-Wire RTD, Pt 1000	±0.1, ±0.5	±240, ±640
4- and 3-Wire RTD, Pt 100	±0.1, ±0.5	±2400, ±6400
Quarter-Bridge, 350 Ω	±0.1, ±0.5	±2400, ±6400
Quarter-Bridge, 120 Ω	±0.1, ±0.5	±2400, ±6400
Half-Bridge, ±500 mV/V	±0.03, ±0.07	±300, ±450
Full-Bridge, ±62.5 mV/V	±0.03, ±0.08	±300, ±1000
Full-Bridge, ±7.8 mV/V	±0.03, ±0.08	±2200, ±8000
CJC Sensor Accuracy	N/A	±1 °C, typical

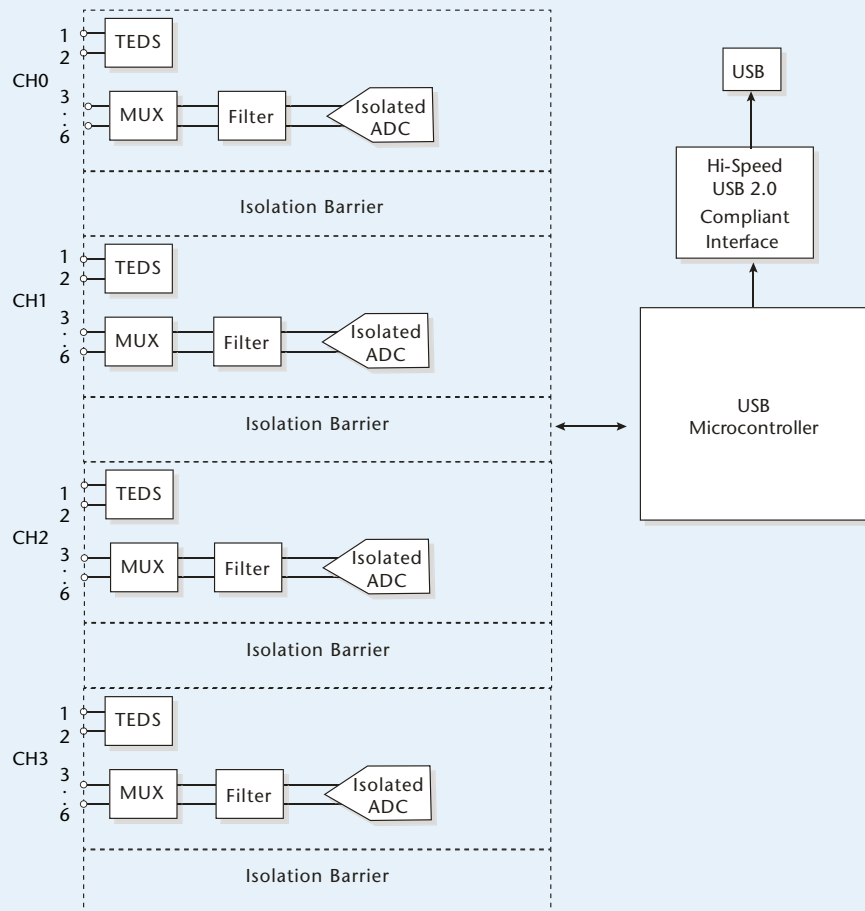
\* 2-Wire resistance mode accuracy depends on the lead wire resistance. This table assumes 0 Ω of lead wire resistance.

Stability		
Measurement Conditions	Gain Drift (PPM of Reading/ °C)	Offset Drift (PPM of Range/°C)
Voltage, ±60 V	±20	±0.2
Voltage, ±15 V	±20	±0.8
Voltage, ±4 V	±20	±3.2
Voltage, ±1 V	±10	±0.2
Voltage/Thermocouple, ±125 mV	±10	±1.6
Current, ±25 mA	±15	±0.4
4- and 2-Wire Resistance, 10 kΩ	±15	±3
4- and 2-Wire Resistance, 1 kΩ	±15	±30
4- and 3-Wire RTD, Pt 1000	±15	±6
4- and 3-Wire RTD, Pt 100	±15	±60
Quarter-Bridge, 350 Ω	±15	±120
Quarter-Bridge, 120 Ω	±15	±240
Half-Bridge, ±500 mV/V	±3	±20
Full-Bridge, ±62.5 mV/V	±3	±20
Full-Bridge, ±7.8 mV/V	±3	±20

