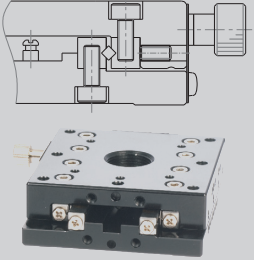
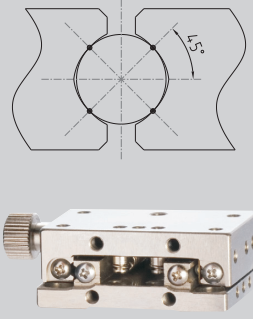
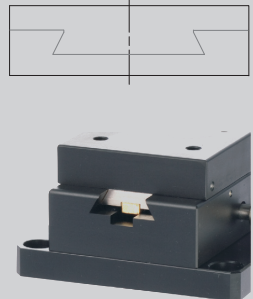
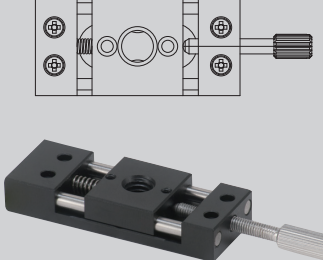


Positioning Stages

Characteristic of Different Guiding Type

Slide Way	Structure	Characteristic
Crossed roller		The slide rail consists of two hardened V-grooves with fine ground surface and crossed roller bearings.
Linear ball		Slide way and body is in one unit, and Gothic arc-groove ground precisely to meet requirement of high parallelism and high flatness. Gothic arc-groove formed by dual arc-grooves individually on upper and lower rails of body. Ball moving in single groove is structured by 2 points – contact, and total 4 contact points in dual arc-groove to form strong rail construction. In case of rails of SUS-STAGE is to set ball assembly in arc-groove to save traditional adjustment and revision time. In addition, without adjustment screw would save accuracy problem and maintenance time caused by loosen screw, and cheaper as well.
Dovetail type		Dovetail plane-pinion and rack (Main material: Brass or aluminum alloy) GMT supplies proper models suitable to be equipped to various modules such as small, coarse or fine turn, larger size for installation etc. Driven-adjustment mode is rack and pinion. Apply to higher working frequency, requirement of faster movement and larger stroke. Screw-driven plane (main material: brass) Prepared by easy-carry standard and slide type fit for inner set mode. Driven adjustment mode is screw shaft mode. Apply to lower frequency, fine tuning environment.
XY Simplified stage		Round sticks on two sides are applied to support middle transmission construction: Feeding screw type To move stage table by push-and-press from screws, and to restrain gap produced by using springs tensile force. It's the type suitable for light loading and accuracy feeding application. Threading type The stage table is moved by thread which has been crossed through to the table. The stage table will be feed-movement in Z-axis application. The stage is suitable for heavier loading compared to feeding screw with spring transmission type.

Positioning Stages

Characteristic of Different Guiding Type

Application	Moving Accuracy	Load Capacity	Rigidity
This is suitable for precise movement device in high accuracy and high capacity, optical instruments in precise gauging and fine tuning, various machine tools, gauging instruments, precise positioning and quantitative movement...etc.	Excellent	Excellent	Excellent
Applied to precise positioning device in high accuracy and mid-capacity, product and design integrated system, optical experiment, precise transportation and fine tuning mechanism application.	Excellent	Good	Good
It is applied to optical instruments and equipments, sampler, detecting device, semi-conductor manufacturing equipment, test machine, microscope, transiting machine, machining center, medical instrument, printer and others.	Fair	Good	Excellent
The product is applied to fixture, camera, sensor, nozzle, and guiding groove of the conveyor, those equipments don't require high accuracy adjustment.	Fair	Fair	Fair

Outline

- Mini-Stage is applied for high precision or mid and heavy loading of various production machinery, testing device, precise positioning and quantitative movement.
- There're many types of mini-stages with single axis (X-axis); dual axes (XY-axis); Z-axis; θ -axis, α -axis... can be collocated as needed.

