

LinMAX B

Linear Motor Drive

Gantry Type High Speed 5-Axis Machine Center



Focus On High Speed & 5-Axis

- Stability
- Precision
- Strength



KEN ICHI MACHINE CO., LTD.

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LinmaxB

— LINEAR MOTOR DRIVE —

Gantry Type High Speed 5-Axis Machine Center

High Dynamic

- Gantry type
- Column One-piece design
- X/Y Linear motor drive
- Rapid feed rate 60m/min
- Box in Box symmetrical design
- Direct drive motor with two-axis milling head

Box in Box Symmetrical Design

Driven with the center of gravity

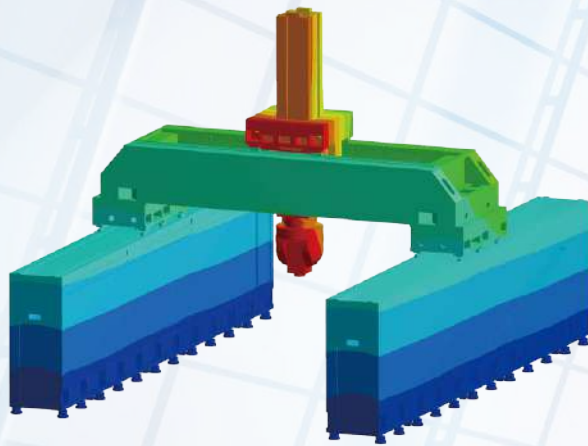
Minimized crossbeam deformation after long period of usage for reliable and rigidity

Application For

- Aerospace aluminum parts
- Automotive plastic injection mold, stamping die, die casting mold
- High-speed, high-precision components



The Optimal Structural Design High Performing Structure



- X/Y-axis equipped with linear motor drive
- B/C-axis equipped with torque motor drive
- Z-axis equipped with dual ball screw
- High rigidity one-piece column design
- Working table fixed to the foundation
- Advanced FEM analysis and design to optimize higher rigidity, response and provide stability for high speed cutting

Modular Structure to Satisfy Your Requests

- The column is one-piece design, high rigidity, high vibration resistance to ensure that the machine can reach excellent cutting and dynamic performance.



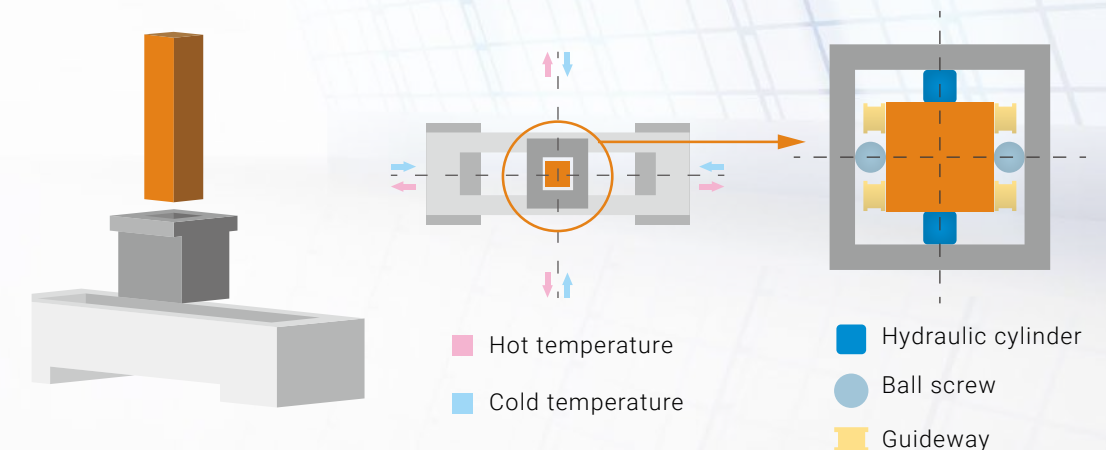
Box in Box Symmetrical Design More stability, more precision and more strength

