# USB-500/600 Series

## Stand-Alone, Low-Cost Data Loggers and Accessories

**MC MEASUREMENT COMPUTING**

*USB-500/600 Series data loggers offer low-cost, stand-alone data collection for temperature, humidity, voltage, current, or event/state change.*

## Overview

The USB-500/600 Series of stand-alone data loggers record several types of environmental readings. Users can easily set up the logging interval and start-time, log data, and then download the data over USB to the computer.

Logged data can then be graphed, printed, and exported to Excel. Each data logger is powered by a long-life lithium battery which lasts for up to a full year.

Several models are available with different measurement input types, sampling intervals, and amount of built-in memory.

## Features
- Stand-alone remote data loggers and portable logger assistant
- Measure temperature, humidity, voltage, current, or event/state change
- 1 or 2 channels
- Low cost, small size
- Battery powered
- Start/stop logging directly from device on USB-600 Series loggers

## Software
- Includes easy-to-use software to set sampling interval, alarms, start time, and other options
- Easily display, graph, and save data in formats such as .csv to import into Microsoft® Excel®
- Supported Operating Systems: Windows® 8/7/Vista®/XP, 32-/64-bit

| USB-500/600 Series Comparison Chart | | | | | | |
|---|---|---|---|---|---|---|
| Model | Channels | Measurement Type | Temperature Measurement Range | Sampling Interval | Memory | Features |
| USB-501-LT* | 1 | Temperature | –10 °C to 50 °C | 15 min to 2 h | 4 K readings | — |
| USB-501* | 1 | Temperature | –35 °C to 80 °C | 10 s to 12 h | 16 K readings | — |
| USB-501-LCD* | 1 | Temperature | –35 °C to 80 °C | 1 s to 12 h | 16 K readings | Built-in LCD Display |
| USB-501-PRO* | 1 | Temperature | –40 °C to 125 °C | 1 s to 12 h | 32 K readings | Extended Temperature Range |
| USB-501-RCG* | 1 | Temperature | –20 °C to 60 °C | 1 s to 12 h | 32 K readings | Rechargeable Battery |
| USB-501-TC* | 1 | Thermocouple | Thermocouple-dependent | 1 s to 12 h | 32 K readings | — |
| USB-501-TC-LCD* | 1 | Thermocouple | Thermocouple-dependent | 1 s to 12 h | 32 K readings | Built-in LCD Display |
| USB-502* | 2 | Temperature, Humidity | –35 °C to 80 °C | 10 s to 12 h | 16 K readings | — |
| USB-502-LCD* | 2 | Temperature, Humidity | –35 °C to 80 °C | 10 s to 12 h | 16 K readings | Built-in LCD Display |
| USB-502-PLUS* | 2 | Temperature, Humidity | –35 °C to 80 °C | 10 s to 12 h | 16 K readings | Increased Accuracy |
| USB-503 | 1 | 0 VDC to 30 VDC | — | 1 s to 12 h | 32 K readings | — |
| USB-504 | 1 | 4 mA to 20 mA | — | 1 s to 12 h | 32 K readings | — |
| USB-505 | 1 | Event/State Change | — | 10 s to 30 m | 32 K readings | — |
| USB-601 | 1 | Temperature | –30 °C to 80 °C | 10 s to 2 h | 250 K readings | Graphic Display, Stores Multiple Logging Sessions |
| USB-602 | 2 | Temperature, Humidity | –30 °C to 80 °C | 10 s to 2 h | 250 K readings | |
| USB-603 | 2 | Thermocouple | Thermocouple-dependent | 2 s to 2 h | 250 K readings | |

\* Compatible with USB-525 Logger Assistant

# USB-500/600 Series
## General Information

**MEASUREMENT COMPUTING**

## Analog Input

One or two channels are available on USB-500/600 Series data loggers. Devices are available with temperature, thermocouple, humidity, voltage, current, or event inputs.

## Sampling Interval

Loggers can be programmed with sampling intervals from 1 second to as long as 12 hours, depending on your data collection needs and the logger you are using. The logger stores the data and then uploads it to a computer through USB when collection is complete.

## Logger Start Modes

Depending on the USB-500/600 Series logger being used, users can configure a device to start logging in one of the following ways:

- start immediately
- start when logger button pressed (loggers with LCDs only)
- start at selected date and time
- start based on temperature or humidity condition (USB-600 loggers only)

## Alarms

All USB-500/600 Series data loggers except for the USB-505 provide high alarm and low alarm options that can be set through software. Users can also enable a *hold* on each alarm so that an alarm status continues even if the logged value is no longer in an alarm condition. The hold option allows users to be notified of an alarm condition without having to download data from the logger.

Alarms are indicated by LED blink patterns. USB-600 Series data loggers also have LCD and audible alarm indicators.

## Status LEDs

Each USB-500/600 Series data logger includes one or two LEDs which indicate logging status and alarm conditions.

Some loggers also have LED indicators for battery and memory status.

## Real-Time LCD Display

The following USB-500/600 Series data loggers feature a built-in LCD for real-time text display of data:

- USB-501-LCD
- USB-501-TC-LCD
- USB-502-LCD
- USB-601
- USB-602
- USB-603

The LCD on all of these loggers can display current and maximum/minimum stored temperature and humidity values.

The LCD on the USB-601, USB-602, and USB-603 also display the following information:

- graphical display of temperature/humidity
- logging start mode (if logging does not start immediately)
- alarm indicators
- animated icon indicating device is logging
- *locked* mode indicator when start/stop logging button is disabled



*The USB-601, USB-602, and USB-603 are the newest additions to the USB-500/600 Series of data loggers. USB-600 Series loggers offer device controls to start and stop logging, LCD and audible alarm indicators, the ability to store multiple logging sessions between downloads, and graphical data displays.*

## Multiple Logging Sessions (USB-600 Series Only)

Users can start and stop logging on the USB-600 Series data loggers either through software or using the buttons on the logger. This feature allows for storing of multiple logging sessions in between downloads.

