## MLS203P11 - August 23, 2022

Item # MLS203P11 was discontinued on August 23, 2022. For informational purposes, this is a copy of the website content at that time and is valid only for the stated product.

### HIGH-SPEED MOTORIZED XY SCANNING STAGES

▶ **Ultra Fast XY Scanning Up to 250 mm/s**

▶ **Low-Profile, Compact Footprint**

▶ **Compatible with Thorlabs' Cerna®, Nikon, Olympus, and Zeiss Microscopes**

MLS203-1 Stage Shown Mounted to a Nikon Eclipse Ti-U Microscope Equipped with Thorlabs' Confocal Imaging System

**MLS203-1**
Shown with MLS203P2 Slide Holder.
Stage Dimensions: 260 mm x 230 mm x 31 mm

### OVERVIEW

**Features**

- Integrates with Nikon, Olympus, Zeiss, and Thorlabs' Cerna® Upright and Inverted Microscopes
- Range of Sample Holders Available
- Integrated Brushless DC Linear Servo Motor Actuators
- Linear Optical Encoders
- High-Quality, Precision-Engineered Linear Bearings
- High Repeatability (0.25 µm) and Position Accuracy (<3 µm)
- Compatible with Thorlabs' Kinesis® and APT™ Software

Thorlabs' MLS203 stages have been designed as drop-in replacements for the manual stages found on select Nikon, Olympus, Zeiss, and Cerna® microscopes to provide motorized XY positioning of microscopy samples. A complete stage package consists of the stage itself, a controller, mounting brackets, and optional accessories; all of these items need to be purchased separately. The table below outlines the items that should be purchased to form a stage package compatible with a particular microscope. Alternatively, optional mounting brackets (Item # MLSA01) enable the MLS203-1 stage to be bolted to an optical table or breadboard as part of a custom-built microscope setup or for use in typical photonics applications.

Characterized by high-speed scanning capabilities and high positional accuracy, these stages are ideal for manually or automatically positioning a wide range of specimens and samples in many types of microscopy or imaging techniques and applications. Very precise manual fine positioning and control at the cellular level is easily achieved through the combination of a stable closed-loop control system and an associated joystick option. In addition, the stages can be combined with our Z-Axis Piezo Stage to form an XYZ stage ideally suited for laser scanning microscopy.

The motorized stage technology is covered by US patent 8,575,792.

**Controller Option**
The recommended controller for the MLS203 stage is the BBD302 Dual-Axis Brushless DC Motor Controller, which is compatible with our Kinesis and APT software suites. See below for a brief overview, or click here to view the full presentation for this controller.

**Specimen Holders and Accessories**
We offer a range of adapters to allow the positioning of standard microscope slides, multiwell plates, petri dishes, and mounted metallurgical specimens. Please see the details below.

### Complete Microscope Stage Assemblies

| Microscope[a] | Stage | Mounting Bracket | Controller | Optional Specimen Holders and Accessories |
|---|---|---|---|---|
| Thorlabs Cerna | MLS203-1 | CSA1000 | BBD302 | **MLS203P1:** Multiwell Plate Adapter<br>**MLS203P2:** Petri Dish / Slide Holder for Inverted Microscopes<br>**C4SH01:** Multi Slide Holder for Inverted Microscopes<br>**MLS203P3:** Blank Adapter Plate<br>**MLS203P5:** 1/4"-20 Tapped Breadboard Plate<br>**MLS203P4:** M6-Tapped Breadboard Plate<br>**MLS203P10:** Multiple Slide Holder for Upright and Inverted Microscopes<br>**MLS203P11:** Recessed Slide Holder for Upright Microscopes<br>**MJC001:** 2-Axis Joystick Controller |
| Nikon 50i, 80i, 90i, and Ci-L | MLS203-1 | MLSA06 | | |
| Nikon TE2000 and Eclipse Ti | MLS203-1 | MLSA03 | | |
| Nikon Eclipse FN1 | MLS203-1 | MLSA07 | | |
| Olympus BX41, BX43, BX51, BX53, and BX61 | MLS203-1 | MLSA08 | | |
| Olympus IX51, IX71, IX73, IX81, and IX83 | MLS203-1 | MLSA02 | | |
| Olympus IX70 | MLS203-1 | MLSA09 | | |
| Zeiss Axio Observer and Axiovert 40 | MLS203-2 | None Needed | | |
| Optical Breadboard / Custom Configuration | MLS203-1 | MLSA01 | | |

a. If your microscope is not listed, please contact Technical Support to inquire about custom mounting adapters. We can support microscopes from Olympus, Nikon, Zeiss, and Leica.

