

MT3/M-Z8 - November 13, 2023

Item # MT3/M-Z8 was discontinued on November 13, 2023. For informational purposes, this is a copy of the website content at that time and is valid only for the stated product.

12 mm (0.47") MOTORIZED TRANSLATION STAGES

- 12 mm (0.47") of Travel per Axis
- 1/4"-20 or M6 Tapped Holes for Mounting Standard Optomechanics
- Sold in Single-Axis and XYZ Configurations



MT1-Z8
1-Axis Stage

MT401

Breadboard Mounting Adapter



MT405

Side-Mounted Actuator Adapter



MT3-Z8
3-Axis Stage

OVERVIEW

Features

- 12 mm (0.47") Travel Range
- Carriage Contains Seven 1/4"-20 (M6) Taps
- Locking Screw Holds Stage in Place
- Adapters Available for Breadboard Mounting and XY, XZ, and XYZ Arrangements
- DC Servo Motor Actuator

| Motorized Linear Translation Stages | |
|-------------------------------------|--------------------|
| 12 mm | Standard |
| 25 mm | Compact |
| | Standard |
| | TravelMax |
| 50 mm | Compact |
| | Direct-Drive Servo |
| | TravelMax |
| Long Travel: 100 mm to 300 mm | |

Thorlabs' Motorized Translation Stages provide electronically controlled linear motion along a well-defined axis. The MT1-Z8 (MT1/M-Z8) Single-Axis Stage provides 12 mm (0.47") of travel along one axis, while the MT3-Z8 (MT3/M-Z8) Three-Axis Stage provides travel in three dimensions. Each stage is equipped with a 1.00" x 1.00" (25.0 mm x 25.0 mm) tapped hole matrix that includes seven 1/4"-20 (M6) taps for compatibility with standard optomechanics.

Key Specifications^a

| | |
|--|-----------------------------|
| Travel Range | 12 mm (0.47") |
| Velocity (Max)^b | 2.6 mm/s |
| Min Achievable Incremental Movement^c | 0.05 μ m |
| Bidirectional Repeatability^d | 1.5 μ m |
| Backlash^e | <8 μ m |
| Horizontal Load Capacity (Max) | 20 lbs (9 kg) |
| Vertical Load Capacity (Max) | 10 lbs (4.5 kg) |
| Included Actuator | Z812B ^f DC Motor |
| Cable Length | 500 mm (1.64 ft) |
| Recommended Controller | KDC101 |

- a. Please see the *Specs* tab for a complete specifications list.
- b. At 2.6 mm/sec, velocity ripple and distortion of the acceleration/deceleration profile may occur. For improved control, the max velocity should be limited to 2.3 mm/sec.
- c. The measured minimum incremental motion that the stage can achieve, also referred to as the minimum step size.

The moving platform contains holes for alignment pins that ensure orthogonality when the stage is stacked with other stages or connected to our accessories. Horizontal loads of 20 lbs (9 kg) and vertical loads of 10 lbs (4.5 kg) are supported by the actuator's inline 67.49:1 planetary gear head. The stages feature hardened steel linear bearings for precision motion and long life.

Mounting Adapters and Stage Combinations

Thorlabs' adapter plates and brackets provide a convenient way to mount the MT1-Z8 on an optical table or breadboard; to allow several stages to be combined in XY, XZ, or XYZ configurations; and to reduce the overall length of the stage by repositioning the stage's actuator. Photos of these adapters in use are shown below.

Included and Compatible Actuators

The included Z812B* DC Servo Actuator features a 500 mm (1.64 ft) cable length, an internal limit switch to prevent travel outside of the intended range, and an encoder that provides 29 nm resolution (see the *Specs* tab for additional details). This actuator attaches to the stage using a flexure clamp that tightens around the Ø3/8" barrel. If desired, the Z812B actuator can be replaced by any manual or motorized 12 mm (0.47") actuator that includes a Ø3/8" barrel, including stepper motor actuators and manual micrometers.

Controller Options

For low-power stages such as the MT1-Z8 (MT1/M-Z8), Thorlabs recommends the KDC101 DC Servo Motor Controller. Each KDC101 provides control for a single axis, with or without a PC. It is bundled with Thorlabs' Kinesis® software, which supplies out-of-the-box stage control from a PC and enables support for common programming interfaces like LabVIEW, LabWindows, and ActiveX. A USB cable is included with the KDC101. Power supplies are sold separately; options are listed below.

