

71D/MHATT-CAT
APS/AJD

THORLABS INC

Z600 Series Motorized Actuator Owners Manual



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Safety Precautions

- * These Motorized Actuators can generate high forces. If handled improperly, they may cause injury. Be aware that failure of the motor controller may drive the unit into a hard stop and cause damage to the unit.
- * To avoid injury never put anything in the gap between the Actuator and any rigid structure.

Warranty

Thorlabs warrants the Z600 Series of Motorized Actuators to be free from defects in material and workmanship for a period of one year from the date of shipment. This warranty does not apply to any defects or damage resulting from misuse, abuse or problems that may arise from improper wiring.

Caution

If the motorized actuator encounters a hard stop while still in the middle of its range (i.e. a translation stage or mirror mount at the end of its travel range), the motor should be stopped as soon as possible to prevent damage to the gear head or motor and to keep the unit from overheating. When storing these units, be sure to retract the lead screw all the way in to protect the threads from damage.

Table of Contents:

1. Overview

2. Model Specifications

2.1 Z606 6mm Motorized Actuator

2.2 Z612/Z612B 12mm Motorized Actuator

2.3 Z625B 25mm Motorized Actuator

12mm body

3. Mechanical Drawings

4. Wiring Diagram

5. Recommended Drivers

6. Related Products

1. Overview

Thorlabs Incorporated has developed this series of high-resolution motorized actuators for use in high precision applications. From drop-in replacements to custom mounts, these motorized actuators will satisfy even the most demanding requirements. Three different travel lengths are offered in two alternate versions depending on the application.

The two versions offered are a threaded version (6mm & 12mm travel) for use in applications where a normal micrometer or adjustment screw threads into a mount and a 3/8" barreled version (12mm & 25mm travel) for applications where a setscrew is used to lock the micrometer in place. Both of these versions will suit most any application.

The Z600 series Motorized Actuators utilize a 12V DC servomotor that provides sufficient torque for high load capabilities. Utilizing a 256:1 gear reduction head, the actuators provide very small movements over the entire travel range, allowing greater flexibility with negligible backlash and fine resolution. The DC servomotor allows for continuously variable speeds while an optical encoder allows closed loop operation. The actuators use integrated hard stops that automatically cut the power when they have reached their mechanical limits*. Unlike most small actuators, Thorlabs utilizes internal limit switches to prevent overdriving.

The Z600 series Motorized Actuators are light, compact and extremely durable. They are ideal for use in mirror mounts, translation stages, microscopes, OEM applications and a wide variety of other components that require higher precision than most standard drive mechanisms allow. These actuators are especially convenient for compact laboratory setups that are difficult to adjust by hand. With sub-micron minimum incremental movement, the Z600 series Motorized Actuators are suitable for all high precision applications.

Thorlabs Motorized Actuators are compatible with a wide array of controllers, therefore, making it easy for you to incorporate them into existing setups. When using these actuators, performing complex tasks or complicated alignment procedures will take less time than before. They provide more effective and precise control over instrumentation. Plus, the high repeatability of these actuators means faster overall performance of complex scanning.

***Note: The limit switches are wired to be normally open.**

2. Model Specifications

2.1 Z606 Motorized Actuator Specifications

Z606	6mm motorized micrometer
Travel range	6mm
Gear reduction	256:1
Lead screw pitch	0.5mm
Feedback	Motor mounted rotary encoder, 48pts/rev @ the motor
Limit switches	Electromechanical
Motor type	12V DC Servo
Backlash	<13 μ m
Axial load capacity	90N
Speed range	50-425 μ m/s
Minimum incremental motion	>0.2 μ m