| MLS203 Stage | |
|---|---|
| Travel Range | 110 mm x 75 mm (4.3" x 2.95") |
| Speed (Max) | 250 mm/s |
| Acceleration (Max) | 2000 mm/s$^2$ |
| Bidirectional Repeatability | 0.25 µm |
| Unidirectional Repeatability | 0.25 µm |
| Backlash[a] | N/A |
| Load Capacity (Max) | 1 kg (2.2 lb) |
| Incremental Movement (Min) | 0.1 µm |
| Absolute On-Axis Accuracy | <3 µm |
| Percentage Accuracy (Max) | X-Axis: 0.0027% Y-Axis: 0.004% |
| Flatness in X Axis | ±3 µm Over Full Travel , ±1 µm Over 10 mm |
| Flatness in Y Axis | ±2 µm Over Full Travel , ±1 µm Over 10 mm |
| Home Location Accuracy | 0.25 µm |
| Settling Time within 1 µm (600 g Load) | 0.1 s |
| Settling Time within 0.1 µm (600 g Load) | 0.6 s |
| Weight (Including Cables) | 3.2 kg (7.0 lbs) |
| Limit Switches | X and Y as Standard |
| Bearing Type | Precision Linear Bearing |
| Motor Type | Brushless DC Linear Motor |
| Dimensions (Mid Travel, Excluding Guards) | 260.0 mm x 230.0 mm x 31.3 mm (10.24" x 9.06" x 1.23") |
| Recommended Controller | BBD302 |

| BBD302 Controller | |
|---|---|
| Number of Channels | 2 |
| Drive Connector | 8 Pin DIN, Round, Female |
| Feedback Connector | 15-Pin D-Type, Female |
| Brushless Continuous Output | 2.5 A per Channel, 5.2 A Max All-Channel Total Output |
| Brushless Peak Output | 4.0 A per Channel, 5.2 A Max All-Channel Total Output |
| PWM Frequency | 40 kHz |
| Operating Modes | Position and Velocity |
| Control Algorithm | 16-Bit Digital PID Servo Loop with Velocity and Acceleration Feedforward |
| Velocity Profile | Trapezoidal/S-Curve |
| Position Count | 32 Bit |
| Position Feedback | Incremental Encoder |
| Encoder Bandwidth | 2.5 MHz (10 M Counts/sec) |
| Encoder Supply | 5 V |
| AUX Control Connector | 37-Pin D-Type Female (User Digital IO, 5 V O/P) |
| Front Panel Display | 4.3" Full-Color LCD, 480 x 272 Pixels |
| Input Power Requirements | 250 VA Voltage: 100 to 240 VAC Frequency: 47 to 63 Hz Fuse: 3.15 A |
| Dimensions (W x D x H) | 250.0 mm x 279.1 mm x 108.8 mm (9.84" x 10.99" x 4.28") |
| Mass (Weight) | 1.70 kg (3.75 lbs) |

a. The stage does not suffer from backlash because there is no leadscrew.

