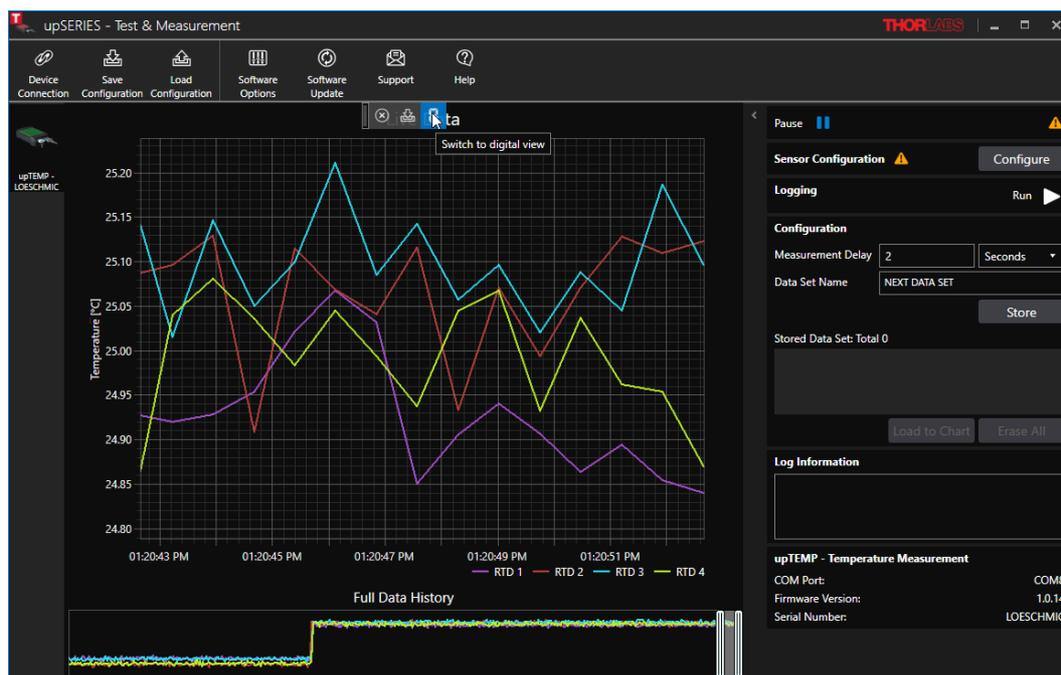




Software for upTEMP™ and upLED™

upSERIES™ Software Manual



2021

Version: 1.1
Date: 03-Aug-2021

Contents

Foreword

1	General Information	1
1.1	Requirements	1
2	First Steps	2
2.1	Software Installation	2
2.2	Graphical User Interface (GUI)	3
3	upTEMP™ Specific GUI	6
3.1	Settings	7
3.1.1	Sensor Configuration	7
3.1.1.1	NTC Sensor Configuration	8
3.1.1.2	RTD Sensor Configuration	10
3.1.1.3	Temperature Offset	11
3.2	Running a Measurement	11
3.2.1	Data Display	11
3.2.2	Logging to upTEMP™	12
3.3	Saving Data to the PC	13
3.4	Data Analysis	14
4	upLED™ Specific GUI	15
4.1	Settings	16
4.1.1	upLED™ Configuration	17
4.2	Driving an LED	20
5	Appendix	21
5.1	List of Acronyms	21
5.2	Copyright and Exclusion of Liability	21
5.3	Thorlabs Worldwide Contacts	22

We aim to develop and produce the best solutions for your applications in the field of optical measurement techniques. To help us to live up to your expectations and constantly improve our products, we treasure your ideas and suggestions. We and our international partners are looking forward to hearing from you.

Thorlabs GmbH

Warning

Sections marked by this symbol explain dangers that might result in personal injury or death. Always read the associated information carefully before performing the indicated procedure.

Attention

Paragraphs preceded by this symbol explain hazards that could damage the instrument and the connected equipment or may cause loss of data.

Note

This manual also contains "NOTES" and "HINTS" written in this form.

Please read this advice carefully!

1 General Information

The upSERIES™ Software is designed for straight forward use with the [upTEMP™ Multichannel USB Temperature Logger](#) and the [upLED™ LED Driver](#). The upSERIES™ Software accommodates for complex setups with several upTEMP™ and upLED™ models in parallel.

When used with the [upTEMP™](#), the upSERIES™ Software monitors, saves, and evaluates temperature measurements detected by resistance temperature detectors (RTD) or negative temperature coefficient thermistors (NTC). A variety of options for data display and measurements can be configured. To monitor the temperature in complex setups, signals from several upTEMP™ modules can be processed by the upSERIES™ Software in parallel. Each upTEMP™ can transmit signals from up to 8 temperature sensors to the software.

When using the upSERIES Software with the constant current [upLED™ LED Driver](#), the forward current can be precisely set and saved for later applications. Additionally, software configuration allows to use LEDs without a Thorlabs EEPROM with the upLED™.

The user can set the display language to English or Chinese.

1.1 Requirements

The following PC specifications are required for remote operation of the upSERIES™ Software with a upTEMP™ Multichannel USB Temperature Logger or upLED™ LED Driver.

Hardware Requirements:

- CPU: 1 GHz
- RAM: 512 MB
- Graphics Card Resolution: 1280 x 768 (Minimum)
- Hard Drive: 200 MB (Minimum) of Available Disk Space (64 bit)
- Interface: Free USB 2.0 Port

Software Requirements:

The upSERIES™ Software is compatible with the following operating systems:

- Windows® 8.1 (64-bit)
- Windows® 10 (64-bit) (recommended)

For operation of the upSERIES™ Software, the Microsoft .NET Framework V 4.7.2 or later is required. This software (V 4.7.2) is included with the Thorlabs upSERIES™ Software installation package.

2 First Steps

2.1 Software Installation

The upSERIES™ Software can be downloaded from the Thorlabs website:

https://www.thorlabs.com/newgrouppage9.cfm?objectgroup_id=14285&tabname=Software#tabTitles

Note

Do not connect an upTEMP™ or upLED™ to the PC during software installation! Please make sure that the installation is carried out completely, including reboot requests.

- Save the ZIP file to your computer and unpack the archive.
- Double click the setup.exe to install Shield Wizard.
- Read and accept the End-User License Agreement and the GNU Lesser General Public License.
- After installing the upSERIES™ Software, connect the upTEMP™ or upLED™ devices to the PC.

Note

Several upTEMP™ or upLED™ modules can be connected and monitored in parallel in a single software instance. If your PC does not provide a sufficient number of USB-ports, use a powered USB-HUB to ensure that enough power is supplied to the temperature sensors.

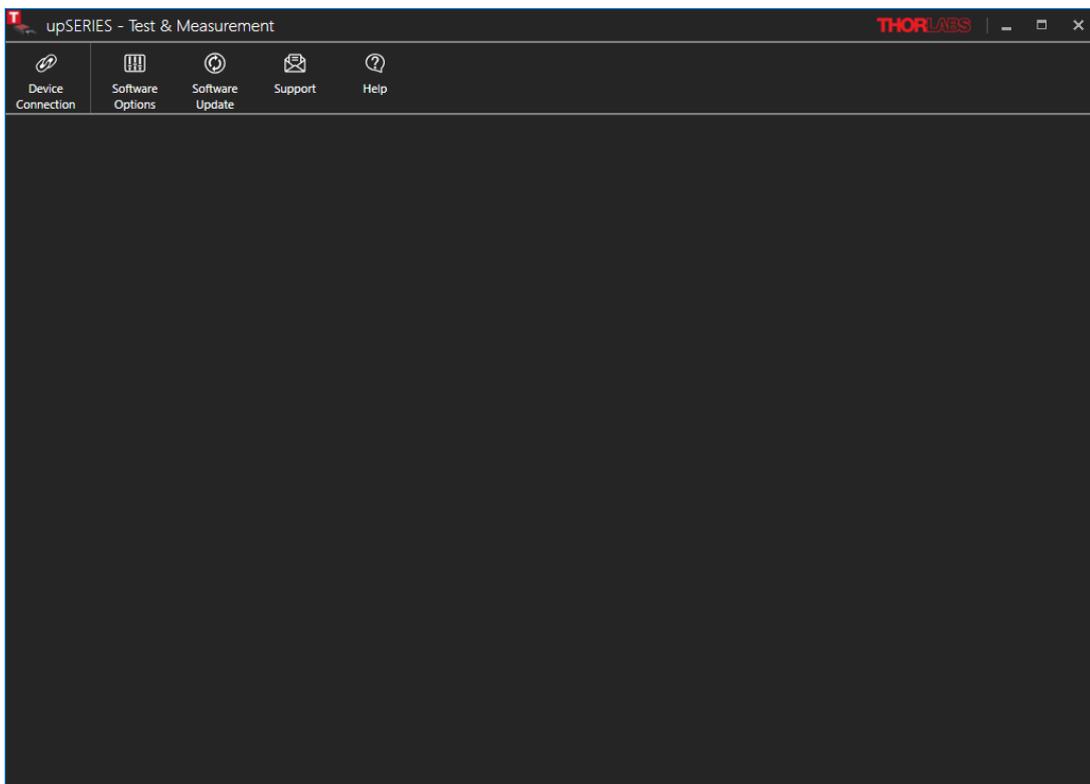
Start Application

Start the upSERIES™ Software from the desktop icon:



