

COMPACT B

Linear Motor Drive

Gantry Type High Speed 5-Axis Machine Center



KEN

Focus On High Speed & 5-axis

- Stability
- Precision
- Strength



KEN ICHI MACHINE CO., LTD.

www.kencnc.com

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Linear Motor Drive

Gantry Type High Speed 5-Axis Machine Center

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

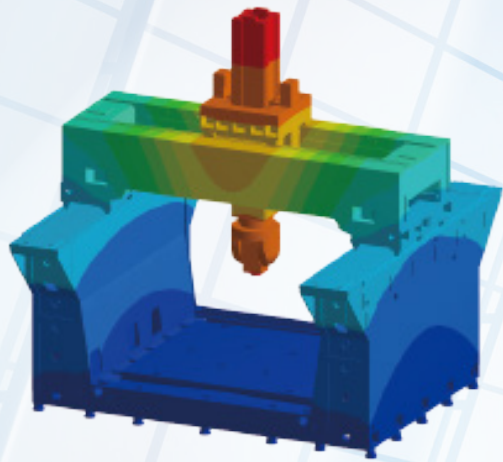
High Dynamic

- Gantry Type
- Box in Box Symmetrical Design
- U-shaped Column and Base Design
- X/Y-axis Linear Motor Drive
- Feed rate: 60 m/min
- Direct drive motor with 2-axis milling head



High Rigidity Structure

High performance structure



- Gantry type design, all axial components (X/Y/Z/B/C axis) is moving above of the column. The weight of work piece does not affect the machine performance.
- Optimal structural design for high speed.
- Advanced FEM analysis and design to optimize higher rigidity, response and provide stability of high speed cutting.

High Rigidity

U-shaped Column and Base

Improved overall structural rigidity.
Ensured the stability of precision and mechanical performance.



Box in Box Symmetrical Design

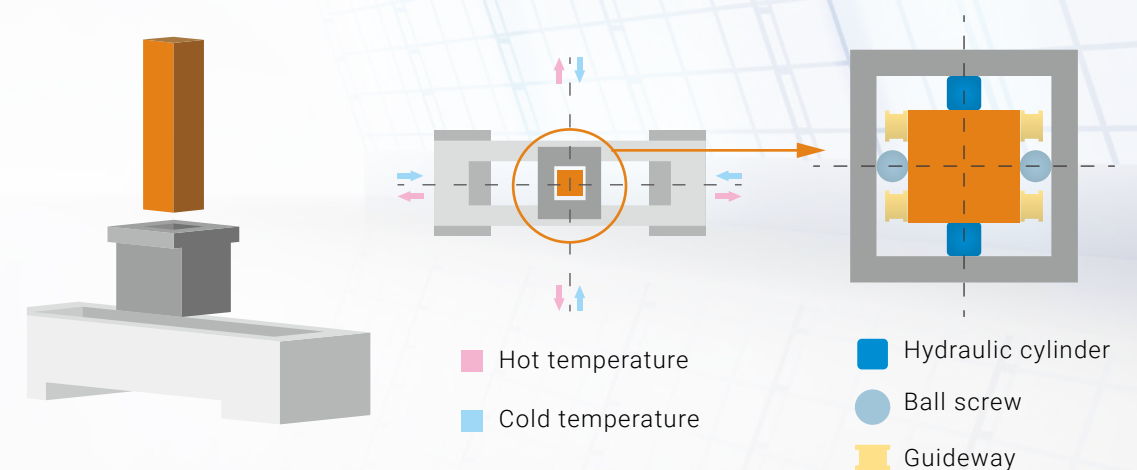
More stability, more precision and more strength