# USB-500/600 Series

## Software

## USB-500/600 Series Data Logger Software

Each USB-500/600 Series data logger includes an easy-to-use software application which allows users to configure the following settings:

- sampling interval
- high/low alarm options
- temperature scale
- logger start mode
- buffer management
- LED and LCD power saving options

Settings vary depending on the data logger you are using.

Use the included software to download, display, and save data to a file. The loggers also record maximum and minimum values. Logged temperature, humidity, dew point, voltage, and current data can also be exported to *comma-separated values* (`.csv`) and text formats for display and analysis in popular spreadsheet programs such as Microsoft Excel.
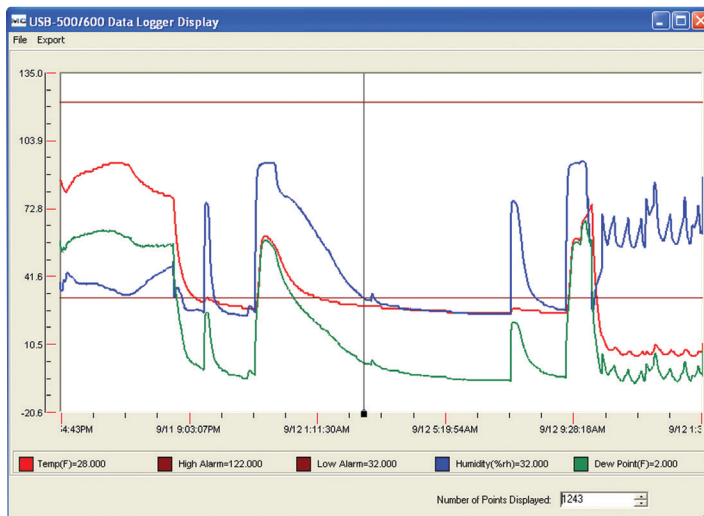


*The included USB-500/600 Data Logger software displays recorded measurements in an easy-to-read chart. Movable markers isolate data values along with a time stamp. Temperature, humidity, dew point, voltage, or current measurements are displayed. In addition, high and low alarms are also shown.*

## USB-525 Logger Assistant

The ultra-portable USB-525 Logger Assistant allows the user to conveniently program compatible USB-500 model loggers and view the data on a high-resolution screen.

The USB-525 is compatible with the following temperature/humidity data loggers:

- USB-501-LT
- USB-501
- USB-501-LCD
- USB-501-PRO
- USB-501-RCG
- USB-501-TC
- USB-501-TC-LCD
- USB-502
- USB-502-LCD
- USB-502-PLUS

Connect a data logger directly to the USB port on the USB-525, and follow the instructions on the touch-screen display to set up a compatible logger, download data, view data, and export data for use in a spreadsheet application. Logger setup and data display can be done on site without the need of a computer, reducing interruptions in data collection and decreasing travel by users between sites.

Logged data can also be transferred to a computer over the included micro-USB cable for display using the USB-500/600 Data Logger software.

## Specifications

All specifications are subject to change without notice.
Typical for 25 ˚C unless otherwise specified.

### USB-501-LT

**Lowest Cost Temperature Logger**

**Temperature**
**Measurement range:** –10 ˚C to 50 ˚C
 (14 ˚F to 122 ˚F)
**Internal resolution:** 1 ˚C (2 ˚F) typ
**Accuracy (overall error):** ±2.5 ˚C (±4.5 ˚F) max

**Data Sampling**
**Sampling intervals (software-selectable):** 15 min, 30 min, 1 h, 2 h
**Max temperature samples:** 4,080
**Units:** ˚C or ˚F

**USB Specifications**
**USB device type:** USB 2.0 (full speed)
**Device compatibility:** USB 1.1, USB 2.0

**Power**
**Power source:** CR1620 lithium button cell
**Battery life:** 1 month

**Environmental**
**Operating temperature range:** –10 ˚C to 50 ˚C (14 ˚F to 122 ˚F)

**Mechanical**
**Dimensions (L × W × H):** 2.67 × 0.72 × 0.72 in. (68 × 18.5 × 18.5 mm)

## Specifications

### USB-501

**Temperature Logger**

**Temperature**
**Measurement range:** –35 ˚C to 80 ˚C (–31 ˚F to 176 ˚F)
**Internal resolution:** 0.5 ˚C (1 ˚F) typ
**Accuracy (overall error):** ±1 ˚C (±2 ˚F) typ

**Data Sampling**
**Sampling intervals (software-selectable):** 10 s, 30 s, 1 min, 5 min, 15 min, 30 min, 1 h, 2 h, 6 h, 12 h
**Max temperature samples:** 16,382
**Units:** ˚C or ˚F

**USB Specifications**
**USB device type:** USB 2.0 (full speed)
**Device compatibility:** USB 1.1, USB 2.0

**Power**
**Power source:** 1/2AA 3.6 V lithium battery
**Battery life:** 3 years @ 25 ˚C and 1 min logging rate

**Environmental**
**Moisture and dust protection:** Protective cap installed, IP67
**Operating temperature range:** –35 ˚C to 80 ˚C (–31 ˚F to 176 ˚F)

**Mechanical**
**Dimensions (L × W × H):** 99 × 25 × 23 mm (3.89 × 0.98 × 0.90 in.)

### USB-501-LCD

**Temperature Logger with LCD**

**Temperature**
**Measurement range:** -35 °C to 80 °C (-31 °F to 176 °F)
**Internal resolution:** 0.5 ˚C (1.0 ˚F) typ
**Accuracy (overall error):** ±0.5 ˚C (±1.0 ˚F) typ, ±1.5 ˚C ( ±3.0 ˚F) max, when operating between 0 ˚C and 40 ˚C

**Data Sampling**
**Sampling intervals (software-selectable):** 1 s, 2 s, 5 s, 10 s, 30 s, 1 min, 5 min, 15 min, 30 min, 1 h, 2 h, 6 h, 12 h
**Temperature samples:** 16,379
**Units:** ˚C or ˚F
**Data rollover (software-selectable):** Allows unlimited logging periods by overwriting the oldest data when the memory is full