2.2 Graphical User Interface (GUI)

When no upTEMP™ or upLED™ device is connected, the upSERIES software starts with the following screen:

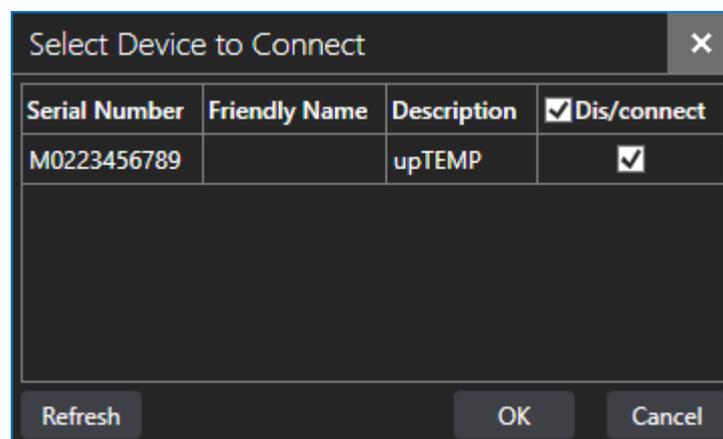


Use this main menu bar to select and connect an upTEMP or upLED device, to choose GUI options like temperature units and display language, to update the software, and to find support information and help.

Main Menu Bar:

Device Connection

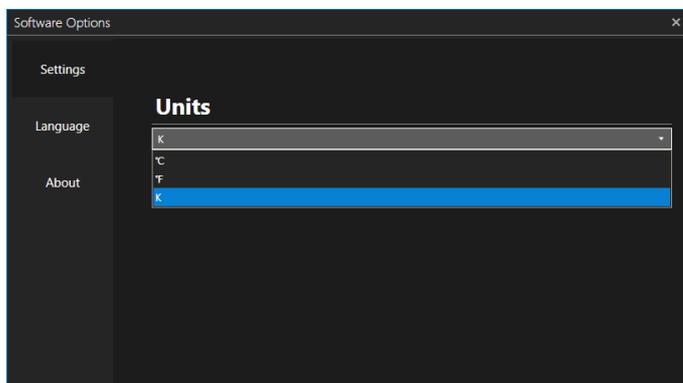
To connect an upTEMP™ (shown here) or upLED™ that is plugged into the PC to the software, check the box under Dis/connect in the line of your selected device and confirm with OK.



- The window "Device Connection" shows the connected device type with its serial number.
- A "Friendly Name" with up to 24 digits may be chosen for easy identification.

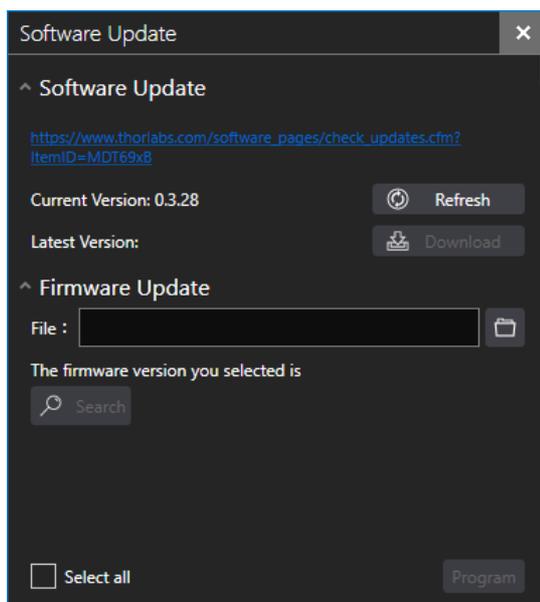
Software Options

Choose between English and Chinese for the GUI language and choose the temperature unit, in case you are also using a upTEMP™ in parallel. The panel "ABOUT" gives information on the software version.

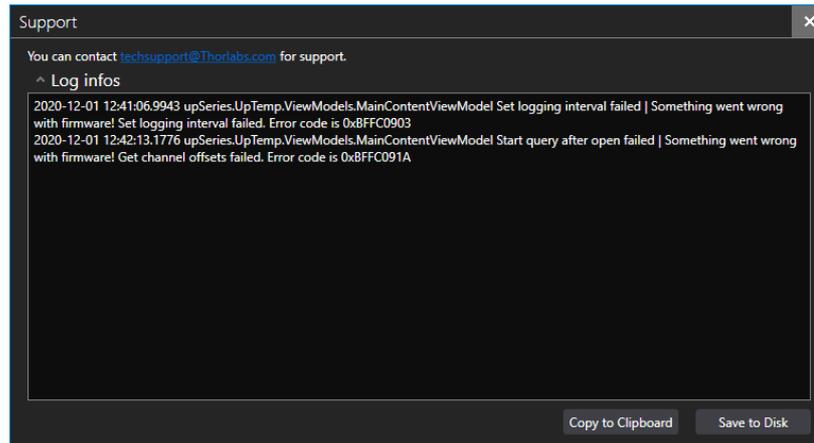


Software Update

Both the upSERIES™ Software and upTEMP™ or upLED™ firmware can be updated through this panel.



Support



The support panel shows the logged information on software performance and errors. Please provide this information to the Thorlabs support engineers in case they are contacted for assistance.

Help

This option opens this manual.

3 upTEMP™ Specific GUI

In this section, the upSERIES™ Software interface is described based on a setup using an upTEMP™ with four 4-wire RTDs. The upTEMP™ is connected to a PC running with OS Windows® 10.

When an upTEMP™ is already connected to the PC prior to starting the software or connected afterwards via the window [Device Connection](#), the upSERIES™ Software automatically connects the first recognized upTEMP™ device.

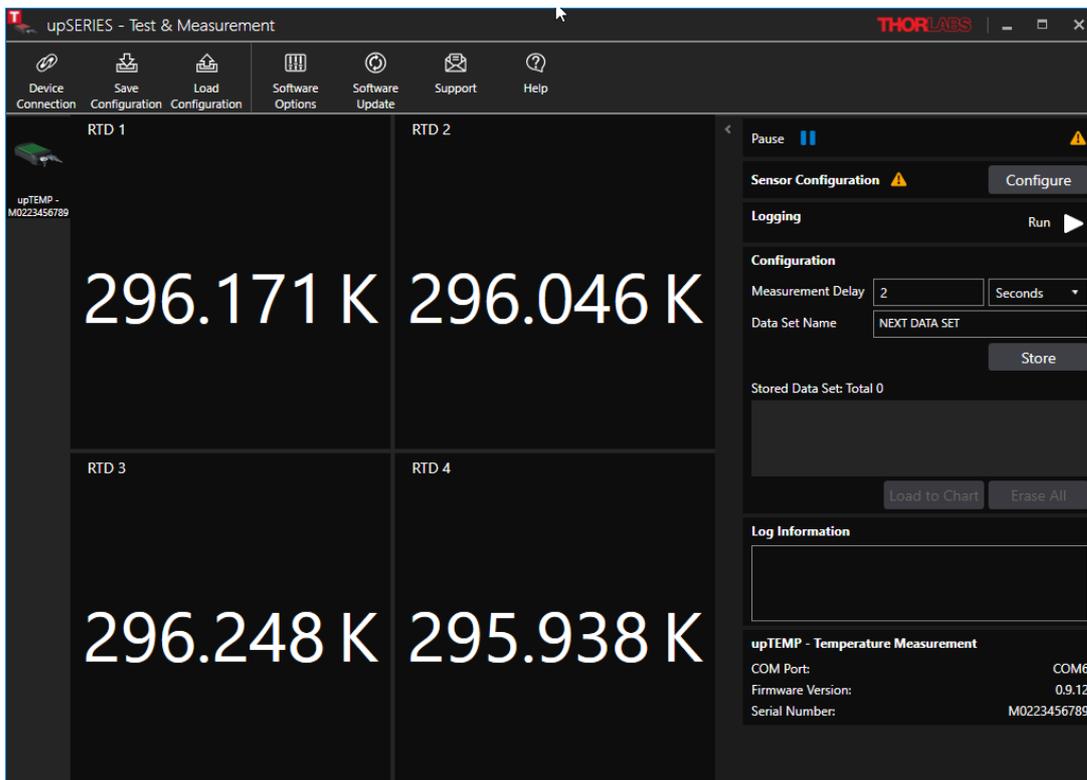
The GUI lists the connected upTEMP™ devices in the left panel and shows the setting and measurement options on the right side panel. To gain meaningful measurements, please first use the sensor configuration wizard on the right side to adjust the settings.

