

Manual Micropositioners

Technical Considerations

Range of Travel

Linear Stages provide a wide choice of travel from 6.5 mm with micrometer-driven MicroMech Stages to 50 mm with micrometer-driven MacroMech Stages.

Rotary Stages offer a full 360 degree coarse travel range and a minimum of 6 degrees fine calibrated adjustment.

Tilting Stage provides either single or two-axis tilt up to a range of 3.75 degrees.

Size (of positioner platform and component to be moved)

The load capacity required may ultimately determine the stage size.

For compact systems on a rail or breadboard, and for OEM applications where space is restricted, stages from the MicroMech or MiniMech ranges are ideal. The larger or heavier component will need to be supported on a stage from the MacroMech range.

Larger components within the stage load capacity may exceed the stage dimensions only if the load is reasonably balanced.

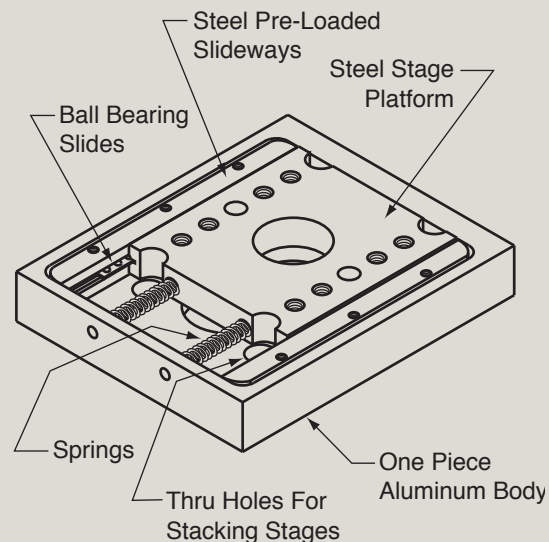
Typical platform sizes for Ealing Manual Micropositioners are shown below:

Positioner Type	Platform Size
MicroMech	30 x 30 mm
MiniMech	60 x 60 mm
MacroMech	100 x 100 mm



Construction

Ealing linear manual micropositioners are constructed from a combination of steel and aluminum to provide a light weight stage with performance approaching that of an all steel design. This is achieved by machining the outer body of the positioner from a single piece of aluminum which has an exceptional resistance to deformation despite its light weight. Accurately machined and pre-loaded hardened steel ball bearing slide-ways and a steel central stage combine to give exceptionally precise and accurate linear motion. The hardened steel ball bearing slides are individually adjusted and tested during assembly. Spring loaded guides maintain contact between the central steel translation stage and the driving head, ensuring minimal backlash.



Load

Each Manual Micropositioner has a maximum load carrying capability specified. Figures are normally given for both horizontal and vertical stage movement. Linear and Rotary Stages will accept higher loads when mounted in the horizontal plane. Typical horizontal loading capacities for Ealing Manual Micropositioners are shown below:

Positioner Type	Horizontal Load Capacity
MicroMech	3 kg
MiniMech	5.5 kg
MacroMech	12 kg



Resolution or Minimum Incremental Movement

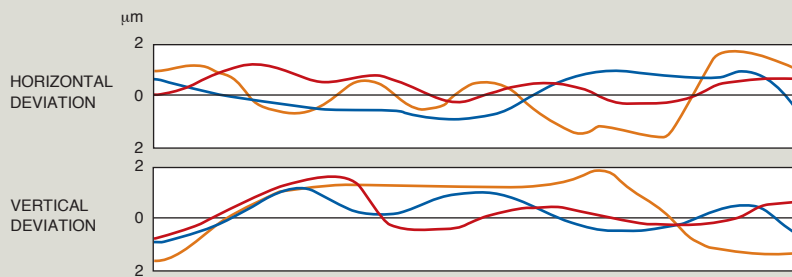
This is the smallest controllable movement of a stage (i.e. the smallest movement achievable by hand on thumbscrew or micrometer-driven stages). It is specified individually for each Manual Micropositioner. When using stages fitted with MotorDrivers™ or EncoderDrivers™ much higher resolutions or smaller movements are achievable using push-button control or computer control respectively.

Reading Accuracy

This is the smallest division or reading from a calibrated micrometer-driven stage (normally division on the 1/2 micrometer).

Vacuum Compatibility

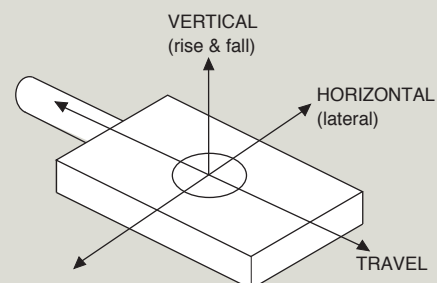
Ealing linear manual micropositioners can be used in a vacuum down to 10^{-3} Torr without any modification. By replacing the grease in the precision ball bearing slides with high vacuum compatible grease they can be prepared for use in a vacuum down to 10^{-5} Torr. For lower pressures than this special attention has to be made to the finish and types of materials used in constructing the stage. Ealing will be pleased to quote for your special needs.



FULL TRAVEL

Tracking Accuracy

This is the maximum deviation from a straight line and is specified as a maximum deviation in both horizontal and vertical planes. All Linear Stages feature two rows of linear ball bearings, pre-loaded in precision-ground, hardened steel grooves. This ensures that the moving stage maintains accuracy after many direction reversals at the full rated load.



Mounting and Compatibility

The three Ealing product ranges feature their own individual hole patterns which ensure that all stages are compatible within their range. MiniMech™ and MacroMech™ range micropositioners are available in two types – Metric, with metric thread forms and hole patterns and Inch, which uses UNC threads on an inch grid. The Inch series has been developed to meet the industry standards in the US and provides complete compatibility with inch series optical tables and benches. Metric products correspond to the equipment standards used in industry and research throughout Europe.