**USB Specifications**
**USB device type:** USB 2.0 (full speed)
**Device compatibility:** USB 1.1, USB 2.0

**Power**
**Power source:** 1/2AA 3.6 V lithium battery
**Battery life:** 1 year max @ 1 min logging rate,

**Environmental**
**Operating temperature range:** –35 ˚C to 80 ˚C (–31 ˚F to 176 ˚F)
**Moisture and dust protection:** Protective cap installed, IP67

**Mechanical**
**Dimensions (L × W × H):** 120 × 25 × 22 mm (4.72 × 0.98 × 0.86 in.)

### USB-501-PRO

**Temperature Logger with Rugged Enclosure**

**Temperature**
**Measurement range:** –40 ˚C to 125 ˚C (–40 ˚F to 257 ˚F)
**Internal resolution:** 0.1 ˚C (0.2 ˚F) typ
**Accuracy (overall error):** ±0.2 ˚C (±0.4 ˚F) typ, ±0.5 ˚C ( ±1.0 ˚F) max, when operating between 0 ˚C and 40 ˚C

**Data Sampling**
**Sampling intervals (software-selectable):** 1 s, 2 s, 5 s, 10 s, 30 s, 1 min, 5 min, 15 min, 30 min, 1 h, 2 h, 6 h, 12 h
**Temperature samples:** 32,510
**Units:** ˚C or ˚F
**Data rollover (software-selectable):** Allows unlimited logging periods by overwriting the oldest data when the memory is full

**USB Specifications**
**USB device type:** USB 2.0 (full speed)
**Device compatibility:** USB 1.1, USB 2.0

**Power**
**Power source:** 2/3AA 3.6 V lithium battery
**Battery life:** 2 years at 80°C and 10 s logging rate

**Environmental**
**Operating temperature range:** –40 ˚C to 125 ˚C (–40 ˚F to 257 ˚F)
**Moisture and dust protection:** Protective cap installed, IP67
**Corrosion protection:** Stainless steel housing, 316 grade

**Mechanical**
**Dimensions (L × W × H):** 110 × 18 mm (4.33 × 0.70 in.)

### USB-501-RCG

**Temperature Logger with Rechargeable Battery**

**Temperature**
**Measurement range:** –20 ˚C to 60 ˚C (–4 ˚F to 140 ˚F)
**Internal resolution:** 0.1 ˚C (0.2 ˚F) typ
**Accuracy (overall error):** ±1 ˚C (±2 ˚F) typ

**Data Sampling**
**Sampling intervals (software-selectable):** 1 s, 2 s, 5 s, 10 s, 30 s, 1 min, 5 min, 15 min, 30 min, 1 h, 2 h, 6 h, 12 h
**Temperature samples:** 32,510
**Units:** ˚C or ˚F
**Data rollover (software-selectable):** Allows unlimited logging periods by overwriting the oldest data when the memory is full

**USB Specifications**
**USB device type:** USB 2.0 (full speed)
**Device compatibility:** USB 1.1, USB 2.0

**Power**
**Power source:** Rechargeable lithium battery
**Battery life:** 4 weeks at 20 °C and 1 min logging rate
**Recharging time:** 5 hr

**Environmental**
**Operating temperature range:** –20 ˚C to 60 ˚C (–4 ˚F to 140 ˚F)
**Moisture and dust protection:** Protective cap installed, IP67
**Corrosion protection:** Protective cap installed, stainless steel housing, 316 grade

**Mechanical**
**Dimensions (L × W × H):** 3.66 × 0.78 in. (93 × 20 mm)

## USB-501-TC

### Thermocouple Logger

#### Temperature

**Probe measurement range**
**K-type thermocouple:** –200 ˚C to 1350 ˚C (–328 ˚F to 2462 ˚F)
**J-type thermocouple:** –200 ˚C to 1190 ˚C (–328 ˚F to 2174 ˚F)
**T-type thermocouple:** –200 ˚C to 390 ˚C (–328 ˚F to 734 ˚F)
**Internal resolution:** 0.5 ˚C (1 ˚F) typ
**Accuracy (overall error):** ±1 ˚C (±2 ˚F) typ

#### Included Thermocouple Probe

**Type:** K
**Measurement range:** 0 ºC to 200 ºC (32 ºF to 392 ºF)
**Accuracy:** ±2.5 ºC (±4.5 ºF)
**Connector type:** Mini-thermocouple
**Cable length:** 1.5 m
**Stainless steel probe length:** 100 mm

#### Data Sampling

**Sampling intervals (software-selectable):** 1 s, 2 s, 5 s, 10 s, 30 s, 1 min, 5 min, 15 min, 30 min, 1 h, 2 h, 6 h, 12 h
**Max temperature samples:** 32,510
**Units:** ˚C or ˚F

#### USB Specifications

**USB device type:** USB 2.0 (full speed)
**Device compatibility:** USB 1.1, USB 2.0

#### Power

**Power source:** 1/2AA 3.6 V lithium battery
**Battery life:** 2 years at 25°C and 1 min logging rate

#### Environmental

**Operating temperature range (data logger only):** –10 ˚C to 40 ˚C (14 ˚F to 104 ˚F)

#### Mechanical

**Dimensions (L × W × H):** 118 × 27 × 27 mm (4.64 × 1.06 × 1.06 in.)

## USB-501-TC-LCD

### Thermocouple Logger with LCD

#### Temperature

**Probe measurement range**
**K-type thermocouple:** –200 ˚C to 1350 ˚C (–328 ˚F to 2462 ˚F)
**J-type thermocouple:** –200 ˚C to 1190 ˚C (–328 ˚F to 2174 ˚F)
**T-type thermocouple:** –200 ˚C to 390 ˚C (–328 ˚F to 734 ˚F)
**Internal resolution:** 0.5 ˚C (1 ˚F) typ
**Accuracy (overall error):** ±1 ˚C (±2 ˚F) typ

#### Included Thermocouple Probe

**Type:** K
**Measurement range:** 0 ºC to 200 ºC (32 ºF to 392 ºF)
**Accuracy:** ±2.5 ºC (±4.5 ºF)
**Connector type:** Mini-thermocouple
**Cable length:** 1.5 m
**Stainless steel probe length:** 100 mm

#### Data Sampling

**Sampling intervals (software-selectable):** 1 s, 2,s, 5 s, 10 s, 30 s, 1 min, 5 min, 15 min, 30 min, 1 h, 2 h, 6 h, 12 h
**Temperature samples:** 32,510 max
**Units:** ˚C or ˚F
**Data rollover (software-selectable):** Allows unlimited logging periods by overwriting the oldest data when the memory is full.