Our System

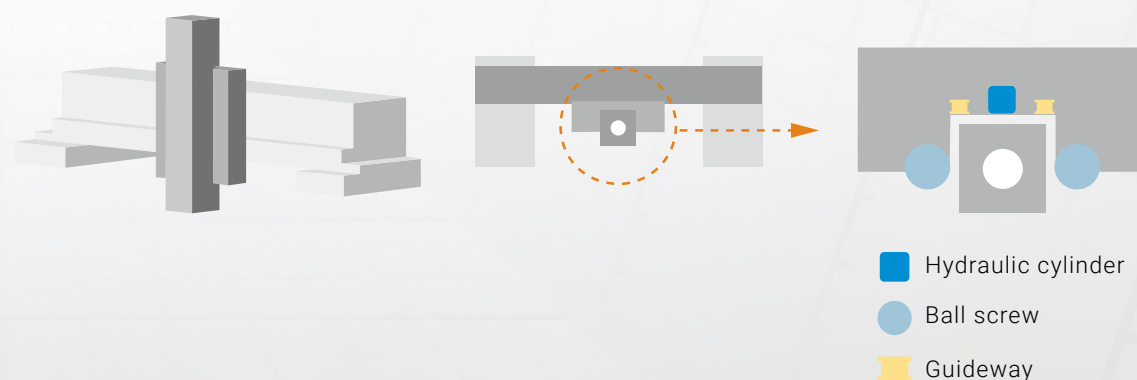
- Box in Box design has spindle locating at the center of crossbeam and Saddle.
- Symmetrical construction makes the machine less susceptible to adverse ambient conditions. Heat deformation will be minimized even after long period of usage.
- Box in Box design ensures excellent precision during working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



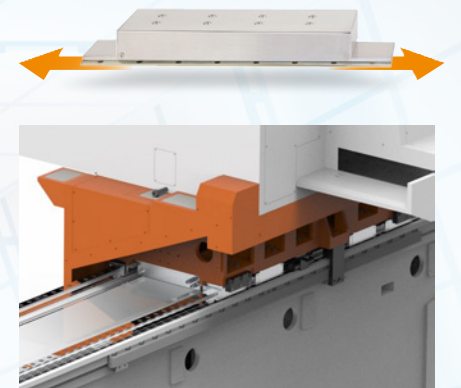
- Backlash free offers high positioning accuracy.
- Direct transmission
Reduced number of ball screw/nut, bearings and couplings.
- Free of wear due to friction free drive concept.
- Simple structure / long-term accuracy / easy maintenance.



Excellent Design For 5-Axis High Speed Machine

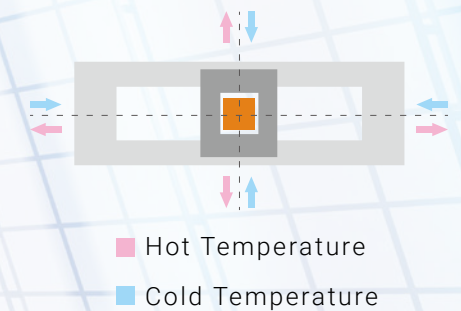
X-axis

- 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 3 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.

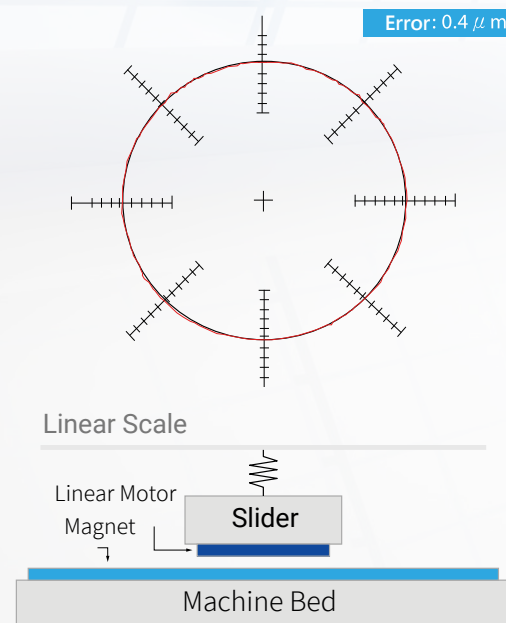


Y-axis

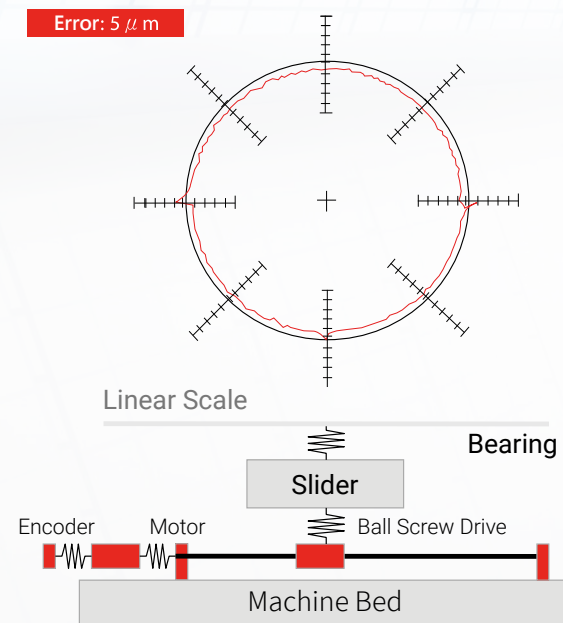
- Y-axis with symmetrical box in box design crossbeam will reduce the thermal deformation and minimize the effects from temperature.
- Y-axis uses linear motor without coupling. It directly transmits the force for saddle movement. It can produce a high speed response and high positioning accuracy.
-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



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

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.