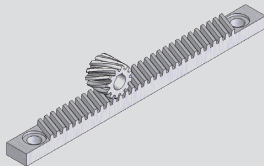
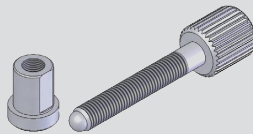
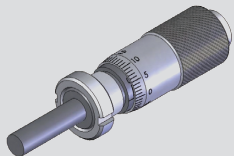
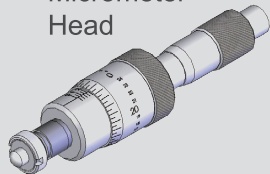
Characteristics

- Can be customized according to the requirements of precise fine tuning; positioning; quantitative movement and able to proceed mass feed of fine tuning.
- Coordinated customer's precise machinery of instrument and fixed in suitable position.
- Feeding mode diversification such as coarse moving handle/ micrometer head; feed screw, rack and pinion with scale and able to manage movement rate.
- The sets of mini stages, XY-axis, XYZ-axis, XZ-axis, and multi-axis modules are able to effectively reduce assembling process because of adjusting their vertical angle before shipping.

Standard Selection

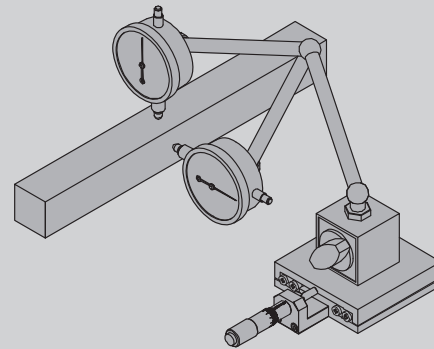
- GMT presents clearly with each kind of mini stages in accordance with different types of moving axis, minimum reading and loading capacity.
- Please coordinate with adjusting methods and refer below information to select the most suitable stages.
- Please refer to the feeding method provided to select the most suitable stages.

The Main Feeding Mode of Mini Stages

Main feeding mode	Characteristics	A circle movement of handle rotation	Applied for guiding device
Rack and Pinion 	● Suitable for high speed mass feed. ● Not suitable for precise positioning.	17~20 mm	● Dovetail
Feeding Screw 	● Use precise threadscrew pitch to proceed simple precise moving.	0.25~1 mm	● Dovetail ● Crossed roller ● Linear ball bearing
Micrometer Head 	● Precise reading Unit: 0.01mm is suitable For precise tuning.	0.5 mm	● Dovetail ● Crossed roller ● Linear ball bearing
Rough Slightly Moving Micrometer Head 	● Divided into rough moving (general feeding) and slight moving (micro feeding) use. ● It's a special feeding device and a bit costly. ● Differential motion Structure for slightly transmission.	Coarse tuning : 0.5 mm Fine tuning : 0.025 mm	● Linear ball bearing ● Crossed roller

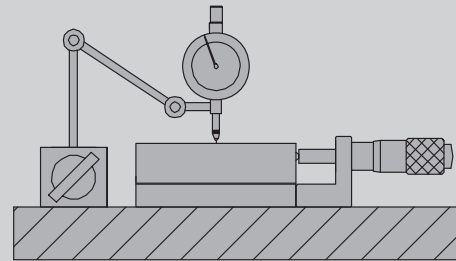
Straightness (refer to JIS B 6191-1993)

In linear motion units, geometric straight line decides positions in order from datum point to same direction, differences between length variation in those positions and datum is as measured value. To connect datum and final testing post, the max. difference of geometric line is called "Straightness".



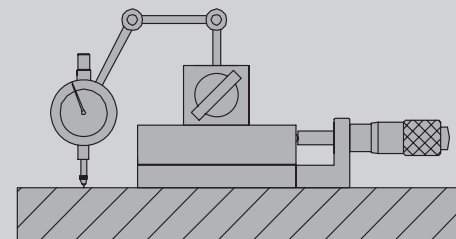
Yawing and Pitching (refer to JIS B 6191-1993)

Linear motion parts would occur slanting in Transmitting, and slanting proportion would cause deflection in linear transmission. Position is decided by same direction from datum point in order, and maximum angular gap measured from horizontal direction of each position corresponding to the datum is called yawing (deviation). Same situation to have the maximum angular gap from vertical direction of each position corresponding to ht datum called pitching.



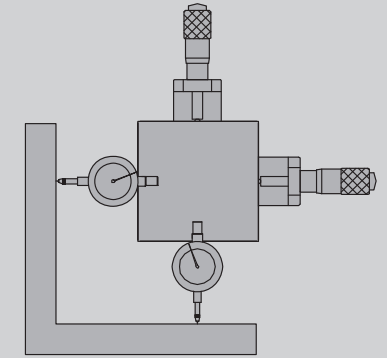
Parallelism (refer to JIS B6191-1993)

Parallelism of plane, and slanting proportion between parallel interval to mechanism parts, and degrees between center place of manual stage movement and base plate is called parallelism. Parallelism measurement is to fix micrometer on the plate, and operate manual stage with clamping device to measure the maximum of 4 corner errors.