## MLS203 XY Scanning Stage Pin Out Descriptions

### Motor Drive
### Male
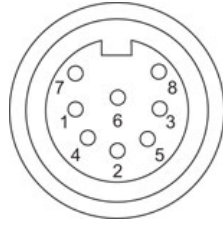


| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1 | Motor Phase V | 5 | Stage ID |
| 2 | GND | 6 | GND |
| 3 | Thermistor (Not Used) | 7 | Motor Phase W |
| 4 | Motor Phase U | 8 | Enable |

### Encoder Feedback
### D-Type Male
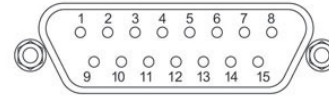


| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1 | Not Connected | 9 | GND |
| 2 | GND | 10 | Limit Switch + |
| 3 | Not Connected | 11 | Limit Switch - |
| 4 | Enc Index - | 12 | Enc Index + |
| 5 | QB - | 13 | QB + |
| 6 | QA - | 14 | QA + |
| 7 | 5 V | 15 | Not Connected |
| 8 | 5 V | | |

## BBD302 Controller Pin Out Descriptions

### MOTOR DRIVE
### Female DIN Connector
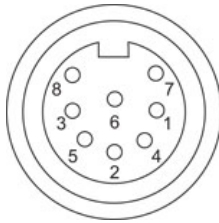


| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1 | Motor Phase V | 5 | Stage ID |
| 2 | GND | 6 | GND |
| 3 | Temp. Sensor (Not Used) | 7 | Motor Phase W |
| 4 | Motor Phase U | 8 | Enable |

### FEEDBACK
### Female D-Type Connector
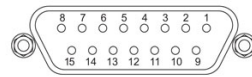


| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1 | Not Connected | 9 | GND |
| 2 | GND | 10 | Limit Switch + |
| 3 | Not Connected | 11 | Limit Switch - |
| 4 | Index - | 12 | Index + |
| 5 | QB - | 13 | QB + |
| 6 | QA - | 14 | QA + |
| 7[a] | 5 V | 15 | Not Connected |
| 8[a] | 5 V | | |

- Pins 7 and 8 are short circuited internally.

### HANDSET
### Female Mini DIN Connector
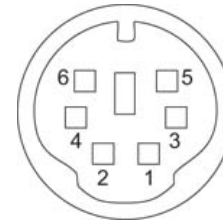


| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1 | RX (Controller Input) | 4 | Supply Voltage for Handset 5 V |
| 2 | Ground | 5 | TX (Controller Output) |
| 3 | Ground | 6 | Ground |

### AUX I/O
### Female D-Type Connector
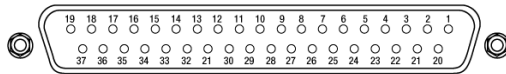


| Pin | Description | Pin | Description | Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|-----|-------------|-----|-------------|
| 1 | RS232 TX | 11 | User Digital O/P 11+ | 21 | +5 V | 31 | User Digital O/P 4+ |
| 2 | RS232 RX | 12 | User Digital O/P 10- | 22 | User Digital I/P 3 | 32 | User Digital O/P 4- |
| 3 | Ground | 13 | User Digital O/P 10+ | 23 | User Digital I/P 2 | 33 | User Digital O/P 5+ |
| 4 | Differential I/P 2+ | 14 | User Digital O/P 9- | 24 | User Digital I/P 1 | 34 | User Digital O/P 5- |
| 5 | Differential I/P 2- | 15 | User Digital O/P 9+ | 25 | User Digital I/P 0 | 35 | User Digital O/P 6+ |
| 6 | Differential I/P 1- | 16 | User Digital O/P 8- | 26 | User Digital O/P 0 | 36 | User Digital O/P 6- |
| 7 | Differential I/P 1+ | 17 | User Digital O/P 8+ | 27 | User Digital O/P 1 | 37 | Ground |
| 8 | User Digital O/P 12- | 18 | User Digital O/P 7- | 28 | User Digital O/P 2 | - | - |
| 9 | User Digital O/P 12+ | 19 | User Digital O/P 7+ | 29 | User Digital O/P 3 | - | - |
| 10 | User Digital O/P 11- | 20 | +5 V | 30 | Ground | | |