Save Configuration or Load Configuration

Two additional menu options "Save Configuration" and "Load Configuration" appear when the software is started with an upTEMP™ device connected. Use these options to store or reuse the following settings:

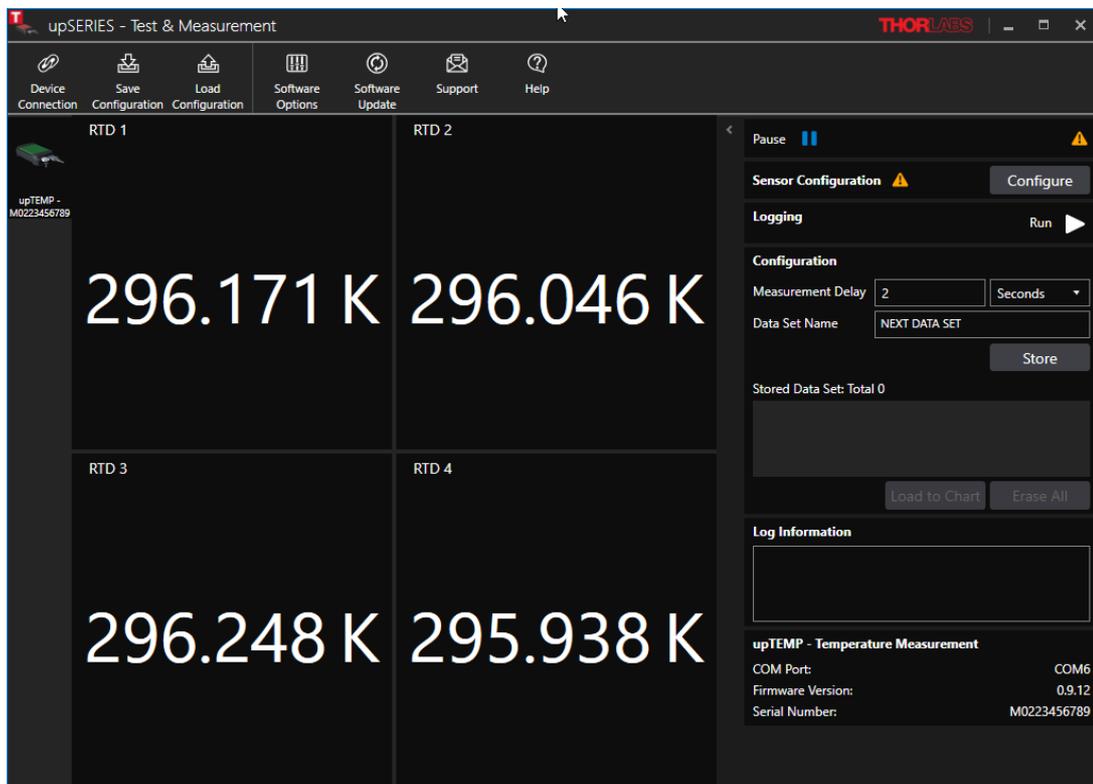
- Selected Sensor Model assigned to sensor slots 1-4 (RTDs) or 1-8 (NTCs). The sensor slots in the software refer to the pin-out slots on the upTEMP™. Please ensure that the sensors are connected in the correct order.
- Temperature Ranges as assigned to sensor slots 1-4 (RTDs) or 1-8 (NTCs). In the configuration file, the temperature ranges are referred to as 0-7. 0-7 corresponds to the [temperature ranges shown in the GUI interface](#), lines 1 through 8, top to bottom.
- Predefined Sensor Models.

Note The configuration file does not save which connected sensors are enabled/disabled. A sensor can only be activated by clicking ON/OFF in the software. Please also ensure that the connected sensors match the loaded config file.



3.1 Settings

On the right side panel, measurement and settings for each sensor and the logging protocol can be configured.

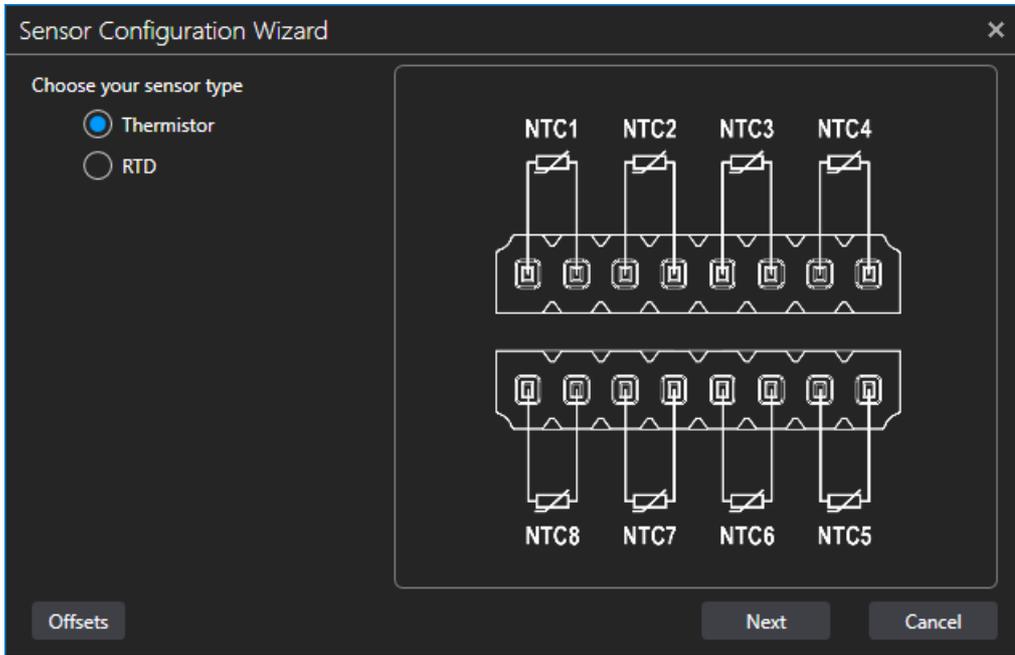


3.1.1 Sensor Configuration

To choose the type of sensor and to configure the settings for a connected sensor, click the icon "Configure" and the Sensor Configuration Wizard appears.

3.1.1.1 NTC Sensor Configuration

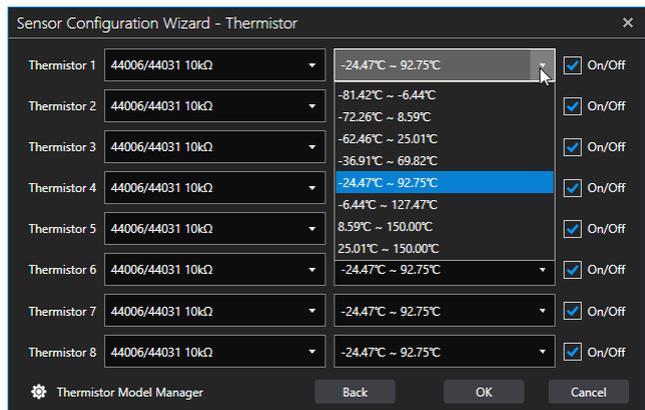
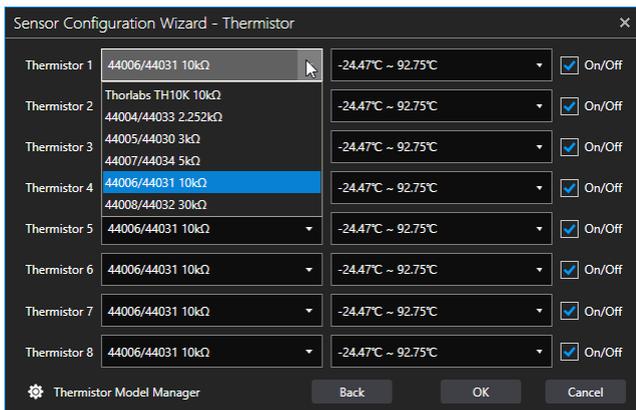
When using NTC sensors, choose "Thermistor". The first configuration panel shows an example of a panel with 8 NTCs connected. Please see the PIN assignment for NTCs in the up-TEMP™ hardware manual.