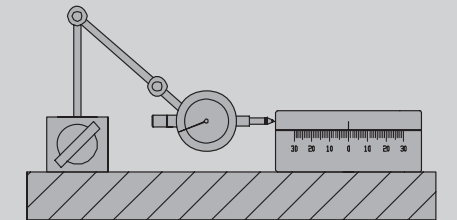
XY Vertical Value (refer to JIS B7440-1987)

Vertical value between 2 axes also for one line of geometric line in transmission datum and one in its corresponding right angle. In the other direction (Opposite), to take slanting proportion in linear transmission, reference point of X-axis stage, and geometric line of final tested position as datum axes. X-axis stage as for datum axis, maximum of parallel errors from its vertical geometric line in opposition to datum position of Y-axis stage to final texted position is called XY vertical value.



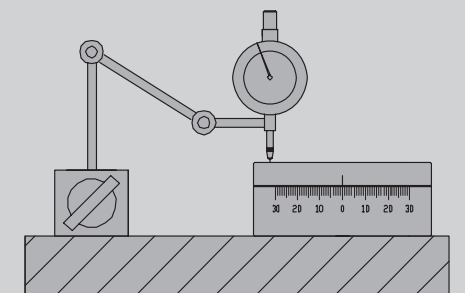
Concentricity (refer to JIS B 6191-1993, B6194-1997)

Difference of datum circle and geometric circle. All points in line in same plane of 2 concentric circles, radius difference of 2 concentric circles is in case of smallest radial interval difference. Opposite to geometric circle, measured difference is called concentricity. Fix rotating stage on the plate, and put micrometer around stage. Have it to rotate one circle (360°) to proceed measuring. Concentricity is half of top value shown in micrometer.



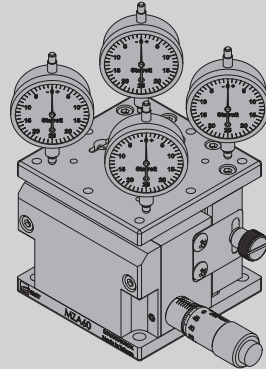
Plane travel Amplitude (refer to JIS B6191-1993)

Rotate as center of single axis, in the period of plane turning, max. slanting value of deviation of vertical plane to datum axis back to stage vertically is called plane travel amplitude. Take micrometer fixed on the plate to contact upper edge of rotating stage (rotating one circle 360), and proceed measuring. Top value shown in micrometer is called Plane-pulsating.



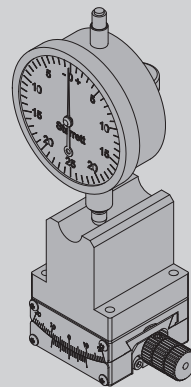
Inspection of Level Z axis (GMT specification)

The stage surface will be slanted caused by transmission components while the stage moves vertically. In order to check if the stage surface is remained in a level, GMT offers one inspection method which is to place 4 inspection meters on the ends of two diagonal lines according to the stage platform, then, check sum of plus and minus figures measured from 4 meters during movement, regard as the level variation of the stage vertical movement.



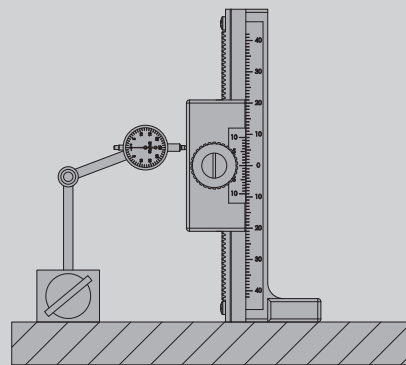
Precision of Rotation Center Height (GMT specification)

To use a specified inspection tool (meter) (The tool (meter) has been calibrated its circle center matched to the rotation circle center of goniometer stage) to check the tool (meter) indicator changes during repeated movement to examine the circle center accuracy.

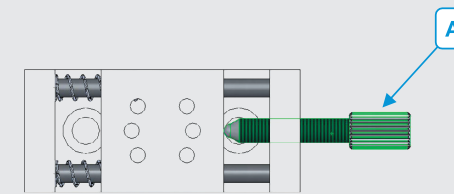


Vertical Z axis (GMT specification)

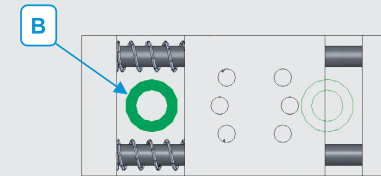
To check measured figures from the meter applied to the area between limited strokes during vertical movement. The sum of plus and minus figures measured from the meter means the variation between the movement verticality with base surface.



