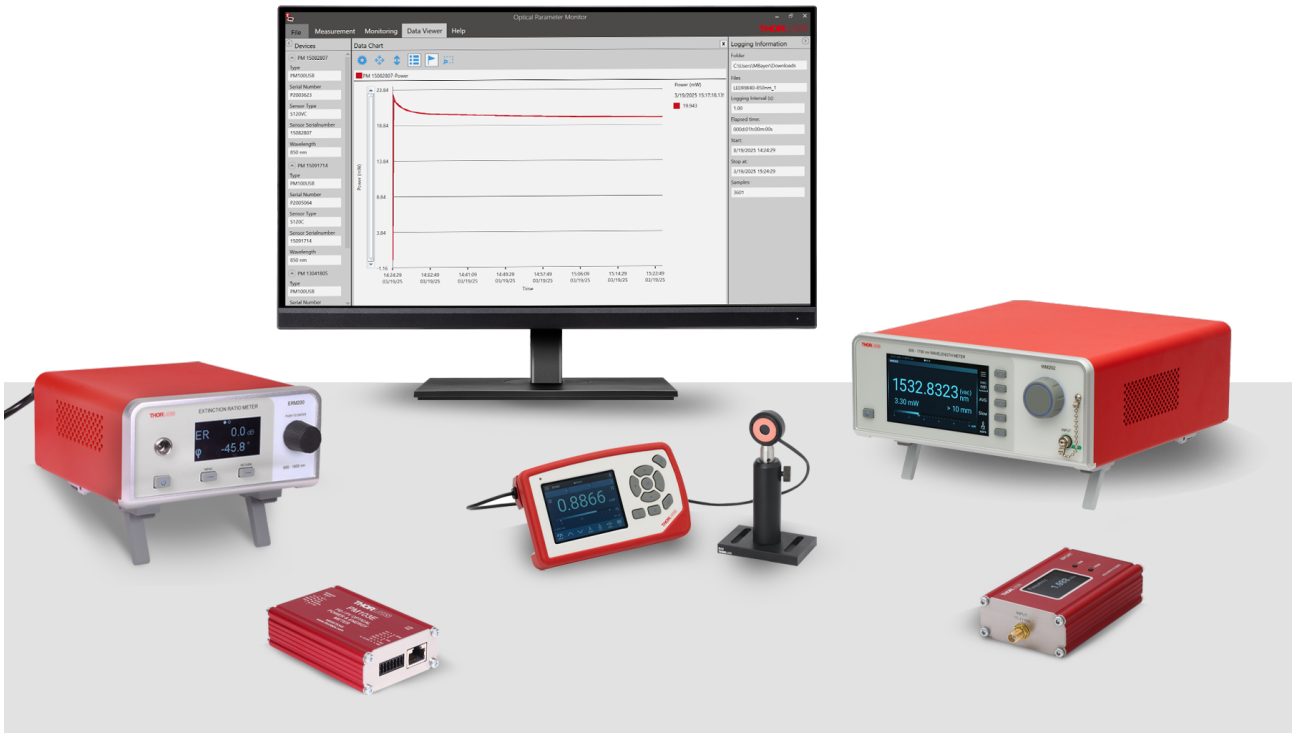
# Optical Parameter Monitor (OPM) Software

# User Guide



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# Chapter 1 Introduction

The OPM Software is a Graphical User Interface (GUI) that has been specially designed for use with various Thorlabs light analysis devices. An overview of the devices that are compatible with the OPM Software can be found in the section Supported Devices.

The OPM Software continuously monitors and stores measurement data, providing an intuitive interface for clear visualization and in-depth analysis. It also supports straightforward adjustment of various settings such as the connected devices, display configurations, and measurement parameter configuration. Designed with minimal brightness and color usage, the interface provides a high-contrast layout that remains easy to read even when wearing laser safety glasses, making it well suited for low-light laboratory environments.

The following key features summarize the core functions of the OPM Software, designed for efficient measurement and analysis:

- Real-Time & Long-Term Logging
- Multiple Display Modes
- Pass/Fail Checks
- Fast Parameter and Sensor Switching
- Data File Loading
- Statistical Data Analysis

## 1.1 Explanation of Safety Warnings

**NOTICE** Indicates information considered important, but not hazard-related, such as possible damage to the product.

Warning indicates the presence of laser radiation that, if not avoided, could result in minor or moderate injury.

Warning indicates laser radiation exposure that, if not avoided, could result in minor or moderate eye injury.

## 1.2 Supported Devices

The table below lists the devices supported by the OPM Software, along with the interfaces available for connection.

| Devices | USB | Bluetooth® | Ethernet | Serial |
|---|---|---|---|---|
| **Power Meter Consoles** | | | | |
| **PM100A** | ✓ | ✗ | ✗ | ✗ |
| **PM100D** | ✓ | ✗ | ✗ | ✗ |
| **PM100D2** | ✓ | ✗ | ✗ | ✗ |
| **PM100D3**[a] | ✓ | ✓ | ✗ | ✓ |
| **PM400** | ✓ | ✗ | ✗ | ✗ |
| **Power Meter Interfaces** | | | | |
| **PM100USB** | ✓ | ✗ | ✗ | ✗ |
| **PM101** | ✓ | ✗ | ✗ | ✓ |
| **PM101A** | ✓ | ✗ | ✗ | ✗ |
| **PM101R** | ✓ | ✗ | ✗ | ✓ |
| **PM101U** | ✓ | ✗ | ✗ | ✗ |
| **PM102** | ✓ | ✗ | ✗ | ✓ |
| **PM102A** | ✓ | ✗ | ✗ | ✗ |
| **PM102U** | ✓ | ✗ | ✗ | ✗ |
| **PM103** | ✓ | ✗ | ✗ | ✓ |
| **PM103A** | ✓ | ✗ | ✗ | ✗ |
| **PM103E** | ✗ | ✗ | ✓ | ✓ |
| **PM103U** | ✓ | ✗ | ✗ | ✗ |
| **Benchtop Power Meters** | | | | |
| **PM5020** | ✓ | ✗ | ✓ | ✓ |
| **Compact USB Power Meters** | | | | |
| **PM16-xx** | ✓ | ✗ | ✗ | ✗ |
| **Wireless Power Meters** | | | | |
| **PM160x** | ✓ | ✓ | ✗ | ✗ |
| **Fiber Power Meters** | | | | |
| **PM60x** | ✓ | ✗ | ✗ | ✗ |
| **PM61x**[a] | ✓ | ✓ | ✗ | ✗ |
| **Other Devices** | | | | |
| **WM20x** | ✓ | ✗ | ✗ | ✗ |
| **SPCNT** | ✓ | ✗ | ✗ | ✗ |
| **ERM2xx** | ✓ | ✗ | ✗ | ✗ |
| **TSP01** | ✓ | ✗ | ✗ | ✗ |

a. Bluetooth® Low Energy (BLE)

***Table 1 Supported Devices Interfaces***

## 1.3 Overview of Measurement Features

The table below lists the measurement features supported by the OPM Software.

| Devices | Numeric | Tuning | Statistics | Graph | Pass/Fail | Monitoring |
|---|---|---|---|---|---|---|
| **Power and Energy Meters** | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| **WM20x** | ✓ | ✗ | ✓ | ✗ | ✗ | ✓ |
| **SPCNT** | ✓ | ✗ | ✓ | ✓ | ✗ | ✓ |
| **ERM2xx** | ✓ | ✗ | ✗ | ✗ | ✗ | ✓ |
| **TSP01** | ✓ | ✗ | ✗ | ✓ | ✗ | ✓ |

***Table 2 Overview of the Supported Measurement Features***

The PM5020 Dual-Channel Benchtop Optical and Energy Meter Console supports Dual-Channel Measurement and Scope Mode, while the PM61x Fiber Optical Power Meters built-in Visual Fault Locator (VFL). The PM100D3 Optical Power and Energy Meter Console provides Scope Mode functionality.

All of these features are supported by the OPM Software.

# Chapter 2 Getting Started

This chapter outlines the initial steps for installing, configuring, and launching the OPM Software. It covers system requirements, installation instructions, and a quick guide to performing a first measurement.

## 2.1 System Requirements

The following PC specifications are required for remote operation of the devices by the OPM Software.

**Minimum Hardware Requirements**

- **CPU** 2.4 GHz
- **RAM** 4 GB
- **Graphics** Resolution: 1024 x 768 Pixel
- **Hard Drive** 32-bit Operating System: ≥1 GB of Available Free Disk Space
  64-bit Operating System: ≥2.3 GB of Available Free Disk Space
- **Interface** Requires one of the following free interfaces:
  - USB 2.0
  - Bluetooth®
  - Ethernet
  - Serial
- **Cables** Requires one of the following cables:
  - USB 2.0 Cable (Compliant with USB 2.0 Specification)
  - Ethernet Cable
  - Serial Cable (RS-232)

Interfaces are device-dependent; the required interface (see section Supported Devices for further information) must be supported by the device.

**Software Requirements**

The OPM Software is compatible with the following operating systems:

- **Windows® 10 (32-bit, 64-bit)**
- **Windows® 11**

## 2.2 Installation Instructions

The OPM Software is available for download on our website, along with a full list of updates, bug fixes, and new features.

**NOTICE**

**NOTICE: Clean Installation**

- Do not connect any devices to the PC during the installation of the OPM Software.
- Exit all running applications on your PC as the installer may require a reboot of your PC during installation.
- Make sure that the installation is complete, including restarting, if required.

1. Save the downloaded ZIP file to your PC and unpack the archive.
2. Double-click on the *setup.exe* file to install the OPM Software.
3. Read and accept the End-User License Agreement.
4. Choose the folder in which to install the OPM Software.
5. Click on the *Install* button to install the OPM Software.
6. Review the information about the OPM Software and click on the *Next* button.
7. Click on the *Finish* button to close the setup.

## 2.3 Starting a Measurement

Use the following simple steps to start your first measurement with OPM Software confidently.

1. Power on the device and connect it to your PC using the provided USB cable.
2. Launch the OPM Software via the desktop icon (see Figure 1) or the shortcut in the Start menu (see Figure 2).


***Figure 1 Desktop Icon of the OPM Software***

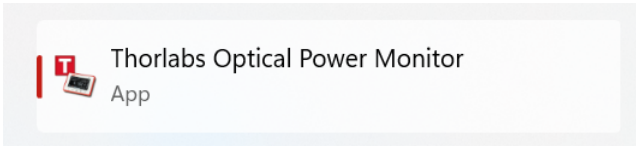



***Figure 2 Start Menu Icon of the OPM Software***

3. The OPM Software automatically connects to the device and displays the current measurement based on its active settings. If no connection is established, see section Connection of Devices.
4. The setup is complete. For guidance on adjusting settings, performing long-term measurements, and using advanced features, see the following chapters.

# Chapter 3 Graphical User Interface (GUI) Overview

The Graphical User Interface (GUI) of the OPM Software is designed for intuitive and efficient navigation, helping both new and experienced users quickly access all core functions. Sub-menus and options dynamically adapt to the connected device, ensuring a streamlined interface with only relevant features shown.

The GUI is organized into three main views, shown in the figures below: Measurement, Monitoring, and Data Viewer.

**NOTICE**

**NOTICE: Using This User Guide**

This user guide is written to be device-independent and describes general features of the OPM Software. Device-specific details - such as available parameters, measurement ranges, and hardware features - must be referenced in the corresponding product manuals.

Please note that screenshots, parameters, toolbar buttons, and icons may vary depending on the connected device and configuration.