To implement an offset, click on the icon in the lower left corner and arrive at the panel describe in the section [Temperature Offset](#).

To set the resistance and the operating temperature range, click NEXT.

The temperature coefficient (here: 4406/44031) and the operating temperature range of choice can be set in the left and right column, respectively.

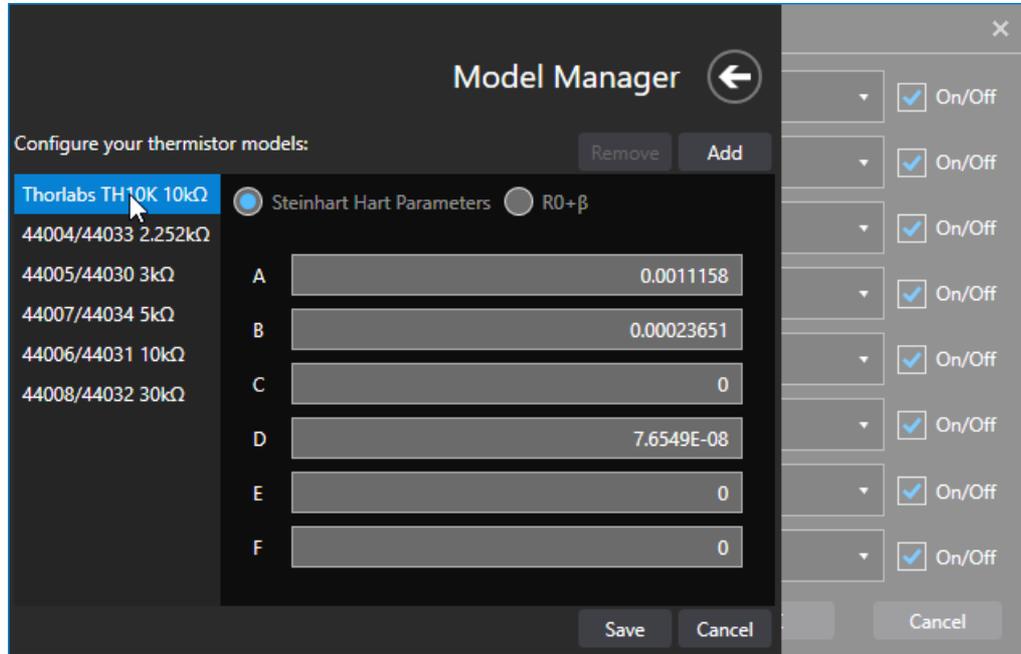


To enable or disable a physically connected sensor for the measurement, check or uncheck it in the On/Off panel.

Thermistor Model Manager

The Thermistor Model Manager allows new NTC thermistor models to be added. The models can be configured with either the Steinhart-Hart equation or beta formula ($R0 + \beta$).

At least 30 slots are available for NTC thermistor configurations. To replace slots, please first remove configured thermistors via the top panel.



The underlying Steinhart-Hart equation uses the constants A through F where C, E and F are mostly irrelevant to applications as they are very small. Please type the coefficients as provided by the sensor supplier into the respective lines.

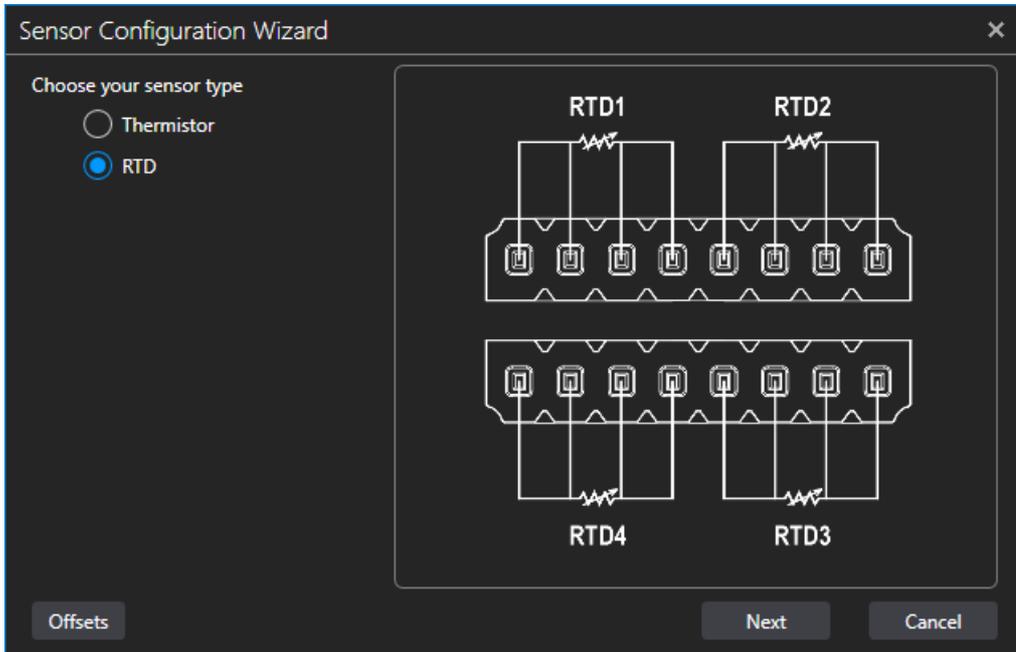
$$1 / T = A + B \cdot \ln(R) + C \cdot \ln(R)^2 + D \cdot \ln(R)^3 + E \cdot \ln(R)^4 + F \cdot \ln(R)^5$$

Steinhart-Hart Equation

The coefficients A, B, C, D, E and F are those for resistance values in Ohm and for temperature values in Kelvin.

3.1.1.2 RTD Sensor Configuration

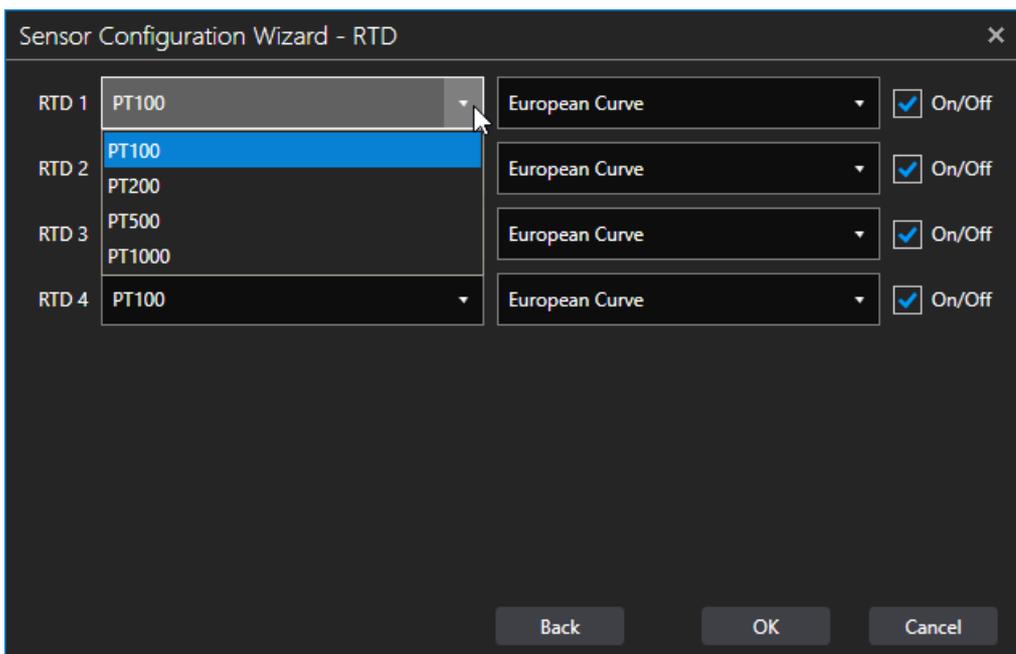
When using RTD sensors, the first configuration panel shows an example panel with four 4-wire RTDs connected. Please see the PIN assignment for four-wire RTDs as well as two- or three-wire RTDs in the [upTEMP™ hardware manual](#).