*This previous generation actuator is no longer available for individual sale. If a replacement is required, the Z912B actuator can be used.

- d. The average of the repeatability when a set position is approached from both directions.
- e. When a stage is moved to a position and then returned to its original position, some motion is lost due to the lead screw mechanism. This loss is known as backlash.
- f. This previous generation actuator is no longer available for individual sale. If a replacement is required, the Z912B actuator can be used.

S P E C S

| Motor Specifications | |
|--|------------------------------|
| Motor Type | DC Servo |
| Cable Length | 500 mm (1.64 ft) |
| Motor Drive Voltage ^a | 6 VDC |
| Feedback | Motor-Mounted Rotary Encoder |
| Encoder Counts per Lead Screw Revolution | 34,555 |
| Planetary Gear Head Ratio | 67.49:1 |

- a. The nominal motor drive voltage is 6 V. Voltages up to 12 V can be used with pulse width modulation (PWM) controlled outputs.

Resolution Calculation

For the Z812B* Actuator, there are 512 encoder counts per revolution of the motor. The output shaft of the motor goes into a 67.49:1 planetary gear head. This requires the motor to rotate 67.49 times to rotate the 1.0 mm pitch lead screw one revolution. The end result is the lead screw advances by 1.0 mm.

The linear displacement of the actuator per encoder count is given by

$$512 \times 67.49 = 34,555 \text{ encoder counts per revolution of the lead screw,}$$

whereas the linear displacement of the lead screw per encoder count is given by

$$1.0 \text{ mm} / 34,555 \text{ counts} = 2.9 \times 10^{-5} \text{ mm (29 nm).}$$

*This previous generation actuator is no longer available for individual sale. If a

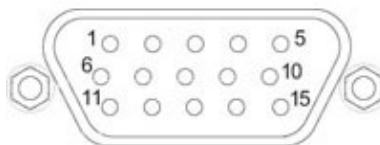
replacement is required, the Z912B actuator can be used.

| Stage Specifications | |
|--|--|
| Translation | |
| Travel Range | 12 mm (0.47") |
| Bidirectional Repeatability ^a | 1.5 μm |
| Backlash ^b | <8 μm |
| Min Achievable Incremental Movement ^c | 0.05 μm |
| Min Repeatable Incremental Movement ^d | 0.2 μm |
| Home Location Accuracy | $\pm 1 \mu\text{m}$ |
| Resolution | 29 nm (See Calculation at Right) |
| Motion Parameters | |
| Velocity (Max) ^e | 2.6 mm/sec |
| Velocity Stability | $\pm 0.125 \text{ mm/s}$ |
| Acceleration (Max) | 4 mm/s^2 |
| Load Capacity | |
| Vertical Load | Recommended ^f : <3 kg (<6.6 lbs) Max: 4.5 kg (10 lbs) |
| Horizontal Load | Recommended ^f : <7.5 kg (<16.5 lbs) Max: 9 kg (20 lbs) |
| Orthogonality | |
| Pitch | 0.006° (105 μrad) |
| Yaw | 0.013° (227 μrad) |
| Absolute On-Axis Accuracy | 95 μm |
| Percentage Accuracy (Max) | 0.82% |
| Physical | |
| Dimensions | 7.70" x 2.41" x 0.81" (195.7 mm x 61.2 mm x 20.6 mm) |

- The average of the repeatability when a set position is approached from both directions.
- When a stage is moved to a position and then returned to its original position, some motion is lost due to the lead screw mechanism. This loss is known as backlash.
- The measured minimum incremental motion that the stage can achieve, also referred to as the minimum step size.
- The minimum incremental motion that the stage can repeatedly achieve within its standard error.
- At 2.6 mm/sec, velocity ripple and distortion of the acceleration/deceleration profile may occur. For improved control, the max velocity should be limited to 2.3 mm/sec.
- Under Continuous Use

PIN DIAGRAM

Z812B* Connector Pin Out D-Type Male



| Pin | Description | Pin | Description |
|-----|-------------------------|--------|-------------------------|
| 1 | Ground (Limit and Vcc) | 8 | Reserved for Future Use |
| 2 | Forward Limit | 9 | Ident Resistor |
| 3 | Reverse Limit | 10 | Vcc (5 V DC) |
| 4 | Reserved For Future Use | 11 | Encoder Channel A |
| 5 | Motor (-) | 12 | Reserved for Future Use |
| 6 | Reserved For Future Use | 13 | Encoder Channel B |
| 7 | Motor (+) | 14, 15 | Reserved for Future Use |

*This previous generation actuator is no longer available for individual sale. If a replacement is required, the Z912B actuator can be used.