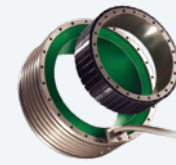
Torque Motor Milling Head

Torque Motor Direct Drive

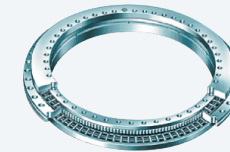
- High feed rate, high acceleration & deceleration
- Backlash free offers high-positioning accuracy
- Simple structure, easy maintenance
- No ball screw, no worn gears, no belts and other wearable mechanism transmission



Precision Components



Torque Motor



Cross Roller Bearing



Encoder



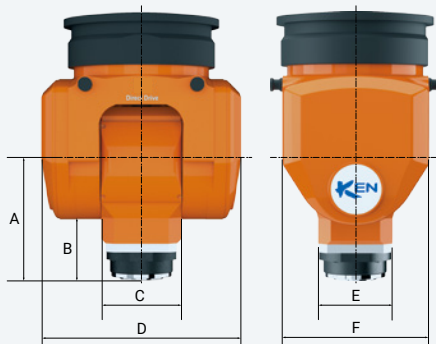
Fork Type Modular Design

High Rigidity,
Dual Side Bearing Support

- Fast and convenient maintenance, low maintenance cost.
- High rigidity cross roller bearings on B/C-axis ensure high accuracy and rigidity of milling head.
- High braking torque on B/C-axis can satisfy any position of the milling requirements.

Unit: mm

	TCH-19 (A63)	TCH-19 (A100)	TCH-19 (A63)	TCH-19 (A100)
A	323	358	D	567
B	148	185	E	235
C	205		F	405



Milling Head (Torque Motor)		TCH-19
Specification		B / C
Max. rotation speed	rpm	50 / 50
Max. rotation acceleration	rad/s ²	30 / 30
Max. rotation torque	Nm	1,100 / 900
Brake torque	Nm	4,000 / 4,000
Position accuracy	arc.sec	5 / 5
Rotate angle	degree	±100°/±360°

Side Type

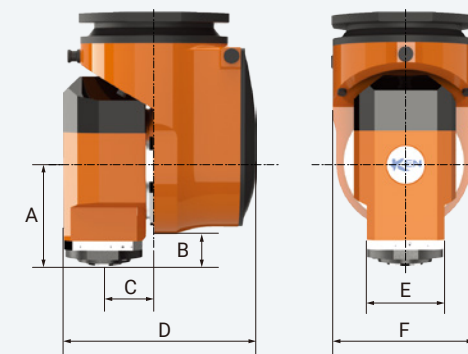
Specify for Plastic Injection Mold

Compact Design,
Low Interference

- Torque motor direct drive on A/C-axis with high torque and high precision performance.
- High braking torque on A/C-axis can satisfy any position of the milling requirements.

Unit: mm

	TCH-L13 (A63)	L15 (A63)	L15 (A100)	TCH-L13 (A63)	L15 (A63)	L15 (A100)
A	340	233	268	D	489	526
B	170	43	78	E	210	210
C	135	135	135	F	400	400

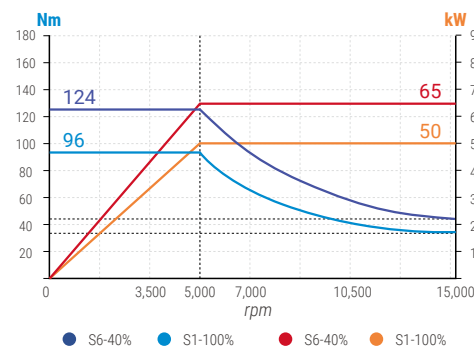


Milling Head (Torque Motor)		TCH-L13	L15
Specification		A / C	A / C
Max. rotation speed	rpm	50 / 50	50 / 50
Max. rotation acceleration	rad/s ²	15 / 15	30 / 30
Max. rotation torque	Nm	312 / 442	500 / 500
Brake torque	Nm	2,000 / 2,000	4,000 / 4,000
Position accuracy	arc.sec	5 / 5	5 / 5
Rotate angle	degree	±105°/±250°	±115°/±360°