### USB
### Type B USB Female
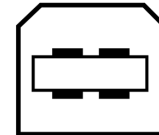


### I/O
### Female BNC Connector
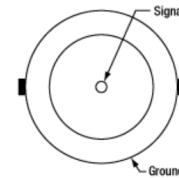


5 V TTL

Thorlabs offers two platforms to drive our wide range of motion controllers: our Kinesis® software package or the legacy APT™ (Advanced Positioning Technology) software package. Either package can be used to control devices in the Kinesis family, which covers a wide range of motion controllers ranging from small, low-powered, single-channel drivers (such as the K-Cubes™ and T-Cubes™) to high-power, multi-channel, modular 19" rack nanopositioning systems (the APT Rack System).
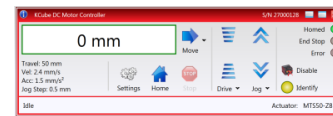
The Kinesis Software features .NET controls which can be used by 3rd party developers working in the latest C#, Visual Basic, LabVIEW™, or any .NET compatible languages to create custom applications. Low-level DLL libraries are included for applications not expected to use the .NET framework. A Central Sequence Manager supports integration and synchronization of all Thorlabs motion control hardware.

Our legacy APT System Software platform offers ActiveX-based controls which can be used by 3rd party developers working on C#, Visual Basic, LabVIEW™, or any Active-X compatible languages to create custom applications and includes a simulator mode to assist in developing custom applications without requiring hardware.


Kinesis GUI Screen

By providing these common software platforms, Thorlabs has ensured that users can easily mix and match any of the Kinesis and APT controllers in a single application, while only having to learn a single set of software tools. In this way, it is perfectly feasible to combine any of the controllers from single-axis to multi-axis systems and control all from a single, PC-based unified software interface.

The software packages allow two methods of usage: graphical user interface (GUI) utilities for direct interaction with and control of the controllers 'out of the box', and a set of programming interfaces that allow custom-integrated positioning and alignment solutions to be easily programmed in the development language of choice.


APT GUI Screen

A range of video tutorials is available to help explain our APT system software. These tutorials provide an overview of the software and the APT Config utility. Additionally, a tutorial video is available to explain how to select simulator mode within the software, which allows the user to experiment with the software without a controller connected. Please select the *APT Tutorials* tab above to view these videos.

### Software
**Kinesis Version 1.14.35**

The Kinesis Software Package, which includes a GUI for control of Thorlabs' Kinesis and APT™ system controllers.

**Also Available:**

- Communications Protocol

Software

### Software
**APT Version 3.21.5**

The APT Software Package, which includes a GUI for control of Thorlabs' APT™ and Kinesis system controllers.

**Also Available:**

- Communications Protocol

Software

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Thorlabs' Kinesis® software features new .NET controls which can be used by third-party developers working in the latest C#, Visual Basic, LabVIEW™, or any .NET compatible languages to create custom applications.

**C#**
This programming language is designed to allow multiple programming paradigms, or languages, to be used, thus allowing for complex problems to be solved in an easy or efficient manner. It encompasses typing, imperative, declarative, functional, generic, object-oriented, and component-oriented programming. By providing functionality with this common software platform, Thorlabs has ensured that users can easily mix and match any of the Kinesis controllers in a single application, while only having to learn a single set of software tools. In this way, it is perfectly feasible to combine any of the controllers from the low-powered, single-axis to the high-powered, multi-axis systems and control all from a single, PC-based unified software interface.

The Kinesis System Software allows two methods of usage: graphical user interface (GUI) utilities for direct interaction and control of the controllers 'out of the box', and a set of programming interfaces that allow custom-integrated positioning and alignment solutions to be easily programmed in the development language of choice.

For a collection of example projects that can be compiled and run to demonstrate the different ways in which developers can build on the Kinesis motion control libraries, click on the links below. Please note that a separate integrated development environment (IDE) (e.g., Microsoft Visual Studio) will be required to execute the Quick Start examples. The C# example projects can be executed using the included .NET controls in the Kinesis software package (see the Kinesis Software tab for details).

C#

Click Here for the Kinesis with C# Quick Start Guide
Click Here for C# Example Projects
Click Here for Quick Start Device Control Examples

C#

**LabVIEW**
LabVIEW can be used to communicate with any Kinesis- or APT-based controller via .NET controls. In LabVIEW, you build a user interface, known as a front panel, with a set of tools and objects and then add code using graphical representations of functions to control the front panel objects. The LabVIEW tutorial, provided below, provides some information on using the .NET controls to create control GUIs for Kinesis- and APT-driven devices within LabVIEW. It includes an overview with basic information about using controllers in LabVIEW and explains the setup procedure that needs to be completed before using a LabVIEW GUI to operate a device.