To implement an offset, click on the icon in the lower left corner and arrive at the panel described in the section [Temperature Offset](#).

In the next panel, the category of the RTDs, based on the resistance at zero degrees Celcius (PTxxx), and the calibration curve can be set based on the information provided from the RTD supplier.

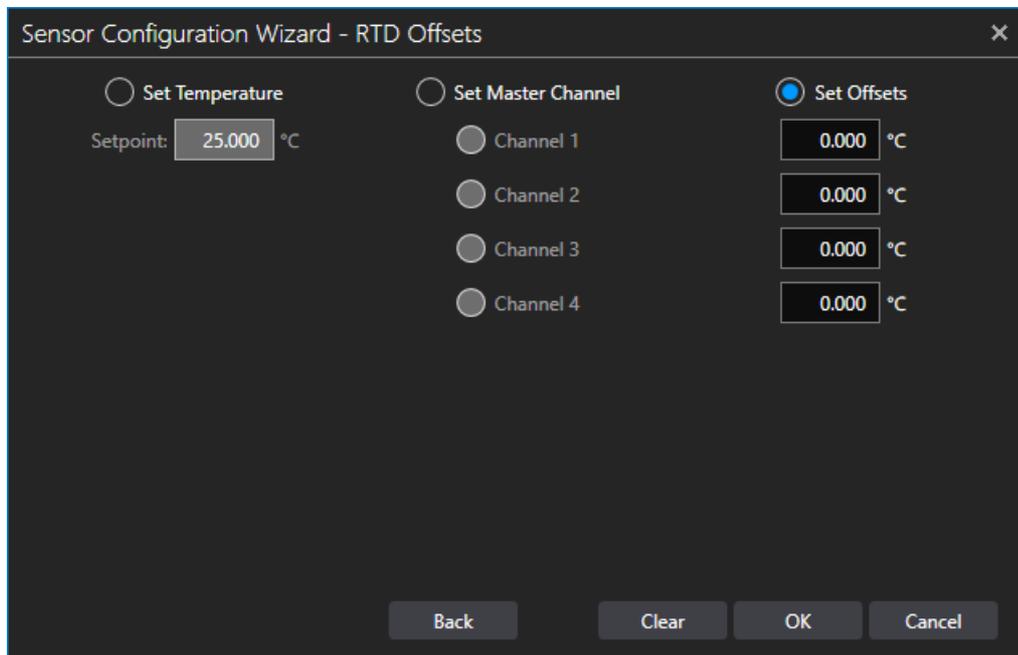
To activate or inactivate a sensor, check or uncheck the On/Off panel.



3.1.1.3 Temperature Offset

To implement an offset, go to the [Sensor Configuration Wizard](#) top window and select Offset in the lower left corner.

The following panel will open:



Left panel: Set the same offset for multiple channels in the panel to the left, followed by selecting the channels to apply this offset temperature to. The offset will be applied to the selected channel by clicking OK.

Right panel: Set different offset temperatures for each channel. As above, they are applied by clicking OK.

3.2 Running a Measurement

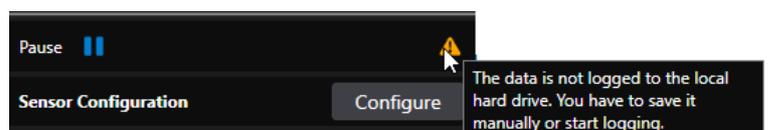
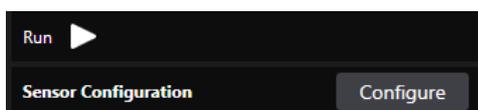
With the upSERIES™ Software, temperatures calculated from the signal of the sensors can be recorded in the display, logged to the upTEMP™ and data saved to the PC.

The following describes the procedures for this.

3.2.1 Data Display

The RUN icon located on the **upper** right side of the main window (shown below) activates the live data display in the main window. Use the Run and Pause buttons to switch the data display on or off. Display will continue after hitting Run again. Starting the display will not automatically log or save data as indicated by the warning sign (see below).

Logging of data to the upTEMP™ occurs when activated in the [logging panel](#) below.



3.2.2 Logging to upTEMP™

Logging temperatures to the upTEMP™

To configure data logging on the upTEMP™, use the panel on the right side of the window, as shown here.

Logging - Run: This will start logging the measured data with the chosen name and the specified measurement delay. Please configure the measurement prior to Run.

Configuration:

Measurement Delay:

The measurement delay describes the update rate of the measured data in the upTEMP™ and on the screen. When set at 1 second, data will be retrieved one second after the previous data point.

Data Set Name: Determine a name for the data set. The data will then be saved to the upTEMP™ under this name. The name is not automatically used when [saving the data to the PC](#) as described below.

Saving Data to the upTEMP

Store: Click this button to store the logged data to the upTEMP™, internal memory following the measurement.

Note:

To save data to the PC please see the section [Saving Data to the PC](#).

The upTEMP™ internal memory can save up to 100K cumulative data points with one data point being a temperature per time point per recorded sensor, ie., 8 data points per time point with 8 NTCs connected.

Erase All:

When the internal upTEMP™ memory is full, logging will be stopped and temperatures will be displayed - but not saved. To free up internal memory on the upTEMP™, save the data to the PC and delete the data on the internal upTEMP™ memory by clicking "Erase".

Note:

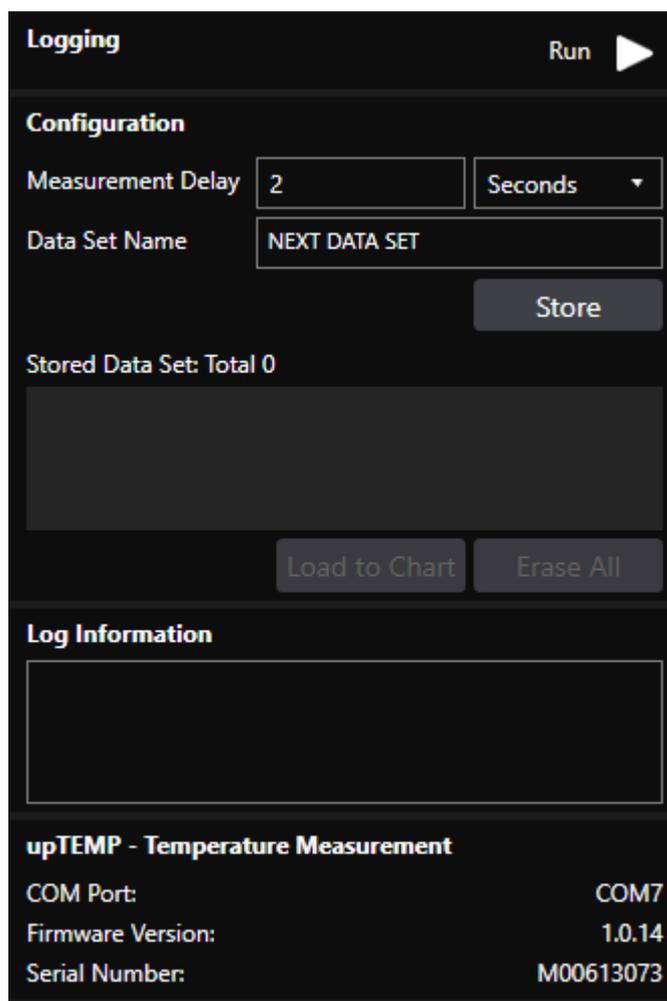
When logging is started from the GUI with an already full internal memory, a warning message will appear.

If the software is still active and data logging is started directly on the device upTEMP™ using the On / Off with a full internal memory, the status LED on the upTEMP™ will briefly be red. The the measured data will be displayed on the screen but not saved in the upTEMP™.

Log Information:

This panel displays information on the logging process.

An error message message appears when the configurations do not match the sensor. An example would be when a NTC is physically connected but the software is configured for an RTD sensor.



3.3 Saving Data to the PC

Measurements displayed on the screen can be saved to a PC.

Hover the mouse over the top of the display window. Options to delete the displayed measurement, save it to the PC or to change the display from digital to plot will appear.



Note Deleted data can no longer be saved, unless they were previously logged.

The display data are saved as a .csv file with the following information:

- Time and Date
- Sensor Type, Sensor Number (i.e. RTD1, RTD2, according to the list in the software), Temperature Unit
- Temperature Value as Calculated and Displayed

3.4 Data Analysis

The displayed data can be analysed on the screen or [saved to a PC](#) for subsequent analysis.