#### USB Specifications

**USB device type:** USB 2.0 (full speed)
**Device compatibility:** USB 1.1, USB 2.0

#### Power

**Power source:** 1/2AA 3.6 V lithium battery
**Battery life:** 2 years at 25°C and 1 min logging rate

#### Environmental

**Operating temperature range:** –10 ˚C to 40 ˚C (14 ˚F to 104 ˚F)

#### LCD Status Indicators

The high-contrast LCD shows temperature data and information regarding the logger status.
**Temperature (˚C/˚F):** Current temperature, stored max, and stored min values
**LCD mode (software-selectable):** Always on; on for 30 seconds after the LCD button is pressed; always off

#### Mechanical

**Dimensions (L × W × H):** 135 × 24 × 21 mm (5.31 × 0.94 × 0.82 in.)

## USB-502

### Temperature & Humidity Logger

#### Temperature

**Measurement range:** –35 ˚C to 80 ˚C (–31 ˚F to 176 ˚F)
**Internal resolution:** 0.5 ˚C (1 ˚F) typ
**Accuracy (overall error)*:** ±0.55 ˚C (±1.04 ˚F) typ (5 ˚C to 60 ˚C)
**Long term stability:** <0.02 °C (0.04 °F) per year
**Alarm threshold range (software-selectable):** –35 ˚C to 79.5 ˚C (–31 ˚F to 175 ˚F), high and low alarms

#### Relative Humidity (%RH)

**Measurement range:** 0% to 100%
**Accuracy (overall error)*:** ±3.0 typ
**Internal resolution:** 0.5% RH
**Long term stability:** <0.25% RH / year
**Alarm threshold range:** 0% to 99.5% (high and low alarms)

#### Dew Point

**Accuracy (overall error)*:** ±1.7 ˚C typ (–35 °C to 80 °C, 40% RH to 100% RH)

#### Data Sampling

**Sampling intervals (software-selectable):** 10 s, 30 s, 1 min, 5 min, 15 min, 30 min, 1 h, 2 h, 6 h, 12 h
**Temperature samples:** 16,382 max
**Relative humidity samples:** 16,382 max
**Temperature units:** ˚C or ˚F
**Logging modes:** Immediate and delayed start

#### USB Specifications

**USB device type:** USB 2.0 (full speed)
**Device compatibility:** USB 1.1, USB 2.0

#### Power

**Power source:** 1/2AA 3.6 V lithium battery
**Battery life:** 3 years at 25°C and 1 min logging rate

#### Environmental

**Operating temperature range:** –35 ˚C to 80 ˚C (–31 ˚F to 176 ˚F)
**Ingress protection:** Meets IP67 Standard with protective cap installed

#### Mechanical

**Dimensions (L × W × H):** 108 × 25 × 22 mm (4.25 × 0.98 × 0.86 in.)

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\* The overall error takes into account the sensor accuracy and the data logger resolution. Refer to the USB-502/USB-502-LCD accuracy tables on page 6.

# USB-500/600 Series

## Specifications

### USB-502-LCD

**Temperature and Humidity Logger with LCD**

#### Temperature
**Measurement range:** –35 ˚C to 80 ˚C (–31 ˚F to 176 ˚F)
**Accuracy (overall error)*:** ±0.5 ˚C typ, ±2 ˚C max; ±1 ˚F typ, ±4 ˚F max
**Internal resolution:** 0.5 ˚C, 1 ˚F typ
**Alarm threshold range (software-selectable):** –35 ˚C to 79.5 ˚C (–31 ˚F to 175 ˚F, high and low alarms

#### Relative Humidity (%RH)
**Measurement range:** 0% to 100%
**Accuracy (overall error)*:** 2.25% RH typical (20% RH to 80% RH)
**Internal resolution:** 0.5% RH typ
**Long term stability:** <0.25% RH/year
**Alarm threshold range:** 0% to 99.5% (high and low alarms)

#### Dew Point
**Accuracy (overall error)*:** ±1.7 ˚C typ (–35 °C to 80 °C, 40% RH to 100% RH) The overall error takes into account the sensor accuracy and the resolution of the data logger

#### Data Sampling
**Sampling interval (software-selectable):** 10 s, 30 s, 1 min, 5 min, 15 min, 30 min, 1 h, 2 h, 6 h, 12 h
**Temperature samples:** 16,379 max
**Relative humidity samples:** 16,379 max
**Temperature units:** ˚C or ˚F
**Logging modes:** Immediate, delayed start, and push to start (through the LCD button on the device)
**Data rollover (software-selectable):** Allows unlimited logging periods by overwriting the oldest data when memory is filled

