

MTS50/M-Z8E - March 15, 2016

Item # MTS50/M-Z8E was discontinued on March 15, 2016. For informational purposes, this is a copy of the website content at that time and is valid only for the stated product.

50 MM (1.97") COMPACT MOTORIZED TRANSLATION STAGE

- ▶ 50 mm (1.97") of Travel in a Low-Profile Package
- ▶ 8-32 (M4) and 4-40 (M3) Tapped Holes
- ▶ Mounting Adapters for Breadboards, Multi-Axis Motion, and 60 mm Cage Systems



[Hide Overview](#)

OVERVIEW

Features

- 50 mm (1.97") Travel Range
- Carriage Contains One Centered 8-32 (M4) Tap and Eighteen 4-40 (M3) Taps
- Low-Profile Package Combines Actuator and Moving Platform
- DC Servo Motor Actuator
- Several Mounting Adapters Available
 - Base Plate for Breadboard Mounting
 - Mounting Adapter Plate for Standard Optical Accessories, Provides Seven 1/4"-20 (M6) and Six 8-32 (M4) Tapped Holes
 - XY Mounting Adapter
 - Right-Angle Bracket for Vertical Mounting
 - Adapter for 60 mm Cage Systems

Thorlabs' MTS50-Z8 (MTS50/M-Z8) Motorized Translation Stage features 50 mm (1.97") of electronically controlled linear travel along a well-defined axis. Each stage is equipped with a 1.50" x 1.50" (37.5 mm x 37.5 mm) tapped hole matrix that includes eighteen 4-40 (M3) taps and a centered 8-32 (M4) tap. By integrating the moving platform with the actuator, the overall package size is greatly reduced relative to other motorized stages like the LNR50S(M) Motorized Stage.

Key Specifications^a

Key Specifications ^a	
Travel Range	50 mm (1.97")
Velocity (Max)	2.4 mm/s
Min Achievable Incremental Movement^b	0.05 μm
Bidirectional Repeatability^c	1.6 μm
Backlash^d	<6 μm
Horizontal Load Capacity (Max)	25 lbs (12 kg)
Vertical Load Capacity (Max)	10 lbs (4.5 kg)
Included Actuator	Built-In DC Servo
Cable Length	500 mm (1.64 ft)
Recommended Controller	KDC101

- Please see the Specs tab for a complete specifications list.
- The measured minimum incremental motion that the stage can achieve, also referred to as the minimum step size.
- 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

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 25 lbs (12 kg) and vertical loads of 10 lbs (4.5 kg) are supported by the 67:1 planetary gear head. A built-in Hall Effect encoder provides 29 nm resolution (see the *Specs* tab for additional details). Backlash loss is known as backlash.

The translation mechanism, based upon a dual set of linear rails with continuously recirculating ball bearings, provides smooth, low-friction movement. Built-in limit switches prevent travel outside of the intended range, regardless of the control interface being used.

Mounting Adapters and Stage Combinations

Thorlabs' adapter plates and brackets provide a convenient way to mount the MTS50-Z8 on an optical table or breadboard; to install a motor along the optical axis of our 60 mm cage systems; and to allow several stages to be combined in XY, XZ, or XYZ configurations. A multi-hole adapter plate is also available that offers seven 1/4"-20 (M6) and six 8-32 (M4) tapped holes, providing more options when mounting standard optical accessories to the top platform. Our MTS25-Z8 25 mm (0.98") Motorized Translation Stage can also be combined with the MTS50-Z8 in certain arrangements. All these uses are described in greater detail below.

Controller Options

For low-power stages such as the MTS50-Z8, Thorlabs recommends the KDC101 DC Servo Motor Controller, sold separately below. Alternatively, we offer the MTS50-Z8E bundle, which includes the MTS50-Z8 translation stage, the former generation TDC001 DC Servo Controller, and a power supply at a significant savings over ordering these items separately.

The 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.

Thorlabs also manufactures the LNR50S(/M) Motorized Stage, which features a larger mounting surface for even more flexibility.