Analysis on the Screen:

Zoom: To zoom into data sets, select the region of interest in the lower panel.

Single Values: To display temperature data from a specific time point, hover the mouse in the plot display over the respective time point.

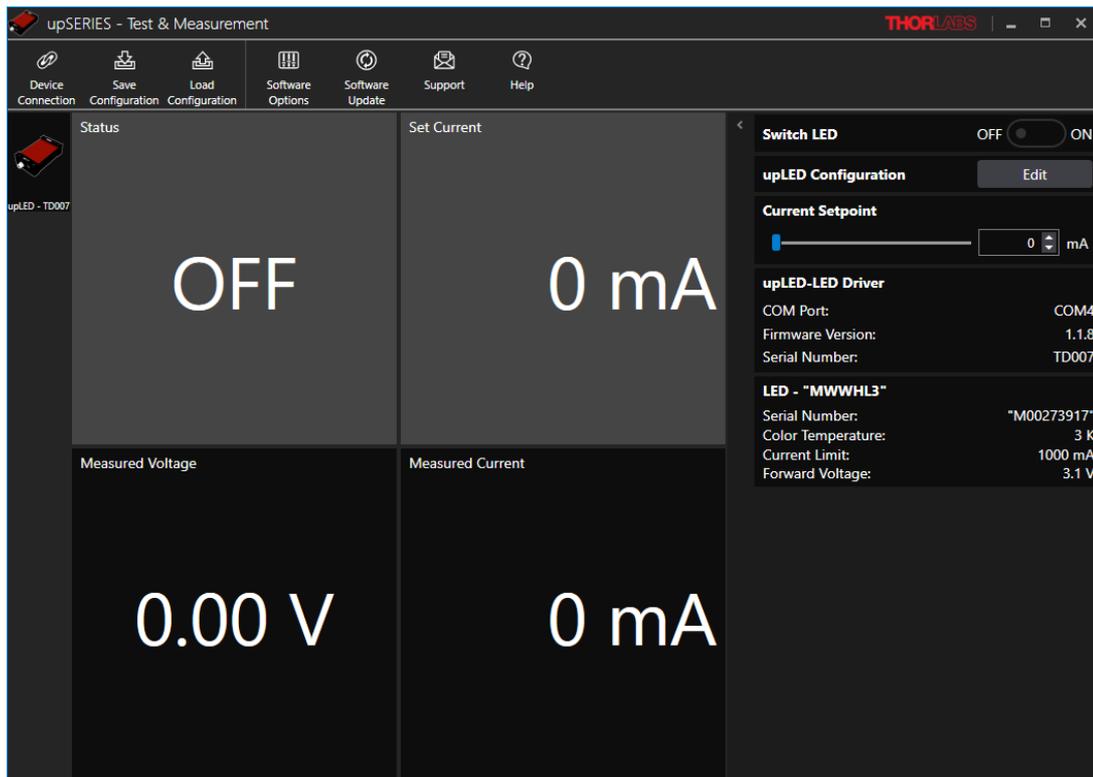


4 upLED™ Specific GUI

Please note that software versions 1.2 and higher fully support the upLED™.

In this section, the upSERIES™ Software interface is described based on a setup using an upLED™ with a Thorlabs MWWHL3 mounted LED. The upLED™ is connected to a PC running with OS Windows® 10.

When an upLED™ is already connected to the LED, power supply and PC prior to starting the software, the upSERIES™ Software automatically connects the first recognized upLED™ device or the device selected in the last software instance. The following start screen appears in the upSERIES Software:



The GUI lists all connected upLED™ devices in the left panel, displays the status of the LED (ON/OFF), the current set point, and the measured voltage and current as reported by the upLED™ in the reporting middle panel, and shows the settings on the right side panel.

Use the main menu bar described above in the chapter [Graphical User Interface \(GUI\)](#) to select and connect an upLED™ device, save or load configurations, choose GUI options like the display language, update the software and firmware, and to find support information and help.

Please adjust the upLED™ configuration on the right panel before activation of the LED.

Save and Load Configuration

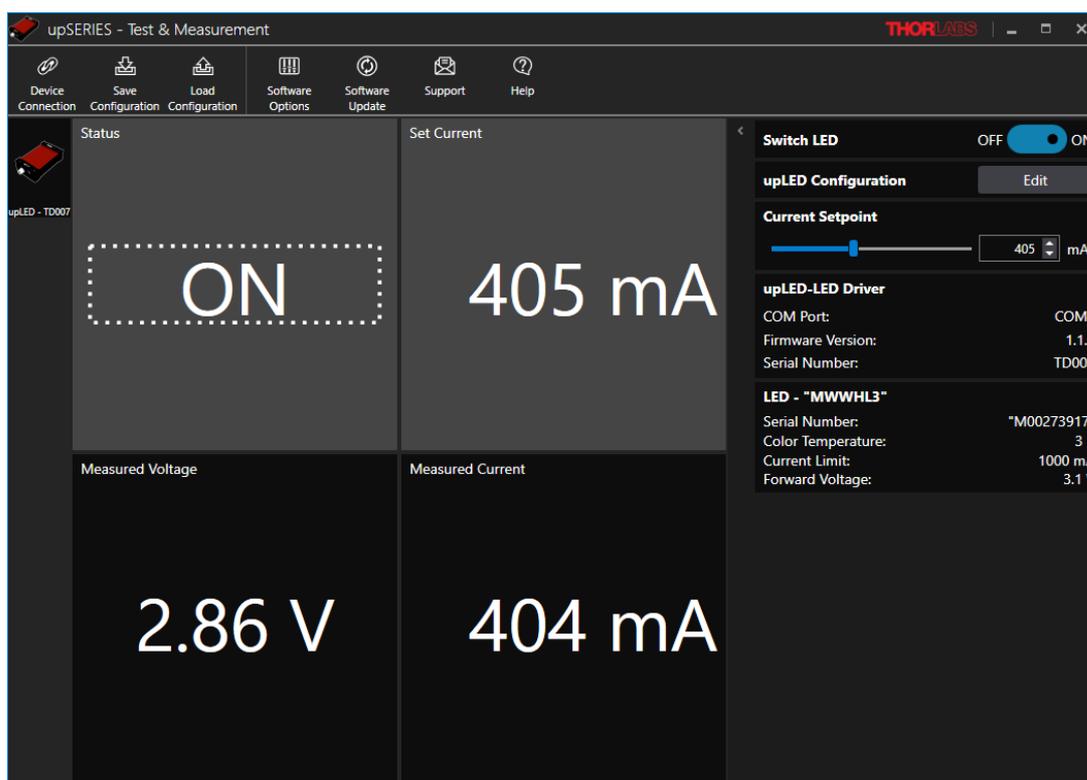
The menu options "Save Configuration" and "Load Configuration" appear when the software is started with an upLED™ connected. The following settings can be stored or reused:

- Current limit as set by the user
- Enable operation of LEDs without Thorlabs EEPROM
- General Settings from the upLED™ Configurator

4.1 Settings

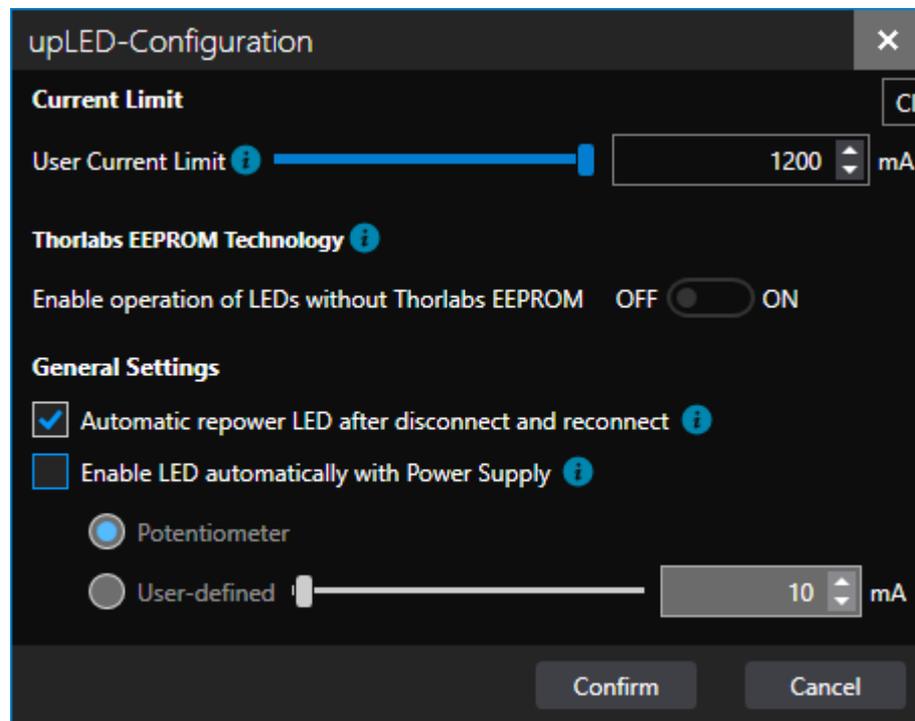
Configure the upLED and get information on the LED and upLED™ on the right hand side panel with the following options:

- Activation or deactivation of the attached LED by switching between ON and OFF
- Adjust settings for the selected upLED™ via the upLED-Configuration panel
- Current Setpoint: Setting the current at which to run the LED. For Thorlabs LEDs with EEPROM, the maximum current is read from the EEPROM and set in the software. When using the POWER dial (potentionmeter) on the upLED™, the displayed Current Setpoint will change accordingly in the software.
- Information on the upLED™ and the connected LED as read from the respective EEPROMs.