#### USB Specifications
**USB device type:** USB 2.0 (full speed)
**Device compatibility:** USB 1.1, USB 2.0

#### LCD Status Indicators
The high-contrast LCD shows temperature data and information regarding the logger status.
**Temperature (˚C/˚F):** Current temperature, stored max, and stored min values
**Relative humidity (%RH):** Current relative humidity, stored max, and stored min values
**LCD mode (software-selectable):** Always on; on for 30 seconds after the LCD button is pressed; always off
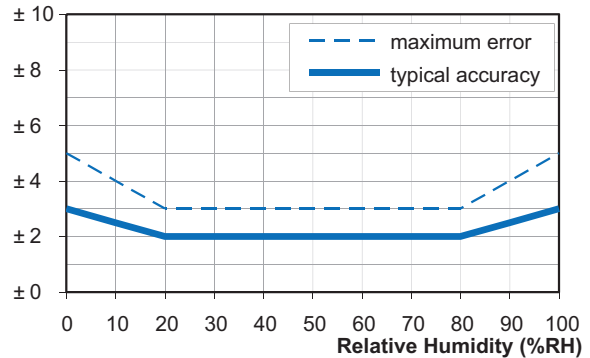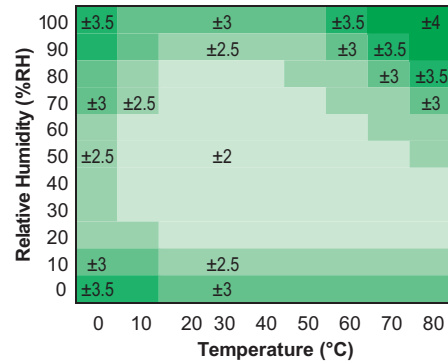
**ΔT (˚C)    USB-502/USB-502-LCD**
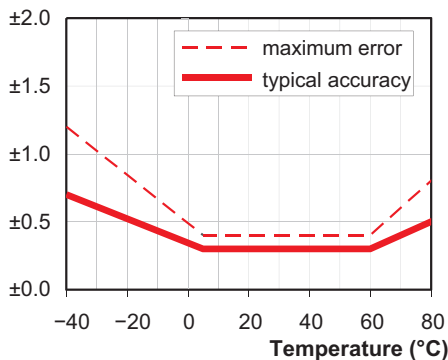


*Typical and maximum tolerance for USB-502/USB-502-LCD temperature sensor in ˚C.*

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\* The overall error takes into account the sensor accuracy and the data logger resolution. Refer to the USB-502/USB-502-LCD accuracy tables on this page.
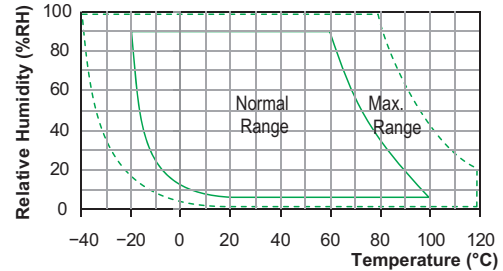
**ΔRH (%RH)    USB-502/USB-502-LCD**



*Typical and maximum tolerance for USB-502/USB-502-LCD at 25 °C for relative humidity.*

**USB-502/USB-502-LCD**



*Typical accuracy of relative humidity measurements for USB-502/USB-502-LCD given in %RH for temperatures 0 °C to 80 °C.*

**USB-502/USB-502-LCD**



Long-term exposure of the USB-502/USB-502-LCD to humidity levels outside of the "normal" range may temporarily offset RH measurements (±3 %RH after 60 hours). Once returned to less extreme conditions, the device slowly returns toward calibration state.

#### Power
**Power source:** 1/2AA 3.6 V lithium battery
**Battery life:** 2 years at 25°C and 1 min logging rate, LCD on

#### Environmental
**Operating temperature range:** –35 ˚C to 80 ˚C (–31 ˚F to 176 ˚F)
**Note:** At temperatures below –20 ˚C (–4 ˚F), the LCD may exhibit slower response time of approximately 10 seconds

#### Mechanical
**Dimensions (L × W × H):** 126 × 25 × 22 mm (4.96 × 0.98 × 0.86 in.)

# USB-500/600 Series

## Specifications

### USB-502-PLUS

**Temperature and Humidity Logger
with Increased Accuracy**

#### Temperature
**Measurement range:** –35 ˚C to 80 ˚C (–31 ˚F to 17( 
**Accuracy (overall error)\*:** 0.45 °C (0.86 °F) typ
   (5 °C to 60 °C)
**Internal resolution:** 0.5 ˚C (1 ˚F) typ
**Long term stability:** <0.02 ˚C (0.86 °F) typ
   (5 °C to 60 °C)
**Alarm threshold range (software-selectable):** –35 ˚C
   to 79.5 ˚C (–30 ˚F to 175 ˚F) (high and low alarms)

#### Relative Humidity (%RH)
**Measurement range:** 0% to 100%
**Accuracy (overall error)\*:** ±2.0 typ, ±4.0 max
   Specifies the overall error in the logged readings for relative humidity measure-
   ments between 10% and 90% RH
**Internal resolution:** 0.5% RH typ
**Long term stability:** <0.25 %RH/year
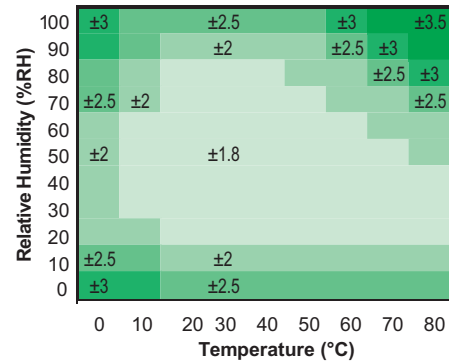**Alarm threshold range:** 0% to 99.5% (high and low alarms)

#### Dew Point*
**Accuracy (overall error):** 1.5°C typical (–35 to 80°C, 40% RH to 100% RH)



Typical and maximum tolerance for USB-502-PLUS temperature sensor in °C.



Typical and maximum tolerance for USB-502-PLUS at 25 °C for relative humidity.