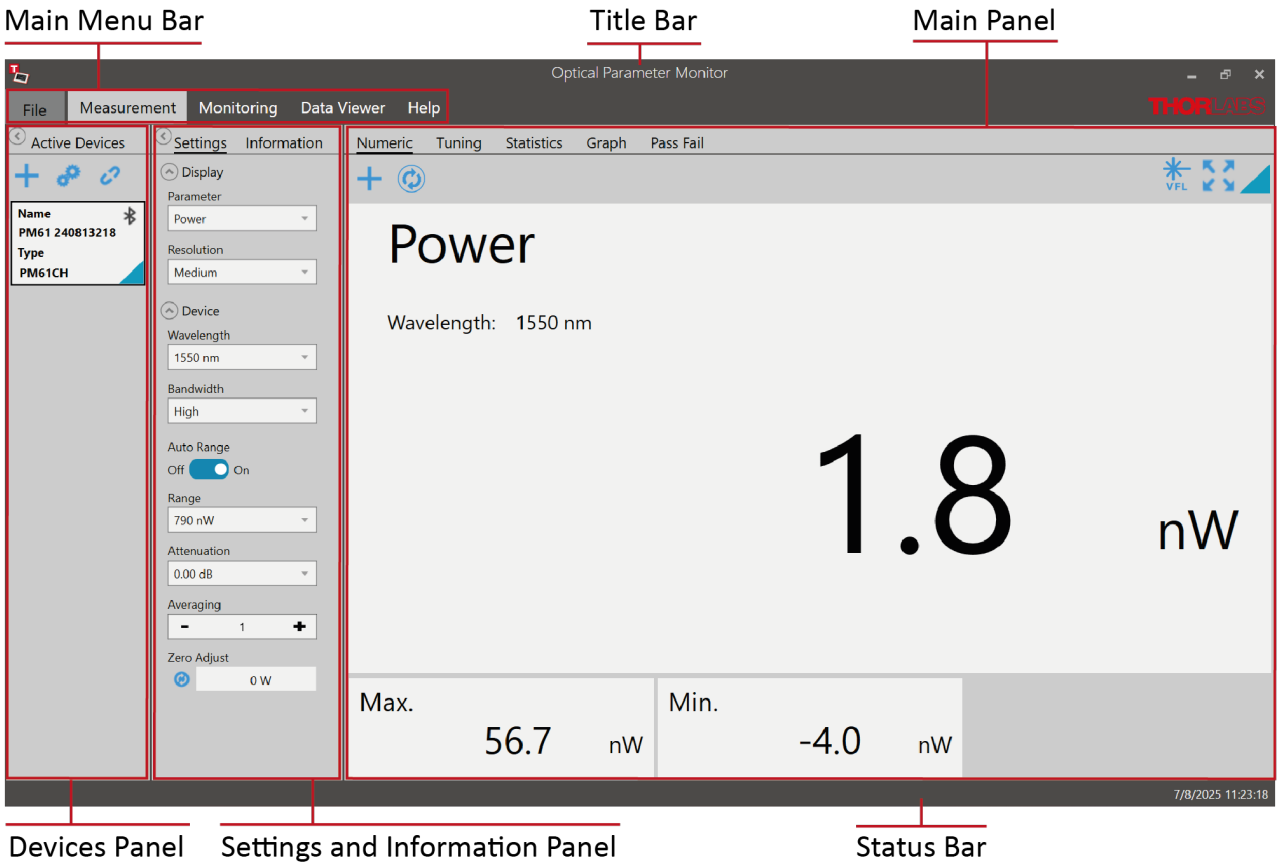



***Figure 3 GUI Overview - Measurement View***

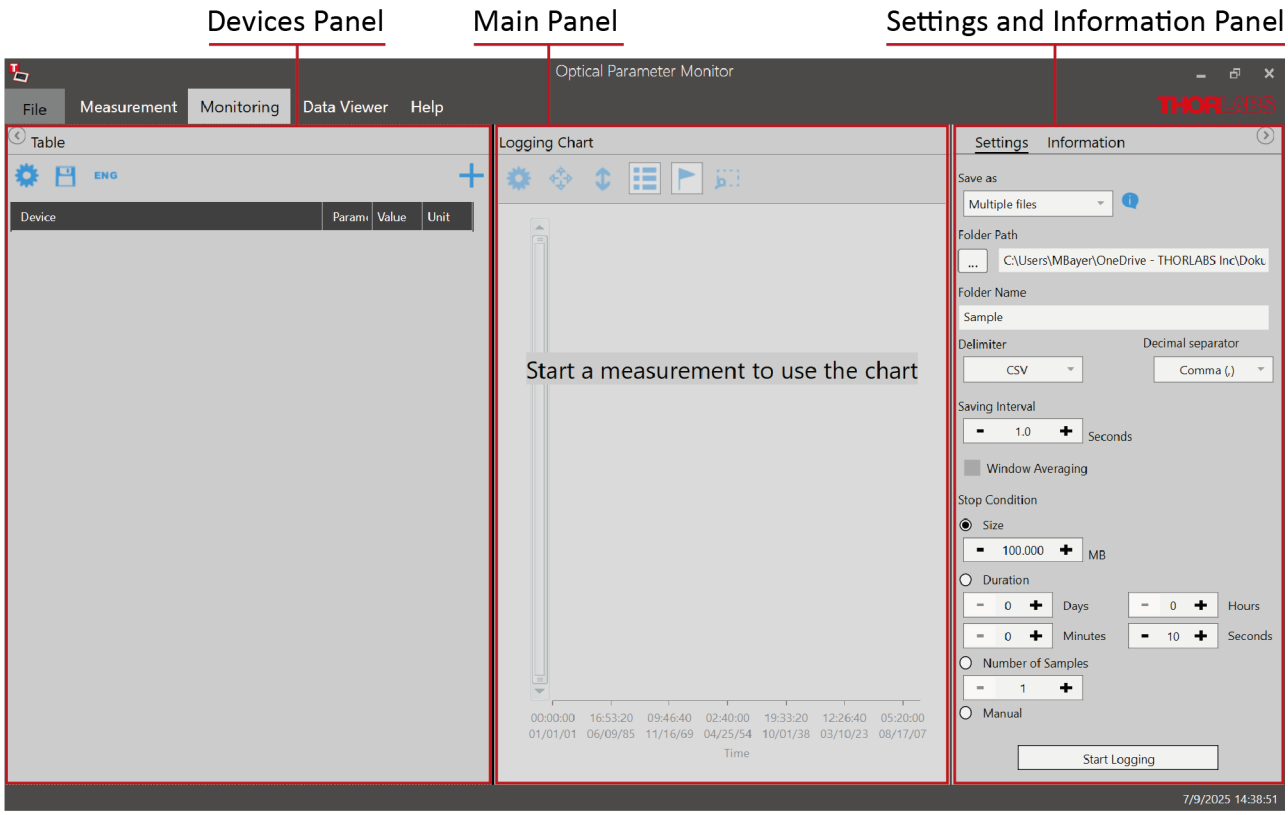



***Figure 4 GUI Overview - Monitoring View***

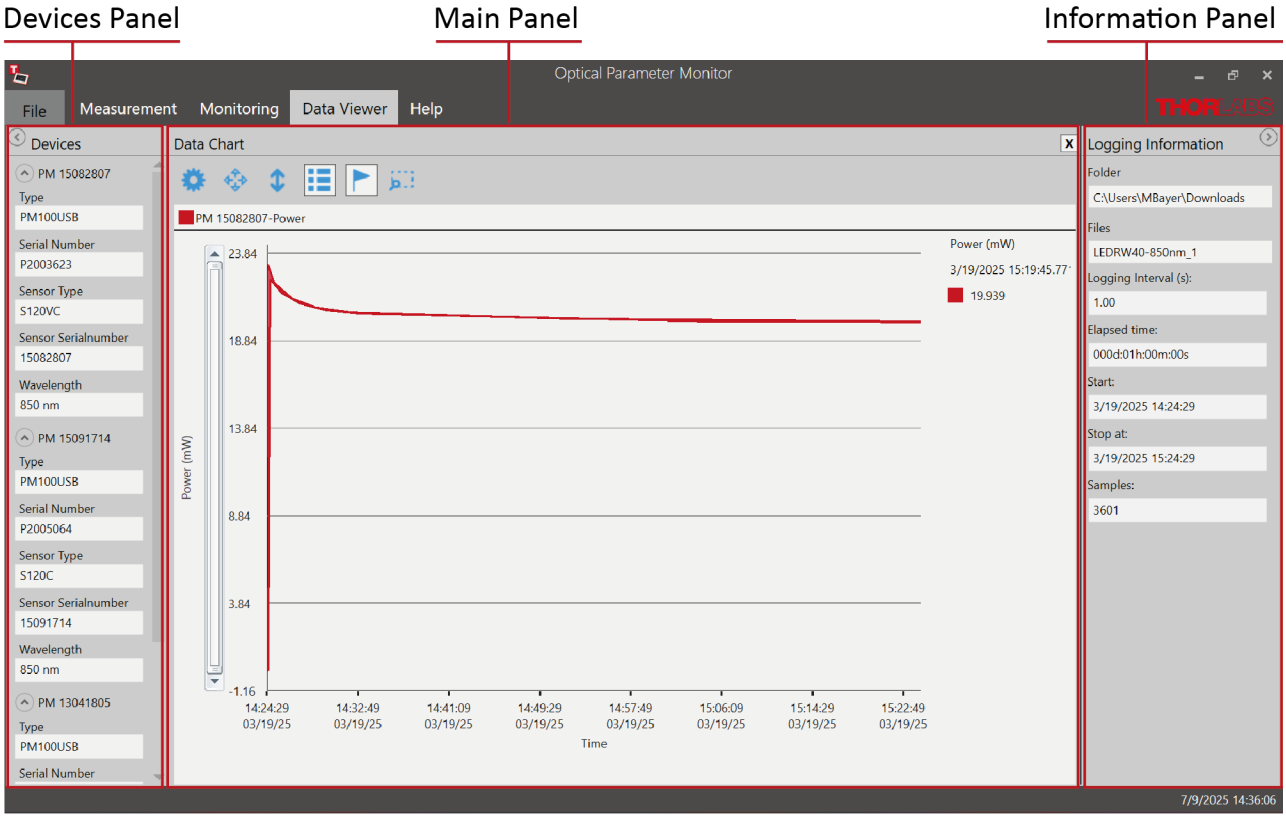



***Figure 5 GUI Overview - Data Viewer View***

| Component | Description |
|---|---|
| **Title Bar** | The Title Bar displays the Optical Parameter Monitor branding in Measurement, Monitoring, and Data Viewer views. Standard window controls in the upper-right corner allow you to minimize, maximize/restore, or close the application. |
| **Main Menu Bar** | The Main Menu Bar provides access to the different main features: File, Measurement, Monitoring, Data Viewer, and Help. Each tab opens a dedicated workspace for measurement or analysis tasks. It is shown in all views. |
| **Devices Panel** | The Devices Panel provides a structured overview of all connected devices in all views. Depending on the selected view, it displays key information such as device type, and serial number. |
| **Settings and Information Panel** | The Settings and Information Panel displays key system data, depending on the selected view and device in Monitoring view. It also offers logging configuration options that allow users to customize the measurement process to their specific requirements. |
| **Information Panel** | The Information Panel displays session details such as file path, logging interval, timestamps, and sample count in the Data Viewer view. |
| **Status Bar** | The Status Bar displays real-time updates such as date, time, and logging status in all views. |
| **Main Panel** | The Main Panel displays measured values in all views. It supports min/max tracking, live value readouts, and graphical analysis to assess performance and detect anomalies during active sessions. |

***Table 3 Description of the GUI Components***

# Chapter 4 Connection of Devices

The OPM Software supports USB, Bluetooth®, Bluetooth® Low Energy (BLE), Serial, and Ethernet connections, depending on the device model. For supported interfaces, see Supported Devices; for setup instructions, refer to Interfaces Configuration section.

## 4.1 Devices Management

In the OPM Software devices are categorized into two states:

- **Found Devices** have been detected by the system but are not yet connected.
- **Active Devices** are currently connected and ready for use.

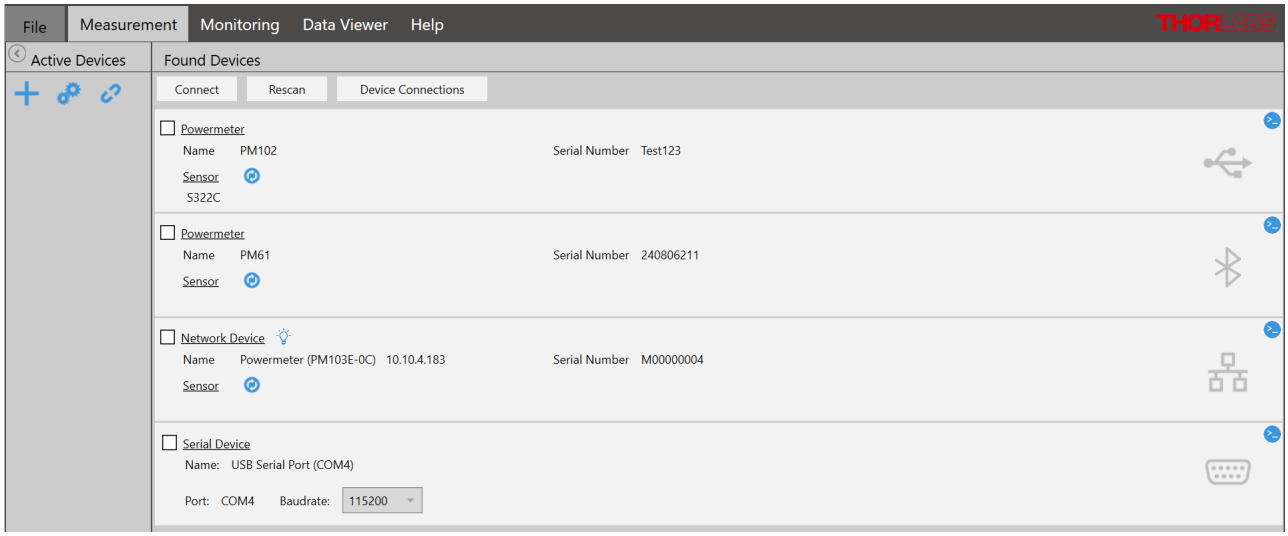



***Figure 6 Active and Found Devices Panel with PM102 & S322C Connected via USB, PM61 Connected via Bluetooth®, PM102 Connected via Ethernet and PM103E Connected via Serial Interface***

**Found Devices**

The Found Devices panel allows users to view and manage devices that have been detected by the system but are not yet connected. From here, devices can be reviewed, selected, and added to the active configuration in the OPM Software.

| Icon | Description |
|---|---|
|  | The *USB* icon indicates that the device is connected via USB. |
|  | The *Bluetooth®* icon indicates wireless Bluetooth® communication. |
|  | The *Ethernet* icon indicates a network connection via LAN. |
|  | The *Serial* icon indicates connection via serial (RS-232) interface. |

***Table 4 Icons in the Found Devices Panel***

| Button | Description |
|---|---|
|  | Pushing the *Synchronize* button displays additional device information, such as the name, serial number, and other relevant details. |
|  | The *Terminal* button opens the terminal for SCPI communication. |
|  | The *Lamp* button makes the device blink for quick identification. |

***Table 5 Buttons in the Found Devices Panel***

**Auto Connect**

When the OPM Software is launched, it automatically detects and connects to previously used USB devices, provided they are available and the interface matches the last session. If no previously connected device is found, the first detected compatible device is connected instead. All connected devices appear in the Devices panel without requiring manual setup.