Our System

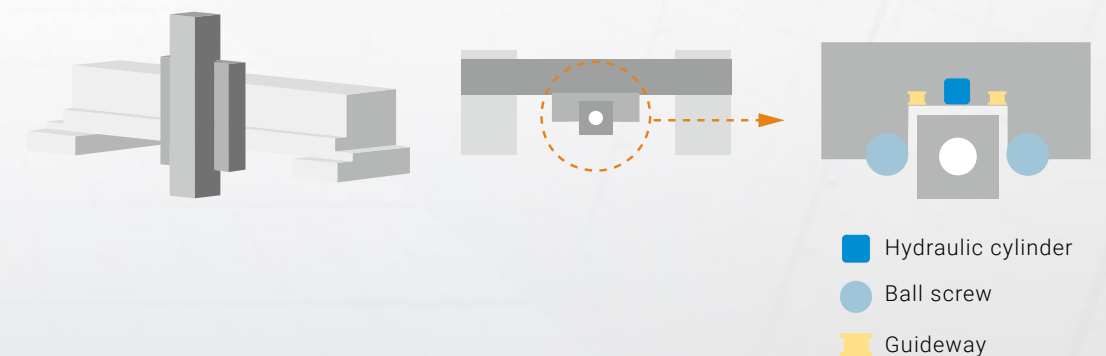
- Box in Box design has spindle locating at the center of crossbeam and saddle.
- Symmetrical construction makes the machine less susceptible to adverse ambient conditions. Heat deformation will be minimized even after long period of usage.
- Box in Box design ensures excellent precision during working hours.

Advantages of Box in Box Structural Design

- Y-axis with 4 linear guide ways ensure 2 tracks on XY plane and YZ plane to support Ram and Saddle. It helps reaching optimized dynamic characteristics.
- Z-axis equipped with 4 linear guide ways on 2 side of the slider. Each side undertakes the same cutting force, which balances design to enhance the machine lifetime and accuracy.
- Dual ball screw and dual counterbalance system in Z-axis. Its stable structure provides accurate high speed.



Other Manufacturers

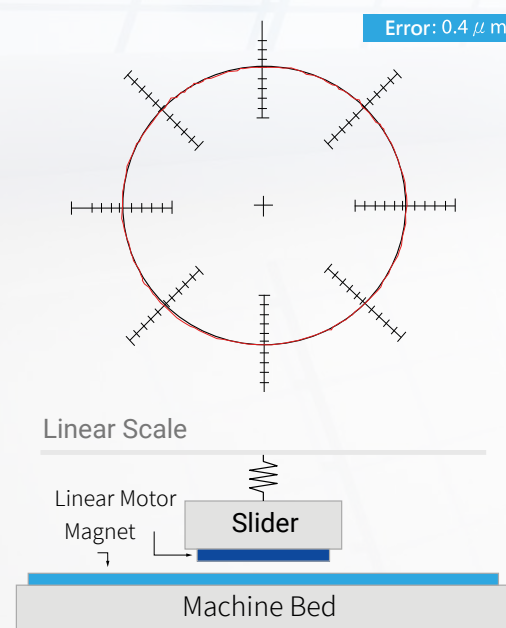


Linear Motor Drive The inevitable trend in the future

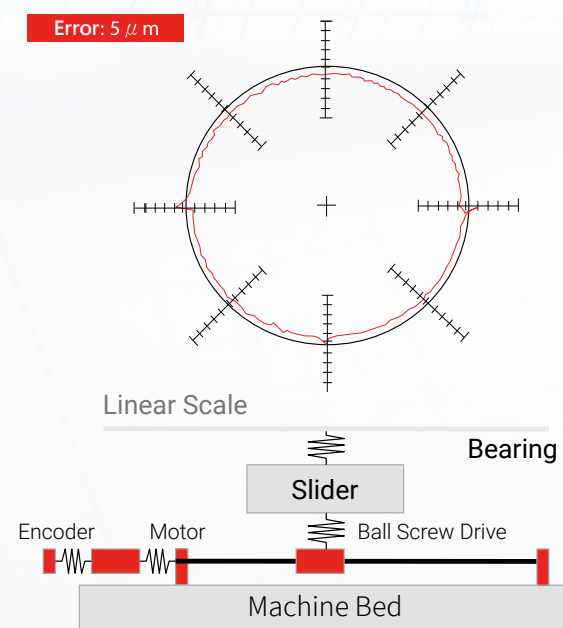
- Backlash free offers high positioning accuracy.
- Direct transmission
Reduced number of ball screw/nut, bearings and couplings.
- Free of wear due to friction free drive concept.
- Simple structure / long-term accuracy / easy maintenance.