# USB-2404 Series

## Specifications (USB-2404-UI)

**USB-2404-UI Block Diagram**



Half-Bridge and Full-Bridge Mode Excitation Level		
Measurement Conditions	Load Resistance ( $\Omega$ )	Excitation (V)
Half-Bridge	700	2.5
Half-Bridge	240	2.0
Full-Bridge	350	2.7
Full-Bridge	120	2.2

Resistance, RTD, and Quarter-Bridge Mode Excitation Level	
Load Resistance ( $\Omega$ )	Excitation (mV)
120	50
350	150
1,000	430
10,000	2,200

# USB-2404 Series

## Specifications (USB-2404-UI, USB-2404-10/2404-60)



Input Noise				
Mode, Range	Conversion Time			
	High Speed	Best of 60 Hz Rejection	Best of 50 Hz Rejection	High Resolution
Voltage, $\pm 60$ V	7.6	1.3	1.3	0.5
Voltage, $\pm 15$ V	10.8	1.9	1.9	0.7
Voltage, $\pm 4$ V	10.8	2.7	2.7	1.3
Voltage, $\pm 1$ V	7.6	1.3	1.3	0.5
Voltage/Thermocouple, $\pm 125$ mV	10.8	1.9	1.9	1.0
Current, $\pm 25$ mA	10.8	1.9	1.9	1.0
4- and 2-Wire resistance, 10 k $\Omega$	4.1	1.3	0.8	0.3
4- and 2-Wire resistance, 1 k $\Omega$	7.1	1.8	1.2	0.7
4- and 3-Wire RTD, Pt 1000	7.6	1.7	1.1	0.4
4- and 3-Wire RTD, Pt 100	10.8	1.9	1.9	0.9
Quarter-Bridge, 350 $\Omega$	5.4	1.0	1.0	0.7
Quarter-Bridge, 120 $\Omega$	5.4	1.0	1.0	0.7
Half-Bridge, $\pm 500$ mV/V	3.8	0.5	0.5	0.2
Full-Bridge, $\pm 62.5$ mV/V	5.4	1.0	1.0	0.8
Full-Bridge, $\pm 7.8$ mV/V	30	4.7	4.7	2.3

### Power

Current Consumption from USB: 500 mA, max

### Bus interface

USB Specification: USB 2.0 Hi-Speed

### Environmental

The USB-2404-UI is intended for indoor use only, but may be used outdoors if installed in a suitable enclosure.

Operating Temperature Range: 0 °C to 60 °C

Storage Temperature Range: -40 to 85 °C

Operating Humidity: 10% to 90% RH, non-condensing

Storage Humidity: 5% to 95% RH, non-condensing

Maximum Altitude: 2000 meter (6562 feet)

### Mechanical

Dimensions (L x W x H): 134 x 143 x 39 mm  
(5.27 x 5.64 x 1.54 in.)

Weight: 1.25 lbs (567 grams)

### Safety Voltages

Connect only voltages that are within the limits specified below.

#### Channel-To-Earth Ground Isolation

Continuous: 250 VAC, Measurement Category II

Withstand: 2300 VAC, verified by a 5 second dielectric withstand test

#### Channel-To-Channel Isolation

Continuous: 250 VAC, Measurement Category II

Withstand: 1390 VAC, verified by a 5 second dielectric withstand test  
Measurement Category II is for measurements performed on circuits directly connected to the electrical distribution system. This category refers to local-level electrical distribution, such as that provided by a standard wall outlet, for example 115 V for US or 230 V for Europe.

Do not connect the device to signals or use for measurements within Measurement Categories III or IV.

### Spring Terminal Connectors

Connector Type: Four 6-position detachable spring terminal connectors

Spring Terminal Wiring: 18 AWG to 28 AWG copper conductor wire with 7 mm (0.28 in.) of insulation stripped from the end.

## USB-2404-10 and USB-2404-60

### Analog Input

Number Of Channels: 4

A/D Converter Resolution: 24-bit

A/D Converter Type: Delta-Sigma with analog pre-filtering

Sampling Mode: Simultaneous

Sample Rate: 1.613 kS/s to 50 kS/s<sup>1</sup>

Sample Rates ( $f_s$ ):  $\frac{(f_{s+} + 256)}{n}$ ,  $n = 1, 2, \dots, 31$ .