15,000 rpm (HSK-A100)

Milling Head: TCH-19 / L15

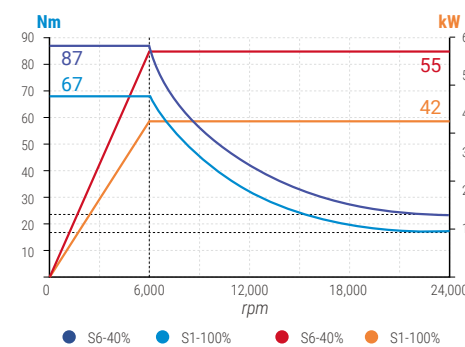
Spindle power S1-100% (S6-40%) kW 50 (65)
Spindle torque S1-100% (S6-40%) Nm 96 (124)



24,000 rpm (HSK-A63)

Milling Head: TCH-19 / L15

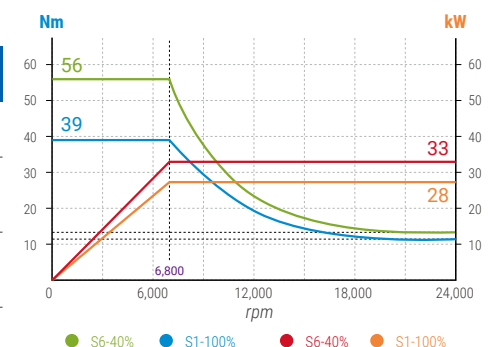
Spindle power S1-100% (S6-40%) kW 42 (55)
Spindle torque S1-100% (S6-40%) Nm 67 (87)



24,000 rpm (HSK-A63)

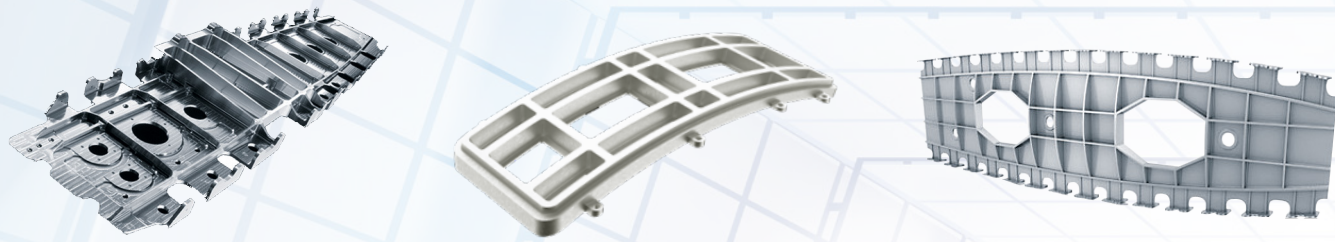
Milling Head: TCH-L13

Spindle power S1-100% (S6-40%) kW 28 (33)
Spindle torque S1-100% (S6-40%) Nm 39 (56)

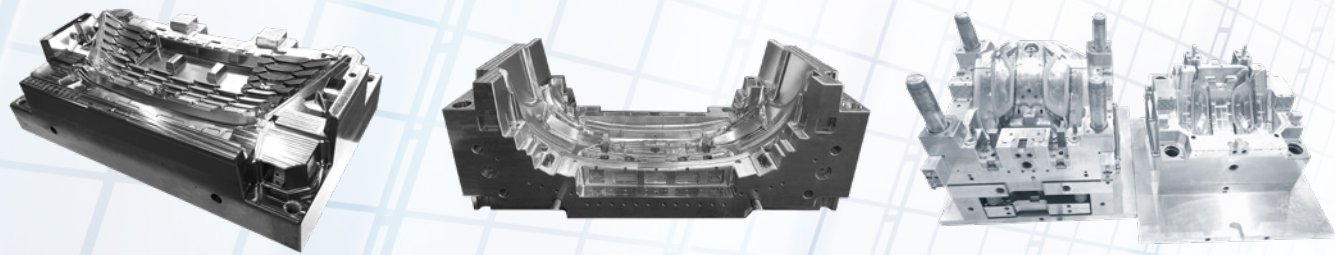


Applications

Aerospace Aluminum Frame Floor, wing ribs, hatch door & etc.