Linear Motor VS Ball Screw



- Direct transmission
- System with high KV value
- Path of high precision
- No backlash



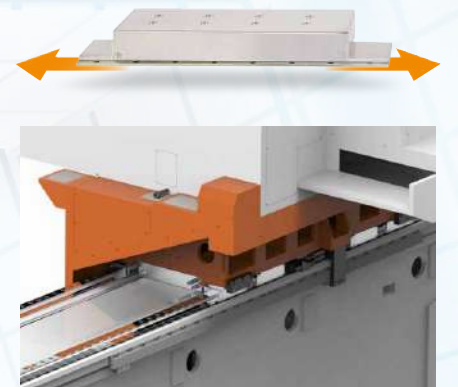
- Transmission chain length, the error is larger
- The path is less accurate
- Backlash exists

Source : Siemens laboratory testing

Excellent Design For 5-Axis High Speed Machine

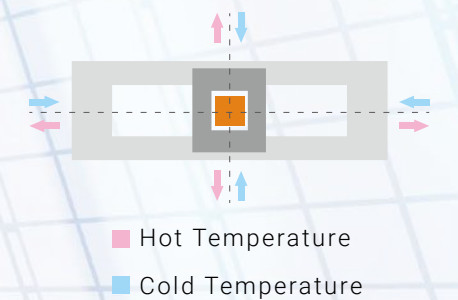
X-axis

- The column for the X-axis uses the linear motor without the belt or coupling to increase high accuracy and high speed movement.
- X-axis is supported by the left and right box column with each side using 2 roller linear guide ways. Each guide way has 4 blocks to increase rigidity and keep excellent accuracy for long time.
- Brakes will immediately clamp the axis in case of an emergency stop or power failure.



Y-axis

- Y-axis with symmetrical box in box design crossbeam will reduce the thermal deformation and minimize the effects from temperature.
- Y-axis uses linear motor without coupling. It directly transmits the force for saddle movement. It can produce a high speed response and high positioning accuracy.
- Y-axis crossbeam equipped with 4 linear roller guide ways; each guide way encloses 2 blocks. (Total 8 blocks) can reach higher rigidity.



Z-axis

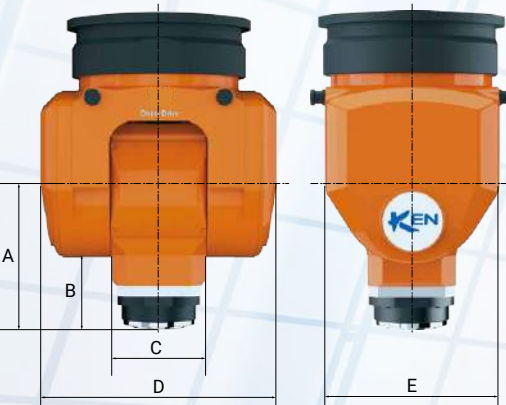
- Z-axis with symmetrical design to remain in the center of gravity. Ensures force to be evenly distributed during cutting and moving.
- Z-axis equipped with Dual ball screw & Dual counterbalance system features high stability during high speed cutting.
- Z-axis equipped with 4 roller linear guide ways to provide the best cutting rigidity.
- Reduced the thermal deformation and minimized the effects of temperature.



Torque Motor Milling Head

Torque Motor Direct Drive

- High feed rate, high acceleration & deceleration
- Backlash free offers high-positioning accuracy
- Simple structure, easy maintenance
- No ball screw, no worn gears,no belts and other wearable mechanism transmission



Precision Components



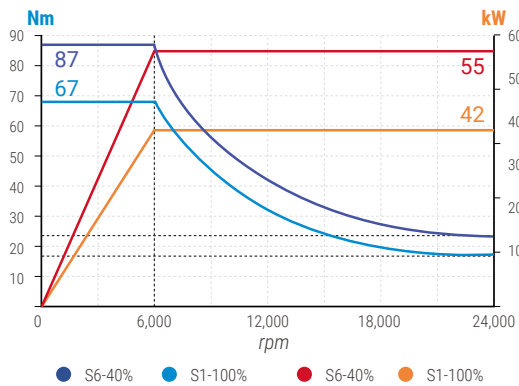
Unit: mm

	K2 (HSK-A63) 24,000rpm	K2 (HSK-A100) 15,000rpm	K2 (HSK-A100) 13,000rpm	TCH-25 (HSK-A100) 12,000rpm
A	260	295	342	345
B	89	124	171	120
C		230		265
D		616		673
E		405		495