2.2 Z612/Z612B Motorized Actuator Specifications

Z612/Z612B	12mm motorized micrometer
Travel range	12mm
Gear reduction	256:1
Lead screw pitch	0.5mm
Feedback	Motor mounted rotary encoder, 48pts/rev @ the motor
Limit switches	Electromechanical
Motor type	12V DC Servo
Backlash	<13 μ m
Axial load capacity	90N
Speed range	50-425 μ m/s
Minimum incremental motion	>0.2 μ m

encoders

$$\frac{0.5 \text{ mm}}{256 \cdot 48} =$$

$$\frac{500 \mu\text{m}}{256 \cdot 48} = 0.040690104$$

*μm
encoder
steps*

2.3 Z625B Motorized Actuator Specifications

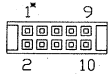
Z625B	25mm motorized micrometer
Travel range	25mm
Gear reduction	256:1
Lead screw pitch	0.5mm
Feedback	Motor mounted rotary encoder, 48pts/rev @ the motor
Limit switches	Electromechanical
Motor type	12V DC Servo
Backlash	<13 μ m
Axial load capacity	90N
Speed range	50-425 μ m/s
Minimum incremental motion	>0.2 μ m

3. Mechanical Drawings

Please visit Thorlabs on the web at www.thorlabs.com for the most recent drawings for the Z600 series Motorized Actuators, as well as the Thorlabs product line. All drawings are available in .PDF or .DXF format. While on the Thorlabs website, please feel free to browse through frequently asked questions and answers on all of the products.

4. Wiring Diagrams

Connector Pin Assignments



DB25 Male connector

Thor Lab motor
D25 Connector (PIN #)

PIN1	Motor(+)	3
PIN2	Vcc	14
PIN3	Channel A	7
PIN4	Channel B	8
PIN5	GND	24
PIN6	Motor(-)	11
PIN7	Limit Ground	24
PIN8	Forward Limit	5
PIN9	Reverse Limit	6
PIN10	No connection	NC

Encoder +5V

Note: Limit switches are wired to be normally open.

Normally open
use 24 for limit
ground + encoder
5nd.

5. Recommended Drivers

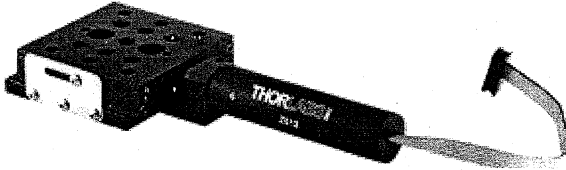
The following list of third party drivers/controllers is only given as a sample of compatible drivers that will work with Thorlabs Z600 Series Motorized Actuators. These actuators may be compatible with other drivers not specified. Thorlabs does not provide technical assistance for third party drivers/controllers. Please contact the product manufacturer.

Manufacturer
National Aperture
Newport

Model#
MC4SA
ESP Series

6. Related Products

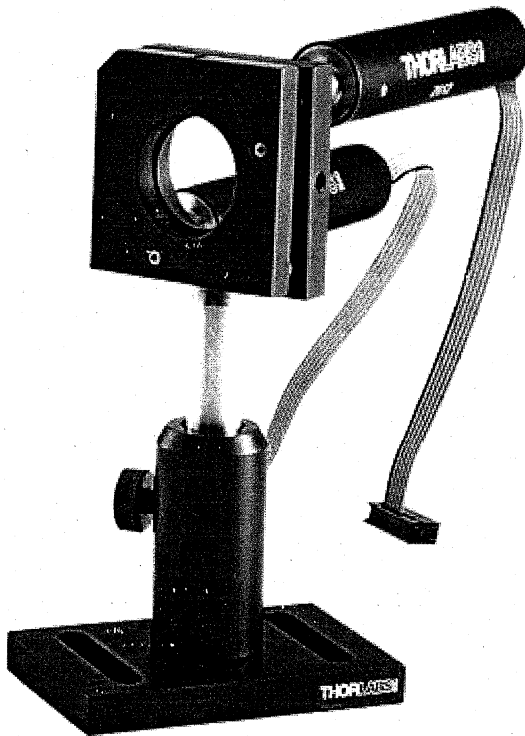
Motorized translation stages



MT1-Z6 shown

Thorlabs Z600B Series Motorized Actuators are designed to be direct drop-in replacements for translation stages. The travel length is based on the standard dimensions of the Mitutoyo micrometer heads. This feature makes them an ideal choice for most applications.

Motorized mirror mounts



KM1-Z6 shown

Thorlabs Z600 Series Motorized Actuators are designed to replace the $\frac{1}{4}$ -80 adjustment screws on any Thorlabs mirror mounts. Please contact technical support at (973) 579-7227 for more details on which actuator best suits the mirror mount application.