MOTION CONTROL SOFTWARE

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).

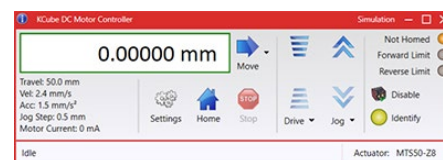
The Kinesis Software features .NET controls which can be used by 3rd party developers working in the latest C#, Visual Basic, LabVIEW[™], or any .NET compatible languages to create custom applications. Low-level DLL libraries are included for applications not expected to use the .NET framework. A Central 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.

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.

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.



Kinesis GUI Screen



APT GUI Screen

Software

Kinesis Version 1.14.44

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

Also Available:

- Communications Protocol

Software

APT Version 3.21.6

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

Also Available:

- Communications Protocol

Software Software 

APT TUTORIALS

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-independent 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, HPVVEE 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 - Part 1: Accessing Online Help](#) [APT Programming Using LabVIEW - Part 2: Creating an ActiveX Control](#) [APT Programming Using LabVIEW - Part 3: Create an ActiveX Method](#)

[APT Programming Using LabVIEW - Part 4: Create an ActiveX Property](#) [APT Programming Using LabVIEW - 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 - Create an ActiveX Method (Alternative) APT Programming Using LabVIEW - 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.







MOTORIZED LINEAR STAGES

Motorized Linear Translation Stages

Thorlabs' motorized linear translation stages are offered in a range of maximum travel distances, from a stage with 20 μm of piezo translation to our 600 mm direct drive stage. Many of these stages can be assembled in multi-axis configurations, providing XY or XYZ translation. For fiber coupling applications, please see our multi-axis stages, which offer finer adjustment than our standard motorized translation stages. In addition to motorized linear translation stages, we offer motorized rotation stages and goniometers. We also offer manual translation stages.






Piezo Stages

These stages incorporate piezoelectric elements in a variety of drive mechanisms. ORIC[®] stages incorporate piezo inertia drives that use "stick-slip" friction properties to obtain extended travel ranges. Our Nanoflex[™] translation stages use standard piezo chips along with manual actuators. Elliptec[®] stages use resonant piezo motors to push and pull the moving platform through resonant elliptical motion. Our LPS710E z-axis stage features a mechanically amplified piezo design and includes a matched controller.

| Piezoelectric Stages | | | | | | |
|------------------------------|---|---|---|--|---|---|
| Product Family | ORIC [®] PD2 Open-Loop 5 mm Stage | ORIC [®] PDX2 Closed-Loop 5 mm Stage | ORIC [®] PD1 Open-Loop 20 mm Stage | ORIC [®] PD1D Open-Loop 20 mm Monolithic XY Stage | ORIC [®] PDX1 Closed-Loop 20 mm Stage | ORIC [®] PD3 Open-Loop 50 mm Stage |
| Click Photo to Enlarge |  |  |  |  |  |  |
| Travel | 5 mm | | 20 mm | | | 50 mm |
| Maximum Velocity | 10 mm/s ^a | 8 mm/s (Typ.) ^b | 3 mm/s ^c | | 20 mm/s ^b | 10 mm/s ^a |
| Drive Type | Piezoelectric Inertia Drive | | | | | |
| Possible Axis Configurations | X, XY, XYZ | | X, XY, XYZ | XY, XYZ | X, XY, XYZ | X, XY, XYZ |
| Mounting Surface Size | 13 mm x 13 mm | | 30 mm x 30 mm | | | 80 mm x 30 mm |
| Additional Details | | | | | | |








a. Specified using PDXC and PDXC2 Benchtop Controllers. For performance when controlled with a KIM001 or KIM101 K-Cube Controller, see the Specs tab of the PD2 or PD3 stage presentation.