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	

Motor Specifications

Motor Type	DC Servo
Cable Length	0.5 m (1.6 ft)
Motor Drive Voltage	6 V
Feedback	Hall Effect Encoder
Encoder Counts per Lead Screw Revolution	34,304
Terminal Resistance	32.7 Ω
Output Power	0.36 W
Efficiency	65%
No Load Speed	6560 rpm
No Load Current	7.43 mA
Stall Torque	1.54 mN·m
Friction Torque	0.03 mN·m
Speed Constant	1140 rpm/V
Back EMF Constant	0.705 mV/rpm
Torque Constant	8.38 mN·m/A
Current Constant	0.149 A/mN·m
Rotor Inductance	310 μ H

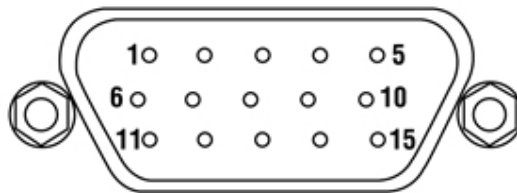
Stage Specifications

Translation	
Travel Range	50 mm (1.97")
Bidirectional Repeatability ^a	1.6 µm
Backlash ^b	<6 µm
Min Achievable Incremental Movement ^c	0.05 µm
Min Repeatable Incremental Movement ^d	0.8 µm
Home Location Accuracy	±4.0 µm
Resolution	29 nm (See Calculation Below)
Motion Parameters	
Max Velocity	2.4 mm/sec
Velocity Stability	±0.25 mm/sec
Acceleration (Max)	4.5 mm/sec ²
Load Capacity	
Vertical Load	Recommended ^e : <4.0 kg (<8.8 lbs) Max: 4.5 kg (10 lbs)
Horizontal Load	Recommended ^e : <10 kg (<22 lbs) Max: 12 kg (25 lbs)
Straightness	
Pitch	0.05° (873 µrad)
Yaw	0.06° (1047 µrad)
Absolute On-axis Accuracy	290 µm
Percentage Accuracy (Max)	0.7%
Physical	
Dimensions	6.33" x 1.69" x 0.87" (160.8 mm x 42.9 mm x 22.1 mm)
Weight	0.34 kg (0.75 lb)

- a. The average of the repeatability when a set position is approached from both directions.
- b. 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.
- c. The measured minimum incremental motion that the stage can achieve, also referred to as the minimum step size.
- d. The minimum incremental motion that the stage can repeatedly achieve within its standard error.
- e. Under Continuous Use

PIN DIAGRAM

Motor Connector Pin Out D-Type Male



Pin	Description	Pin	Description
1	Ground/Return	9	Ident
2	Forward Limit Switch	10	Vcc
3	Reverse Limit Switch	11	Encoder A
4	Not Connected	12	Not Connected
5	Motor -	13	Encoder B
6	Not Connected	14	Not Connected
7	Motor +	15	Braid/Screen
8	Not Connected		

[Hide Motion Control Software](#)

MOTION CONTROL SOFTWARE

Thorlabs offers two platforms to drive our wide range of motion controllers: our legacy APT™ (Advanced Positioning Technology) software package or the new Kinesis software package. Either package can be used to control devices in the APT or 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).

Our legacy APT System Software platform is available by clicking on the link below. It features 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.

The Kinesis Software features new .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.

By providing these common software platforms, Thorlabs has ensured that users can easily mix and match any of the APT and 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.



APT GUI Screen

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 are 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, which are also available on the software CD included with the controllers.

Software

APT Version 3.12.0

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

Also Available:

- [Communications Protocol Software](#)

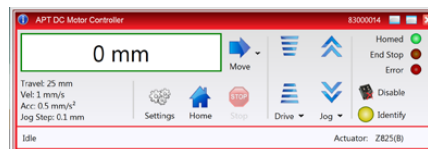
Software

Kinesis Version 1.4.0

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

Also Available:

- [Communications Protocol Software](#)



Kinesis GUI Screen

[Hide APT Tutorials](#)

APT TUTORIALS

These videos illustrate some of the basics of using the APT System Software from both a non-programming and a programming point of view. There are videos that illustrate usage of the supplied APT utilities that allow immediate control of the APT controllers out of the box. There are also a number of videos that explain the basics of programming custom software applications using Visual Basic, LabView and Visual C++. Watch the videos now to see what we mean.



[Click here to view the video tutorial](#)



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



Click here to view the LabView guide



[Hide Selection Guide](#)

SELECTION GUIDE

The table below compares the key specifications of our 50 mm (1.97") linear translation stages. Additional specifications are listed in the *Specs* tab on the webpage of the particular stage.