Requirements

- The device must be powered on.
- The connection interface (e.g., USB, Ethernet) must be the same as in the previous session.
- Only one instance of the OPM Software should attempt to connect to the device at a time.

Limitations

- If the device is unavailable or the interface has changed, Auto Connect will fail silently or prompt for manual selection.
- Simultaneous reconnection via multiple interfaces is not supported.

**Manual Connection**

To manually connect or to switch the connection type, follow these steps:

1. Ensure that no devices are connected to the OPM Software to prevent conflicts and ensure a clean interface setup.
2. Click *Device Connections* to open the Managing Devices window (see Figure 7) for interface configuration.

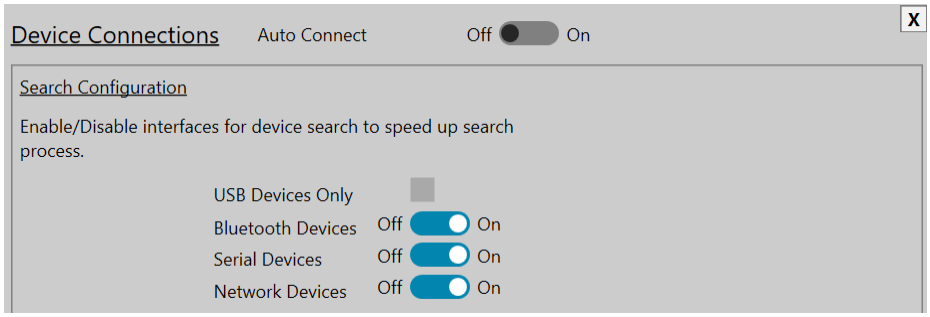



***Figure 7 Managing Devices Window - Device Connections***

3. Enable the desired interface (e.g., Bluetooth®, Serial, or Network) by toggling its slider to "On". The selected interface becomes active, and the "USB Devices Only" option is automatically disabled.
4. Close the Managing Devices window to apply the selected interface settings.
5. Connect the device using the selected interface.
6. Select the device from the Found Devices list and click the *Connect* button. The selected device is added to the Devices panel and becomes available for measurement or configuration.

Notes

Devices connected via USB are typically detected automatically without requiring manual input. Network devices are automatically detected only when connected via a wired connection. Devices accessed over Wi-Fi, VPN, or similar network types must be added manually by entering their network address.

**Active Devices**

The Devices panel lists all devices that are currently connected and ready for use. Devices can be monitored, configured, or disconnected as needed.

| Button | Description |
|---|---|
|  | The *Add Devices* button opens the Found Devices panel. |
|  | The *Edit* button opens the configuration window for the selected device, where the device can be renamed, and its identification color can be adjusted. |
|  | The *Disconnect* button disconnects the selected device from the OPM Software. |

***Table 6 Buttons in the Devices Panel***

Follow these steps to add devices from the Found Devices panel to the list of connected devices in the Devices panel.

1. Click the *Add Devices* button located in the Devices panel.
2. A list of available Thorlabs-compatible devices will appear.
3. Select your desired instrument and confirm to establish the connection.

You can repeat this process to manage multiple devices simultaneously, each independently configurable within the interface.

## 4.2 Interface Configuration

Each device supports only one active interface connection at a time. Simultaneous communication over multiple interfaces with the same device is not supported.

**NOTICE**

**NOTICE: Requirements**

Please ensure that all device-specific requirements are met before establishing a connection. General requirements can be found in the System Requirements section. Any device or interface-specific requirements are described in this section.

**USB**

Several Thorlabs devices compatible with OPM Software support USB communication, offering a convenient and reliable solution for local control and data acquisition.

Configuration

1. Connect the device to the host PC using the appropriate USB cable. If USB-powered, the device will power on automatically and establish a physical connection to the system.
2. Select the desired device and click *Connect* to initiate the pairing process.
3. Once connected, the device is automatically recognized by the operating system and listed in the OPM Software. Successful detection confirms an active USB connection and indicates that the device is ready for use.

**Bluetooth®**

The Bluetooth® configuration enables users to set up and manage wireless connections between the application and supported Bluetooth® (see Chapter 1 Supported Devices) devices.

Bluetooth® supports continuous, high-throughput data transfer and is suitable for applications requiring sustained communication. Bluetooth® Low Energy (BLE) is optimized for low-power, intermittent data exchange, making it ideal for energy-efficient and sensor-based applications.

Device/Interface-Specific Requirements

- Before using a device via Bluetooth®, the PC must first be successfully paired with the device.
- Devices are within range (without barriers up to 10 m).
- Target device is not already connected to another host.

Configuration

1. Make sure that the device is connected with the PC.
2. Enable Bluetooth® for both the host system and the target device to prepare them for wireless communication.
3. Click *Add Devices* or *Rescan* to start the search. Detected Bluetooth® devices will appear in the Found Devices tab.
4. Select the desired device and click *Connect* to initiate the pairing process.
5. Wait for the pairing to complete. Once connected, the device is ready for use in the OPM Software.

Notes

- Multiple Bluetooth® devices can be actively connected at the same time.

**Serial**

The RS-232 interface enables direct serial communication with a host system, making it suitable for embedded applications, industrial use, or environments where Ethernet is unavailable or unnecessary.

Device/Interface-Specific Requirements

- External Power Supply, if Required (RS-232 Does Not Provide Power)

Configuration

1. Connect the device to the host PC using an appropriate serial cable.
2. Supply power to the device via the external power supply.
3. Select the desired device, select the baud rate in the drop down menu, and click Connect to initiate the pairing process.
4. Wait for the pairing to complete. Once connected, the device is ready for use in the OPM Software.

**Network**

The following instructions guide you step by step through setting up a network connection via LAN.

Device/Interface-Specific Requirements

- The PC is connected to a local network (via Ethernet or Wi-Fi).
- The device is powered on and connected to the same network.
- Power over Ethernet (PoE) is possible if both the device and the network infrastructure support it.
- Administrator privileges may be required to change network settings.

Establishing a Connection via the OPM Software

1. Plug the device into the local network using an appropriate cable and ensure it is powered (via power supply unit or PoE).
2. Launch the OPM Software and set the slider for "Network Devices" to On (see Figure 7). The OPM Software will automatically update the available options (see Figure 8).
3. Click the *Rescan* button. All detectable devices in the network will appear in the list, marked with a *Network* icon.
4. Select the desired device and click the *Connect* button. If encryption is enabled, enter the corresponding password.

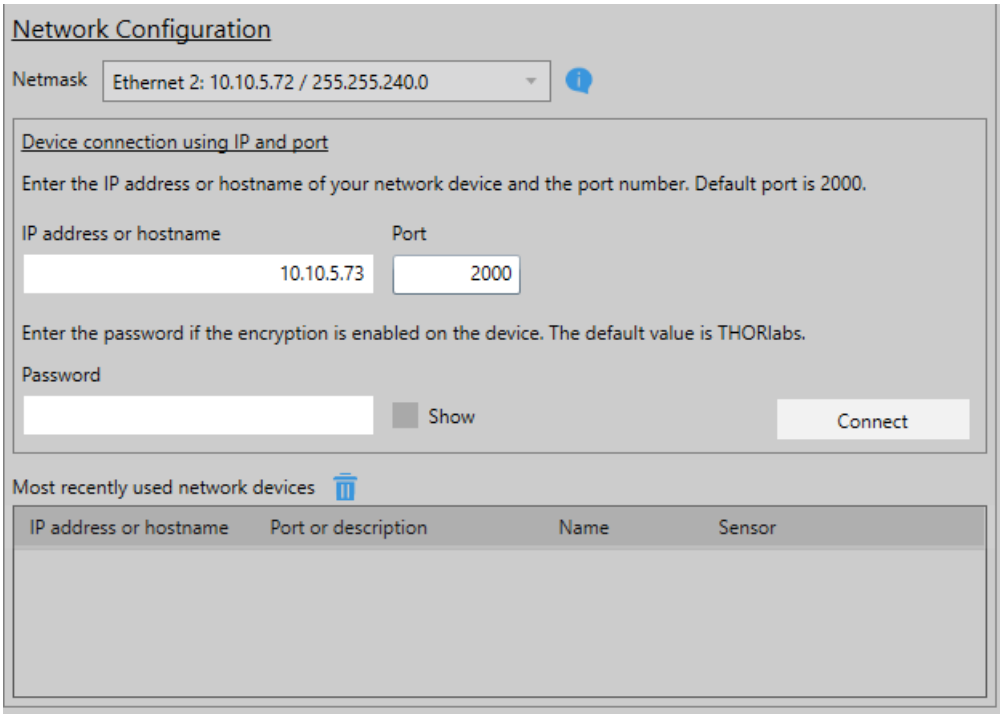



***Figure 8 Network Configuration Window***

Manual IP Configuration

1. Click the *Device Connections* button (see Figure 6) in the OPM Software.
2. Enter the following information:
   - Device IP address
   - SCPI port number: 2000
   - Encryption password (if applicable)
3. Select the correct network adapter (the one connected to the same network as the device).
4. Click the *Connect* button. Note that for devices with a static IP address, record the MAC ID of the device and contact your system administrator. The Static IP address and subnet mask can be configured via the device's display or via serial interface. The DHCP must be disabled.

# Chapter 5 Measurement

This chapter explains how to perform and manage live measurements using the OPM Software.

The Measurement view is divided into different measurement modes, including Numeric, Tuning, Statistics, Graph, and Pass/Fail, which may appear or be hidden depending on the connected device (see section Overview of Measurement Features for further information). It displays the current numerical values of selected parameters and provides dedicated tools for analyzing, visualizing, and evaluating measurement data.

## 5.1 Settings and Information

The Settings and Information panel allows users to configure device-specific parameters and view detailed metadata and firmware information. The available options depend on the connected device.

The **Settings** tab allows comprehensive configuration of device-specific parameters. Users can adjust display preferences such as the primary measurement parameter and resolution, set the operating wavelength, select or enable auto-range, apply attenuation values, and define averaging settings. Beam characteristics, including shape, diameter, and beam profile, can also be specified. These settings are device-dependent, meaning the available options and their ranges vary according to the connected hardware.

The **Information** tab provides a detailed overview of the connected devices. It displays metadata including device type, serial number, firmware revision, date/time, sensor type, wavelength detection range, and calibration records. In addition to viewing information, the tab offers direct access to the Firmware Update Tool, enabling quick firmware checks and calibration adjustments without navigating away from the panel. The displayed data and available functions are device-dependent because they adapt to the connected hardware.

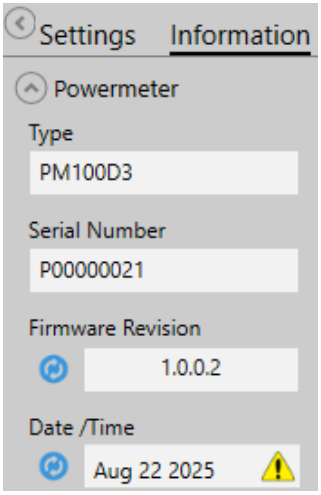



***Figure 9 Settings and Information Panel***

| Button | Description |
|---|---|
|  | In the **Settings** tab, the *Synchronize* button compensates the measurement result by accounting for the measured dark signal or noise.<br>In the **Information** tab, the first *Synchronize* button opens the Firmware Update Tool, while the second updates the device date. |
|  | The *Gear* button in the **Information** tab opens the Calibration Wizard. |

***Table 7 Buttons in the Settings and Information Panel***

## 5.2 Numeric

The Numeric panel displays real-time readings of the primary parameter, which can be set in the Settings tab. Optimized for clarity and precision, this view is ideal for continuous monitoring and general-purpose measurements.