- b. Specified using PDXC and PDXC2 Benchtop
- c. Controllers. Specified using KIM101 K-Cube Controller.

| Piezoelectric Stages | | | | | |
|------------------------------|---|---|---|---|---|
| Product Family | Nanoflex™ 20 µm Stage with 5 mm Actuator | Nanoflex™ 25 µm Stage with 1.5 mm Actuator | Elliptec® 28 mm Stage | Elliptec® 60 mm Stage | LPS710E 1.1 mm Vertical Stage |
| Click Photo to Enlarge |  |  |  |  |  |
| Travel | 20 µm + 5 mm Manual | 25 µm + 1.5 mm Manual | 28 mm | 60.0 mm | 1.1 mm |
| Maximum Velocity | - | | 180 mm/s | 90 mm/s | - |
| Drive Type | Piezo with Manual Actuator | | Resonant Piezoelectric Motor | | Amplified Piezo |
| Possible Axis Configurations | X, XY, XYZ | | X | | Z |
| Mounting Surface Size | 75 mm x 75 mm | 30 mm x 30 mm | 15 mm x 15 mm | | 21 mm x 21 mm |
| Additional Details | | | | | |

Stepper Motor Stages





These translation stages feature removable or integrated stepper motors and long travel ranges up to 300 mm. The MLJ150 stage also offers high load capacity vertical translation. The other stages can be assembled into multi-axis configurations.





| Stepper Motor Stages | | | | | | | |
|------------------------------|---|---|---|--|---|---|---|
| Product Family | LNR Series 25 mm Stage | LNR Series 50 mm Stage | NRT Series 100 mm Stage | NRT Series 150 mm Stage | LTS Series 150 mm Stage | LTS Series 300 mm Stage | MLJ150 50 mm Vertical Stage |
| Click Photo to Enlarge |  |  |  |  |  |  |  |
| Travel | 25 mm | 50 mm | 100 mm | 150 mm | 150 mm | 300 mm | 50 mm |
| Maximum Velocity | 2.0 mm/s | 50 mm/s | 30 mm/s | | 50 mm/s | | 3.0 mm/s |
| Possible Axis Configurations | X, XY, XYZ | X, XY, XYZ | X, XY, XYZ | | X, XY, XYZ | | Z |
| Mounting Surface Size | 60 mm x 60 mm | 100 mm x 100 mm | 84 mm x 84 mm | | 100 mm x 90 mm | | 148 mm x 131 mm |
| Additional Details | | | | | | | |

DC Servo Motor Stages

Thorlabs offers linear translation stages with removable or integrated DC servo motors. These stages feature low profiles and many can be assembled in multi-axis configurations.






| DC Servo Motor Stages | | | | |
|-----------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| Product Family | MT Series 12 mm Stages | PT Series 25 mm Stages | MTS Series 25 mm Stage | MTS Series 50 mm Stage |
| | | | | |

| | | | | |
|------------------------------|---|---|---|---|
| Click Photo to Enlarge |  |  |  |  |
| Travel | 12 mm | 25 mm | 25 mm | 50 mm |
| Maximum Velocity | 2.6 mm/s | | 2.4 mm/s | |
| Possible Axis Configurations | X, XY, XYZ | | X, XY, XYZ | |
| Mounting Surface Size | 61 mm x 61 mm | 101.6 mm x 76.2 mm | 43 mm x 43 mm | |
| Additional Details | | | | |

| DC Servo Motor Stages | | | | |
|------------------------------|---|---|---|---|
| Product Family | M30 Series 30 mm Stage | M30 Series 30 mm Monolithic XY Stage | M150 Series 150 mm XY Stage | KVS30 30 mm Vertical Stage |
| Click Photo to Enlarge |  |  |  |  |
| Travel | 30 mm | | 150 mm | 30 mm |
| Maximum Velocity | 2.4 mm/s | | X-Axis: 170 mm/s Y-Axis: 230 mm/s | 8.0 mm/s |
| Possible Axis Configurations | X, Z | XY, XZ | XY | Z |
| Mounting Surface Size | 115 mm x 115 mm | | 272.4 mm x 272.4 mm | 116.2 mm x 116.2 mm |
| Additional Details | | | | |