Click Here to View the LabVIEW Guide
Click Here to View the Kinesis with LabVIEW Overview Page

The APT video tutorials available here fall into two main groups - one group covers using the supplied APT utilities and the second group covers programming the APT System using a selection of different programming environments.

**Disclaimer:** The videos below were originally produced in Adobe Flash. Following the discontinuation of Flash after 2020, these tutorials were re-recorded for future use. The Flash Player controls still appear in the bottom of each video, but they are not functional.

Every APT controller is supplied with the utilities APTUser and APTConfig. APTUser provides a quick and easy way of interacting with the APT control hardware using intuitive graphical control panels. APTConfig is an 'off-line' utility that allows various system wide settings to be made such as pre-selecting mechanical stage types and associating them with specific motion controllers.

## APT User Utility

The first video below gives an overview of using the APTUser Utility. The OptoDriver single channel controller products can be operated via their front panel controls in the absence of a control PC. The stored settings relating to the operation of these front panel controls can be changed using the APTUser utility. The second video illustrates this process.

APT User - Overview   APT User - OptoDriver Settings

## APT Config Utility

There are various APT system-wide settings that can be made using the APT Config utility, including setting up a simulated hardware configuration and associating mechanical stages with specific motor drive channels. The first video presents a brief overview of the APT Config application. More details on creating a simulated hardware configuration and making stage associations are present in the next two videos.

APT Config - Overview   APT Config - Simulator Setup   APT Config - Stage Association

## APT Programming

The APT Software System is implemented as a collection of ActiveX Controls. ActiveX Controls are language-independant software modules that provide both a graphical user interface and a programming interface. There is an ActiveX Control type for each type of hardware unit, e.g. a Motor ActiveX Control covers operation with any type of APT motor controller (DC or stepper). Many Windows software development environments and languages directly support ActiveX Controls, and, once such a Control is embedded into a custom application, all of the functionality it contains is immediately available to the application for automated operation. The videos below illustrate the basics of using the APT ActiveX Controls with LabVIEW, Visual Basic, and Visual C++. Note that many other languages support ActiveX including LabWindows CVI, C++ Builder, VB.NET, C#.NET, Office VBA, Matlab, HPVEE etc. Although these environments are not covered specifically by the tutorial videos, many of the ideas shown will still be relevant to using these other languages.

## Visual Basic

Part 1 illustrates how to get an APT ActiveX Control running within Visual Basic, and Part 2 goes on to show how to program a custom positioning sequence.

APT Programming Using Visual Basic - Part 1   APT Programming Using Visual Basic - Part 2

## LabVIEW

Full Active support is provided by LabVIEW and the series of tutorial videos below illustrate the basic building blocks in creating a custom APT motion control sequence. We start by showing how to call up the Thorlabs-supplied online help during software development. Part 2 illustrates how to create an APT ActiveX Control. ActiveX Controls provide both Methods (i.e. Functions) and Properties (i.e. Value Settings). Parts 3 and 4 show how to create and wire up both the methods and properties exposed by an ActiveX Control. Finally, in Part 5, we pull everything together and show a completed LabVIEW example program that demonstrates a custom move sequence.

APT Programming Using LabVIEW -   APT Programming Using LabVIEW -   APT Programming Using LabVIEW -
Part 1: Accessing Online Help       Part 2: Creating an ActiveX Control       Part 3: Create an ActiveX Method

APT Programming Using LabVIEW -   APT Programming Using LabVIEW -
Part 4: Create an ActiveX Property   Part 5: How to Start an ActiveX Control

The following tutorial videos illustrate alternative ways of creating Method and Property nodes:

APT Programming Using LabVIEW -       APT Programming Using LabVIEW -
Create an ActiveX Method (Alternative)   Create an ActiveX Property (Alternative)

## Visual C++

Part 1 illustrates how to get an APT ActiveX Control running within Visual C++, and Part 2 goes on to show how to program a custom positioning sequence.

