

## METIS Multi-Axis Motion System



### Description

The stage is composite of two-dimensional mechanical guide and air bearing guide, has the advantages of both mechanical guide and air bearing guide. The high stiffness of the mechanical guide in the XY plane withstands high accelerations and provides high bi-directional repeatability, while the air bearing ensures excellent dynamic flatness over the full travel.

The stage adopts modularization, orthogonality design to integrate MZT standard module on XYZ horizontal H-type motion module for high accuracy, high stiffness linear motion and rotary motion in X, Z, T axes with 4 degrees of freedom.

The MZT uses the large-stroke maglev gravity compensation technology, which has the function of reducing the load of the vertical motor and greatly improving the vertical motion performance and lifetime.

The XY horizontal H-type motion module adopts aligned design between centers of gravity and motor forces as well as lightweight design techniques which reduce the eccentric heart impact on high-precision mechanical guide and improve the reliability and life of motion systems, as well as enable to bias correction for slightly panning Y1 and Y2 motors.

The platform can also be integrated on top of an active damping system module to further improve system performance.

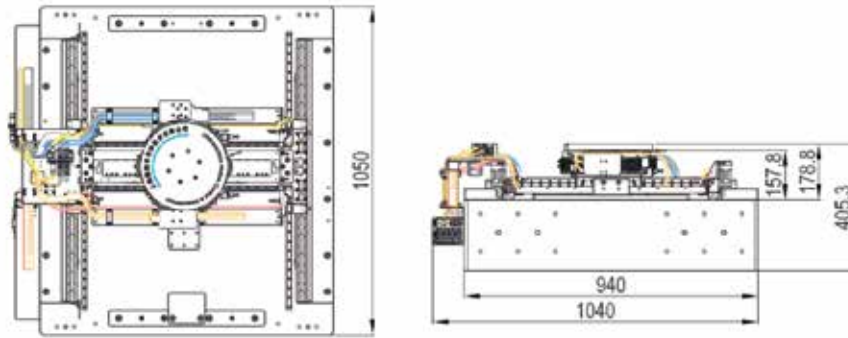
### Applications

- Wafer process control applications such as: optical critical dimension metrology and thin film metrology
- Wafer scribing, cleaning, and cutting
- Laser heat processing of wafer
- Lithography backend

### Features

- Integrated 5-axis stage with orthogonality design
- Flatness and straightness up to to sub- $\mu\text{m}$  level
- Hybrid application of mechanical guide and air-bearing guide
- X/Y axis
  - High stiffness, high precision guide
  - Consistent design of cable disturbing force
  - High-performance air-bearing guide for excellent dynamic flatness over the entire stroke
- Z-axis
  - Vertical maglev gravity compensation for high positioning accuracy
  - High stiffness, high precision guide
  - Ultra-thin, lightweight and modularization design
  - Vertical mechanical travel up to 30mm
- T-axis
  - 360°rotation, no tubing wrapping
  - 12', 8', 6' wafer applicable
  - Rotation velocity up to 150rpm

## Interface Definition



\*Interface dimensions from HS1000

## Technical Specifications

HS1000-00				
Axes name	X	Y1/Y2	Z	T
Travel range	320 mm	550 mm	10 mm	360 °, Infinite
Max. velocity	1.2 m/s	1.2 m/s	0.1 m/s	900 °/s
Max. acceleration	12 m/s <sup>2</sup>	12 m/s <sup>2</sup>	2 m/s <sup>2</sup>	6280 °/s <sup>2</sup>
Accuracy_indicative value	±10 μm	±10 μm	NA	±30 arcsec
Accuracy_calibration value	±1 μm	±1 μm	±0.6 μm	±3 arcsec
Bidirectional repeatability	±0.4 μm	±0.4 μm	±0.3 μm / 2 mm ±1 μm over range	±2 arcsec
Position stability (3σ) *	±25 nm*	±25 nm*	±15 nm*	±0.2 arcsec
Straightness	±2 μm over range	±1.5 μm over range	2 μm	NA
Flatness	±15 μm over range	±15 μm over range	NA	NA
Axial runout	NA	NA	NA	±1.5 μm
Radial runout	NA	NA	NA	±1.5 μm
<b>Mechanical properties</b>				
Moving mass (without payload)	15 Kg	30 Kg	5.5 Kg	NA
Max. load	2 Kg (customizable)			
Stage mass	666 Kg			
Dimensions	1040 mm × 1050 mm × 405.3 mm (size between Chuck adsorption surface and marble:157.8 mm)			

\*Technical data specified with 8μm pitch encoder.

## Customization Information

The series is configured with options that can be selected based on the user's actual application. Options include encoders, shock absorber, control system, and more.

Table 1 Encoder Options

-S1	Incremental analog optical linear encoder, 1Vpp, 20μm Pitch
-S2	Incremental digital optical linear encoder, TTL, 20μm Pitch
-S3	Absolute optical linear encoder, BISS, 20μm Pitch