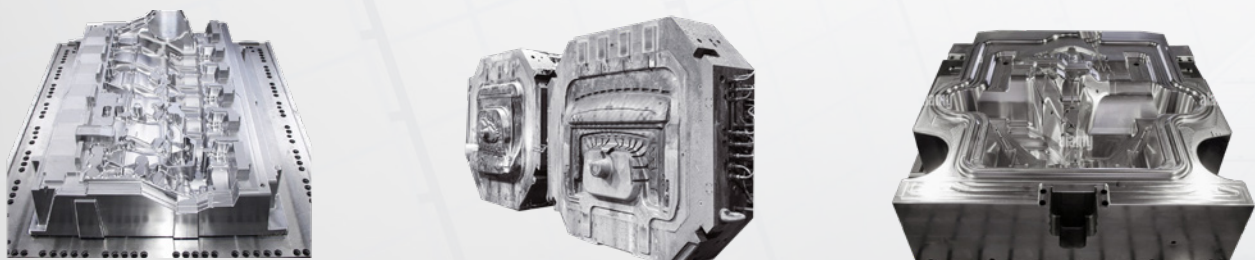
Automotive Plastic Injection Mold Bumper, front grill, panel and etc.



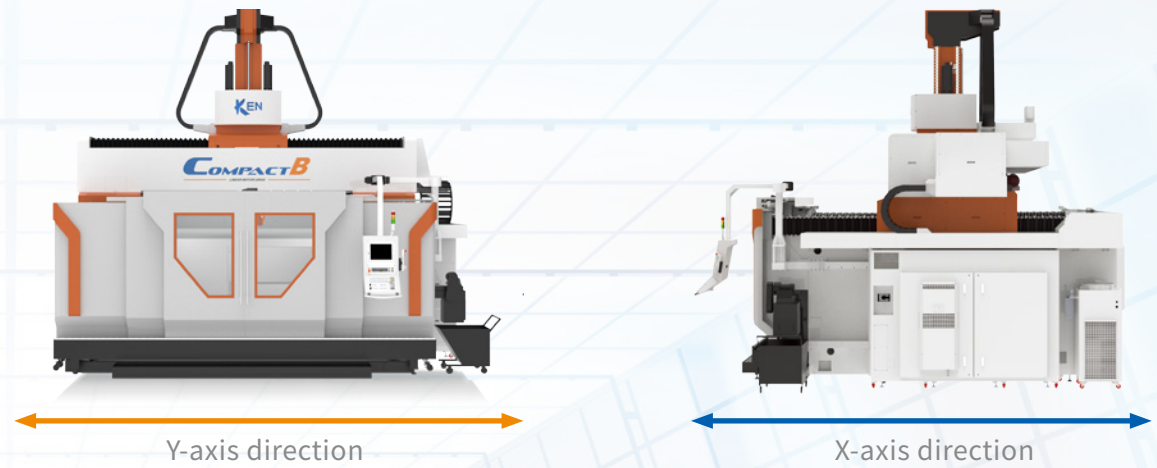
Automotive Stamping Die Fender, door, trunk lid and etc.



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



Machine Specifications

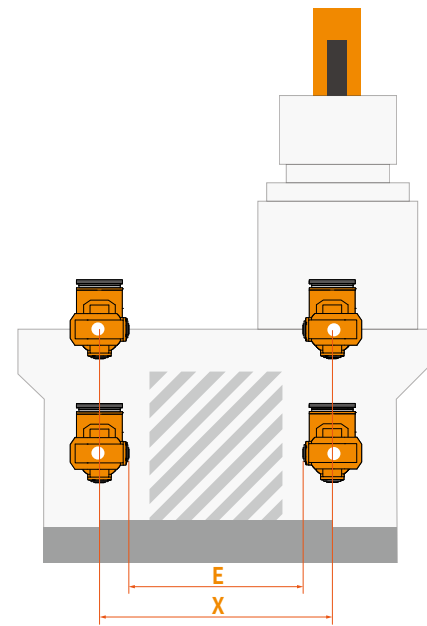
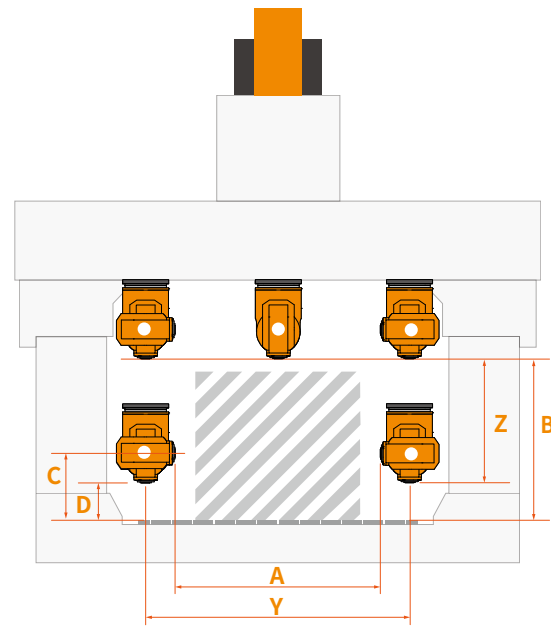