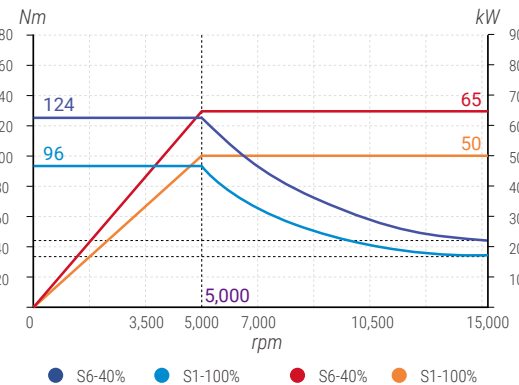
Milling Head (Torque Motor)		K2	TCH-25
Specification		B / C	
Max. rotation speed	rpm	50 / 50	
Max. rotation accerelation	rad/s²	30 / 30	
Max. rotation torque	Nm	1,422 / 1,396	1,450 / 1,400
Brake torque	Nm	5,000 / 5,000	10,500 / 5,400
Position accuracy	arc.sec	5 / 5	5 / 5
Rotate angle	degree	±102° / ±360°	±115° / ±360°

Spindle Specification

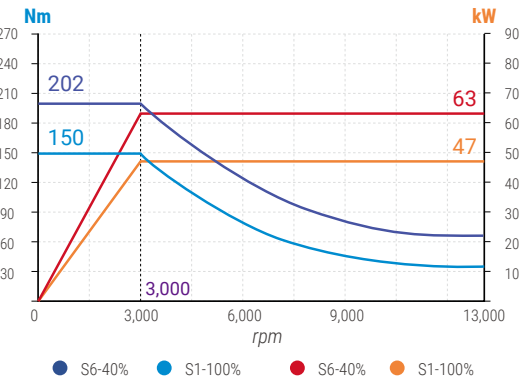
24,000 rpm (HSK-A63)			
Milling Head: K2			
Spindle power S1-100% (S6-40%)	kW	42	(55)
Spindle torque S1-100% (S6-40%)	Nm	67	(87)



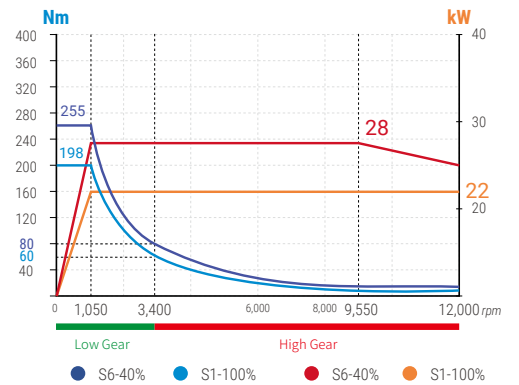
15,000 rpm (HSK-A100)			
Milling Head: K2			
Spindle power S1-100% (S6-40%)	kW	50	(65)
Spindle torque S1-100% (S6-40%)	Nm	96	(124)



13,000 rpm (HSK-A100)			
Milling Head: K2			
Spindle power S1-100% (S6-40%)	kW	47	(63)
Spindle torque S1-100% (S6-40%)	Nm	150	(202)

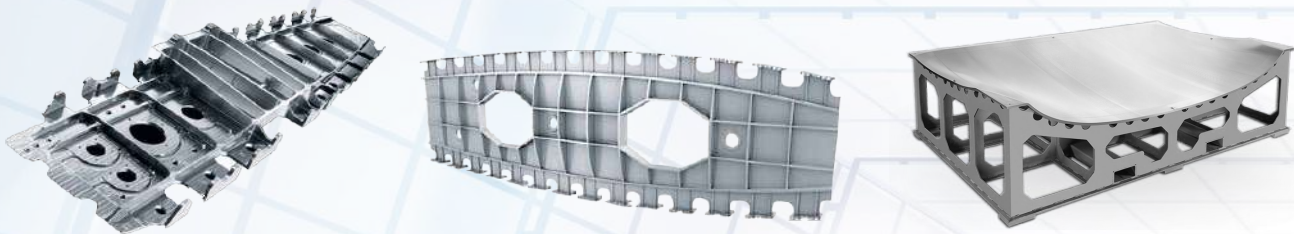


12,000 rpm (HSK-A100)			
Milling Head: TCH-25			
Spindle power S1-100% (S6-40%)	kW	22	(28)
Spindle torque S1-100% (S6-40%)	Nm	198	(255)