4.1.1 upLED™ Configuration

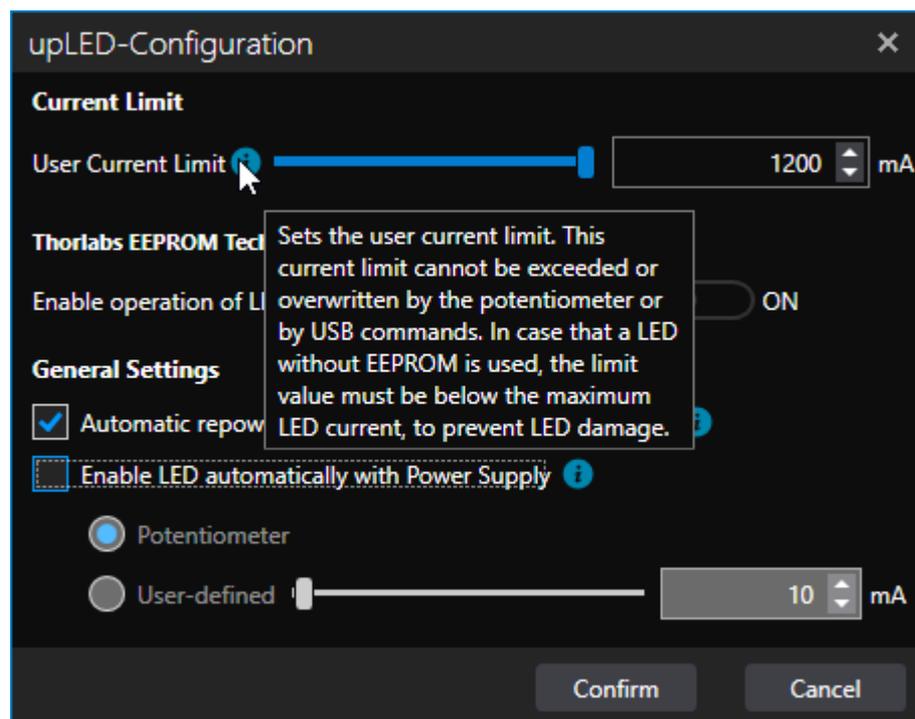
Prior to activating an LED, please configure the settings in the panel upLED-Configuration by clicking **Edit** in the right panel. The following window appears. All options are explained in the tool tips, which can be accessed by clicking on the blue "i" icons.



Current Limit

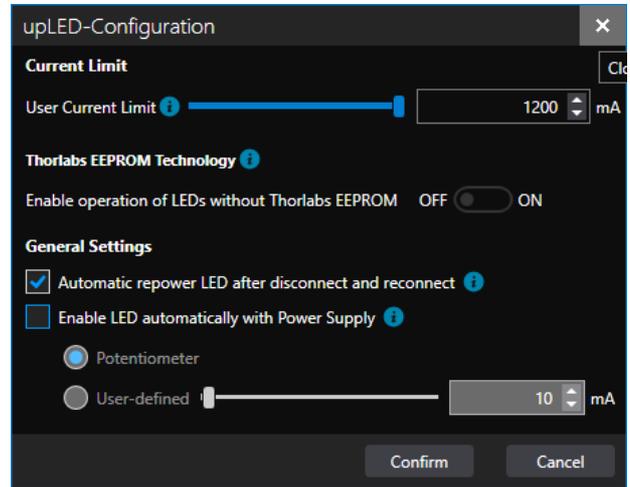
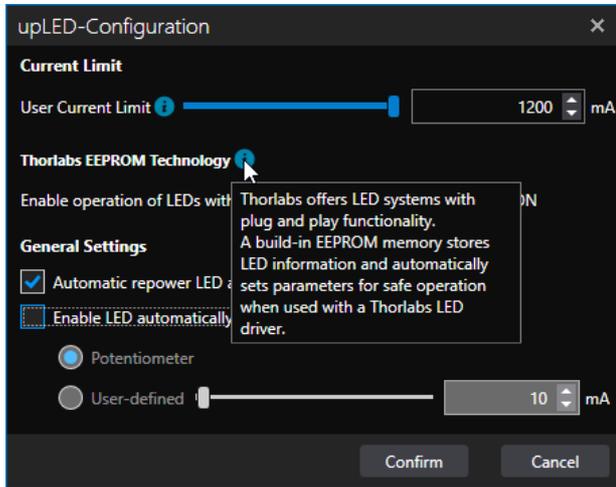
This is automatically set when an LED with a Thorlabs EEPROM is connected. In the case where a non-Thorlabs EEPROM is used, the User Current Limit can be set manually here.

Setting the Current Limit prevents damage to the LED when using the POWER dial (potentiometer) on the upLED™ directly.



Thorlabs EEPROM Technology

The upLED™ is optimized to drive Thorlabs LEDs. However, the upLED™ can also drive LEDs without a Thorlabs EEPROM. In order to enable those, please switch to the operation option to "ON".



General Settings

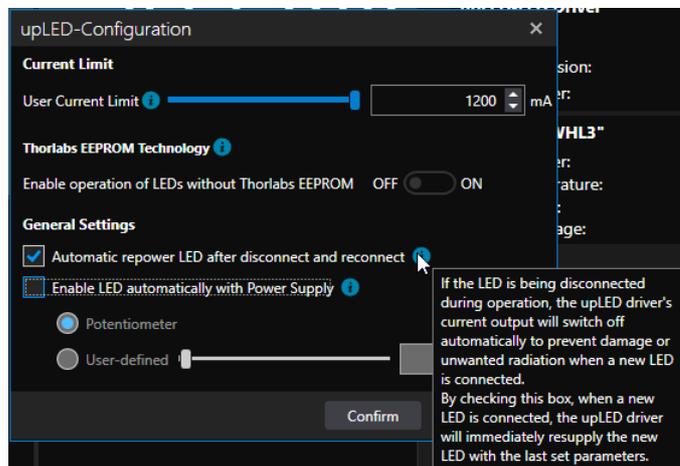
Automatic repower LED after disconnect and reconnect

Warning

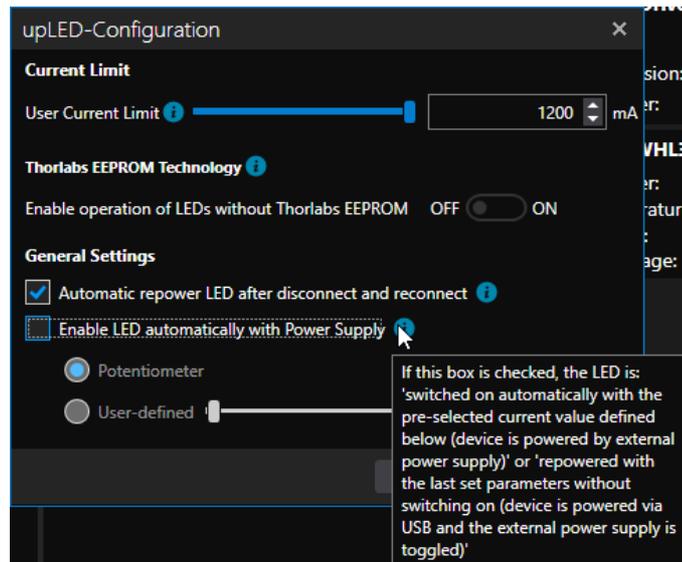
Please be aware that by ticking this box, any LED, also LEDs which belong to the high risk group will be immediately powered up. Please always direct LEDs away from persons and reflecting surfaces prior to powering up the upLED™.