Typical accuracy of relative humidity measurements for USB-502-PLUS given in %RH for temperatures 0 °C to 80 °C.
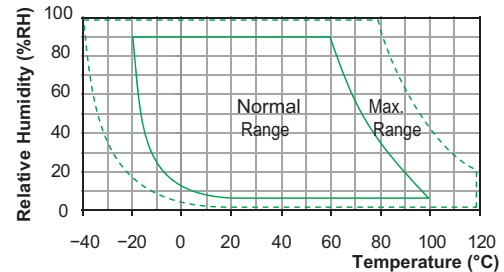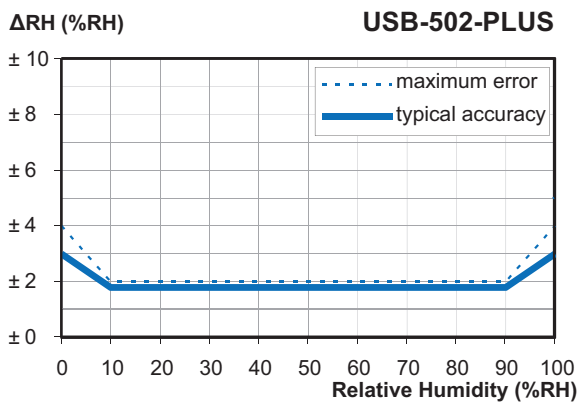


Long-term exposure of the USB-502-PLUS to humidity levels outside of the "normal" range may temporarily offset RH measurements (±3 %RH after 60 hours). Once returned to less extreme conditions, the device slowly returns toward calibration state.

#### Data Sampling
**Sample rate (software-selectable):** 10 s, 30 s, 1 min, 5 min, 15 min, 30 min, 1 h,
   2 h, 6 h, 12 h
**Temperature samples:** 16,382 max
**Relative humidity samples:** 16,382 max
**Temperature units:** ˚C or ˚F
**Logging modes:** Immediate and delayed start
**Data rollover (software-selectable):** Allows unlimited logging periods by overwrit-
   ing the oldest data when the memory is full.

#### USB Specifications
**USB device type:** USB 2.0 (full speed)
**Device compatibility:** USB 1.1, USB 2.0

#### Power
**Power source:** 1/2AA 3.6 V lithium battery
**Battery life:** 3 years at 25°C and 1 min logging rate

#### Environmental
**Operating temperature range:** –35 ˚C to 80 ˚C (–31 ˚F to 176 ˚F)
**Ingress protection:** Meets IP67 Standard with protective cap installed

#### Mechanical
**Dimensions (L × W × H):** 4.25 × 0.98 × 0.86 in. (108 × 25 × 22 mm)

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\*   The overall error takes into account the sensor accuracy and the data logger
   resolution. Refer to the USB-502-PLUS accuracy tables on this page.

# USB-500/600 Series

## Specifications

## USB-503

**Voltage Logger**

### Voltage
**Measurement range:** 0 VDC to 30 VDC
**Internal resolution:** 50 mVDC
**Accuracy (overall error):** ±1% typ

### Data Sampling
**Sampling intervals (software-selectable):** 1 s,
2 s, 5 s, 10 s, 30 s, 1 min, 5 min, 15 min,
30 min, 1 h, 2 h, 6 h, 12 h
**Max voltage samples:** 32,510
**Units:** VDC

### USB Specifications
**USB device type:** USB 2.0 (full speed)
**Device compatibility:** USB 1.1, USB 2.0

### Power
**Power source:** 1/2AA 3.6 V lithium battery
**Battery life:** 1 year typ

### Environmental
**Operating temperature range:** –35 ˚C to 80 ˚C (–31 ˚F to 176 ˚F)

### Mechanical
**Dimensions (L × W × H):** 98.0 × 26.8 × 26.8 mm (3.86 × 1.05 × 1.05 in.)

## USB-504

**4-20 mA Current Logger**

### Current
**Measurement range:** 4 mA DC to 20 mA DC typ
**Internal resolution:** ±0.05 mA DC
**Accuracy (overall error):** ±1%

### Data Sampling
**Sampling intervals (software-selectable):** 1 s,
2 s, 5 s, 10 s, 30 s, 1 min, 5 min, 15 min,
30 min, 1 h, 2 h, 6 h, 12 h
**Max current samples:** 32,510
**Units:** mA DC

### USB Specifications
**USB device type:** USB 2.0 (Full-speed)
**Device compatibility:** USB 1.1, USB 2.0

### Power
**Power source:** 1/2AA 3.6 V lithium battery
**Battery life:** 2 years at 25 °C and 2 s logging rate

### Environmental
**Operating temperature range:** –35 ˚C to 80 ˚C (–31 ˚F to 176 ˚F)

### Mechanical
**Dimensions (L × W × H):** 98.0 × 26.8 × 26.8 mm (3.86 × 1.05 × 1.05 in.)

## USB-505

**Counter, Event and State Logger**

### Counter, Event and State
**Event/state change frequency:** 2 Hz max
**Time in state:** 100 ms min
**Resolution event /state mode:** 100 ms (depending on operating mode)
**Count/count per frequency:** 100 Hz max
(40 Hz max when event LED is enabled )

### Voltage
**Input range:** 3 VDC to 28 VDC
**Volt free contacts voltage resolution:** 50 mVDC

### Current
**Volt free contacts current:** 35 µA typ

### Data Sampling
**Max event or state change samples:** 32,510
**Timing accuracy:** ±3 s per day at 20 °C
**Sampling intervals (software-selectable):** 10 s, 30 s, 1 min, 5 min, 15 min, 30 min
**Max event samples:** 32,510

### USB Specifications
**USB device type:** USB 2.0 (full speed)
**Device compatibility:** USB 1.1, USB 2.0

### Power
**Power source:** 1/2AA 3.6 V lithium battery
**Battery life:** 1 year typ (depends on operating mode)

### Environmental
**Operating temperature range:** –35 ˚C to 80 ˚C (–31 ˚F to 176 ˚F)

### Mechanical
**Dimensions (L × W × H):** 98.0 × 26.8 × 26.8 mm (3.86 × 1.05 × 1.05 in.)

## USB-525 Logger Assistant

**Portable Device for USB-500 Model Logger Setup and Data Viewing**

### Compatible Data Loggers

- USB-501-LT
- USB-501
- USB-501-LCD
- USB-501-PRO
- USB-501-RCG
- USB-501-TC
- USB-501-TC-LCD
- USB-502
- USB-502-LCD
- USB-502-PLUS

### Memory
**Internal flash memory:** Stores over 8,500,000 temperature/humidity samples

### LCD
240 × 320 pixels, 2.8” thin film transistor with touch-screen
**Time out (software-selectable):** Backlight turns off after 10 s, 20 s, 30 s, or 1 min of inactivity