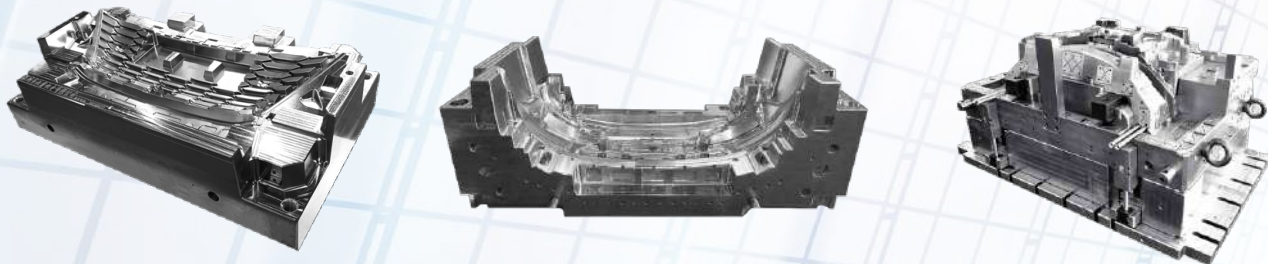


Application

Aerospace Aluminum Parts Tooling, wing ribs, body parts and etc.



Automotive Injection Mold Bumper, dashboard, front grill, panel and etc.



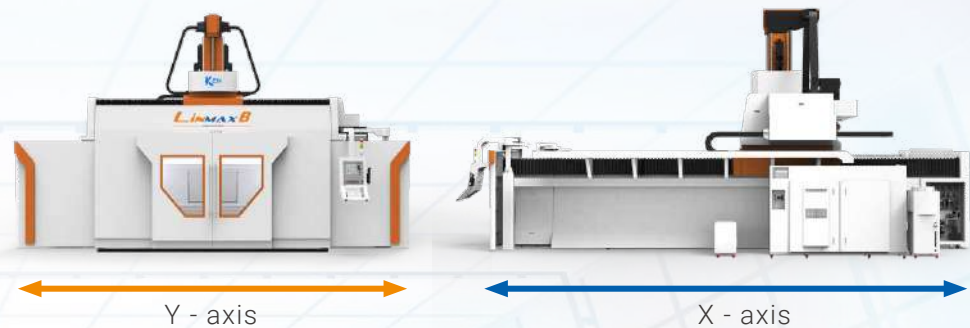
Automotive Stamping Die Engine hood, door, body side and etc.



Automotive Die Casting EV car frame, one-piece chassis, parts and etc.