Direct Drive Stages

These low-profile stages feature integrated brushless DC servo motors for high speed translation with zero backlash. When no power is applied, the platforms of these stages have very little inertia and are virtually free running. Hence these stages may not be suitable for applications where the stage's platform needs to remain in a set position when the power is off. We do not recommend mounting these stages vertically.

| Direct Drive Stages | | | | | |
|------------------------------|---|---|--|---|---|
| Product Family | DDS Series 50 mm Stage | DDS Series 100 mm Stage | DDS Series 220 mm Stage | DDS Series 300 mm Stage | DDS Series 600 mm Stage |
| Click Photo to Enlarge |  |  |  |  |  |
| Travel | 50 mm | 100 mm | 220 mm | 300 mm | 600 mm |
| Maximum Velocity | 500 mm/s | | 300 mm/s | 400 mm/s | 400 mm/s |
| Possible Axis Configurations | X, XY | | X, XY | X | X |
| Mounting Surface Size | 60 mm x 52 mm | | 88 mm x 88 mm | 120 mm x 120 mm | |
| Additional Details | | | | | |

12 mm (0.47") Motorized Translation Stages



- Single-Axis and Three-Axis Versions
- Z812B* DC Servo Actuator Provides 12 mm (0.47") Travel per Axis
- Includes Two Alignment Pins per Axis for Stage Stacking and Mounting Accessories
- Controller and Power Supply Sold Separately

Thorlabs' MT1-Z8 (MT1/M-Z8) Single-Axis and MT3-Z8 (MT3/M-Z8) Three-Axis Motorized Translation Stages provide linear, orthogonal

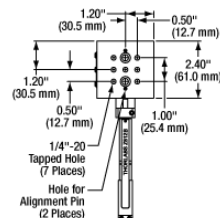
motion in one or three dimensions. Seven 1/4"-20 (M6) tapped holes allow easy integration with a wide variety of common optomechanical setups. The stages feature hardened steel linear bearings for precision motion and long life.

The MT1-Z8 stage is designed for single-axis translation. For applications requiring XY motion, simply purchase two MT1-Z8 stages and stack them using the provided alignment pins to ensure orthogonality. If XYZ motion is desired, then we recommend the MT3-Z8 stage. In addition to alignment pins for all three axes, the MT3-Z8 includes an MT401 Base Plate and an MT402 Right-Angle Bracket. For more details on these accessories, please read below.

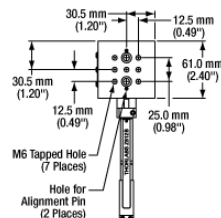
Each axis requires a standalone controller unit and power supply to operate. For this purpose, we recommend our KDC101 K-Cube™ Motor Controller, which is described in more detail below.

The motor cable that is built into the Z812B actuator is 0.5 m (1.64 ft) long. If more length is required for your application, we recommend our PAA632 Extension Cable, which provides an additional 2.5 m (8.20 ft). It is sold at the bottom of this page.

*This previous generation actuator is no longer available for individual sale. If a replacement is required, the Z912B actuator can be used.



Click to Enlarge Schematic of Imperial Single-Axis Stage



Click to Enlarge Schematic of Metric Single-Axis Stage

| Part Number | Description | Price | Availability |
|-------------|--|------------|--------------|
| MT1/M-Z8 | 12 mm (0.47") One-Axis Motorized Translation Stage, M6 Taps | \$999.25 | Lead Time |
| MT3/M-Z8 | 12 mm (0.47") Three-Axis Motorized Translation Stage, M6 Taps | \$3,057.15 | Today |
| MT1-Z8 | 12 mm (0.47") One-Axis Motorized Translation Stage, 1/4"-20 Taps | \$999.25 | Lead Time |
| MT3-Z8 | 12 mm (0.47") Three-Axis Motorized Translation Stage, 1/4"-20 Taps | \$3,057.15 | Today |

Base Plate for Breadboards and Optical Tables



- Mount an MT1(/M)-Z8 Single-Axis Stage to a Breadboard or Optical Table
- Four 1/4"-20 (M6) Mounting Holes
- Alignment Holes Ensure Parallelism
- Contains Four 1/4" (M6) Counterbored Slots

The MT401(/M) Base Plate is ideal for securing the stages sold above to an optical table or breadboard when counterbores in the middle of the stages are obstructed. This base plate provides mounting flanges with 1" (25 mm) centers. For a single-axis stage, the base plate allows an attached stage to be mounted on a

breadboard without having to disassemble a setup that already exists on the moving platform in order to access the mounting holes.