### USB Specifications
**USB device type:** USB 2.0 (full speed)
**Device compatibility:** USB 1.1, USB 2.0
**USB type a socket (top of device):** Connects to compatible USB-500 Series data logger
**Micro-USB socket (bottom of device):** Connects device to computer using 1 m (3.28 ft) USB cable (included)

### Power
**Power source:** Lithium polymer battery, rechargeable using micro-USB connection
**Battery life:** 8 hours max (intermittent use), 5 hours min (constant use)
**Power down:** Device powers down after 5 minutes of inactivity

### Environmental
**Operating temperature range:** 0 ˚C to 50 ˚C (32 ˚F to 122 ˚F)

### Mechanical
**Dimensions (L × W × H):** 107 × 68 × 19 mm (4.2 × 2.7 × 0.7 in.)

# USB-500/600 Series

## Specifications

## USB-601

**Temperature Logger with Graphic LCD Screen**

### Temperature
**Measurement range:** –30 ˚C to 80 ˚C (–22 ˚F to 176 ˚F)
**Internal resolution:** 0.1 ˚C (0.1 ˚F) typ
**Accuracy (overall error)\*:** 0.35 ˚C (0.59 ˚F) typ (5 °C to 60 °C)

### Data Sampling
**Sampling intervals (software-selectable):** 10 s, 15 s, 20 s, 30 s, 1 min, 2 min, 5 min, 10 min, 15 min, 20 min, 30 min, 1 h, 2 h
**Max temperature samples:** 252,928
**Units:** ˚C or ˚F

### USB Specifications
**USB device type:** USB 2.0 (full speed)
**Device compatibility:** USB 1.1, USB 2.0

### Power
**Power source:** Two 1/2AA 3.6 V lithium batteries
**Battery life:** 4 months typ

### Environmental
**Moisture and dust protection:** IP67
**Operating temperature range:** –30 ˚C to 80 ˚C (–22 ˚F to 176 ˚F)

### Mechanical
**Dimensions (L × W × H):** 3.46 × 1.90 × 1.20 in. (88 × 48.5 × 30.5 mm)



*Temperature error for USB-601 temperature sensor in ˚C.*

## USB-602

**Temperature/Humidity Logger with Graphic LCD Screen**

### Temperature
**Measurement range:** –30 ˚C to 80 ˚C (–22 ˚F to 176 ˚F)
**Internal resolution:** 0.1 ˚C (0.1 ˚F) typ
**Accuracy (overall error):** ±0.5 ˚C (±1.0 ˚F) typ, ±2.0 ˚C (±4.0 ˚F) max

### Relative Humidity (%RH)
**Measurement range:** 0% to 100%
**Accuracy (overall error)\*:** ±2.0 typ, ±4.0 max
   Note: Specifies the overall error in the logged readings for relative humidity measurements between 20% and 80% RH
**Internal resolution:** ±0.1 %RH typ
**Long term stability:** 0.5 typ (%RH per year)
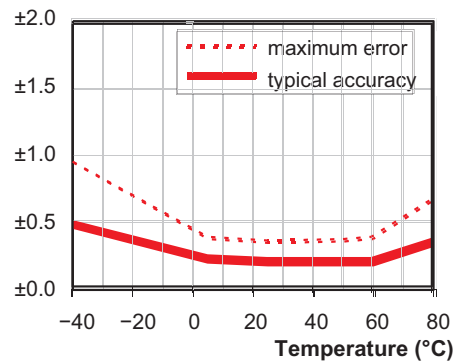**Alarm threshold range:** 0% to 99.5% (high and low alarms)

### Dew Point
**Accuracy (overall error)\*:** ±1.1 ˚C (±2.0 ˚F) typ



*Typical and maximum tolerance for USB-602 temperature sensor in ˚C.*
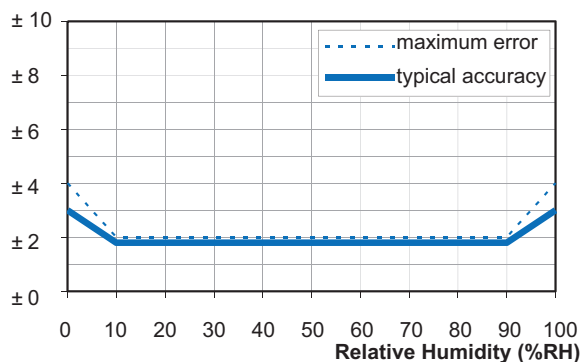


*Typical and maximum tolerance for USB-602 at 25 °C for relative humidity.*

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\*  The overall error takes into account the sensor accuracy and the data logger resolution. Refer to the USB-601 and USB-602 accuracy tables on this page and on page 10.

# USB-500/600 Series

## Specifications

### USB-602



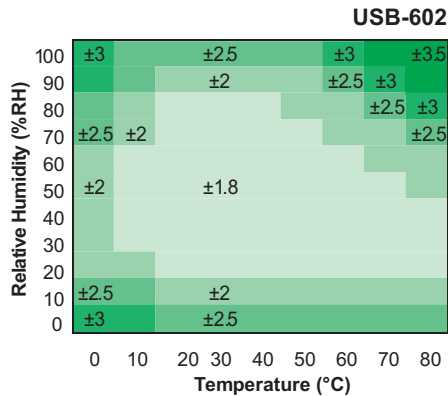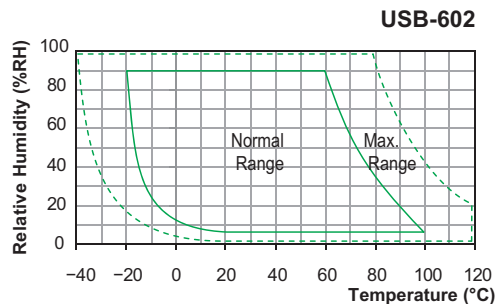*Typical and maximum accuracy of relative humidity measurements for USB-602 given in %RH for temperatures 0 °C to 80 °C.*