When ordering, please note that the catalog numbers of Metric units are prefixed by either a 53- or 74- and Inch catalog numbers commence with a 61- .

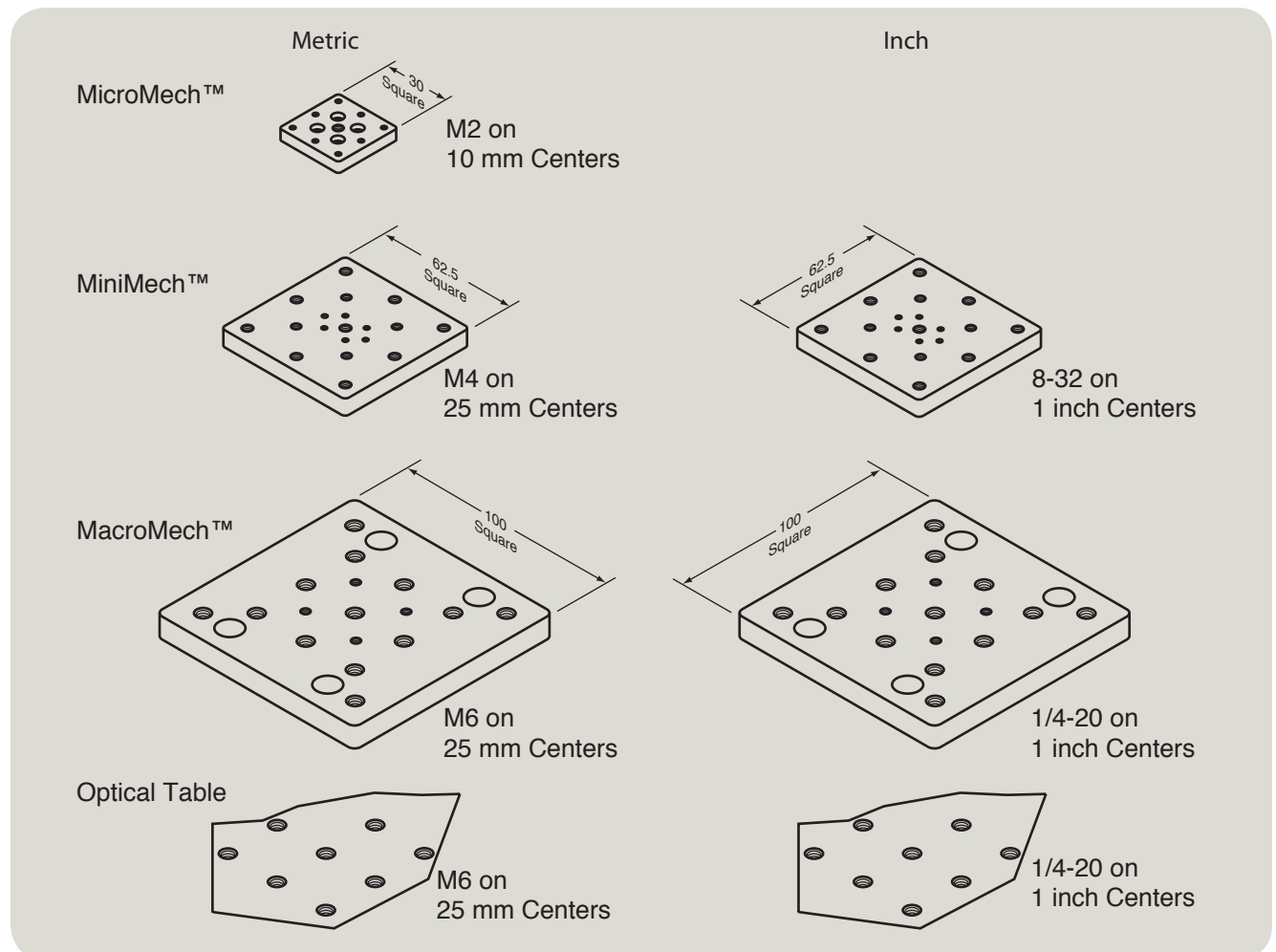
Three basic sizes of micropositioning equipment are available –MicroMech™, MiniMech™, and MacroMech™. Availability of these sizes as Metric and Inch types is shown below, with the principle thread forms and hole patterns used on each size/type combination.

The modular nature of the micropositioners' construction enables assemblies to be built up which permit the positioning of components in three dimensional space with micrometer

and sub-micrometer precision. Most manual micropositioners have provision for locking the translation stage to provide a permanently fixed position when required. In many cases there is compatibility between ranges either directly or with the use of adapter plates.

The MacroMech range is also designed for direct mounting to optical tables and breadboards. The other ranges may be table mounted using the appropriate adapter plates.

The following table illustrates the compatibility between the product ranges.



Actuators & Motorization

Motorization

Many of the Manual Micropositioners can be fitted with either MotorDrivers™ or EncoderDrivers™. They simply replace the normal manual micrometer head fitted to the stage.

MotorDrivers allow remote control of a stage when used in conjunction with a MotorDriver Control Unit and suitable Power Supply. They can also improve the resolution of a linear stage, resolving 0.1 μm for one press of the control button.

EncoderDrivers convert a manual stage to a computer-programmable micropositioner capable of sub-micrometer resolution. Up to eight stages with EncoderDrivers may be controlled from a PC with one Drive Card and eight Plug-In Modules installed. USB control available on request.

Stage compatibility data for MotorDrivers and EncoderDrivers is given in the individual stage information later in this section.

Diagram showing the modular design of Ealing micropositioners