Internal Master Timebase: Frequency: 12.8 MHz

Accuracy:  $\pm 100$  ppm maximum

Input Voltage Ranges (CH+ to CH-)

#### USB-2404-10

$\pm 10$  V nominal

$\pm 10.52$  V typ

$\pm 10.3$  min

#### USB-2404-60

$\pm 60$  V nominal

$\pm 62.64$  V typ

$\pm 61.5$  V min

Overvoltage Protection:  $\pm 100$  V

Input Coupling: DC

Input Impedance (CH+ to CH-): 1 M $\Omega$

#### Input Noise

USB-2404-10: 70  $\mu$ V rms

USB-2404-60: 320  $\mu$ V rms

Gain Drift:  $\pm 5$  ppm/ $^{\circ}$ C

#### Offset Drift

USB-2404-10:  $\pm 24$   $\mu$ V/ $^{\circ}$ C

USB-2404-60:  $\pm 150$   $\mu$ V/ $^{\circ}$ C

#### Post Calibration Gain Match

(Channel-to- Channel, 20 kHz): 0.22 dB max

Crosstalk (1 kHz): -130 dB

#### Phase Mismatch (Channel-to-Channel)

USB-2404-10: 0.075 $^{\circ}$ /kHz max

USB-2404-60: 0.045 $^{\circ}$ /kHz max

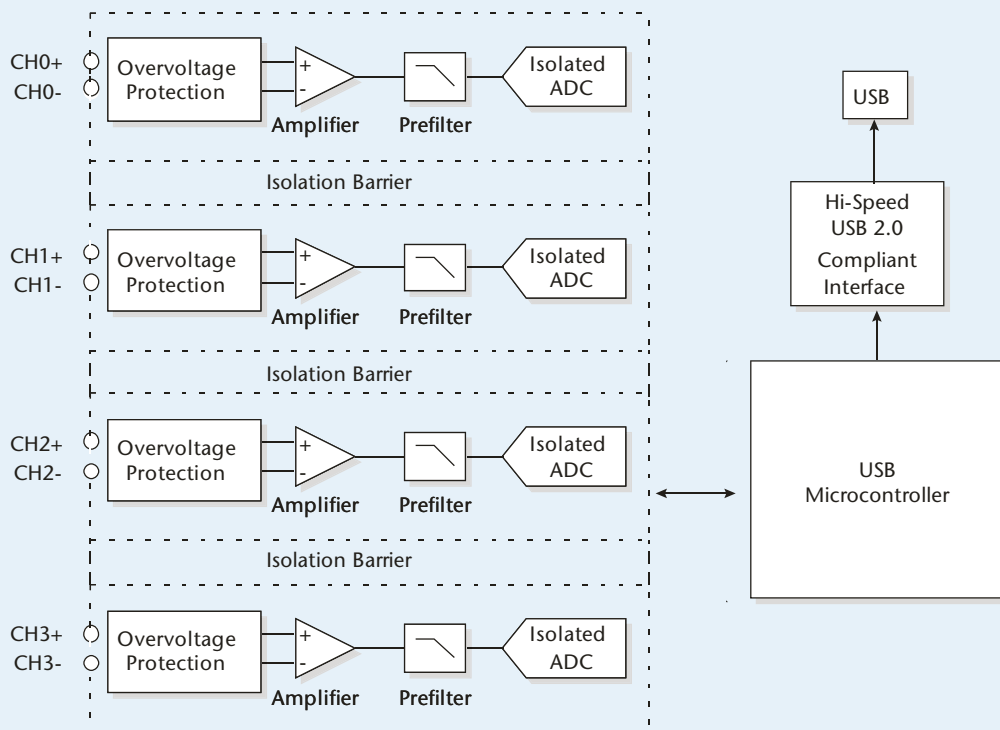
Phase Nonlinearity ( $f_s = 50$  kS/s): 0.11 $^{\circ}$  max

<sup>1</sup> Full performance requires connections to a USB 2.0 Hi-Speed host controller and USB 2.0 high-speed hubs.) The maximum sample rate may be lower on USB 1.1 ports.