Item #	MTS50-Z8 (MTS50/M-Z8)	LNR50S(M)	LNR50SE(M)
Travel Range	50 mm (1.97")	50 mm (1.97")	50 mm (1.97")
Min Achievable Incremental Movement	0.1 μm	0.05 μm^a	0.05 μm^a
Min Repeatable Incremental Movement	0.8 μm	1 μm	0.1 μm
Bidirectional Repeatability	1.6 μm	0.5 μm	0.3 μm
Backlash	<6 μm	<6 μm	<6 μm
Horizontal Load Capacity (Max)	25 lbs (12 kg)	55 lbs (25 kg)	55 lbs (25 kg)
Vertical Load Capacity (Max)	10 lbs (4.5 kg)	22 lbs (10 kg)	22 lbs (10 kg)
Angular Deviation	Pitch: 0.05° (873 μrad) Yaw: 0.06° (1047 μrad)	Pitch: 0.03° (524 μrad) Yaw: 0.015° (262 μrad)	Pitch: 0.03° (524 μrad) Yaw: 0.015° (262 μrad)
Velocity (Max)	2.4 mm/s	20 mm/s	20 mm/s
Mounting Features	Eighteen 4-40 (M3) Taps and One 8-32 (M4) Tap	Thirteen 1/4"-20 (M6) Taps	Thirteen 1/4"-20 (M6) Taps
Included Actuator	Built-In DC Servo	DRV014 Stepper Motor	DRV014 Stepper Motor
Cable Length	500 mm (1.64 ft)	600 mm (1.97 ft)	600 mm (1.97 ft)
Physical Dimensions ^b (L x W x H)	6.33" x 1.69" x 0.87" (160.8 mm x 42.9 mm x 22.1 mm)	11.55" x 5.59" x 1.88" (293.4 mm x 142 mm x 47.9 mm)	11.55" x 5.59" x 1.88" (293.4 mm x 142 mm x 47.9 mm)

- If used with a BSC201, BSC202, or BSC203 controller.
- When stage is fully retracted.

[Hide 50 mm \(1.97"\) Low-Profile Motorized Translation Stage](#)

50 mm (1.97") Low-Profile Motorized Translation Stage

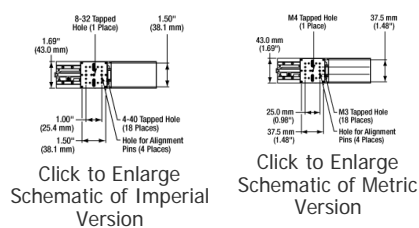


- ▶ Built-In 50 mm (1.97") DC Servo Actuator
- ▶ Includes One 8-32 (M4) and Eighteen 4-40 (M3) Tapped Holes
- ▶ Sold by Itself or Bundled with Controller and Power Supply
- ▶ Multi-Axis, Breadboard, and 60 mm Cage System Mounting Adapters Offered Below

Thorlabs' MTS50-Z8 (MTS50/M-Z8) Motorized Translation Stage provides linear motion in one dimension. One centered 8-32 (M4) tapped hole and eighteen 4-40 (M3) tapped holes allow small optomechanics to be directly mounted to the moving platform. Based upon a dual set of linear rails with continuously recirculating ball bearings, the translation mechanism provides smooth, low-friction movement.

The stage requires a standalone controller unit and power supply. For this purpose, we recommend our KDC101 DC Servo Motor Controller and Power Supply (sold separately), which are described in more detail below. For convenience, we also offer a stage, former generation TDC001 DC Servo controller, and power supply in a bundle at a significant savings over purchasing these items individually. The power supply you receive will be compatible with plugs in your region. Please contact Tech Support prior to ordering if you require a different plug.

The motor cable that is built into the stage 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.