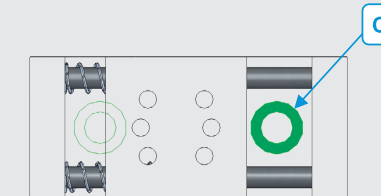
XY Simplified Stage (Feeding Screws)



- Remove feeding screws (A)

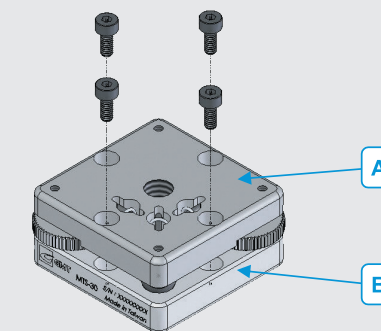


- To have B side fixed with a bolt.



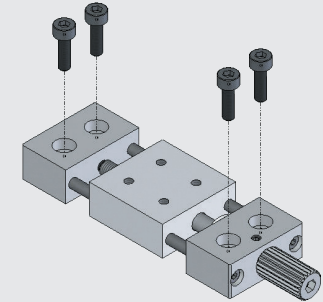
- To have stage table slid to B side.
- To have C side bolt fixed.
- To lock up the feeding screws.

Tilt Stage (Thumbscrew Type)



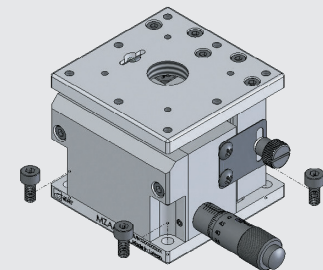
- The mounting holes on the upper plates (A) have been drilled through and counter bores on the lower plate, (B) such design offers an easier assembly to have bolts assembled from upper plate directly.

XY Simplified Stage (Threading Type)



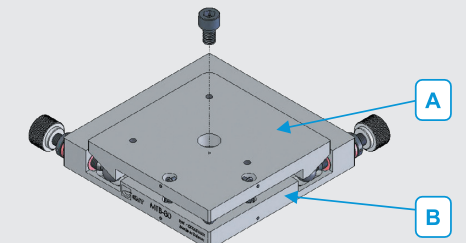
- The stage has been integrated counter bores on left and right sides for mounting.

Leavel Z Axis Stage



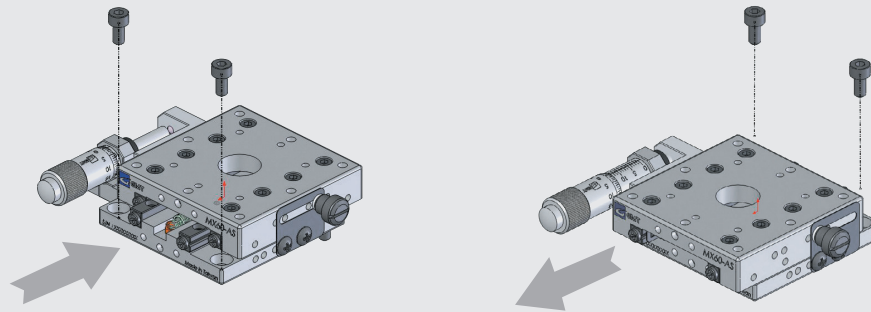
- There are 4 holes reserved for bolts Screw-in on 4 corners of the stage upper surface. It can be screwed-in by the hex-wrench without conflict.

Tilt Stage (Feeding Screw Type)



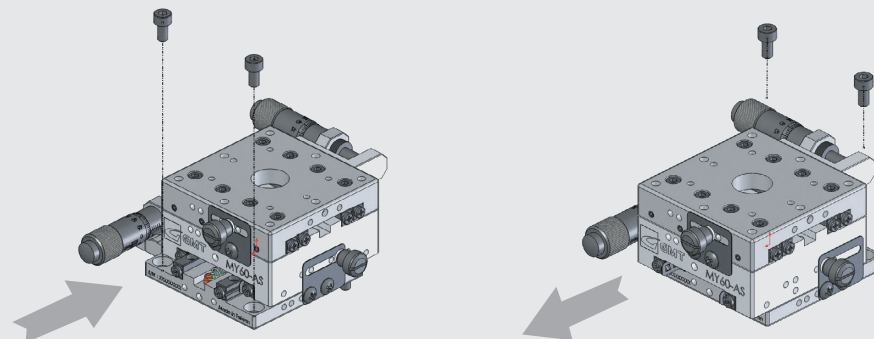
- The mounting holes on the upper plates (A) have been drilled through and counter bores on the low plate, (B) such design offers an easier assembly to have bolts assembled from upper plate directly.