# USB-2404 Series

## Specifications (USB-2404-10 and USB-2404-60)

USB-2404-10/2404-60 Block Diagram



### Input Delay

USB-2404-10: 38.4 +3  $\mu$ s  
 USB-2404-60: 38.4 +2.6  $\mu$ s  
 Passband Frequency: 0.453  
 Passband Flatness ( $f_s = 50$  kS/s):  $\pm 100$  mdB max  
 Stopband Frequency:  $0.547 \cdot f_s$   
 Stopband Rejection: 100 dB  
 Alias-Free Bandwidth:  $0.453 \cdot f_s$   
 -3 dB Pre-Filter Bandwidth ( $f_s = 50$  kS/s): 24.56 kHz  
 Common Mode Rejection Ratio ( $f_{in} = 60$  Hz):  
 USB-2404-10: 126 dB  
 USB-2404-60: 116 dB  
 Spurious Free Dynamic Range (1 kHz, -60 dBFS): -128 dBFS  
 Total Harmonic Distortion  
 1 kHz, -1 dBFS: -99 dB  
 1 kHz, -20 dBFS: -105 dB

Accuracy		
Measurement Conditions	Percent of Reading (Gain Error)	Percent of Range* (Offset Error)
Calibrated Maximum (-0 °C To 60 °C)	$\pm 0.13\%$	$\pm 0.05\%$
Calibrated Typical (25 °C, $\pm 5$ °C)	$\pm 0.03\%$	$\pm 0.008\%$
Uncalibrated Maximum (-0 °C To 60 °C)	USB-2404-10: $\pm 1.4\%$ USB-2404-60: $\pm 1.2\%$	USB-2404-10: $\pm 0.67\%$ USB-2404-60: $\pm 0.55\%$
Uncalibrated Typical (25 °C, $\pm 5$ °C)	$\pm 0.3\%$	$\pm 0.11\%$

\* The USB-2404-10 range equals 10.52 V.  
The USB-2404-60 range equals 62.64 V.



# USB-2404 Series

## Specifications (USB-2404-10/2404-60) & Ordering



### Power

Current Consumption from USB: 500 mA, max

### Bus Interface

**USB Specification:** USB 2.0 Hi-Speed mode (480 Mbps) is recommended. Otherwise, USB 1.1 Full Speed mode (12 Mbps)

### Environmental

**Operating Temperature Range:** 0 °C to 60 °C

**Storage Temperature Range:** -40 °C to 85 °C

**Operating Humidity:** 10% to 90% relative humidity, non-condensing

**Storage Humidity:** 5% to 95% relative humidity, non-condensing

**Maximum Altitude:** 2000 m (6562 feet)

**Pollution Degree (IEC60664):** 2

### Mechanical

**Dimensions (L × W × H):** 114.30 × 139.7 × 38.1 mm (4.5 × 5.5 × 1.5 in)

**Weight:** 1.2 lbs. (544 grams)

### Safety Voltages

Connect only voltages that are within the limits specified in this table.

#### Channel-to-Earth Ground Isolation

**Continuous:** 250 Vrms, Measurement Category II

Measurement Category II is for measurements performed on circuits directly connected to the electrical distribution system. This category refers to local-level electrical distribution, such as that provided by a standard wall outlet, for example 115 V for US or 230 V for Europe.

Do not connect the device to signals or use for measurements within Measurement Categories III or IV.

**Withstand:** 2,300 Vrms, verified by a 5 sec dielectric withstand test

#### Channel-to-Channel Isolation

**Continuous:** 250 Vrms, Measurement Category II (Note 4)

**Withstand:** 1390 Vrms, verified by a 5 sec dielectric withstand test

### Ordering Information

Part No.	Description
USB-2404-UI	24-bit, 100 S/s, simultaneous-sampling DAQ device with 4 simultaneous analog inputs for voltage, temperature, and bridge-based sensors (includes USB cable and MCC DAQ software CD)
USB-2404-10	24-bit, 50 kS/s DAQ device with 4 simultaneous analog inputs ±10 V (includes USB cable and MCC DAQ software CD)
USB-2404-60	24-bit, 50 kS/s DAQ device with 4 simultaneous analog inputs ±60 V (includes USB cable and MCC DAQ software CD)

### Accessories

Part No.	Description
ACC-102	2-position screw terminal connector kit for the USB-2404-10 and USB-2404-60 (quantity of 10)
ACC-160	Backshell kit for the USB-2404-10 and USB-2404-60 (quantity of 4)
ACC-164	6-position spring terminal connector kit for the USB-2404-UI (quantity of 4)
ACC-176	Backshell kit for the USB-2404-UI (quantity of 4)

### Software

Part No.	Description
TracerDAQ Pro	Out-of-the-box virtual instrument suite with strip chart, oscilloscope, function generator, and rate generator – professional version
DASYLab	Icon-based data acquisition, graphics, control, and analysis software