Click to Enlarge
Schematic of Imperial
Version

Click to Enlarge
Schematic of Metric
Version

Part Number	Description	Price	Availability

MTS50/M-Z8	50 mm (1.97") Motorized Translation Stage, M4 and M3 Taps	\$1,040.00	Today
MTS50/M-Z8E	Metric-Tapped 50 mm Motorized Stage with Controller and Power Supply	\$1,500.00	Lead Time
PAA632	APT DC Servo Motor Cable for Z8 Motors, DE15 Male to DE15 Female, 2.5 m	\$54.40	Today
MTS50-Z8	50 mm (1.97") Motorized Translation Stage, 8-32 and 4-40 Taps	\$1,040.00	Today
MTS50-Z8E	Imperial-Tapped 50 mm Motorized Stage with Controller and Power Supply	\$1,500.00	Lead Time

[Hide Base Plate for Breadboards and Optical Tables](#)

Base Plate for Breadboards and Optical Tables



- ▶ Mount an MTS50-Z8 Stage to an Optical Table or Breadboard
- ▶ Contains Four 1/4" (M6) Counterbored Slots for Imperial and Metric Compatibility
- ▶ Includes All Necessary Mounting Hardware and Alignment Pins for Parallelism

The MTS50A-Z8 Base Plate contains four 1/4" (M6) counterbored slots that allow an attached MTS50-Z8 to be positioned on a breadboard, as shown in the photo to the right. The bottom of the translation stage is connected to the base plate using four 4-40 or M3 cap screws. Two alignment pins ensure that the translation axis is parallel to the length of the plate.



Click to Enlarge
MTS50-Z8 Stage on an Optical Table with
MTS50A-Z8 Base Plate

Part Number	Description	Price	Availability
MTS50A-Z8	Base Plate for MTS50 Series Translation Stages	\$77.70	Today

[Hide Accessory Mounting Plate with 1/4"-20 \(M6\) and 8-32 \(M4\) Tapped Holes](#)

Accessory Mounting Plate with 1/4"-20 (M6) and 8-32 (M4) Tapped Holes



- ▶ Mount Standard Optical Accessories
- ▶ Contains Seven 1/4"-20 (M6) and Six 8-32 (M4) Mounting Holes
- ▶ Includes All Necessary Mounting Hardware

The MTSA1(M) adapter plate fixes to the top platform of the MTS50 stages via the through holes in each corner and 4 screws (supplied). It has an array of seven 1/4"-20 (M6) and six 8-32 (M4) mounting holes to offer increased mounting options when used with general-purpose accessories and components. The working height of the stage with an adapter plate and base plate fitted is 1.4" (35.5 mm). The plate is finished in a black, low reflective anodized coating.



Click to Enlarge
MTSA1 Adapter Plate Attached
to
MTS50-Z8 Stage

Part Number	Description	Price	Availability
MTSA1/M	Customer Inspired!Adapter Plate with M6 and M4 Tapped Holes for MTS25 and MTS50 Stages	\$42.84	3-5 Days
MTSA1	Customer Inspired!Adapter Plate with 1/4"-20 and 8-32 Tapped Holes for MTS25 and MTS50 Stages	\$42.84	Today

[Hide XY Mounting Adapter](#)

XY Mounting Adapter



- ▶ Stack Two MTS50-Z8 Stages in an XY Configuration
- ▶ Includes All Necessary Mounting Hardware and Alignment Pins for Orthogonality

The MTS50B-Z8 XY Adapter Plate is designed to orient two MTS50-Z8 (MTS50/M-Z8) stages orthogonally in the XY plane, as shown in the photo to the right. This plate may also be used to stack our 25 mm (0.98") MTS25-Z8 stage with a 50 mm (1.97") MTS50-Z8 stage, but the

MTS25-Z8 must be on the bottom.

To begin the assembly process, fasten the plate to the top of the lower stage using four of the provided 4-40 or M3 cap screws. Then insert the provided alignment pins. To complete the assembly, use the remaining 4-40 or M3 cap screws to fasten the plate to the bottom of the upper stage.

In order to mount an MTS50-Z8 stage in the vertical plane, please see the MTS50C-Z8 Right-Angle Bracket shown below.



Click to Enlarge
Two MTS50-Z8 Stages in XY Configuration
with MTS50B-Z8 Adapter

Part Number	Description	Price	Availability
MTS50B-Z8	XY Adapter Plate for MTS50 Series Translation Stages	\$53.60	Today

[Hide Right-Angle Bracket](#)

Right-Angle Bracket



- ▶ Vertically Mount an MTS50-Z8 Translation Stage
- ▶ Designed for XZ or XYZ Configurations
- ▶ Includes All Necessary Mounting Hardware and Alignment Pins for Orthogonality

The MTS50C-Z8 Right-Angle Bracket orients an MTS50-Z8 (MTS50/M-Z8) stage along the vertical axis. It is needed when configuring multiple MTS50-Z8 stages into XZ or XYZ arrangements. This bracket may also be used to stack our 25 mm (0.98") MTS25-Z8 stage with a 50 mm (1.97") MTS50-Z8 stage, but the vertical stage must be an MTS50-Z8.