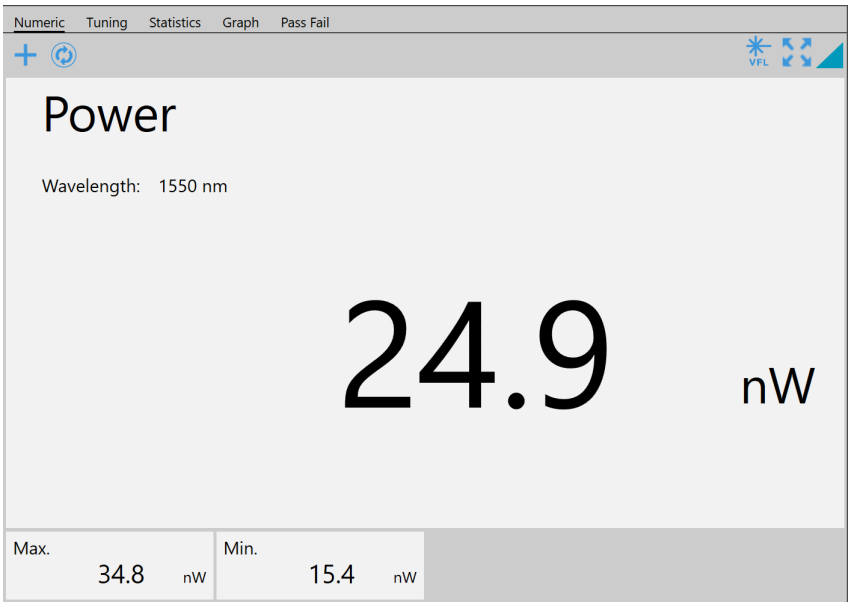



***Figure 10 Numeric Panel Showing the Current Power Value at the Selected Wavelength***

The following buttons and icons provide quick access to tools for displaying, scaling, and filtering live measurement values.

| Button | Description |
|---|---|
|  | The *Add Parameter* button opens a selection window for adding and removing additional numerical parameters to the display. Parameters can be chosen directly from the list view. For more information, refer to the corresponding section. |
|  | The *Reset Min/Max* button resets the values and recalculates their ratio. |
|  | The *Activate VFL* button enables the Visual Fault Locator function on supported devices. For more information, see section 8.1 Visual Fault Locator (VFL). |
|  | The *Fullscreen* button expands the display to fullscreen mode, showing only the primary parameter. |
|  | The *Reduce Display* button returns to the standard view, allowing all selected parameters to be shown. |
|  | The *Brightness* button adjusts the background brightness of the numeric display. The *Brightness* button is only visible in full screen mode. |
| **Icon** | **Description** |
|  | The *Color Indicator* icon displays the assigned color used to identify the connected device. |

***Table 8 Buttons and Icons in the Numeric Panel***

The Numeric Parameter window allows users to select measurement parameters to be displayed in the Numeric panel. Each tile represents a different measurable quantity or calculated value that can be assigned to a device channel. Multiple parameters can be selected for parallel display.

The following table provides an overview of all parameter groups available in the OPM Software, along with the associated measurement values that can be displayed, logged, or analyzed depending on the connected device.

| Parameter Group | Parameters |
|---|---|
| **General Power/Signal** | Min/Max Ratio, Saturation (%),<br>Power (W or dBm), Average Power (W),<br>Energy (J), Fluence (J/cm²), Irradiance (W/cm²) |
| **Electrical Values** | Current (A),<br>Voltage, Analog Voltage 1 - 3, X OUT (V),<br>Voltages Q1 - Q4 (V or mV) |
| **Timing & Frequency** | Frequency, Min/Max Frequency, Frequency Counts,<br>Pulse Width (ms), Duty Cycle (%), Measured Time (s) |
| **Positioning** | Position X, Position Y (mm) |
| **Temperature and Humidity** | Head Temperature, Ext. NTC Temperature,<br>I2C Temperature, Thermistor CH1/CH2 (°C/°F),<br>I2C Humidity, Humidity (%) |
| **Polarization/ER** | ER (dB), Phi (°) |
| **Wavelength Measurement** | Wavelength (nm [air, vac], $cm^{-1}$, THz),<br>Power (mW), Coherence Length (mm),<br>Reference Signal (%), Status Code |

***Table 9 Parameter in the Numeric Panel***

## 5.3 Tuning

The Tuning panel provides fast, real-time visual feedback for alignment and optimization tasks. It is ideal for adjusting optical components such as fiber couplers, lenses, or stages, where immediate signal response is essential. The display prioritizes responsiveness over precision, helping users quickly identify signal peaks and maximize optical throughput.

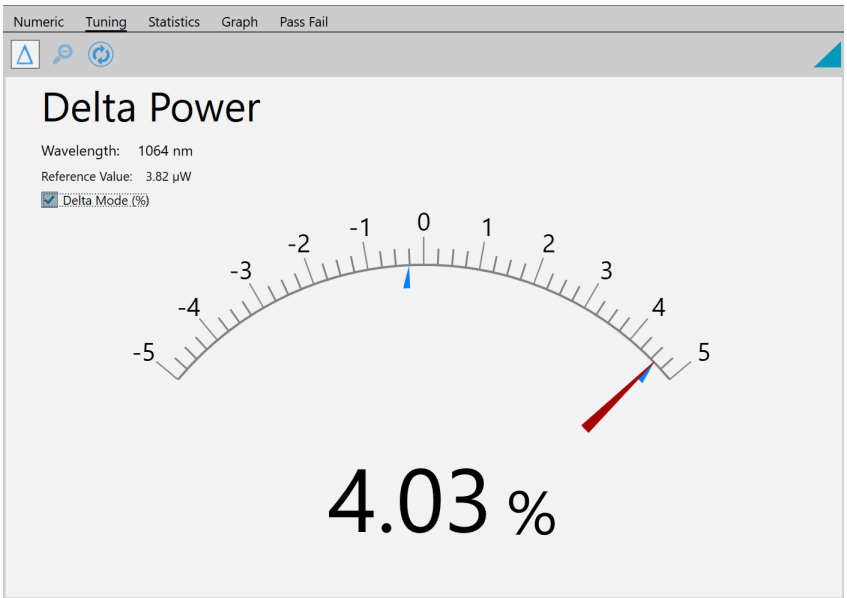



***Figure 11 Delta Mode "On" in the Tuning Panel***

The following buttons and icons support fine-tuning of device parameters in real time.

| Button | Description |
|---|---|
|  | The *Enable/Disable Delta Mode* button activates a mode for tracking changes relative to a baseline value, shown in absolute or percentage units. |
|  | The *Zoom In/Out* button allows zooming into specific value ranges set by the OPM Software for detailed visual analysis. |
|  | The *Reset Min/Max* button resets the displayed minimum and maximum values and recalculates their ratio. |
| **Icon** | **Description** |
|  | The *Color Indicator* icon displays the assigned color used to identify the connected device. |

***Table 10 Buttons and Icons in the Tuning Panel***

**Delta Mode**

Delta Mode shows the fluctuation around the measured value at the moment of starting the delta mode. This value is reset to zero by clicking the *Reset Min/Max* button. View the Delta Mode in % by selecting the check-box.

## 5.4 Statistics

The Statistics panel summarizes key measurement values over time to provide insight into signal stability and overall performance. It is especially useful for identifying fluctuations, tracking long-term trends, and verifying measurement consistency. Typical metrics include mean, standard deviation, minimum, and maximum, all of which are continuously updated during active measurement.

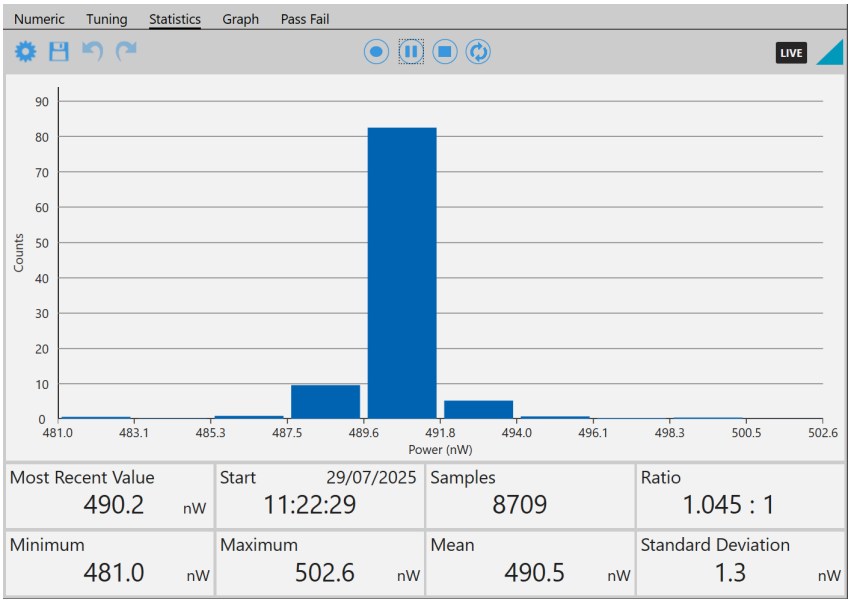



***Figure 12 Statistics Panel***

The following buttons and icons enable configuration and export of key statistical metrics from recorded data in the Statistics panel.

| Button | Description |
|---|---|
|  | The *Settings* button opens the Statistics/Graph Settings panel. It allows users to define the acquisition window by time or number of samples. These settings apply to both the Statistics and Graph panels. |
|  | The *Save* button stores the current statistical results - including incomplete or paused data collection - as a .csv file. Histogram data can also be saved for later analysis or documentation in a text editor. |
|  | The *Back* button loads the previous recorded measurement. This function requires that a measurement has been taken. |
|  | The *Forward* button loads the next recorded measurement. This function requires that a measurement has been taken. |
|  | The *Start Recording Data* button begins statistical acquisition based on the defined settings. Any previously recorded data will be discarded at the start of a new session. |
|  | The *Pause* button temporarily halts data collection without resetting the current statistical values. Useful for reviewing data mid-session. |
|  | The *Stop* button ends the current acquisition and freezes all statistics. Incomplete results remain available for review or export. |
|  | The *Restart* button clears all acquired data from both Statistics and Graph modes and starts a new synchronized acquisition cycle for both views. |
| **Icon** | **Description** |
|  | The *Color Indicator* icon displays the assigned color used to identify the connected device. |
|  | The *LIVE* icon indicates that live measurement mode is active. |

***Table 11 Buttons and Icons in the Statistics Panel***

The Statistics/Graph Settings window (see Image below) defines how data is acquired and displayed. Users can set the acquisition size by time or sample count separately for live statistics and recorded data. These settings also apply to the Graph panel.

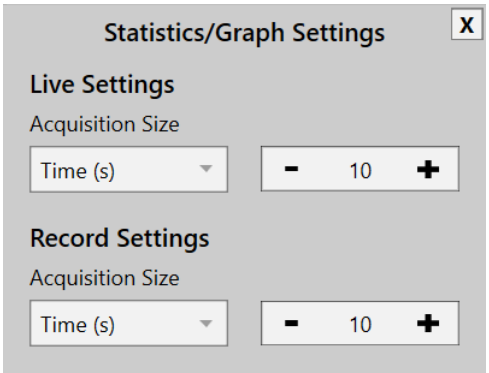



***Figure 13 Statistics/Graph Settings Window of the Statistics Panel***

## 5.5 Graph

The Graph panel displays the selected parameter over time from the selected device and is optimized for high-resolution, time-resolved measurements and uses a rolling data mode in which new data overwrites the oldest once the configured duration or sample count is reached. Selecting a different device in the Devices panel resets the current graph. This section is ideal for users who require detailed insight into signal behavior over time, such as in stability testing, modulation analysis, or system tuning.

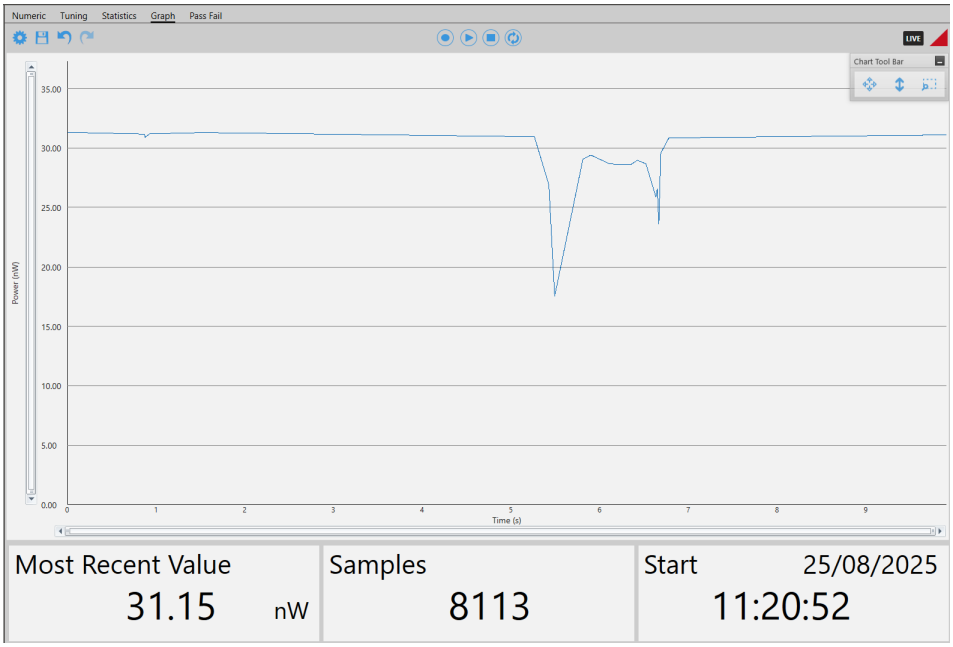



***Figure 14 Graph Panel***

Measurement settings, display options, and data saving are accessible via the following buttons and icon. Please note, that the buttons used in the Graph panel are the same as those in the Statistics panel. For more details, refer to the Statistics section.

| Button | Description |
|---|---|
|  | The *Zoom Out* button resets the graph view to its original full-scale resolution on both the X and Y axes. |
|  | The *Zoom Out Y-Axis* Button zooms out the original resolution on the Y-axis only. |
|  | The *Zoom Selection* button allows you to zoom into a selected region of the graph by clicking and dragging with the mouse. The selected area remains movable for closer inspection. |
| **Icon** | **Description** |
|  | The *Color Indicator* icon displays the assigned color used to identify the connected device. |
|  | The *LIVE* icon indicates that live measurement mode is active. |

***Table 12 Buttons and Icons in the Graph Panel***

## 5.6 Pass/Fail

The Pass/Fail panel enables real-time evaluation of measurement results against predefined thresholds. Users can define upper and lower power limits, and each reading is automatically classified as pass or fail. Color-coded indicators provide immediate visual feedback, while results can be logged for traceability. This feature is ideal for quality control, batch testing, and automated validation workflows.