Specification



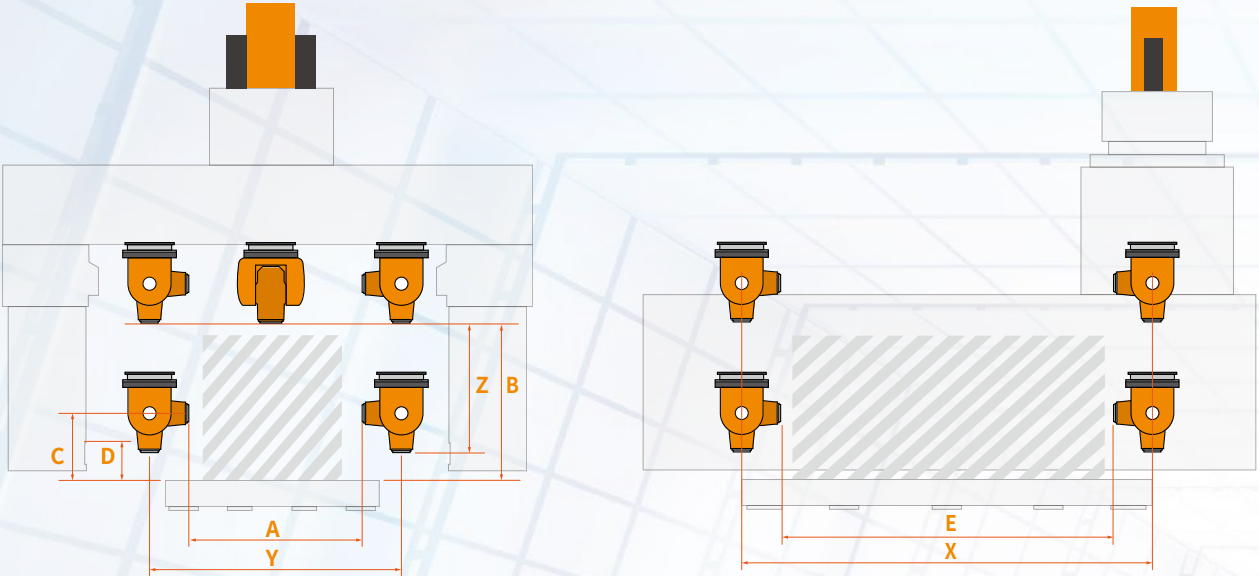
Model		LinmaxB				
		2200 series	2500 series	3000 series	3500 series	4000 series
Travel						
X-axis travel *1	mm	4,000	4,000 / 5,000	4,000 / 5,000	5,000 / 6,000	6,000 / 8,000
Y-axis travel	mm	2,200	2,500	3,000	3,500	4,000
Z-axis travel	mm	1,000 (opt. 1,250)				
Distance between spindle nose to table surface *2	mm	200 ~ 1,200 (opt. Z-axis 1,250 : 200 ~ 1,450)				
Distance between columns	mm	3,320	3,620	4,120	4,970	5,470
Table						
Table size (X-axis direction)	mm	as same as X-axis travel				
Table size (Y-axis direction)	mm	2,000	2,200	2,700	3,200	3,700
Width of T-slot / gap	mm	28 / 200				
Table load	kg/ m²	5,000				
Feed rate						
X / Y / Z-axis driven		Linear motor / Linear motor / Dual ball screws				
X / Y / Z-axis rapid feed rate	m/min	60 / 60 / 50				

*1 : Customized X-axis travel is available.

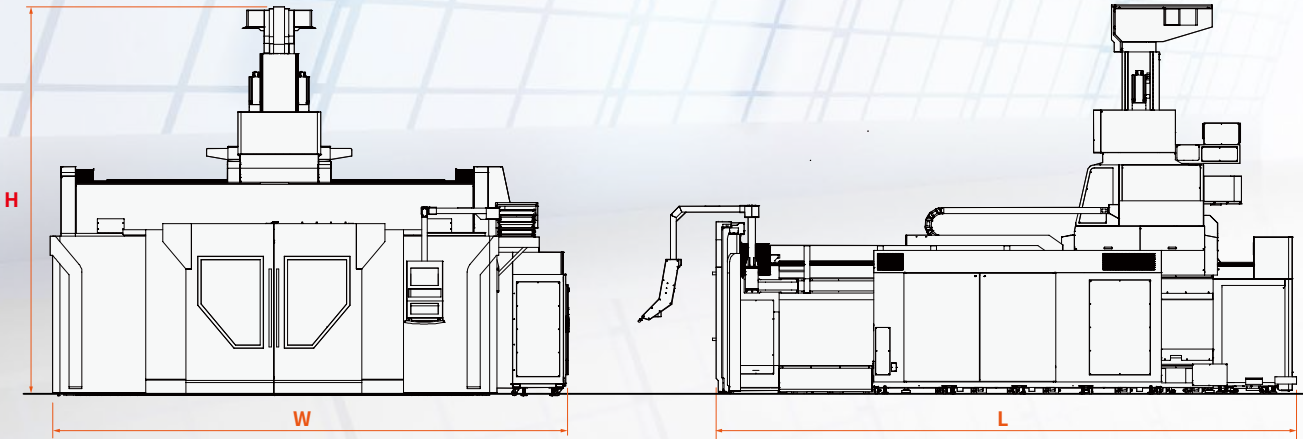
*2 : Standard milling head K2(A63). Others spec. please see page 12.

