Thorlabs Beam
Beam Analyzing Software

BP209-VIS(/M), BP209IR1(/M), and BP209-IR2(/M) with M2MS(-AL)

Quick Reference



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We aim to develop and produce the best solution for your application in the field of optical measurement technique. To help us to live up to your expectations and constantly improve our products we need your ideas and suggestions. Therefore, please let us know about possible criticism or ideas. 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!

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1 General Information

The BP209 Series Thorlabs Dual Scanning Slit Beam Profilers are ideal for analyzing cross sectional profiles of near-Gaussian laser beams and can be operated in scanning-slit or knife-edge modes. The beam diameter is measured in accordance with the ISO 11146 standard and can be displayed using a number of industry-standard clip levels or an arbitrary clip level set by the user. When the beam of interest does not have a near-Gaussian beam shape, or when single-shot measurements of pulsed beams are required, we recommend the Thorlabs BC207 CMOS Camera Beam Profilers.

With the BP209 beam profiler, measurements of the intensity profiles along the user-specified X and Y axes of the beam's cross section are acquired at scan rates between 2 Hz and 20 Hz, Scan rates can be set in the Beam Software. The fast 20 Hz scan rate enables real-time optical system alignment. Primarily intended for CW laser beams, >10 Hz pulsed beams can also be measured using an averaging technique.

These measurements can be used for beam quality evaluation, examination of the reconstructed beam profile, and monitoring long-term stability.

Three BP209 Dual Scanning Slit beam profiler models are available with different wavelength ranges: BP209-VIS(/M), BP209IR1(/M), and BP209-IR2(/M). Each can be purchased as a metric or imperial version. For the purpose of this manual, the versions are referred to a BP209xxx(/M).

The Beam Software versions 8.0 and higher support the BP209 Beam Profiler. The Beam Software is provided for download from the software tab on the Thorlabs website.

To convert Thorlabs beam profilers into a M^2 measurement system, Thorlabs offers the M2MS(-AL) extension sets. For more information please visit the Thorlabs M2MS website.

For the full operating manual, please see the Thorlabs Beam Profiler website or use the manual within the Beam Software.

1.1 Ordering Codes and Accessories

BP209-VIS	Slit Beam Profiler, 200 - 1100 nm, 9 mm aperture, 5 and 25 µm slits, imperial version
BP209-VIS/M	Slit Beam Profiler, 200 - 1100 nm, 9 mm aperture, 5 and 25 µm slits, metric version
BP209IR1	Slit Beam Profiler, 500 - 1700 nm, 9 mm aperture, 5 and 25 µm slits, imperial version
BP209IR1/M	Slit Beam Profiler, 500 - 1700 nm, 9 mm aperture, 5 and 25 µm slits, metric version
BP209-IR2	Slit Beam Profiler, 900 - 2700 nm, 9 mm aperture, 5 and 25 µm slits, imperial version
BP209-IR2/M	Slit Beam Profiler, 900 - 2700 nm, 9 mm aperture, 5 and 25 µm slits, metric version

For beam quality (M^2) measurements, Thorlabs offers M2MS hardware extension sets to BP209 Series as well as complete M^2 Measurement Systems consisting of M2MS and BP209 Series beam profilers. The M2MS extension sets can be purchased through the M2MS website.

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M² Measurement System with Slit Beam Profiler

These combinations comprise the M2MS Extension and a mounted BP209 Beam Profiler. The following models are available:

Item Number	Description
M2MS-BP209VIS-AL	M2 Measurement System with BP209-VIS, 250 - 600 nm, Imperial
M2MS-BP209VIS-AL/M	M2 Measurement System with BP209-VIS/M, 250 - 600 nm, Metric
M2MS-BP209VIS	M2 Measurement System with BP209-VIS, 400 - 1100 nm, Imperial
M2MS-BP209VIS/M	M2 Measurement System with BP209-VIS/M, 400 - 1100 nm, Metric
M2MSBP2I	M2 Measurement System with BP209IR1, 500 - 1700 nm, Imperial
M2MSBP2I/M	M2 Measurement System with BP209IR1/M, 500 - 1700 nm, Metric
M2MS-BP209IR2	M2 Measurement System with BP209-IR2, 900 - 2700 nm, Imperial
M2MS-BP209IR2/M	M2 Measurement System with BP209-IR2/M, 900 - 2700 nm, Metric

Please visit our homepage http://www.thorlabs.com for further information.