Single Axis



Move upper plate back and forth, and secure the screw on the base plate And work piece with tight confirmation.

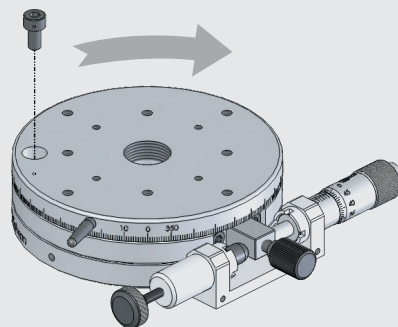
Dual Axis



Screw security same as single axis.

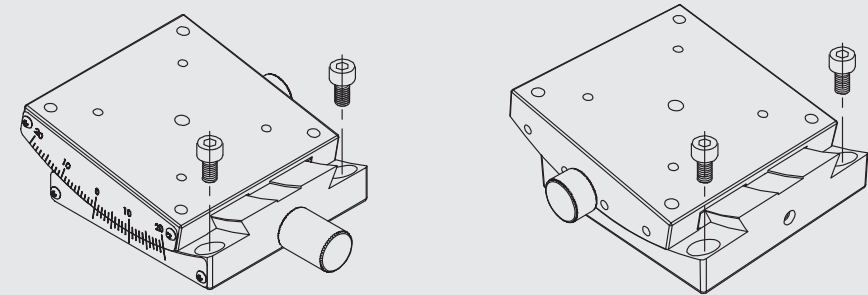
θ Axis

- ◆ Move upper plate by rotating, and take the screw through it.
- ◆ Proceed taking screws through base plate with matched bores nespactly.
- ◆ Lock the stage on the work piece with tight confirmation.



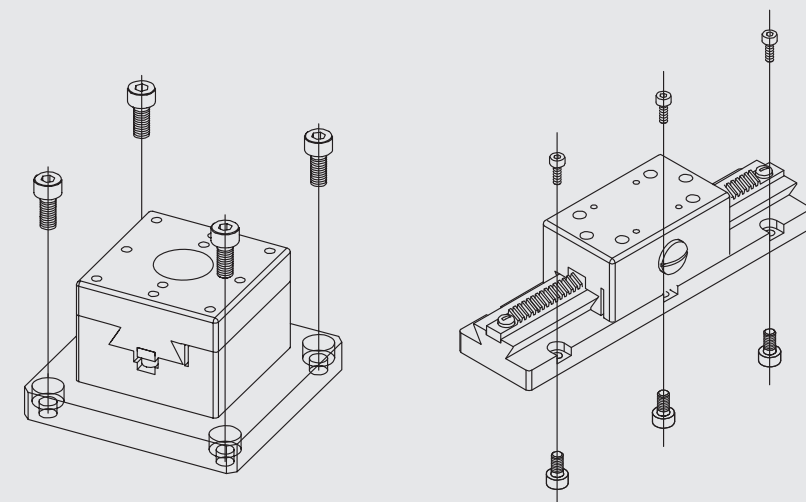
Goniometer Stage

Rotate knob clockwise to move plate to the other side.
(Please operate after loosing safety knob), to adjust locked screw into half-secured status.
Next, rotate knob counterclockwise to move plate to the other side, and secure the screw on base plate and work piece with tight confirmation.



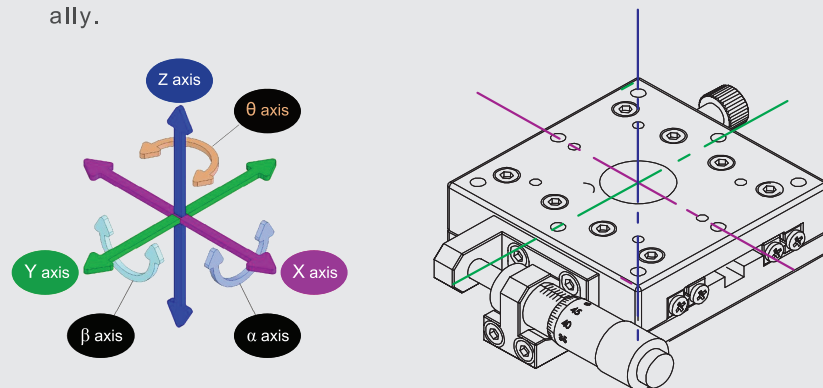
Other Stages

Consider easy installation fit for other devices, threaded holes pattern is made to meet requirement of securing from upper or lower direction, and this provides more options for installation.