APT Programming with Visual C++ - Part 1   APT Programming with Visual C++ - Part 2

## MATLAB

For assistance when using MATLAB and ActiveX controls with the Thorlabs APT positioners, click here.

To further assist programmers, a guide to programming the APT software in LabVIEW is also available here.

## High-Speed Motorized XY Scanning Stages

These XY scanning stages are drop-in replacements for the manual stages found on select microscopes, and provide motorized XY positioning of microscopy samples. The MLS203-1 is compatible with Thorlabs' Cerna® microscopes, as well as inverted and upright microscopes from Nikon and Olympus (see the table in the *Overview* tab above). Adapter brackets can be purchased separately that enable the stage to be fitted to a particular microscope. Tabletop mounting brackets (Item # MLSA01) are also available that enable the stage to be bolted to an optical table or breadboard as part of a custom built microscope setup or for use in typical photonics applications (see below for more details).

The MLS203-2 is directly compatible with Zeiss Axio Observer and Axiovert 40 microscopes. Mounting brackets are not required.

| Key Specifications[a] | |
|---|---|
| Travel Range | 110 mm x 75 mm (4.3" x 2.95") |
| Velocity (Max) | 250 mm/s |
| Acceleration (Max) | 2000 mm/s$^2$ |
| Bidirectional Repeatability | 0.25 µm |
| Unidirectional Repeatability | 0.25 µm |
| Horizontal Load Capacity (Max) | 1.0 kg (2.2 lb) |
| Min. Achievable Incremental Movement | 0.1 µm |
| Home Location Accuracy | 0.25 µm |
| Absolute On-Axis Accuracy | <3 µm |

a.  Please see the *Specs* tab for complete specifications.

| Part Number | Description | Price | Availability |
|---|---|---|---|
| MLS203-1 | Fast XY Scanning Stage | $7,719.84 | 7-10 Days |
| MLS203-2 | Fast XY Scanning Stage for Zeiss Microscopes | $7,719.84 | Lead Time |

## Compatible Controller for MLS203 Stages

The BBD302 two-channel controller features Thorlabs' Kinesis® control and programming interface, enabling easy integration into automated microscopy applications. It is ideal for applications demanding operation at high speeds (hundreds of mm/s) and high encoder resolution (<100 nm). For greater flexibility, communication with a PC is supported using either a USB or RS232 serial interface. The controller is supplied with a software development kit (SDK) in order to support automated PC control of the stage. This is useful to system integrators and other automation specialists who need to combine operation of the stage with other microscopy automation accessories. The fully documented SDK supports all major development languages running on Windows, such as LabVIEW, C++, and MATLAB, and comes in the form of ActiveX libraries or a conventional dynamic link library (DLL).

Multiple units can be connected to a single PC via standard USB hub technology; for example, both the BBD302 controller for the MLS203 XY stage and the controller with our MZS500-E Z-axis piezo stage kit can be operated simultaneously with a single PC. Combining this feature with the user-friendly Kinesis or APT™ software suites allows the user to program and carry out complex move sequences quickly. For more details on the BBD302 controller, please see the *Specs* tab above or the full presentation for our brushless DC controllers.

| Part Number | Description | Price | Availability |
|---|---|---|---|
| BBD302 | Customer Inspired! 2-Channel Benchtop 3-Phase Brushless DC Servo Controller | $3,405.47 | Today |

## Mounting Brackets for MLS203 Series Stages

We offer a choice of brackets to facilitate mounting the MLS203-1 stage to a range of upright and inverted microscopes from Thorlabs, Nikon, and Olympus. Please see the table below for specific compatibility. We also offer brackets that allow the MLS203-1 stage to be attached to imperial or metric breadboards for home-built microscopes or general photonics applications.

Each bracket (with the exception of the CSA1000) comes with instructions describing how to attach the stage to the microscope. Please note that the MLS203-2 stage can be bolted directly to a Zeiss Axio Observer or Axiovert without the need for brackets.