To create the XYZ configuration shown to the right, first create an XY configuration using the MTS50B-Z8 XY Adapter Plate shown above. Then insert two of the provided alignment pins into the upper stage of the XY configuration. Next, fasten the bracket to the top of the upper stage using four of the provided 4-40 or M3 cap screws. After that, insert the two remaining alignment pins into the vertical mounting surface. Finally, attach the bracket to the upper stage with the remaining cap screws.



Click to Enlarge
Three MTS50-Z8 Stages in XYZ Configuration with MTS50B-Z8 Adapter and MTS50C-Z8 Right-Angle Bracket

Part Number	Description	Price	Availability
MTS50C-Z8	Right-Angle Bracket for MTS50 Series Translation Stages	\$103.00	Today

[Hide Adapter for 60 mm Cage Systems](#)

Adapter for 60 mm Cage Systems



- ▶ Mount an MTS50-Z8 Translation Stage in a 60 mm Cage System
- ▶ Installation Does Not Require Cage System to be Disassembled
- ▶ Includes All Necessary Mounting Hardware and Alignment Pins for Parallelism

The MTS50CSA Adapter Plate orients an MTS50-Z8 (MTS50-Z8) stage parallel to the optical axis in a 60 mm cage system. This allows optics within the cage to be translated over a 50 mm (1.97") range.

The cage segment need only be long enough to accommodate the 6.33" (160.8 mm) length of the MTS50-Z8; no additional length is required. An example of the MTS50CSA in use is shown to the right.

To install, insert the two provided alignment pins into the bottom of the stage. Then fasten the adapter to the stage using the four provided 4-40 or M3 cap screws. At this point, the assembly can be inserted through the cage rods in an existing setup. Finally, tighten the two nylon-tipped setscrews against the rods.



Click to Enlarge
MTS50-Z8 in 60 mm Cage System Using MTS50CSA Adapter

Part Number	Description	Price	Availability
MTS50CSA	60 mm Cage System Adapter for MTS50 Series Translation Stages	\$67.10	Today

[Hide K-Cube DC Servo Motor Controller](#)

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



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

included that can have the backlit dimmed or turned off using the 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.

Part Number	Description	Price	Availability
KDC101	NEW! K-Cube Brushed DC Servo Motor Controller (Power Supply Not Included)	\$613.00	3-5 Days

[Hide Compatible Power Supplies](#)

Compatible Power Supplies



- ▶ Power Supplies
 - ▶ KPS101: For One K-Cube or T-Cube
 - ▶ TPS008: For up to Eight K-Cubes or T-Cubes
- ▶ 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
 - ▶ KAP101: Adapter Plate for Connecting T-Cubes to KCH Series Hubs



Click to Enlarge
The KPS101 and TPS008
Power Supply Units



Click for Details
A location-specific
adapter is shipped with
the power supply unit
based on your location.
The adapters for the
KPS101 are shown
here.

The KPS101 can supply up to 2.4 A and power a single K-Cube or T-Cube, while the TPS008 can supply up to 8 A and can power up to eight K-Cubes or T-Cubes, or up to four TBD001 Brushless DC Servo Controllers. Both power supply units plug into a standard wall outlet and provide +15 VDC.

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. A KAP101 Adapter Plate is required to use a T-Cube with the KCH301 or KCH601. For more information on the USB Controller Hubs, see the full web presentation.

Part Number	Description	Price	Availability
KPS101	15 V, 2.4 A Power Supply Unit for One K-Cube or T-Cube	\$25.71	Today
TPS008	15 V, 8 A Power Supply Unit for up to Eight K-Cubes or T-Cubes	\$180.00	Today
KCH301	NEW! USB Controller Hub and Power Supply for Three K-Cubes or T-Cubes	\$475.00	Today
KCH601	NEW! USB Controller Hub and Power Supply for Six K-Cubes or T-Cubes	\$575.00	3-5 Days
KAP101	NEW! Adapter Plate for T-Cubes and KCH Series Hubs	\$55.00	Today

[Hide Motor Extension Cable](#)

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 Motors, DE15 Male to DE15 Female, 2.5 m	\$54.40	Today