1.2 Requirements

These are the requirements for the PC intended to be used for operation of the BP209 Series of slit beam profilers using the Thorlabs Beam Software V8.0 or higher. Please find the BEAM Software for download from the Beam Software website.

Hardware Requirements

- Processor (CPU): ≥ 3.0 GHz Intel Core (i5 or Higher)[1]
- Memory (RAM): 4.0 GB
- Graphic Card Resolution: OpenGL (specification GLX 1.3 up) compatible graphics adapter:
  - Radeon (X100 series ≥ X850, X1000 series ≥ X1600, HD series ≥ 2400)
  - Geforce 7 series ≥ 7600, 8 series ≥ 8500, 9 series ≥ 9600
  - Quadro FX series ≥ FX770M
- Hard Drive: Min. 2 GB of available disk space
- Interface: Free USB 2.0 port
- Monitor resolution minimum 1024 x 758 pixel (≥ 16 bit color depth)

[1)] Intel Core i3 processors and mobile versions of Intel processors may not satisfy the requirements.

The Thorlabs Beam Software is compatible with the following operating systems:

- Windows® 8.1 (32-bit or 64-bit)
- Windows® 10 (32-bit or 64-bit)

Recommended for Optimal Performance:

- USB 2.0 port
- Processor: Intel Core 2 i5 or AMD Ryzen 5 (min. 3.0 GHz), 8.0 GB RAM
- OpenGL (specification GLX 1.3 up) compatible graphics adapter:
  - Radeon HD series ≥ 7000
  - Geforce GTX series ≥ 500

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2 Getting Started

Please inspect the shipping container for damage. Please do not cut through the cardboard. You might need the box for storage or for returns.

If the shipping container seems to be damaged, keep it until you have inspected the contents for completeness and tested the BP209 Series device mechanically and electrically.

Verify that you have received the following items within the package:

2.1 Parts List BP209-VIS(/M), BP209IR1(/M) and BP209-IR2(/M)

- 1 BP209 Series Beam Profiler Instrument as an External Measurement Head with Dust Cover
- 1 USB 2.0 Cable A to Mini B, Length 3.0 m
- Quick Reference

2.2 Parts List M2MS with BP209 Series

If you have purchased am M^2 measurement system consisting of the M2MS Extension Set with the BP209 Series Beam Profiler, the package will contain the following items:

1. M2MS-BP209VIS-AL(/M)

- M2MS-BP209VIS-AL (/M) Measurement System with mounted BP209-VIS (/M) Slit Beam Profiler
- Power supply 100 to 240 V AC / 15 V 3 A DC
- Cable USB 2.0 A to Mini B, 3 m length
- Cable USB 2.0 A to Mini B, angled, 0.5 m length
- 1 pcs. 0.05" Hex Key
- M2MS Accessory Box UV, that includes:
  - 1 pcs. LA4158-UV Plano Convex Lens, f = 250 mm, UV AR coating
  - 1 pcs. LA1461-A Plano Convex Lens, f = 250 mm, AR coating 350 - 700 nm
  - 4 pcs. CL6 Rail clamps
  - 1 pcs. M2MS Adjustment laser
  - 1 pcs. Ball Driver 3 mm
  - 1 pcs. Pack of 6 Spare Screws M4x10
- Quick Reference