Click to Enlarge
MLS203-1 Stage with MLS203P2 Slide Holder on CSA1000 Fixed Arm for Attachment to a Cerna Microscope Body
(All Sold Separately)

| Click Image for Details |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|
| Bracket Item # | CSA1000 | MLSA02 | MLSA09 | MLSA08 | MLSA03 | MLSA06 | MLSA07 | MLSA01 |
| Microscope Brand | Thorlabs | Olympus | | | Nikon | | | Optical Breadboard, Custom Configuration |
| Microscope Model | Cerna® | IX51, IX71, IX73, IX81, IX83 | IX70 | BX41, BX43, BX51, BX53, BX61 | TE2000, Eclipse Ti | 50i, 80i, 90i, Ci-L | Eclipse FN1 | N/A |
| Microscope Type | Upright | Inverted | Inverted | Upright | Inverted | Upright | Upright | N/A |
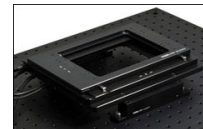
Click to Enlarge
MLS203-1 Stage Attached to a Breadboard with our MLSA01 Bracket Set

We support microscopes from Olympus, Nikon, Zeiss and Leica. Please contact Technical Support to inquire about bracket availability if your microscope model is not listed above.

| Part Number | Description | Price | Availability |
|---|---|---|---|
| CSA1000 | Fixed Arm Holder for MLS203-1 Fast XY Scanning Stage | $755.76 | Today |
| MLSA02 | Olympus IX51, IX71, IX73, IX81, and IX83 Mounting Brackets, 2 Pieces | $119.78 | Today |
| MLSA09 | Olympus IX70 Mounting Brackets, 2 Pieces | $131.58 | Today |
| MLSA08 | Olympus BX41, BX43, BX51, BX53, and BX61 Adapter | $289.97 | Today |
| MLSA03 | Nikon TE2000 and Eclipse Ti Mounting Brackets, 2 Pieces | $146.41 | Today |
| MLSA06 | Nikon 50i, 80i, 90i, and Ci-L Adapter | $289.97 | Today |
| MLSA07 | Customer Inspired! Nikon Eclipse FN1 Mounting Adapter | $395.97 | Today |
| MLSA01 | MLS203 31.5 mm Riser Plates for Breadboard Mounting, 2 Pieces | $176.36 | 7-10 Days |

# Slide Holders for MLS203 Stages

## MLS203P2
### Petri Dish/Slide Holder for Inverted Microscopes

Click to Enlarge

Click to Enlarge
MLS203 Stage with MLS203P2 Petri Dish/Slide Holder Fitted

Click to Enlarge
MLS203 Stage with MLS203P2 Mounted on Inverted Microscope

- Compatible with Petri Dishes Measuring 30 mm to 60 mm (1.18" to 2.36") in Diameter
- Compatible with Glass Slides Measuring 25 mm to 26.5 mm (0.98" to 1.04") in Width

## C4SH01
### Multi Slide Holder for Inverted Microscopes

Click to Enlarge

Click to Enlarge
MLS203 Stage with C4SH01 Slide Holder Tray (Requires the MLS203P1 Plate Adapter, Sold Below)

Click to Enlarge
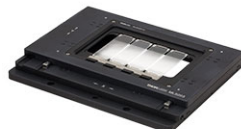MLS203 Stage with C4SH01 in an MLS203P1 Plate Adapter Mounted on Inverted Microscope

- Plastic Holder Compatible with 25 mm x 75 mm, 1.1 ± 0.2 mm Thick Microscope Slides
- Mount up to Four Slides for Automated Tissue and Tissue Microarray Analysis
- Same Footprint as Multiwell Plates (127.6 mm × 85.5 mm)
- Requires MLS203P1 Adapter Plate (Sold Below)

## MLS203P10
### Multi-Slide Holder for Upright or Inverted Microscopes

Click to Enlarge

Click to Enlarge
MLS203 Stage with MLS203P10 Multi Slide Holder, Holding Four Slides

Click to Enlarge
MLS203 Stage with MLS203P10 Multi-Slide Holder Mounted on Inverted Microscope