Two 1/4"-20 cap screws (3/16" hex) or two M6 cap screws (5 mm hex) are included with the MT401 imperial or MT401/M metric base plate, respectively, for mounting an MT stage. The two alignment pins included with the MT1(/M)-Z8 stage fit into the stage and base plate, ensuring that the translation axis is parallel to the plate.



Click to Enlarge Two Stacked MT1-Z8 Single-Axis Stages Mounted to a Breadboard via an MT401 Base Plate

| Part Number | Description | Price | Availability |
|-------------|---|---------|--------------|
| MT401/M | Customer Inspired! Base Plate for MT Series Translation Stages, M6 Mounting Holes | \$26.36 | Today |
| MT401 | Base Plate for MT Series Translation Stages, 1/4"-20 Mounting Holes | \$26.36 | Today |

Right-Angle Bracket

- Vertically Mount an MT1-Z8 Translation Stage



MT402

- Designed for XY, XZ, or XYZ Configurations
- Alignment Holes Ensure Orthogonality
- Includes All Necessary Mounting Hardware for Imperial and Metric Setups

The MT402 Right-Angle Bracket orients an MT1-Z8 (MT1/M-Z8) Single-Axis Stage in the vertical plane and allows for the construction of XY, XZ, or XYZ arrangements. This angle bracket is pre-drilled and includes four 1/4"-20 screws (3/16" hex) and four M6 screws (5 mm hex) for compatibility with both imperial and metric

setups. Balldrivers and hex keys are sold separately here. This bracket is included with the purchase of an MT3-Z8 (MT3/M-Z8) Three-Axis Stage.

To begin the assembly process, insert the two alignment pins provided with the MT1-Z8 stage into the stage's alignment holes. Then position the bracket's alignment holes above the pins. The bracket can be fastened down using two 1/4"-20 (M6) cap screws. At this point, the bracket's vertical mounting surface will accommodate a stage that is attached horizontally (for XY configurations) or vertically (for XZ or XYZ configurations). For details, please see the XYZ Assembly tab on the MT1 Manual Translation Stages page; this page shows different actuators, but the assembly process is otherwise identical.



Click to Enlarge Three MT1-Z8 Single-Axis Stages Mounted into an XYZ Configuration via an MT402 Right-Angle Bracket

| Part Number | Description | Price | Availability |
|-------------|--|---------|--------------|
| MT402 | Right-Angle Bracket for MT Series Translation Stages | \$58.82 | Today |

Side-Mounted Actuator Adapter



MT405

- Reduce the Total Length of the MT1-Z8 Stage
- Four 4-40 Mounting Screws Included

The MT405 Side-Mounted Actuator Adapter allows the actuator to be repositioned from the rear of the stage to the side, as shown in the image on the right. The adapter attaches to the side of the stage that does not contain the locking screw and plate. This reduces the overall length of the stage assembly by 1.2" (30 mm), while increasing the width by 0.71" (18 mm).



Click to Enlarge An MT405 adapter is used to reduce to total length of the MT1-Z8 stage.

| Part Number | Description | Price | Availability |
|-------------|--|---------|--------------|
| MT405 | Side-Mounted Actuator Adapter for MT Series Translation Stages | \$66.11 | Today |

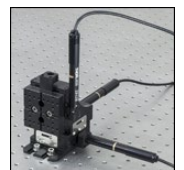
Adapter Plate for Flexure Stage Accessories



MT406

- Use Flexure Stage Accessories with an MT1-Z8 Stage
- Includes Two Alignment Pins that Ensure Parallelism
- Two 1/4"-20 (M6) Cap Screws Provided

The MT406(M) Flexure Stage Accessories Adapter Plate is compatible with our full range of flexure stage accessories and is ideal for creating basic fiber coupling solutions. It fastens directly to the top of the MT1-Z8 (MT1/M-Z8) stage with two 1/4"-20 (M6) cap screws and contains twenty-eight 6-32 (M3) taps.