2. M2MS-BP209VIS(/M)

- M2MSBP-209VIS (/M) Measurement System with mounted BP209-VIS (/M) Slit Beam Profiler
- Power supply 100 to 240 V AC / 15 V 3 A DC
- Cable USB 2.0 A to Mini B, 3 m length
- Cable USB 2.0 A to Mini B, angled, 0.5 m length
- 1 pcs. 0.05" Hex Key
- M2MS Accessory Box VIS, that includes:
  - 1 pcs. LA1461-A Plano Convex Lens, f = 250 mm, AR coating 350 - 700 nm
  - 1 pcs. LA1461-B Plano Convex Lens, f = 250 mm, AR coating 650 - 1050 nm
  - 1 pcs. LA1461-C Plano Convex Lens, f = 250 mm, AR coating 1050 - 1700 nm
  - 1 pcs. LA5255-D Plano Convex Lens, f = 250 mm, AR coating 1650 - 3000 nm

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    - 4 pcs. CL6 Rail clamps
    - 1 pcs. M2MS Adjustment laser
    - 1 pcs. Ball Driver 3 mm
    - 1 pcs. Pack of 6 Spare Screws M4x10
  - Quick Reference

3. M2MSBP2I(/M)

- M2MS Measurement System with mounted BP209IR1(/M) Slit Beam Profiler
- Power supply 100 to 240 V AC / 15 V 3 A DC
- Cable USB 2.0 A to Mini B, 3 m length
- Cable USB 2.0 A to Mini B, angled, 0.5 m length
- 1 pcs. 0.05" Hex Key
- M2MS Accessory Box VIS, that includes:
    - 1 pcs. LA1461-A Plano Convex Lens, f = 250 mm, AR coating 350 - 700 nm
    - 1 pcs. LA1461-B Plano Convex Lens, f = 250 mm, AR coating 650 - 1050 nm
    - 1 pcs. LA1461-C Plano Convex Lens, f = 250 mm, AR coating 1050 - 1700 nm
    - 1 pcs. LA5255-D Plano Convex Lens, f = 250 mm, AR coating 1650 - 3000 nm
    - 4 pcs. CL6 Rail clamps
    - 1 pcs. M2MS Adjustment laser
    - 1 pcs. Ball Driver 3 mm
    - 1 pcs. Pack of 6 Spare Screws M4x10
  - Quick Reference

4. M2MS-BP209IR2(/M)

- M2MS Measurement System with mounted BP209-IR2(/M) Slit Beam Profiler
- Power supply 100 to 240 V AC / 15 V 3 A DC
- Cable USB 2.0 A to Mini B, 3 m length
- Cable USB 2.0 A to Mini B, angled, 0.5 m length
- 1 pcs. 0.05" Hex Key
- M2MS Accessory Box VIS, that includes:
    - 1 pcs. LA1461-A Plano Convex Lens, f = 250 mm, AR coating 350 - 700 nm
    - 1 pcs. LA1461-B Plano Convex Lens, f = 250 mm, AR coating 650 - 1050 nm
    - 1 pcs. LA1461-C Plano Convex Lens, f = 250 mm, AR coating 1050 - 1700 nm
    - 1 pcs. LA5255-D Plano Convex Lens, f = 250 mm, AR coating 1650 - 3000 nm
    - 4 pcs. CL6 Rail clamps
    - 1 pcs. M2MS Adjustment laser
    - 1 pcs. Ball Driver 3 mm
    - 1 pcs. Pack of 6 Spare Screws M4x10
  - Quick Reference

2.3 Basic Setup BP209 Series

This chapter describes the basic setup for the BP209-VIS(/M), BP209IR1(/M) and BP209-IR2(/M).

1. Mount the BP209 Series Beam Profiler on a post as described in the full manual.
2. Download the Beam Software version 8.0 or higher from the website and install it on your computer.

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3. With the dust cover still on the beam profiler, adjust the BP209 Series Beam Profiler such that its optical aperture will be exposed to the optical beam.
4. Align the beam to be measured so that it is perpendicular to the front face of the Beam Profiler.
5. Be sure to not exceed the maximum allowed optical power to the instrument. Please see the Optical Power Range in the chapter Technical Data BP209 Series in the full manual for details.
6. Connect the camera using the supplied USB 2.0 cable to the PC.
7. Remove the dust cover.
8. Start the Beam Software.
9. Switch on the light source.