### USB-602



*Long-term exposure of the USB-602 to humidity levels outside of the "normal" range may temporarily offset RH measurements (±3 %RH after 60 hours). Once returned to less extreme conditions, the device slowly returns toward calibration state.*

#### Data Sampling
**Sampling intervals (software-selectable):** 10 s, 15 s, 20 s, 30 s, 1 min, 2 min, 5 min, 10 min, 15 min, 20 min, 30 min, 1 h, 2 h
**Max temperature samples:** 252,928
**Units:** ˚C or ˚F

#### USB Specifications
**USB device type:** USB 2.0 (full speed)
**Device compatibility:** USB 1.1, USB 2.0

#### Power
**Power source:** Two 1/2AA 3.6 V lithium batteries
**Battery life:** 4 months typ at 25 ˚C and 10 minute logging rate with no audible alarm or alarm LEDs and minimal LCD use

#### Environmental
**Moisture and dust protection:** IP67
**Operating temperature range:** –30 ˚C to 80 ˚C (–22 ˚F to 176 ˚F)
At temperatures below -5 °C the LCD exhibits slower response times. The LCD is disabled at temperatures below -20 °C and above 70 °C.

#### Mechanical
**Dimensions (L × W × H):** 3.46 × 1.90 × 1.20 in. (88 × 48.5 × 30.5 mm)

### USB-603

**Two-Channel Thermocouple Logger with Graphic LCD Screen**

#### Temperature
**Measurement ranges**
    **K-type thermocouple:** –200 ˚C to 1350 ˚C (–328 ˚F to 2462 ˚F)
    **J-type thermocouple:** –200 ˚C to 1190 ˚C (–328 ˚F to 2174 ˚F)
    **T-type thermocouple:** –200 ˚C to 390 ˚C (–328 ˚F to 734 ˚F)
**Internal resolution:** 0.1 ˚C (0.1 ˚F) typ
Above 999.9 °C/˚F display becomes 1 °C. Internal resolution remains at 0.1 °C/˚F.
**Accuracy (overall error):** ±0.5 ˚C (±0.9 ˚F) typ
Quoted accuracy is for the data logger only when measuring within the specified operating temperature. Thermocouple error is not included and should also be taken into consideration.

#### Included Thermocouple Probes
**Type:** K
**Measurement range:** 0 ºC to 400 ºC (32 ºF to 752 ºF)
**Accuracy:** ±2.5 ºC (±4.5 ºF)
**Connector type:** Mini-thermocouple
**Cable length:** 1.5 m
**Stainless steel probe length:** 100 mm
To improve response time, the thermocouple probes supplied with the USB-603 are not electrically isolated from the thermocouple junction.
Depending upon the application, it may be necessary to use electrically-isolated thermocouple probes to avoid ground loops, and/or situations where the probes may come into contact with conductors that are at different electrical potentials. If unsure of the application needs, Measurement Computing recommends using electrically-isolated probes.

#### Data Sampling
**Sampling intervals (software-selectable):** 2 s, 5 s, 10 s, 15 s, 20 s, 30 s, 1 min, 2 min, 5 min, 10 min, 15 min, 20 min, 30 min, 1 h, 2 h
**Max temperature samples:** 252,928
**Units:** ˚C or ˚F

#### USB Specifications
**USB device type:** USB 2.0 (full speed)
**Device compatibility:** USB 1.1, USB 2.0

#### Power
**Power source:** Two 1/2AA 3.6 V lithium batteries
**Battery life:** 4 months typ at 25 ˚C and 10 minute logging rate with no audible alarm or alarm LEDs and minimal LCD use

#### Environmental
**Operating temperature range:** –10 ˚C to 40 ˚C (–14 ˚F to 104 ˚F)
Applies to the data logger module only. Refer the probe manufacturer for operating temperature of thermocouple.

#### Mechanical
**Dimensions (L × W × H):** 4.01 × 1.90 × 1.20 in. (102.0 × 48.5 × 30.5 mm)

# USB-500/600 Series

## Ordering Information

## Order Information

| Part No. | Description |
| --- | --- |
| USB-501-LT | Lowest-cost temperature logger temperature logger measures and stores over 4,000 temperature readings. |
| USB-501 | Battery-powered remote temperature logger measures and stores up to 16,382 temperature readings. |
| USB-501-LCD | Battery-powered remote temperature logger with LCD measures and stores up to 16,379 temperature readings. |
| USB-501-PRO | Temperature logger with rugged enclosure and extended temperature range (–40 ˚C to 125 ˚C) measures and stores over 32,000 temperature readings. |
| USB-501-RCG | Temperature logger with rechargeable battery measures and stores over 32,000 temperature readings. |
| USB-501-TC | Thermocouple data logger measures and stores over 32,000 temperature readings. One K-type thermocouple included. |
| USB-501-TC-LCD | Thermocouple data logger with LCD measures and stores over 32,000 temperature readings. One K-type thermocouple included. |
| USB-502 | Temperature and humidity logger measures and stores over 16,000 readings. |
| USB-502-LCD | Temperature and humidity logger with LCD measures and stores over 16,000 readings. |

| Part No. | Description |
| --- | --- |
| USB-502-PLUS | Temperature and humidity logger with increased accuracy (±0.45 ˚C typical, ±2.05 %RH typical) measures and stores over 16,000 readings. |
| USB-503 | Voltage data logger measures and stores over 32,000 readings. |
| USB-504 | Current loop data logger measures and stores over 32,000 readings |
| USB-505 | Event, state change, and event count logger measures and stores over 32,000 readings. |
| USB-525 | Portable Logger Assistant for logger setup and data viewing from compatible USB-500 model data loggers. |
| USB-601 | Temperature logger with graphic LCD screen, device controls, and multi-session logging measures and stores over 250,000 readings. |
| USB-602 | Temperature/humidity logger with graphic LCD screen, device controls, and multi-session logging measures and stores over 250,000 readings. |
| USB-603 | Two-channel thermocouple logger with graphic LCD screen, device controls, and multi-session logging measures and stores over 250,000 readings. Two K-type thermocouples included. |