Automatic Tool Change		HSK-A63	HSK-A100
Suitable Milling Head		K2	K2 / TCH-25
Tool magazine	T	30 (opt. 60/90/120)	30 (opt. 60/90/120)
Max. tool weight	kg	7	15
Max. tool length	mm	350	350
Max. tool diameter	mm	Ø75	Ø125

Work Area



Machine Dimension



Model			LinmaxB									
			2232	2240	2540	2550	3040	3050	3550	3560	4060	4080
Description												
L	Length	mm	8,100	9,210	9,380	10,380	9,670	10,670	10,670	11,670	11,670	13,670
W	Width	mm	6,275		6,580		7,200		7,700		8,200	
H	Height	mm	5,200 (Z-axis 1,000) / 5,450 (Z-axis 1,250)									

Work Area

Model			LinmaxB					
			2200 series	2500 series	3000 series	3500 series	4000 series	
A	Distance between spindle nose to spindle nose Y-Direction	K2(A63)	mm	1,680	1,980	2,480	2,980	3,480
		K2(A100)	mm	1,610	1,910	2,410	2,910	3,410
		K2(A100)_202Nm	mm	1,516	1,816	2,316	2,816	3,316
		TCH-25(A100)_255Nm	mm	1,510	1,810	2,310	2,810	3,310
B	Distance between spindle nose to table surface (the highest)	K2(A63)	mm	1,200 (Z-axis 1,000) / 1,450 (Z-axis 1,250)				
		K2(A100)	mm	1,200 (Z-axis 1,000) / 1,415 (Z-axis 1,250)				
		K2(A100)_202Nm	mm	1,200 (Z-axis 1,000) / 1,368 (Z-axis 1,250)				
		TCH-25(A100)_255Nm	mm	1,150 (Z-axis 1,000) / 1,320 (Z-axis 1,250)				
C	Distance between spindle nose in 90 degree to table surface (the lowest)	K2(A63)	mm	460				
		K2(A100)	mm	495 (Z-axis 1,000) / 460 (Z-axis 1,250)				
		K2(A100)_202Nm	mm	542 (Z-axis 1,000) / 460 (Z-axis 1,250)				
		TCH-25(A100)_255Nm	mm	495 (Z-axis 1,000) / 415 (Z-axis 1,250)				
D	Distance between spindle nose to table surface (the lowest)	K2(A63)	mm	200 (Z-axis 1,000) / 200 (Z-axis 1,250)				
		K2(A100)	mm	200 (Z-axis 1,000) / 165 (Z-axis 1,250)				
		K2(A100)_202Nm	mm	200 (Z-axis 1,000) / 118 (Z-axis 1,250)				
		TCH-25(A100)_255Nm	mm	150 (Z-axis 1,000) / 70 (Z-axis 1,250)				
E	Distance between spindle nose to spindle nose X-Direction	K2(A63)	mm	X-axis - 520				
		K2(A100)	mm	X-axis - 590				
		K2(A100)_202Nm	mm	X-axis - 684				
		TCH-25(A100)_255Nm	mm	X-axis - 690				
X	X-axis travel*1	mm	X-axis (Chosen by customer)					
Y	Y-axis travel	mm	2,200	2,500	3,000	3,500	4,000	
Z	Z-axis travel	mm	1,000 (opt. 1,250)					