Attention

Please install the software prior to connecting the instrument to a PC via the high power USB 3.0 interface. Use only the supplied high speed (USB 3.0) cable.

2.4 Installation

2.4.1 Software Installation

The Beam Software can be downloaded from the Thorlabs website:

http://www.thorlabs.com/software_pages/ViewSoftwarePage.cfm?Code=Beam

Please check for updates to the Thorlabs Beam Software and always use the latest Software version.

The Beam software versions 8.0 or higher support the beam profiler series BP209, BC106N, and BC207. Software versions below V8.0 do not support the BC207 Series.

- Save the ZIP file to your computer and unpack this archive. The Install Shield Wizards starts by double-clicking the setup.exe.
- The installation contains 2 main parts - the NI-VISA™ Runtime V17.0 and the Beam Software itself, including drivers.
- Please read the license agreements carefully, choose "I agree" and click "Next".
- Windows Security will ask your confirmation to install the Thorlabs USB driver.
- You may check the box "Always trust software from Thorlabs GmbH", this will shorten the installation. However, if you do not want to do that, please click the "Install" button. You will then be asked to confirm the installation of further Thorlabs software components. Please install the instrument driver packages as well as the Firmware Loader Driver Package.
- When all drivers are installed and the "Read Me" comes up. Click "Next", then "Finish" to complete the software installation.

2.4.2 Connection to the PC

Connect the BP209 Series Beam Profiler to a USB 2.0 port of your computer.

Attention

Use only the supplied high speed (USB 2.0) cable. USB 1.1 cables can cause transmission errors and improper instrument operation!

Please make sure, that the USB cable is connected to a USB 2.0 port or that a used USB HUB provides sufficient power. Some models may not be able to deliver the specified max. current (500mA).

After connecting the instrument to the PC the operating system loads the appropriate USB drivers for the Beam Profiler instrument.

Once connected, an icon will appear in the task bar indicating that the driver installation is in progress.

2.4.3 Start the Application

Click the "Programs" → "Thorlabs" → "Thorlabs Beam Application" entry, or simply click the appropriate icon added to your desktop.

For detailed operating instructions of the software, please see the full manual, that can be found after software installation in the "Manuals" folder:
Start → All Programs → Thorlabs → Thorlabs Beam Application → Manuals

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3 Appendix

3.1 Safety

Attention

The safety of any system incorporating the equipment is the responsibility of the assembler of the system.

All statements regarding safety of operation and technical data in this instruction manual will only apply when the unit is operated correctly as it was designed for.

The Beam Profiler must not be operated in explosion endangered environments! To prevent the Beam Profiler from overheating, do not cover the instrument.

This precision device is only serviceable if properly packed into the complete original packaging including the plastic foam sleeves. If necessary, ask for replacement packaging. Refer servicing to qualified personnel!

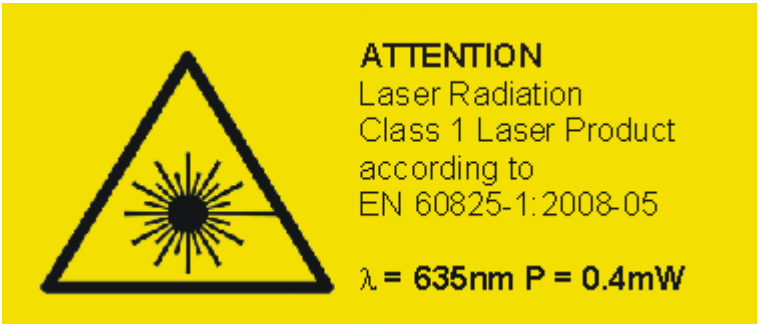
Before applying power to the PC system used to operate the Beam Profiler, make sure that the protective conductor of the 3 conductor mains power cord is correctly connected to the protective earth contact of the socket outlet! Improper grounding can cause electric shock with damages to your health or even death!