Warning

Please be aware that in combination with the switch to "Enable operation of LEDs without Thorlabs EEPROM", the connected LED may be driven with current exceeding the maximum current allowed for this LED. This may potentially damage of the connected LED.



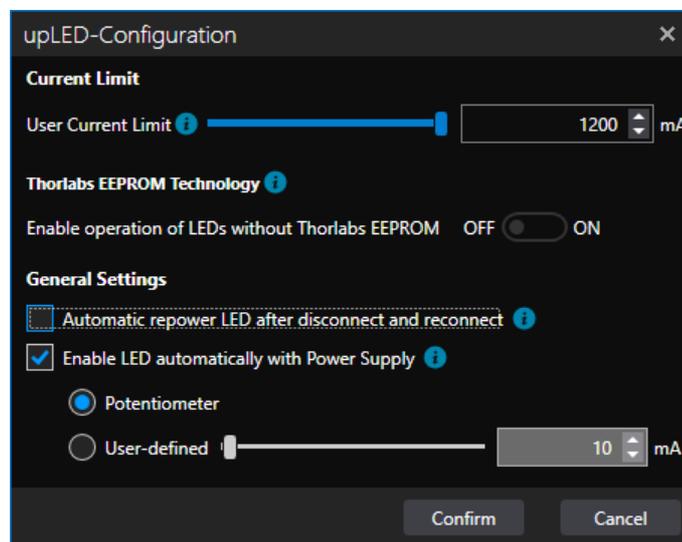
Enable LED automatically with Power Supply



Warning

Please be aware that when ticking this box, the LED will immediately emit light without any safety notice upon connection of the upLED to power. Ensure to point the LED away from any person and reflective surfaces to prevent damage to health.

Please choose between use of the Potentiometer current setting on the POWER dial on the upLED™ device or User-defined current settings via the software. The current will be applied when the LED is promptly activated with power supplied to the upLED™ as selected with the tick mark above. However, when the upLED is still connected to the PC via USB, the current last used in the software will be applied.



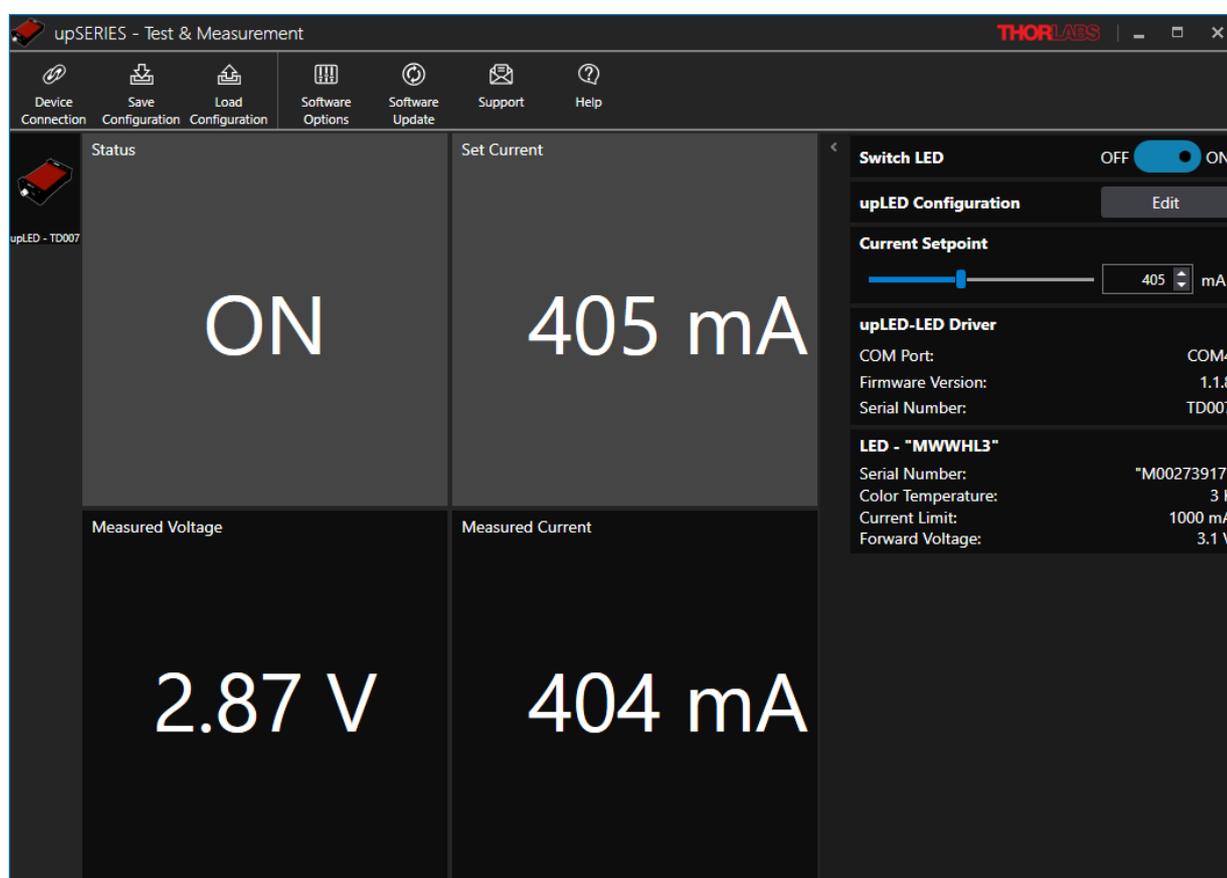
4.2 Driving an LED

To drive the LED connected to the upLED™ via the software, either click the large panel in the middle of the window from OFF to ON or switch the button in the panel on the right side. Please ensure that the upLED™ configuration matches your demands.

Attention

Please ensure safety measures prior to turning on the LED. Be aware that the LED may be on immediately after connection to the upLED™ whenever the software is set to "Automatic re-power LED after disconnect and reconnect" or when the power was switched on if the software was set to "Enable LED automatically with Power Supply".

Note The measured voltage and current may not go down to 0 when lowering the Current Setpoint to 0. This is due to a measurement offset. The measured voltage and current will be 0 when the LED is switched off using the buttons because measurements are no longer taken.



5 Appendix

5.1 List of Acronyms

NTC: Negative Temperature Coefficient Thermistor

RTD: Resistance Temperature Detector

5.2 Copyright and Exclusion of Liability

Thorlabs has taken every possible care in preparing this document. We however assume no liability for the content, completeness or quality of the information contained therein. The content of this document is regularly updated and adapted to reflect the current status of the product.

All rights reserved. This document may not be reproduced, transmitted or translated to another language, either as a whole or in parts, without the prior written permission of Thorlabs. Copyright © Thorlabs 2021. All rights reserved.

Please refer to the general terms and conditions:

https://www.thorlabs.com/Images/PDF/LG-PO-001_Thorlabs_terms_and_%20agreements.pdf

and

https://www.thorlabs.com/images/PDF/Terms%20and%20Conditions%20of%20Sales_Thorlabs-GmbH_English.pdf

5.3 Thorlabs Worldwide Contacts

For technical support or sales inquiries, please visit us at www.thorlabs.com/contact for our most up-to-date contact information.



USA, Canada, and South America

Thorlabs, Inc.
sales@thorlabs.com
techsupport@thorlabs.com

UK and Ireland

Thorlabs Ltd.
sales.uk@thorlabs.com
techsupport.uk@thorlabs.com

Europe

Thorlabs GmbH
europe@thorlabs.com

Scandinavia

Thorlabs Sweden AB
scandinavia@thorlabs.com

France

Thorlabs SAS
sales.fr@thorlabs.com

Brazil

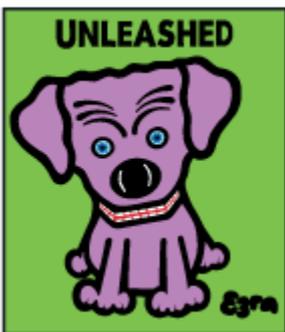
Thorlabs Vendas de Fotônicos Ltda.
brasil@thorlabs.com

Japan

Thorlabs Japan, Inc.
sales@thorlabs.jp

China

Thorlabs China
chinasales@thorlabs.com



THORLABS

www.thorlabs.com
