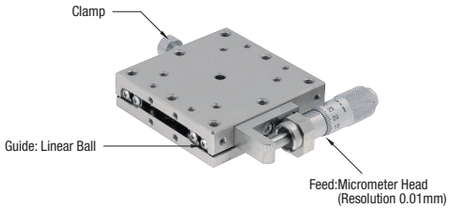
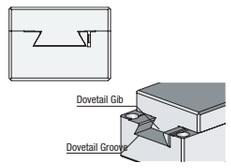
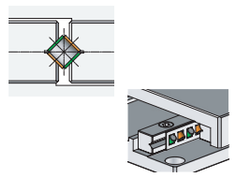
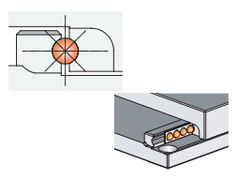
What is a Stage?

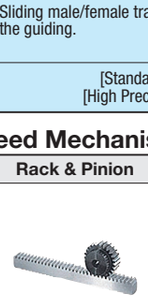
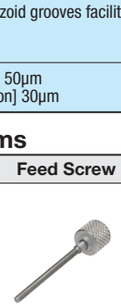
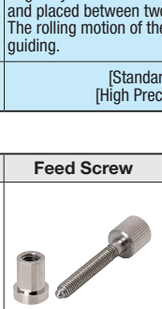
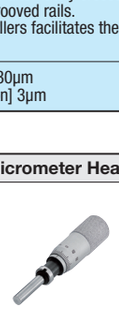
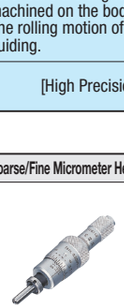
Stages are mechanical unit products composed of Guides, Feed mechanisms, and Clamps. Since they can easily adjust object positions for inspections, machining, and assembly fixtures. A single unit would be used as an X-Axis, and two units can be combined as an XY-Axis stage. Use a Z-Axis for height adjustments.



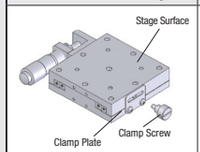
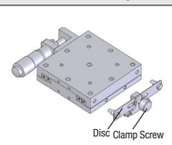
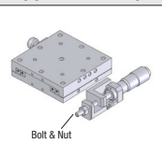
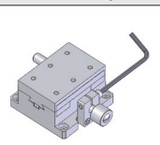
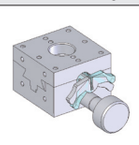
Linear Guidance Structures

	Dovetail Slide	Cross Roller	Linear Ball
			
Structure	Sliding male/female trapezoid grooves facilitate the guiding.	Caged cylindrical rollers are alternately crossed, and placed between two grooved rails. The rolling motion of the rollers facilitates the guiding.	Steel balls are aligned in gothic arch grooves machined on the body of stage. The rolling motion of the rollers facilitates the guiding.
Straightness	[Standard] 50µm [High Precision] 30µm	[Standard] 30µm [High Precision] 3µm	[High Precision, Motorized] 1µm

About Feed Mechanisms

	Rack & Pinion	Feed Screw	Feed Screw	Micrometer Head	Coarse/Fine Micrometer Head	Digital Micrometer Head
						
Guide Mechanism	Dovetail Slide		Cross Roller / Linear Ball Slide			
Travel per Rotation	17~20mm	0.5~10mm	0.5~1mm	0.5mm	0.025~0.5mm	0.5mm
Features	• Suitable for rapid feeding. • Not suitable for accurate positioning.	• Suitable for fine feeding and slightly fast feeding. • Screw lead selectable	• Suitable for fine feeding. • More economical compared to Micrometer Head • Not scaled and incapable of numerical adjustments.	• Suitable for precise positioning by 0.01mm.	• Enables finer adjustment compared to standard Micrometer Head. • 0.5µm Graduation	• With digital display, output • 1µm Graduation

About Clamp Mechanism

	Standard Clamp	Disc Clamp	Opposed Clamp	Slit Clamp	Lever Clamp
					
Features	Clamp plate is pressed against the side of the stage by a clamp screw. It is the most economical and standard holding method.	The stage is immobilized by clamping a disc applying no load on the stage surface. The advantage is that position displacement can be prevented.	The carriage is braced by a bolt from the other side of the micrometer head. The bolt is secured with a nut for vibration resistance and strong holding capacity.	The feed knob shaft is clamped directly. Compared to the conventional model, larger retaining force can be obtained. Drift can be prevented by using it in combination with conventional standard clamp.	The final tightening action of the clamp screw is managed with a lever for easy operation.

Notes on Clamps

The standard clamps for the stages work on frictional forces generated when screws are tightened by turning the knobs and levers. Applied loads exceeding the friction of the clamp mechanical forces can displace the stages. Please devise proper countermeasures to prevent the stage surfaces from being displaced in actual applications. MISUMI offers the following clamp reinforcement measures.