The instrument must only be operated with a duly shielded and low resistance USB cable delivered by Thorlabs.

Only with written consent from Thorlabs may changes to single components be carried out or components not supplied by Thorlabs be used. Do not stick anything into the aperture in the middle of the Beam Profiler front! You may damage the thin-skinned slits, spoil the bearings of the motor and/or block the rotating drum because there is no covering glass in front of it.

Warning

The M2MS(-AL) M² Measurement System comes with an alignment laser that is powered by a M2MS(-AL) internal driver. Be careful when using this laser!



3.2 Certifications and Compliances

EU Declaration of Conformity

in accordance with EN ISO 17050-1:2010

We: Thorlabs GmbH

Of: Münchner Weg 1, 85232 Bergkirchen, Deutschland

in accordance with the following Directive(s):

2014/30/EU	Electromagnetic Compatibility (EMC) Directive
2011/65/EU	Restriction of Use of Certain Hazardous Substances (RoHS)

hereby declare that:

Model: ***BP209 Series***

Equipment: ***Slit Beam Profiler (Visible or Infrared)***

is in conformity with the applicable requirements of the following documents:

EN 61326-1	Electrical Equipment for Measurement, Control and Laboratory Use - EMC Requirements	2013

and which, issued under the sole responsibility of Thorlabs, is in conformity with Directive 2011/65/EU of the European Parliament and of the Council of 8th June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment, for the reason stated below:

does not contain substances in excess of the maximum concentration values tolerated by weight in homogenous materials as listed in Annex II of the Directive

I hereby declare that the equipment named has been designed to comply with the relevant sections of the above referenced specifications, and complies with all applicable Essential Requirements of the Directives.

Signed:  *On:* 22 November 2019

Name: Bruno Gross

Position: General Manager

EDC - BP209 Series -2019-11-22

CE

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3.3 Return of Devices

This precision device is only serviceable if returned and properly packed into the complete original packaging including the complete shipment plus the cardboard insert that holds the enclosed devices. If necessary, ask for replacement packaging. Refer servicing to qualified personnel.

3.4 Manufacturer Address

Manufacturer Address Europe
Thorlabs GmbH
Münchner Weg 1
D-85232 Bergkirchen
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Tel: +49-8131-5956-0
Fax: +49-8131-5956-99
www.thorlabs.de
Email: europe@thorlabs.com

EU-Importer Address
Thorlabs GmbH
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D-85232 Bergkirchen
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Tel: +49-8131-5956-0
Fax: +49-8131-5956-99
www.thorlabs.de
Email: europe@thorlabs.com

3.5 Warranty

Thorlabs warrants material and production of the BP209 Series for a period of 24 months starting with the date of shipment in accordance with and subject to the terms and conditions set forth in Thorlabs' General Terms and Conditions of Sale which can be found at:

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

3.6 Exclusion of Liability and Copyright

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 2023. All rights reserved.

Please refer to the general terms and conditions linked under Warranty 11.

3.7 Thorlabs Worldwide Contacts

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



USA, Canada, and South America
Thorlabs, Inc.
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China
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chinasales@thorlabs.com

Thorlabs 'End of Life' Policy (WEEE)



Thorlabs verifies our compliance with the WEEE (Waste Electrical and Electronic Equipment) directive of the European Community and the corresponding national laws. Accordingly, all end users in the EC may return “end of life” Annex I category electrical and electronic equipment sold after August 13, 2005 to Thorlabs, without incurring disposal charges. Eligible units are marked with the crossed out “wheelie bin” logo (see right), were sold to and are currently owned by a company or institute within the EC, and are not dissembled or contaminated. Contact Thorlabs for more information. Waste treatment is your own responsibility. “End of life” units must be returned to Thorlabs or handed to a company specializing in waste recovery. Do not dispose of the unit in a litter bin or at a public waste disposal site. It is the users responsibility to delete all private data stored on the device prior to disposal.

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