Click to Enlarge Vertically Mounted MT406 Flexure Stage Accessories Plate

| Part Number | Description | Price | Availability |
|-------------|---|---------|--------------|
| MT406/M | Flexure-Stage-Accessories Plate for MT Series Translation Stages, M3 Taps | \$45.44 | Today |
| MT406 | Flexure-Stage-Accessories Plate for MT Series Translation Stages, 6-32 Taps | \$45.44 | Today |

K-Cube™ DC Servo Motor Controller

- Front Panel Velocity Wheel and Digital Display for Controlling Motorized Stages or Actuators



- Two Bidirectional Trigger Ports to Read or Control External Equipment
- Interfaces with Computer Using Included USB Cable
- Fully Compatible with Kinesis® or APT™ Software Packages
- Compact Footprint: 60.0 mm x 60.0 mm x 49.2 mm (2.42" x 2.42" x 1.94")
- Power Supply Not Included (See Below)

Thorlabs' KDC101 K-Cube Brushed DC Motor Controller provides local and computerized control of a single motor axis. It features a top-mounted control panel with a velocity wheel that supports four-speed bidirectional control with forward and reverse jogging as well as position presets. A backlit digital display is also included that can have the backlit dimmed or turned off using the top-panel menu options. The front of the unit contains two bidirectional trigger ports that can be used to read a 5 V external logic signal or output a 5 V logic signal to control external equipment. Each port can be independently configured.

The unit is fully compatible with our new Kinesis software package and our legacy APT control software. Please see the *Motion Control Software* tab for more information.

Please note that this controller does not ship with a power supply. Compatible power supplies are listed below. Additional information can be found on the main KDC101 DC Servo Motor Controller page.



Click to Enlarge
KCH601 USB Controller Hub (Sold Separately) with Installed K-Cube and T-Cube™ Modules (T-Cubes Require the KAP101 Adapter)

| Part Number | Description | Price | Availability |
|-------------|--|----------|--------------|
| KDC101 | K-Cube Brushed DC Servo Motor Controller (Power Supply Not Included) | \$757.51 | Today |

Compatible Power Supplies



- Individual Power Supply
 - KPS201: For K-Cubes™ or T-Cubes™ with 3.5 mm Jacks
- USB Controller Hubs Provide Power and Communications
 - KCH301: For up to Three K-Cubes or T-Cubes
 - KCH601: For up to Six K-Cubes or T-Cubes

The KPS201 power supply outputs +15 VDC at up to 2.66 A and can power a single K-Cube or T-Cube with a 3.5 mm jack. It plugs into a standard wall outlet.



Click to Enlarge
The KPS201 Power Supply Unit



Click for Details
Each KPS201 power supply includes one region-specific adapter, which can be selected upon checkout.

The KCH301 and KCH601 USB Controller Hubs each consist of two parts: the hub, which can support up to three (KCH301) or six (KCH601) K-Cubes or T-Cubes, and a power supply that plugs into a standard wall outlet. The hub draws a maximum current of 10 A; please verify that the cubes being used do not require a total current of more than 10 A. In addition, the hub provides USB connectivity to any docked K-Cube or T-Cube through a single USB connection.

For more information on the USB Controller Hubs, see the full web presentation.

| Part Number | Description | Price | Availability |
|-------------|--|----------|--------------|
| KPS201 | 15 V, 2.66 A Power Supply Unit with 3.5 mm Jack Connector for One K- or T-Cube | \$39.54 | Today |
| KCH301 | USB Controller Hub and Power Supply for Three K-Cubes or T-Cubes | \$586.89 | Today |
| KCH601 | USB Controller Hub and Power Supply for Six K-Cubes or T-Cubes | \$710.31 | Today |

Motor Extension Cable



The PAA632 Extension Cable provides an additional 2.5 m (8.20 ft) of cable length for the 15-pin D-type connectors used throughout our motorized actuator selection. The male end connects to the controller, while the female end connects to the motor.

| Part Number | Description | Price | Availability |
|-------------|--|---------|--------------|
| PAA632 | APT DC Servo Motor Cable for Z8 and Z9 Motors, DE15 Male to DE15 Female, 2.5 m | \$64.64 | Today |