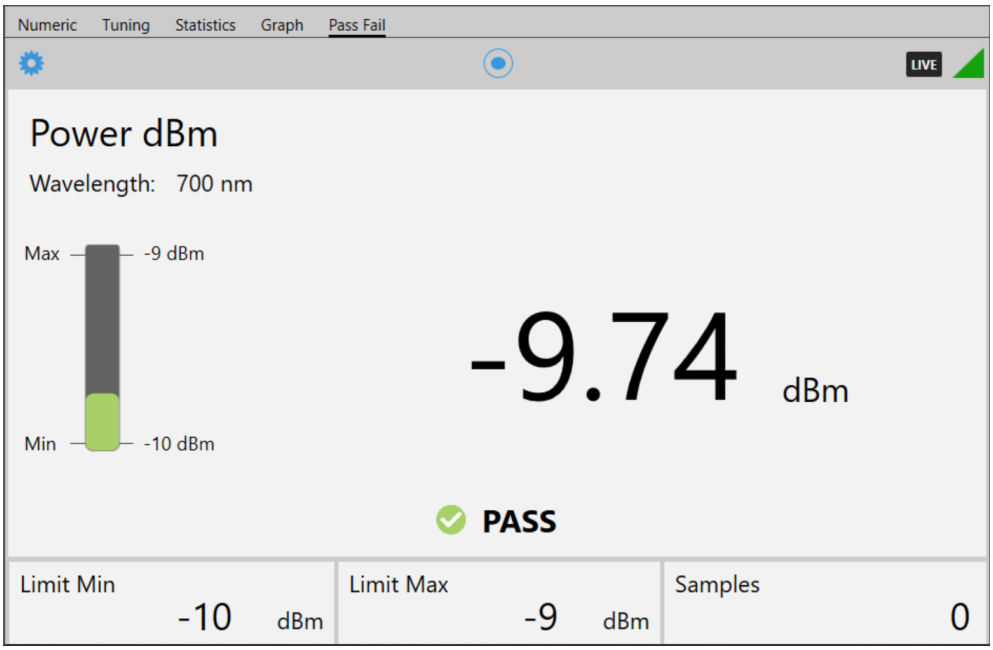



***Figure 15 Pass/Fail Panel***

The following buttons and Icons support fine-tuning of device parameters in real time, especially during active operation or calibration routines.

| Button | Description |
|---|---|
|  | The *Settings* button opens Pass/Fail Settings menu |
|  | The *Start Recording Data* button begins statistical acquisition based on the defined settings. Any previously recorded data will be discarded at the start of a new session. |
|  | The *Stop* button ends the current acquisition and freezes all statistics. Incomplete results remain available for review or export. |
| **Icon** | **Description** |
|  | The *LIVE* icon indicates that live measurement mode is active. |
|  | The *Color Indicator* icon displays the assigned color used to identify the connected device. |
|  | The *Fail* icon indicates that the test or analysis did not meet the specified criteria. |
|  | The *Pass* icon indicates that the test or analysis successfully fulfilled the required criteria. |

***Table 13 Buttons and Icons in the Pass/Fail Panel***

To configure the Pass/Fail criteria, open the Pass/Fail Settings window (see image below) by clicking the *Settings* button. This will open a dedicated dialog where you can define threshold values and recording preferences for automated measurement evaluation.

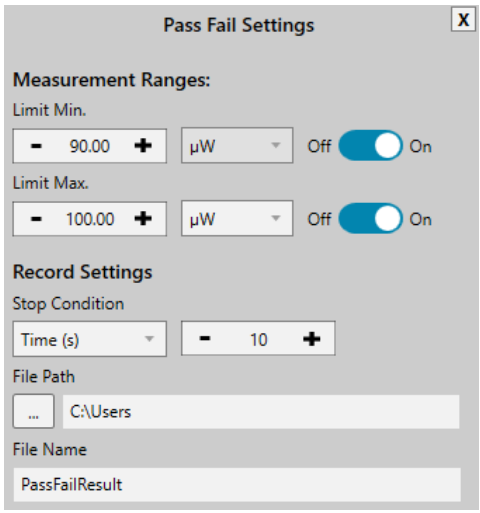



***Figure 16 Pass/Fail Settings Window in the Pass/Fail Panel***

| Setting | Description |
|---|---|
| **Measurement Ranges** | |
| **Limit Min** | The Limit Min defines the minimum acceptable value level of the primary parameter, depending on the parameter selected. Measurements below this value will be marked as "Fail". |
| **Limit Max** | The Limit Max defines the maximum acceptable value level of the primary parameter, depending on the parameter selected. Measurements above this value will be marked as "Fail". |
| **Record Settings** | |
| **Stop Condition** | Select the termination criteria for the logging process, either by time (s) or by number of samples. |
| **File Path** | Specify the output file location for the recorded data. |
| **File Name** | Define a name for the recorded data. |

***Table 13 Pass/Fail Settings Window in the Pass/Fail Panel***

# Chapter 6 Monitoring

The Monitoring view offers a streamlined environment for conducting long-term measurements with one or more connected devices. Designed for synchronized data logging at intervals of one second or more, it accommodates devices with different update rates. This section introduces the core functions of the Monitoring view in the OPM Software, including device setup, real-time data tracking, and export options for recorded logs.

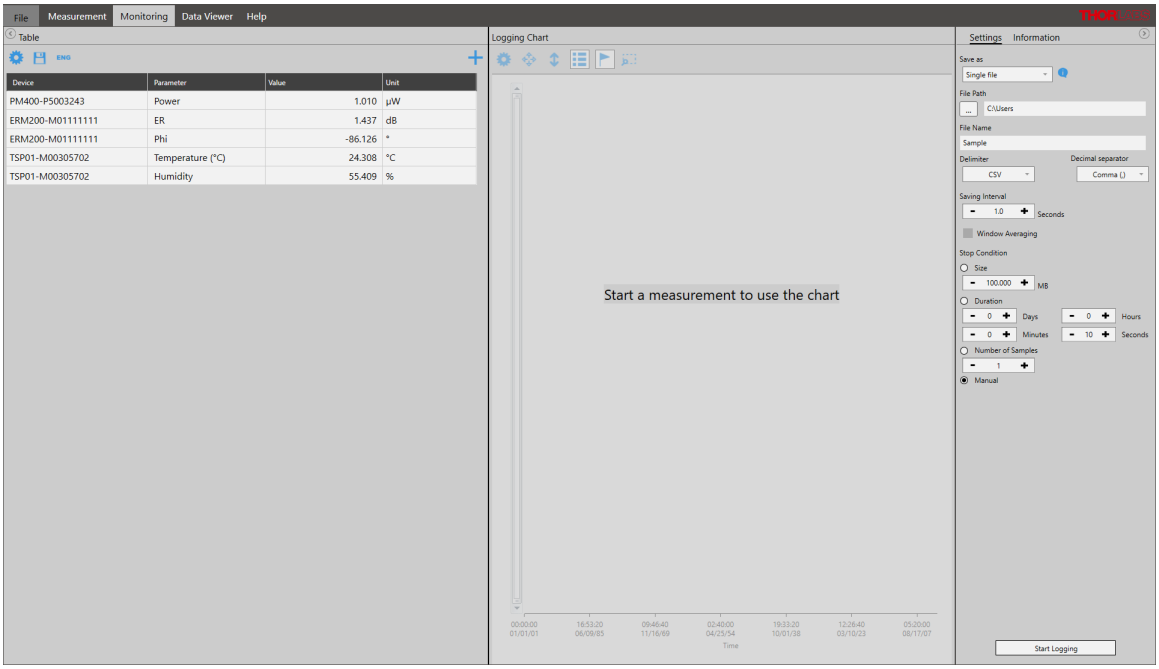



***Figure 17 Start Screen of the Monitoring View***

The following buttons provide chart customization and navigation functions in the Monitoring view.

| Button | Description |
|---|---|
|  | The *Settings* button opens chart configuration options for adjusting visual preferences and selecting active data channels. |
|  | The *Zoom Out* button expands the time or data window to display a broader range of measurement values. |
|  | The *Zoom Out Y-Axis* button rescales the vertical axis to reveal the full range of signal amplitudes. |
|  | The *Enable/Disable Legend* button toggles the visibility of the legend above the chart. When enabled, the legend displays the names of the active parameters and devices to help identify each data trace. |
|  | The *Enable/Disable Marker* button places a vertical timestamp marker on the chart. This marker highlights the exact time point and displays the corresponding values of all active parameters, supporting precise data comparison. |
|  | The *Zoom Selection* button allows you to zoom into a specific area of the chart by clicking and dragging to define a rectangular region. This enables detailed inspection of time-resolved signals within the selected range. |

| Button | Description |
|---|---|
|  | The *Move ROI* button toggles with the Zoom Selection button. When active, it allows you to reposition the selected region of interest (ROI) by dragging it within the chart. This enables you to navigate freely along both the X and Y axes while maintaining the current zoom level in the main graph. |

***Table 15 Buttons in the Monitoring View***

**Devices (Table) Panel**

The Devices (Table) panel lists all active measurement channels, showing the device, selected parameter, current value, and unit. Control buttons allow configuration, while the plus icon adds new devices or parameters. It enables real-time monitoring of multiple parameters across connected devices.

In the Monitoring view, multiple *Settings* buttons are available, each providing access to configuration options depending on the context. The *Settings* buttons in the Devices (Table) panel allow you to configure devices and parameters as well as adjust display options for the measurement data.

| Button | Description |
|---|---|
|  | The *Settings* button opens the configuration menu for selecting which devices and parameters are monitored in the table, logged during measurement, and displayed in the Logging Chart. |
|  | The *Snapshot* button saves the current values in .csv-format. |
| ENG | The *Engineering Notation ENG* button displays numerical values using engineering notation (e.g., 1.23 µW, 5.67 mA), with SI prefixes based on powers of $10^3$, for better readability in technical applications. |
| SI | The *Engineering Notation SI* button switches to scientific notation (e.g., 1.23E-06 W), which offers high precision for numerical display and is well suited for scientific analysis. |
|  | The *Add Devices* button switches to the Active Devices and Found Devices panel in the Measurement view to add and manage connected devices. |
|  | Use the *Pencil* button to rename the device identifier. |
| + | The *Add* button adds parameters to be monitored. |
| X | The *Delete* button deletes selected parameters to be monitored. |

***Table 16 Buttons in the Devices (Table) Panel***

**Settings and Information Panel**

The **Settings** tab in the Monitoring view allows configuration of logging parameters, including the save mode (single file or multiple files), output folder path, folder name, file format (.csv) with a selectable delimiter and decimal separator, and saving interval. Stop conditions can be defined by file size, duration, number of samples, or manual control. Logging is initiated using the *Start Logging* button.

The **Information** tab displays the current status of an active logging session, including the file path, logging interval, elapsed time, start and stop times, and the total number of samples recorded. This enables continuous monitoring of the measurement process throughout the logging session.

To ensure uninterrupted measurements, disable hibernation and sleep mode on the host PC before starting monitoring. Entering these modes will terminate the connection to the monitored devices, interrupt the measurement, and may cause the OPM Software to become unresponsive.

Monitoring cannot be started unless at least one parameter has been selected in the Settings tab.

| Button | Description |
|---|---|
|  | The *Information Balloon* button displays a note recommending the use of the "Multiple Files" option from the drop-down menu for extended measurements. |

***Table 17 Buttons in the Settings Tab***

**Perform a Measurement**

1. Configure the devices and parameters to be monitored in the Logging Chart by clicking the *Settings* button, then using the (+) and (x) buttons in the Table Configuration window (see Figure 18).

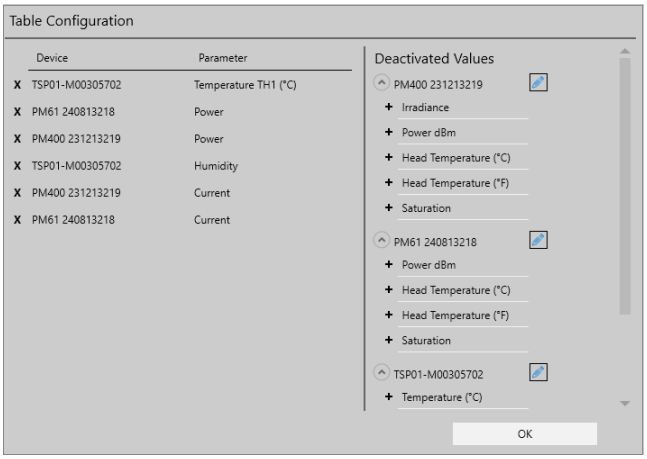



***Figure 18 Table Configuration Window in the Devices (Table) Panel***

2. Adjust the logging settings in the Settings and Information panel.
3. Click the *Start Logging* button in the Settings and Information panel to begin recording measurement data. If the specified file name already exists, a warning dialog will appear prompting confirmation or entry of a new file name.