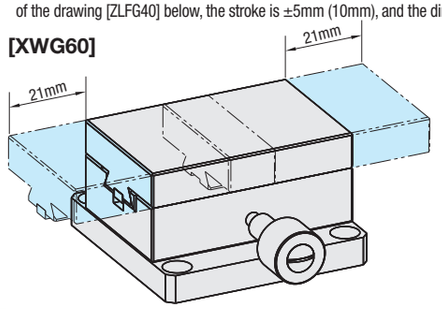
- Selecting the Reinforced Clamp Type Stages (Slit Type Clamp)
- Changing the clamp type when available as "Alterations" (Opposed Clamp, Disc Clamp)

High Precision Stages and Standard Accuracy Stages (Common)

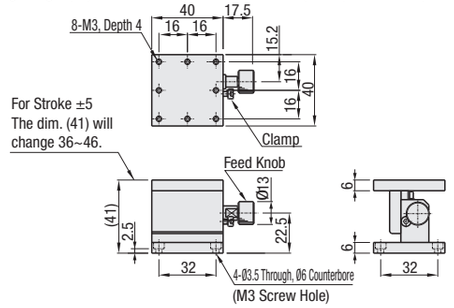
About Stroke (move distance) descriptions.

The dimensions shown in the drawings are for tables at 0mm positions. The dimensions shown in ( ) mean that they would change as the stroke changes. Below diagram [XWG60] as an example, the stroke is ±21mm (42mm) where the table moves 21mm to the right and 21mm to the left, as the position in the diagram as the center. In the case of the drawing [ZLFG40] below, the stroke is ±5mm (10mm), and the dimension indicating the stage height (41) means it changes between 36mm (-5mm) and 46mm (+5mm).

[XWG60]



[ZLFG40]

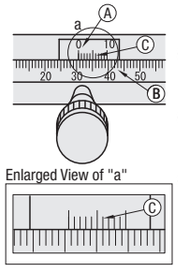


About Resolutions

There are 3 ways of position reading options: Scale Plates, Vernier Scale and Micrometer Heads.These position indicating options can be used as references for applications requiring positional repeatability.

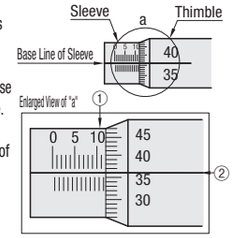
<How to Read Vernier Scale>

① The scale Ⓑ value is read at the 0 position of the sub-scale Ⓐ in 1mm resolution. (30mm in the right figure)
② While looking at Ⓐ scale, read the graduation Ⓒ aligning the Ⓑ scale as 0.1mm resolution. (0.6mm in the right figure)
③ A sum of ① and ② is the value. (30.6mm in the right figure)



<How to Read 0.01mm Micrometer Head>

① Read where the position of end face of the thimble is located on the scale of sleeve by 0.5mm resolution. (11.5mm in the right figure)
② Read a value of the thimble on the position where the base line of sleeve coincides with the scale line of the thimble. (0.36mm in the right figure)
③ The total value of ① and ② is the current position of the stage. (11.86mm in the right figure)



Although the micrometer head stroke will be expressed ±3.25mm and ±6.5mm, the scale starts as 0 (zero) at the left farthest end.
For the case of ±6.5mm stroke, the relationship of the scale and the stroke would be as shown below.
- When the scale reads 0 (zero): Stroke [-6.5mm]
- When the scale reads 6.5mm: Stroke [0 (zero)]
- When the scale reads 13mm: Stroke [+6.5mm]

About Load Capacity

Load Capacity

It is a force that the stage can withstand with the CG of the load is the stage center. The unit is in (N). If the stage is operated at beyond this load capacity, it may no longer operate smoothly. For the load capacities in horizontal orientation, see [Horizontal] values, and see [Vertical] values for the vertically oriented stages. Please be advised that vertically oriented or inverted stages may not always meet the catalog accuracy values.

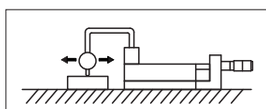
Allowable Moment Load

It indicates loads the stage can withstand when the CG of the load is located away from the stage center. The unit is in (N • m). When CG of the workpiece is located away from the center of the stage (=Overhung), the allowable moment load values will need to be taken in consideration along with the Load Capacity. Products high in this value is defined as [High Rigidity].

About Accuracy Standards

Definition of Straightness

Straightness is a value represented by a maximum difference between an ideal straight line of travel and the actual travel of a top plate over the entire stroke range of the stage. It is the max. deviation in horizontal or vertical direction in relation to the ideal straight axis.

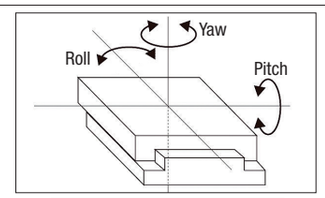


- Straightness (Vertical) Measurement A stage is fully stroked with a dial indicator placed and a vertical displacement is measured.

Definition of Pitching / Yawing / Rolling

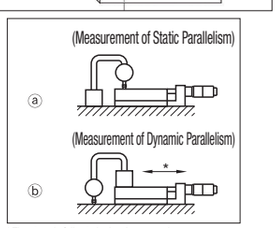
These indicate the amounts of top plate inclinations during linear motion.
To direction of traveling
Leaning forward and back : Pitching
Rotation in a horizontal plane : Yawing
Leaning right and left : Rolling

Allowable Moment Capacity (see Overview page) and Moment Rigidity (carriage attitude in angles against these forces) are used to represent the stage's rigidness.



Definition of Parallelism

A value indicating the parallelism of the top surface against the bottom surface. The illustrations on the right show how ⓐ Static Parallelism and ⓑ Dynamic Parallelism are measured.



* The stage is fully stroked and measured.

Caution

Travel accuracy values shown are for single axis configuration.