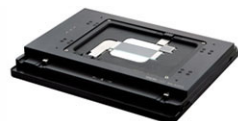- Compatible with Microscope Slides up to 26 mm x 76 mm (1.024" x 3.020")
- Holds up to Four Slides

## MLS203P11
### Recessed Slide Holder for Upright Microscopes

Click to Enlarge

Click to Enlarge
MLS203 Stage with MLS203P11 Slide Holder, Holding a Slide and 18 mm Square Test Target

Click to Enlarge
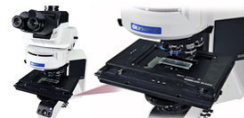MLS203 Stage with MLS203P11 Recessed Slide Holder Mounted on Upright Microscope

- Compatible with Microscope Slides up to 26 mm x 76 mm and 18 mm x 18 mm Calibration Targets
- Allows the Microscope Condenser to be Positioned Within 1.5 mm (0.06") of the Slide Surface
- Can be Used with 25 mm x 75 mm and 1" x 3" Slides

| Part Number | Description | Price | Availability |
|---|---|---|---|
| MLS203P2 | Slide/Petri Dish Holder for Inverted Microscopes | $509.12 | Today |
| C4SH01 | Four-Position Microscope Slide Holder | $89.84 | Today |
| MLS203P10 | Multiple Slide Holder for Upright and Inverted Microscopes | $521.30 | Today |
| MLS203P11 | Recessed Slide Holder for Upright Microscopes | $446.99 | Lead Time |

## General Accessory Plates for MLS203 Stages

These accessory plates can also be mounted on rigid stands for flexible positioning around the light path.

**MLS203P1 Multiwell Plate Adapter**



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- Compatible with C4SH01 and Standard Well Plates
- Clip Holder to Secure Samples in Place

**MLS203P3 Blank Adapter Plate**



Click to Enlarge

- Ideal for Custom or Non-Standard Applications
- Easily Drilled and Tapped

**MLS203P4 and MLS203P5 Breadboard**



Click to Enlarge

- 35 Imperial or Metric Taps
- MLS203P4: M6 Taps on 25 mm Centers
- MLS203P5: 1/4"-20 Taps on 1" Centers

**Application Example 1**



Click to Enlarge
MLS203 Stage with MLS203P1 Multiwell Plate Adapter Fitted

**Application Example 2**



Click to Enlarge
MLS203 Stage with MLS203P3 Blank Adapter Plate Fitted

**Application Example 3**



Click to Enlarge
MLS203 Stage with MLS203P4 Breadboard Fitted

| Part Number | Description | Price | Availability |
|---|---|---|---|
| MLS203P4 | Metric M6 Breadboard Plate | $226.27 | Today |
| MLS203P1 | Multiwell Plate Adapter | $452.54 | 7-10 Days |
| MLS203P3 | Blank Adapter Plate | $169.70 | 7-10 Days |
| MLS203P5 | Imperial 1/4"-20 Breadboard Plate | $226.27 | Today |

## 2-Axis Joystick Console

- ▶ Speed Adjustment for Fast or High Precision Moves
- ▶ Speed Dial for Sensitivity Adjustment
- ▶ Ergonomic Design
- ▶ High-Quality Machined Anodized Aluminum Casing
- ▶ High-Reliability Hall Effect Joystick

The MJC001 Joystick Console has been designed for microscope users and provides intuitive, tactile, manual positioning of a stage. The console features a two-axis joystick for XY control. In most applications, the default parameter settings saved within the controller allow the joystick to be used out-of-the-box with no need for further setup. This operation mode eliminates the need for connection to a host PC and allows for true remote operation.

The MJC001 is compatible with our Benchtop Brushless Controllers, Rack-Mounted Brushless Controller, and Stepper Motor Controllers. The joystick is shipped complete with cables for use with these controllers. If you intend to use the joystick with a legacy BBD10x series unit, please contact Tech Support for a compatible cable.

| Part Number | Description | Price | Availability |
|---|---|---|---|
| MJC001 | 2-Axis Microscopy Joystick Console | $1,125.81 | Today |

THORLABS MLS203P11