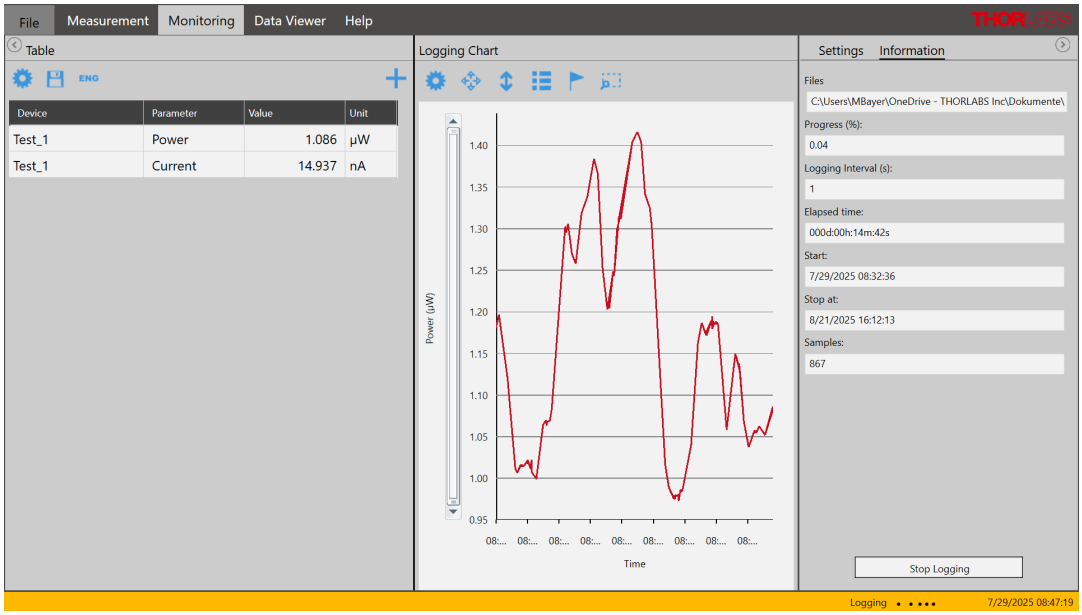



***Figure 19 Logging in the Monitoring View***

4. Once logging starts, the Settings tab automatically switches to the Information tab, where the current status of the measurement process is displayed. The measurement values are then displayed in the Logging Chart within the Main Panel.
5. Click the *Stop Logging* button to stop recording, or wait until the stop condition is met.

**File Format**

Measurement data can be recorded and saved in different formats. Please note that the Data Viewer only supports viewing measurement data recorded in the Monitoring panel; data saved from the Statistics or Graph panels cannot be viewed in the Data Viewer. Data from the Monitoring panel saved as a single file are stored as a .csv file or files and can be opened in the Data Viewer. For large data volumes or long-term measurements, it is recommended to use the "multiple files" mode. This option generates multiple .csv files with an associated .tcsv file for fast loading into the Data Viewer. If "Save as Multiple Files" is selected in the Settings tab, the OPM Software generates files containing a maximum of 604 800 entries each. The .csv files must remain in the same folder as the associated .tcsv file and must not be renamed, as both file types are required for proper use in the Data Viewer.

Note

Do not delete, move, or rename the uncompressed .csv files in the .tcsv folder, as they are required for full Data Viewer functionality.

# Chapter 7 Data Viewer

This chapter explains how to view and analyze previously recorded measurement data in the OPM Software. Only data logged in the Monitoring view can be displayed in the Data Viewer. If supported by the connected device, measurements stored directly on the device can also be accessed. Data from the Statistics or Graph panels are saved as .csv files, but cannot generally be displayed in the Data Viewer. However, data saved on the PM100Dx device memory can be transferred to the PC by USB and then opened with the OPM Software Data Viewer.

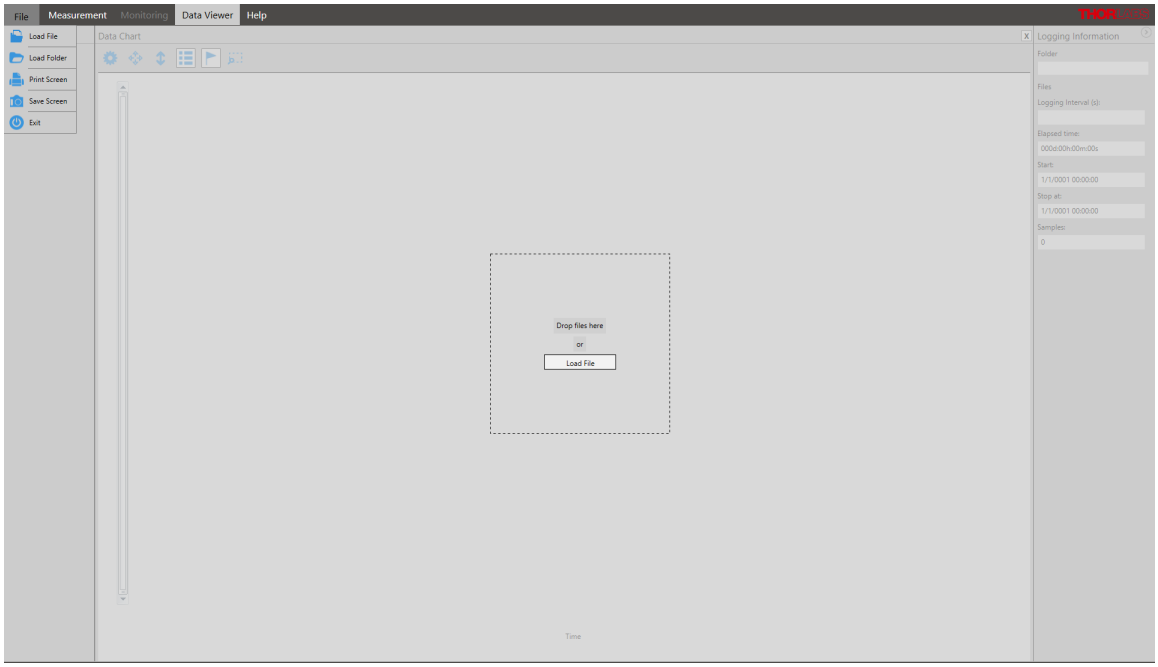



***Figure 20 Load Options in the Data Viewer View***

Measurement data can be imported into the OPM Software in multiple ways. You can load files by dragging them directly into the Data Viewer Panel, or by using dedicated loading options described in the table below:

| Button | Description |
|---|---|
|  | Opens a file explorer to select a single measurement file. Accessible from the Main Panel and the File tab. |
|  | Loads a full measurement series saved as multiple files within a folder. Available via the File tab. For more information, see Chapter 6 Monitoring. |

***Table 18 Load Options in the Data Viewer View***

Once the data is loaded, the measurement appears in the Data Viewer panel. The Device panel lists the devices used during recording, while the Information panel displays additional details related to the measurement.

***Figure 21 Loaded Files in the Data Viewer Panel with TSP01 Sensor, PM61 Power Meter, PM400 Power Meter and S132C Sensor***

The following buttons allow you to navigate and operate the main panel.

| Button | Description |
|---|---|
|  | To analyze the measurement data, click the Settings button. This allows you to add parameters and devices (as listed in the Device Panel) from the loaded file to the Main Panel for visualization. To improve clarity, individual colors can be assigned to each device and parameter. To display a second chart, simply enable the Chart 2 toggle. |
|  | The Zoom Out button resets the chart to its original resolution, adjusting both the X and Y axes to display the full dataset. To zoom in, hover over the desired area and scroll with the mouse wheel, or use the Zoom Selection button to define a specific region for closer inspection. |
|  | The Zoom Out Y-Axis button resets the vertical scaling (Y-axis) of the chart to its original resolution, while preserving the current zoom level and position on the horizontal (X-axis). |
|  | The Enable/Disable Legend button toggles the visibility of the legend at the top of the chart. When enabled, it displays a legend with all devices and parameters monitored in the measurement, making it easier to identify which data traces belong to which device. |
|  | The Enable/Disable Marker button toggles a marker that can be placed at a specific time point on the chart. When enabled, it displays the exact values of all active parameters at that moment, providing precise data inspection alongside the chart. |
|  | The Zoom Selection button allows you to zoom into a region of interest (ROI) by selecting the area within the chart. The user can then move a window of the size of the ROI through the whole chart area. |
|  | The Move ROI button toggles with the Zoom Selection button. When active, it allows you to reposition the selected region of interest (ROI) by dragging it within the chart. This enables you to navigate freely along both the X and Y axes while maintaining the current zoom level in the main graph. |

***Table 19 Buttons in the Data Viewer Panel***

# Chapter 8 Specific Features

This section provides an overview of key OPM Software features that support efficient optical parameter monitoring and analysis, including Visual Fault Locator (VFL), Scope Mode, Multi-Channel operation, Customer Calibration, and Save/Print Screen functions. The subsequent sections provide detailed guidance on configuring and using each feature effectively.

**NOTICE**

**NOTICE: Using Specific Features**

The availability of specific features depends on the connected device. For details on device-specific functions, refer to the corresponding hardware user guides. Parameters, buttons, and icons may vary based on device type and configuration.

## 8.1 Visual Fault Locator (VFL)

Some devices include an integrated Visual Fault Locator (VFL) for identifying individual fibers within a fiber bundle or detecting breaks in optical cables.

When supported by the connected device, the OPM Software provides full remote control of the VFL. The function can be activated directly from the software interface, allowing operation in any supported mode. To start or stop the VFL, click the corresponding button in the OPM Software.

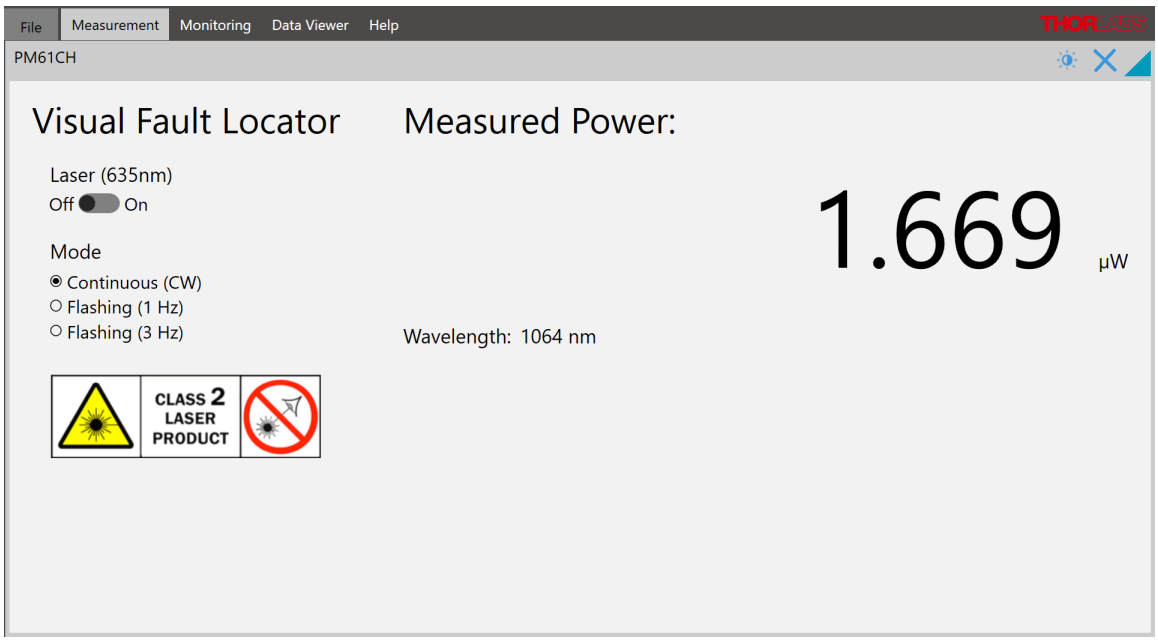
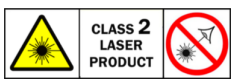



***Figure 22 Window in the VFL Panel Shown Using a PM61 Power Meter***

The visible laser can be switched On/Off by the slide control. Switch between the the following modes:

- Continuous (CW)
- Flashing (1 Hz)
- Flashing (3 Hz)




**WARNING: Laser Radiation**

This device is classified as a Class 2 Laser Product.

- Do not stare into the laser beam.
- Avoid direct eye exposure.

Failure to follow these precautions may lead to temporary visual disturbance or eye injury.

## 8.2 Scope Mode

Scope Mode visualizes alternating or continuous optical signals in real time, enabling quick analysis of stability, fluctuations, and transient events. It is accessed via the *Scope* button, which opens a dedicated window with configuration options for display, acquisition, and triggering.

The Scope Mode is especially useful for visual diagnostics and fine-tuning of optical setups, offering a clear and immediate view of signal behavior.