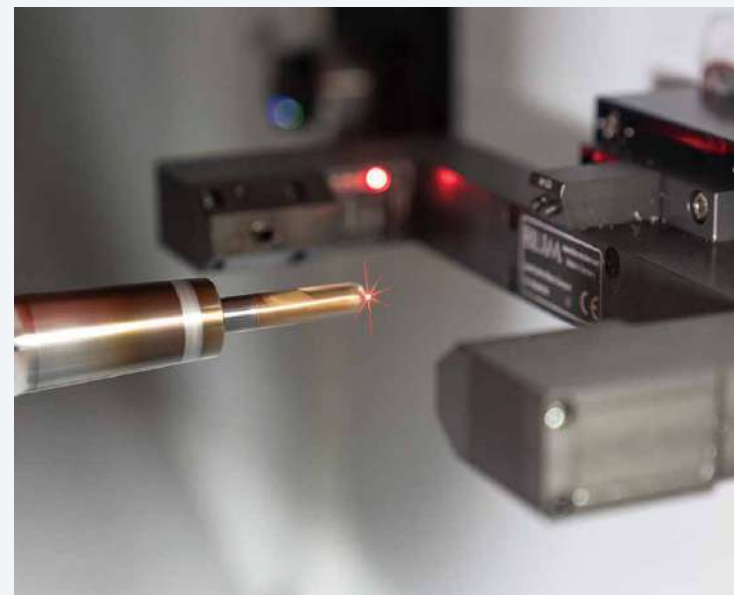
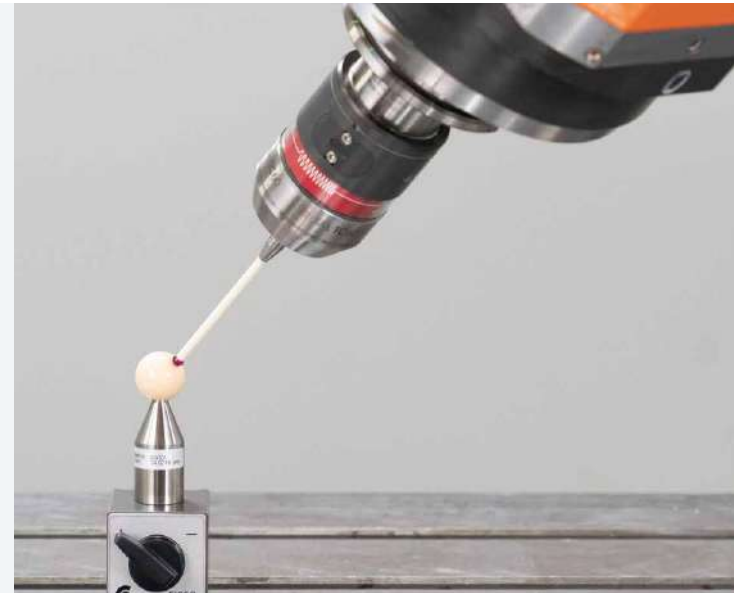
*1:Customized X-axis travel is available.

Standard Configuration

- HEIDENHAIN TNC-640 controller. (5-axis continuous)
- HEIDENHAIN handwheel-HR520
- Fork type Milling Head K2
Spindle:HSK-A63/87Nm/55kW/24,000rpm
- 30 tools magazine
- Linear motor drive on X/Y-axis
- Dual ball-screws drive on Z-axis
- 12 roller linear guide ways (X/Y/Z-axis each 4)
- B/C-axis high resolution angle encoder
- 4 HEIDENHAIN linear scale (2 sets for X-axis, Y/Z-axis each 1 set)
- Electric cabinet air conditioning system
- Cooler for X/Y Linear motors, milling head torque motors and spindle
- Spindle oil mist lubrication system
- Spindle coolant nozzles
- Cutting oil mist device
- Dual chip augers and one rear chip conveyor with a disposal cart
- Oil skimmer
- Paper type filter system
- Front and rear working door safety interlock
- Waterproof work light
- Electrical cabinet with filtration and ventilation installations and variety of electrical protection
- Used in all meta international system of units (SI) standards
- Protection devices complete and reliable, work area safety, according to ISO 12100-1 & -2 1992
- Machine standard paint

Option Configuration

- Fork Type Milling Head K2
Spindle:HSK-A100/124Nm/65kW/15,000rpm
Spindle:HSK-A100/202Nm/63kW/13,000rpm
- Fork Type Milling Head TCH-25
Spindle:HSK-A100/255Nm/28kW/12,000rpm
- SIEMENS controller (5-axis continuous)
- Wireless electronic handwheel HR550
- Automatic kinematics
5-axis compensation function
- HEIDENHAIN handwheel GPS (Global PGM Setting) function
- BLUM form control software
- BLUM laser for tool measuring system
- BLUM probe for workpiece measuring system
- 60 / 90 / 120 tools magazine
- Oil mist collector
- Automatic roof cover
- Coolant through spindle 20/30/40 bar
- Crossbeam flushing system
- Dual chip conveyor on both sides and one rear chip conveyor with a disposal cart
- Stainless steel interior sheet metal
- Transformer
- Voltage stabilizer



ALL SERIES MACHINES



GIANT
Moving Column Mobile Crossbeam Type
5-Axis Machine Center

Loader
Moving Column Type
5-axis Machine Center

SABER
Double Column High Torque
5-Axis Machining Center

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Horizontal
5-Axis Machining Center

ROTOR
High Speed
5-Axis Machine Center

FocusS
High Speed
5-Axis Machine Center

COMPACTB
Gantry Type High Speed
5-Axis Machine Center

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Gantry Type High Speed
5-Axis Machine Center

LinmaxBTwin
Double Gantry Type High Speed
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JET
Moving Column Type
5-Axis Profile Machine Center

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