Axes Definition

Regarding definitions of moving and rotating axis, GMT defines as the diagram below.
X-axis, Y-axis are in parallel direction; Z-axis in vertical direction;
Rotating around X, Y, Z-axes are called α -axis, β -axis, θ -axis individually.

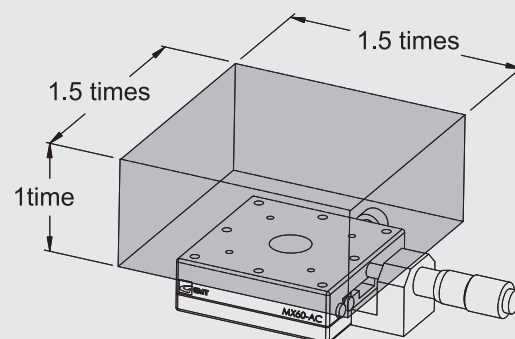


Temperature of Environment

Operating stages in regular range of temperatures as listed. Please contact GMT if products in wider temperature ranges required.

Stages classification	Working temperature
Stainless steel stage	-20°C ~ 120°C
Stainless steel slide	
Others	-20°C ~ 70°C

Volume-Loaded Limit Recommendation



Basic Declaration

1. Diagrams of representative explanation in catalogs are sampled in GMT products series. Products compared to diagrammatic examples in same series may have some difference in shape due to different mechanism design and spec, but basic operation remark are all the same.
2. Photo images are for reference only. For application design, please download 2D drawing.

Notice

Please read operation principles before your use, this would have GMT product series performed for the best motion accuracy and usage life.

Operation Principles

1. GMT product series are all composed of parts in high accuracy, please avoid extreme environment such as high temperature, extreme low temperature, huge temperature variation, exposed to sun light, high humidity, high dust, high vibration, high shock and easy-dewed...etc.
2. To maintain motion accuracy and usage life of products in all series, please check allowable capacity of the product before operation. Do not overload out of rated capacity.
3. Besides allowable capacity limit, please avoid taking barycenter of loaded object out of the edge of the stage.
4. All kinds of rolling mechanisms set in the product need proper clean and lubricated maintenance in the period of operating, depending on operating conditions, and use appropriate lubricant.
5. All kinds of rolling mechanisms set in the product are adjusted and leveled by engineers before shipment, please do not try any adjustment if not have been trained or authorized.
6. Use right lock unit, tools and torque wrench while processing products in positioning security and connecting security.
7. For accessories of GMT product series or related information, GMT sales could offer best consultation. www.gmtlinear.com
8. GMT also provide custom-made service for special purpose application or other unique spec.

Positioning Stages

Model No. Description

M
Y
60 - A
C - 1
5

Transmission Methd	Axis Code	Table Size	Material	Selectable Spec		
				Transmission Positions	Guiding Rail	Transmission
M : Manual	X : Single axis	Various spec, based on the chosen axis code.	A : Aluminum Alloy S : Stainless Steel	S : Side, Forehand	1 : Cross Roller	3 : Cursory and fine micrometer (stage type of dual micrometer)
	Y : Dual axis			SR : Side, backhand	2 : Linear Ball	
	Z : Integration of plate and bracket			SZ : Side, Forehand + micrometer upward	3 : Rotary copper elements	4 : Worm+Wormgeal
	R : θ axis			SZR : Side, backhand + micrometer upward	4 : Cross Roller Bearing	5 : Standard micrometer
	XL : Thin type, single axis			C : Centre, Forehand	5 : Groove Ball Bearing	6 : Cursory and fine micrometer (stage type of two-stage single micrometer)
	YL : Thin type, dual axis			CZ : Centre, backhand	6 : Simplified guide	
	RL : Thin type, θ axis			CSR : Central: cursory adjustment Lateral: fine adjustment		7 : Electronical Micrometer
	LZ : Thin type, +L plate			L : Left		8 : Feeding screw
	YW : Ultra thin type, dual axis			R : Right		9 : Ball screw
	ZL : Standard type, +L plate			V : Vertically placed		
	YP : Thin type, through hole, dual axis			H : Horizontal placed		

Positioning Stages

Feeding Position