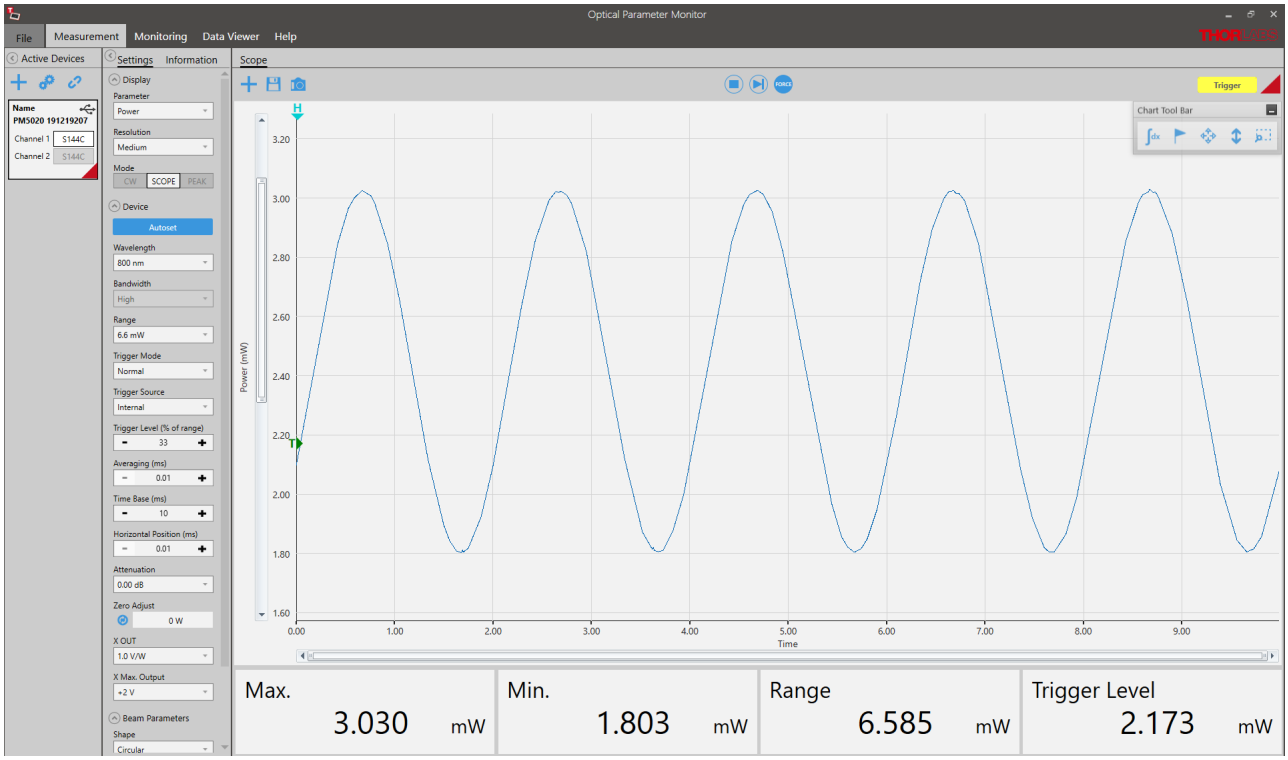



***Figure 23 Scope Mode Display When Using a PM5020 Power Meter with an S144C Sensor***

When Scope Mode is active, additional configuration options are available in the Settings tab and the Main panel.

**NOTICE**

**NOTICE: Scope Mode Using the PM100D3 Optical Power and Energy Meter Console**

Use Scope Mode with the PM100D3 Optical Power and Energy Meter Console only via USB.

## 8.3 Multi-Channel

Some devices support Multi-Channel operation, allowing more than one sensor to be connected and monitored simultaneously. In this mode, multiple channels appear in the Devices panel, and the displayed channel can be switched as needed. Additional features, such as analog output configuration, and multi-mode measurement settings, may also be available depending on the connected device.

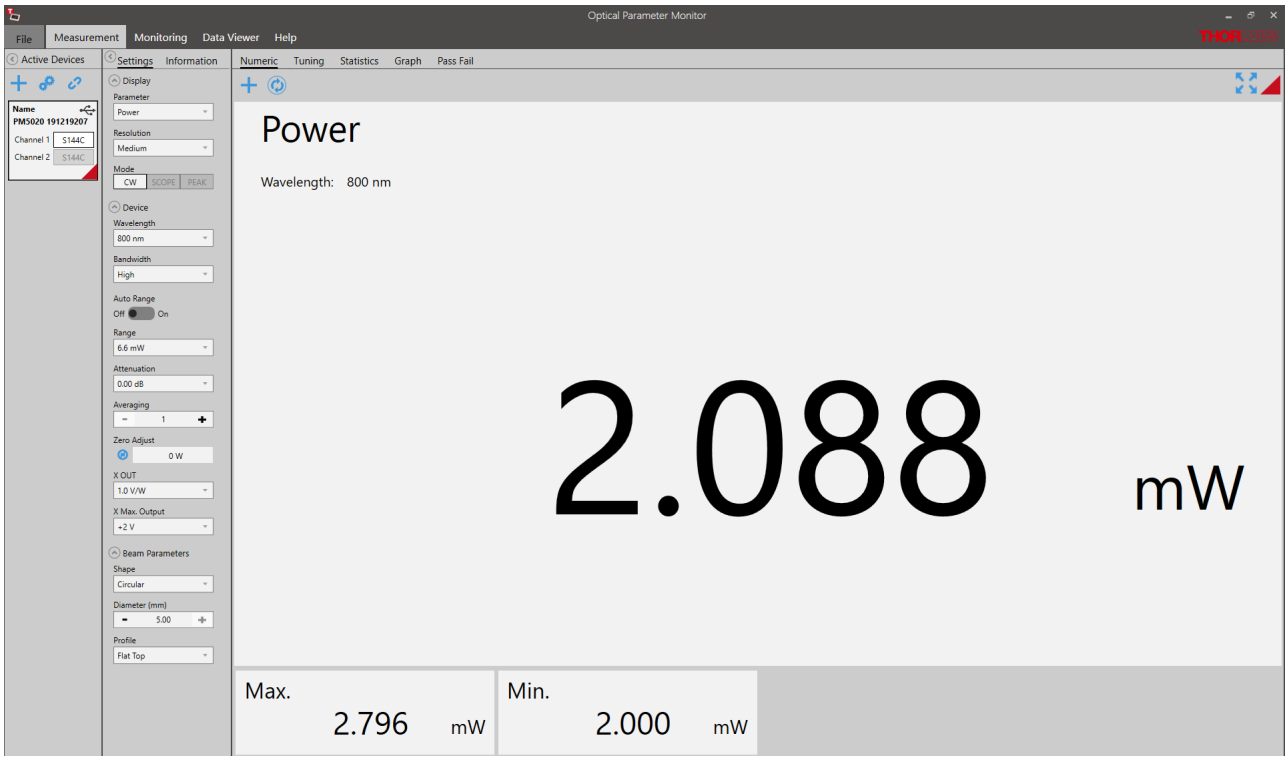



***Figure 23 Dual-Channel Operation Display When Using a PM5020 Power Meter with an S144C Sensor***

The available buttons in the Main Panel depend on the connected device; for detailed information, refer to the corresponding hardware user guides.

## 8.4 Customer Calibration

The OPM Software includes a Calibration Wizard that enables users to calibrate supported sensors in combination with a Power Meter.

Note

Please note that not all Power Meters support the Customer Calibration feature.

The Calibration Wizard applies a correction factor based on a single-point measurement from a trusted reference sensor to adjust the connected sensor's readings. The resulting calibration data is stored together with the sensor's serial number in the power meter's internal memory and automatically retrieved by the OPM Software.

Up to five calibration datasets can be stored, depending on the device, and will remain until they are overwritten with new data.

**Calibration Instruction**

Before starting the calibration, ensure that a power meter, light source, reference sensor, and the sensor to be calibrated are available. The Calibration Wizard leads the customer through the protocol.

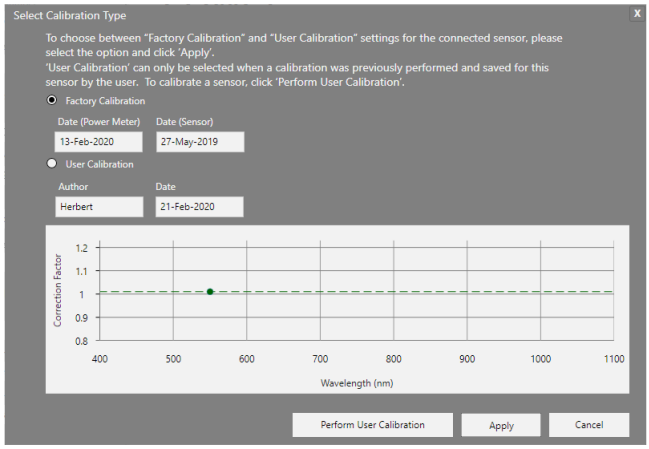



***Figure 23 Start Screen of the Calibration Wizard Tool***

1. Open the Calibration Wizard by clicking the *Open User Calibration Wizard* Button in the Information tab. The start screen allows the user to choose between the factory calibration and a user calibration.
2. Click the *Perform User Calibration* button to start a calibration or select and apply a previously saved calibration. To start a new calibration, define the user and click *NEXT* button to adjust the background noise "Zero Adjust".
3. Follow the instructions and click the *START* button. The background is measured. This can be repeated.
4. When the background measurement is finished, click *NEXT* button to proceed to the calibration.
5. Type the power (in mW) measured by the reference sensor into the field "Reference".
6. Turn on the light source and click "Calibrate" to determine the correction factor. When the calibration is done the following screen appears: To ensure that the calibration is within a reasonable range, the calibration is limited to values differing less that 20% from the reference values. An error message appears if the sensor that is calibrated is out of range.
7. Click the *NEXT* button to write the calibration data in the internal memory of the power meter and save the results as a .pdf file on the PC by clicking the *Write data and save protocol* button.
8. To take a second measurement at, for example, a different wavelength, click the *Add Entry* button.

## 8.5 Save/Print Screen

The File tab provides the following options, enabling flexible data access and streamlined file import within the OPM Software environment. As outlined in the table below, these options support common file management tasks, such as loading and importing measurement data.

Note that the file structure used by OPM Software may differ from that of other Thorlabs devices. To ensure compatibility, you can import files from other Thorlabs systems using the appropriate import function.

| Feature | Description |
|---|---|
|  | The *Print Screen* button captures the current view of the GUI and, once the screenshot is taken, offers the option to print it. This function is useful for producing hard copies of measurement results, graphs, or configuration settings for documentation and reporting. |
|  | The *Save Screen* button captures the current GUI as an image file (e.g., PNG, JPEG, BMP). A dialog prompts for the destination folder and file name, making it convenient for archiving visual results or sharing them electronically. |

***Table 21 Save/Print Screen Options***

For further details on supported formats and file structure, refer to the Data Viewer section.

# Chapter 9 Help and Tools

This chapter describes the available help resources within the OPM Software. The Options panel provides access to settings for language selection, application information, and additional tools. To change the language, click the Language button; available options such as English, German, and Chinese will appear in the panel next to it. To access additional resources, click the Information button to open a list of links with quick access to the Manual, Programming section, Application Log, and License information.

Please note, that when monitoring is in progress, the Tools option is disabled.

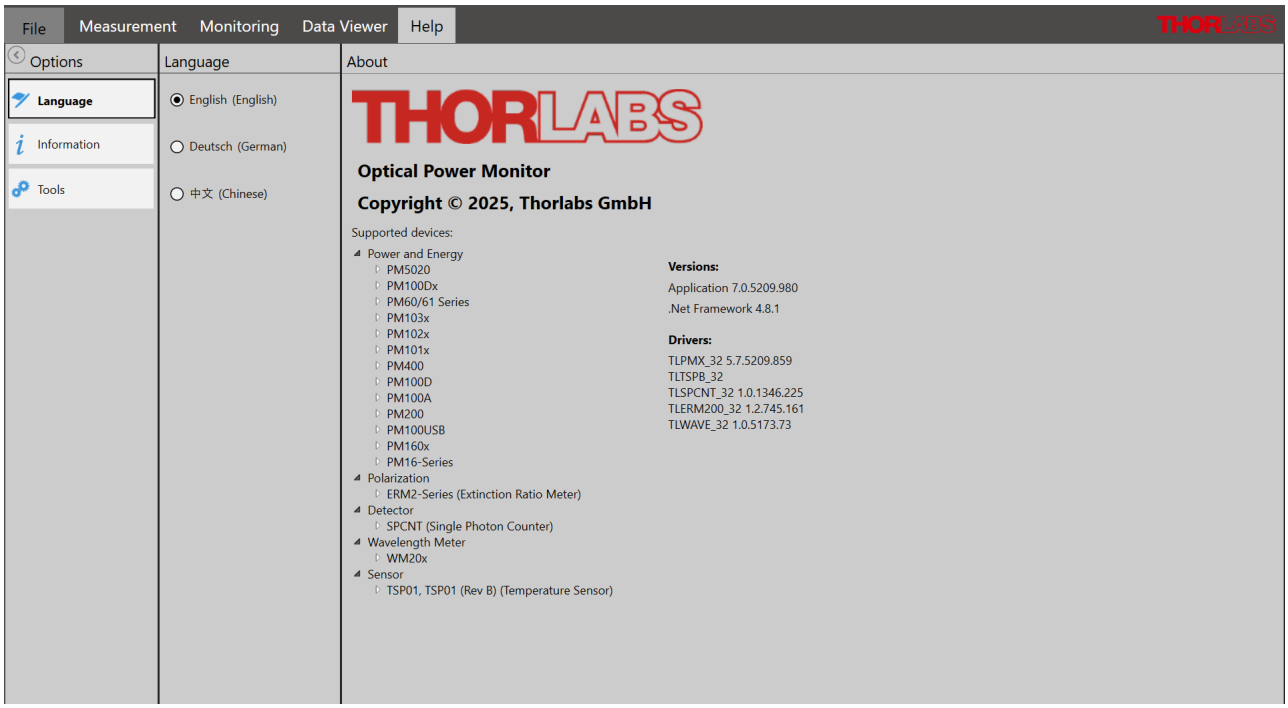



***Figure 24 Start Screen of Help & Tools***

## 9.1 Driver Switcher Tool

The Driver Switcher allows switching between the NI-VISA™-based PM100D.dll driver and the TLPMX.dll driver installed with the OPM Software. Changing drivers requires administrator privileges on the PC. The tool can be launched via the Start menu or from the following Program folder.

- *Start* Button
  All Programs > Thorlabs > PowerMeters > Tools > Driver Switcher
- Program Folder
  *C:\Program Files (x86)\Thorlabs\OPM\Tools\DriverSwitcher*

**Using the Driver Switcher**

1. Open the Driver Switcher. The interface displays a menu bar and a table (see Figure 25) listing all attached instruments, including their type, serial number, and the currently used driver.
2. Use the Menu Bar to restart as Administrator and rescan to ensure all connected devices are visible.
3. Select one or more devices from the table.
4. Convert the drivers for the selected devices to the driver appropriate for your application.
5. After selecting a different driver, reconnect the device to the OPM Software before use.

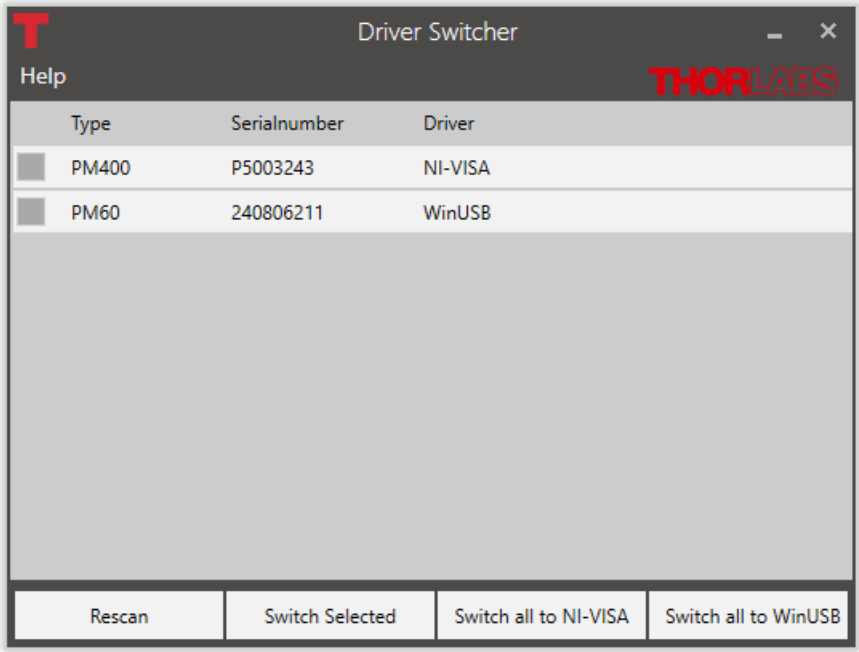



***Figure 25 Driver Switcher***

Note

Each device operates with either the TLPMX or NI-VISA driver - never both simultaneously. By default, TLPMX is selected, though this preference is PC-specific. In some cases, a device may be recognized as an NI-VISA device instead. To manually switch drivers, use the Driver Switcher tool. Multiple devices using different drivers can be operated in parallel within the same instance of the OPM Software.

## 9.2 Calculator Tool

There are two practical tools to calculate sensor-relevant laser beam impact parameters and to convert between physical units.

**Laser Calculator**

The laser calculator is useful for estimating irradiance or fluence values to prevent exceeding the maximum allowed sensor damage specifications. It supports CW and pulsed lasers.

The *Unit Selector* button is a unit selector for the entered value. In the figure below, it is set to W (Watts), meaning the laser power input is interpreted in W. Clicking the button opens a drop-down menu to select other available units, such as milliwatts (mW) or microwatts (µW).

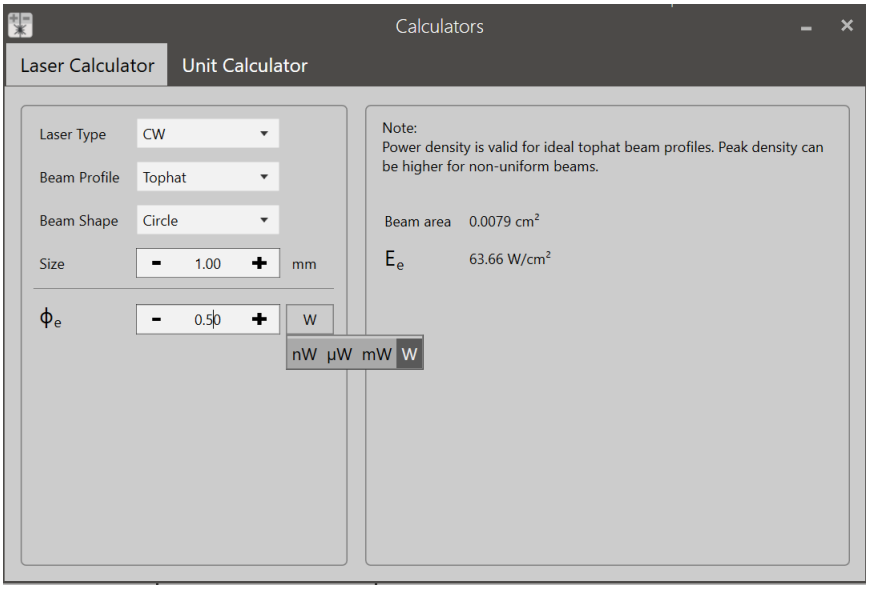



***Figure 26 Laser Calculator Tab of the Calculators Window***

| Parameter | Description |
|---|---|
| **Input Parameters** | |
| **Laser Type** | Select between CW and pulsed laser operation. |
| **Beam Profile** | Select the operation mode (Tophat or Gaussian), depending on the laser type. |
| **Beam Shape** | Select between Circle, Square, and Rectangular operation. |
| **Size** | Enter the dimensions of the selected beam shape to calculate its area. The calculated value is shown on the right. |
| **Diameter** | Use the $1/e^2$ diameter for Gaussian beams. |
| **$\Phi_e$** | Optical (Average) Power (W) |
| **$Q_e$** | Radiant Energy (J) |
| **$f_{Rep}$** | Laser Repetition Rate (Hz) |
| **$t_{Pulse}$** | Pulse Width (s) |
| **Calculation Results** | |
| **Beam Area** | Beam area, calculated from the input parameters ($cm^2$). |
| **$E_e$** | Irradiance ($W/cm^2$) - for CW laser type only. |
| **$Q_e$** | Radiant Pulse Energy (J) |
| **$H_e$** | Pulse Fluence ($J/cm^2$) |
| **$\Phi_e$** | Optical (Average and Peak) Power (W) |
| **$E_e$** | Optical (Average and Peak) Irradiance (W) |

***Table 22 Parameters of the Laser Calculator***

**Unit Calculator**

The unit calculator converts physical units for optical power, wavelength, and photon flux.

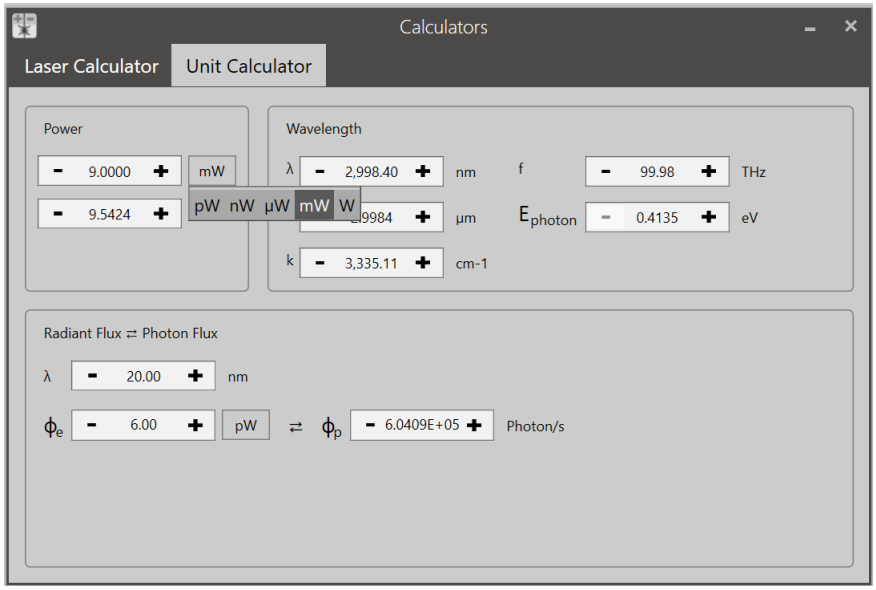



***Figure 27 Parameters of the Unit Calculator***

| Parameter | Description |
|---|---|
| **Input Parameters** | |
| **Power** | Enter the optical power in either pW, nW, µW, mW, and W. The representation will automatically update with the entry. |
| **λ** | Enter the operating wavelength in nm or µm. |
| **$\Phi_e$** | Optical Power/Radiant Flux (W) |
| **$\Phi_p$** | Photon Flux (Photons/s) |
| **Calculation Results** | |
| **k** | Wavenumber ($cm^{-1}$) |
| **f** | Frequency (THz) |
| **$Q_e$** | Pulse Energy (J) |
| **$E_{photon}$** | Photon Energy (eV) |

***Table 23 Parameters of the Unit Calculator***

# Chapter 10 Software and Firmware Update

## Firmware Update

To update the device firmware, use the Firmware Update Tool to scan your PC for previously downloaded versions. The Firmware Update Tool can be accessed via:

- Help > Tools > Firmware Update Tool
- Measurement > Settings/Information Panel > Information Tab (Firmware Revision)

If no firmware is available locally, open the Information panel via the Measurement view to access the online update feature, which checks for updates specific to the connected device. For further support, contact Thorlabs.

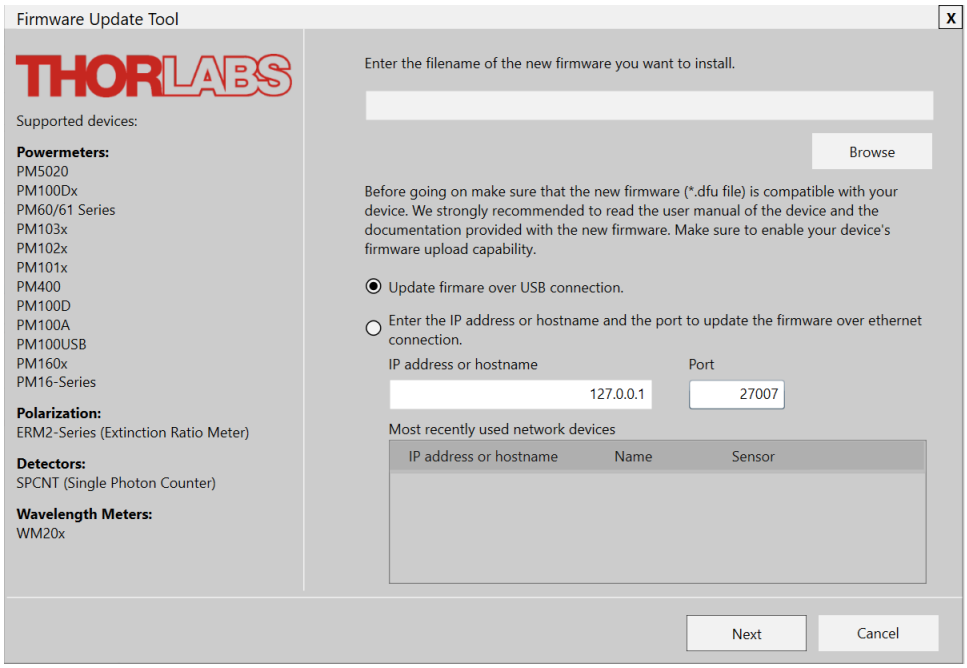



***Figure 28 Firmware Update Tool***

## Software Update

To check for available software updates, click *Check for Software Update* in the Tools panel under *Update*.

Alternatively, you can enable the *Check for OPM Update at application start* option to receive automatic notifications whenever a newer version of the OPM Software is available. This setting can be turned on or off using the slider in the Tools panel.

# Chapter 11 Troubleshooting

This chapter provides guidance for identifying, analyzing, and resolving technical issues efficiently, helping to ensure the smooth and reliable operation of the OPM Software in both laboratory and production environments.

**Issue:** PC or OPM Software freezes during long-term measurements

- Cause: The system have entered sleep or hibernation mode, interrupting communication with the device.
- Solution: Disable sleep and hibernation settings on your PC when performing long-term measurements. See Chapter 6 Monitoring for details.

**Issue:** A device is detected (shown in the Found Devices Panel) but cannot be connected.

- Cause: The sensor was not connected to the device when it was first recognized by the OPM Software.
- Solution: Make sure the sensor is properly attached to the device. Then unplug and reconnect the USB cable. If the problem persists, restart the device.

**Issue:** A device is not automatically recognized after hot-swapping sensors.

- Cause: The software detected the device before the new sensor was connected.
- Solution: Unplug and replug the USB cable between the PC and the device. In case the problem persists, reboot the device.

# Chapter 12 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.

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