Machine Model		CompactB 2520	CompactB 3020
Travel			
X-axis travel	mm	2,000	2,000
Y-axis travel	mm	2,500	3,000
Z-axis travel	mm	1,000 (opt:1,250)	
Spindle nose to table distance*1	mm	350 ~ 1,350 (opt Z-axis 1,250 : 250 ~ 1,500)	
Distance between two columns	mm	3,395	3,895
Table			
Table (X-axis direction)	mm	2,000	2,000
Table (Y-axis direction)	mm	2,500	3,000
T-slot	mm	22	22
Table load	kg/ m ²	5,000	5,000
Feedrate			
X/Y/Z-axis drives		Linear Motor / Linear Motor / Dual Ball Screw	
X/Y/Z-axis feedrate	m/min	60/60/50	60/60/50

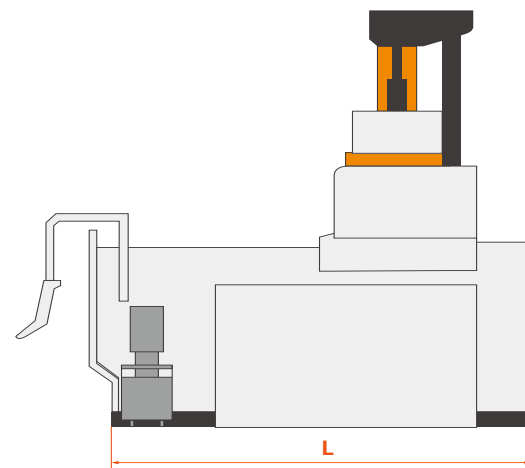
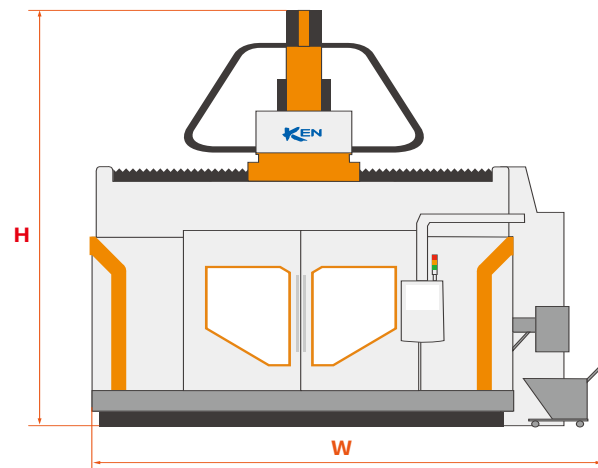
*1 : Standard Configuration is with TCH-L13 (A63), other milling head please review p.12

Automatic Tool Change		HSK-A63	HSK-A100
Suitable Milling Head		TCH-L13 / L15 / TCH-19	L15 / TCH-19
Tool capacity	T	30 (opt: 60)	30 (opt: 60)
Max. tool weight	kg	7	15
Max. tool length	mm	350	350
Max. tool diameter	mm	Ø75	Ø125

Work Area



Machine Dimension



Machine Model			CompactB 2520	CompactB 3020
L	Length	mm	6,130	6,130
W	Width	mm	6,280	6,780
H	Height	mm	5,540 (Z-axis 1,000) 5,690 (Z-axis 1,250)	5,540 (Z-axis 1,000) 5,690 (Z-axis 1,250)

Work Area

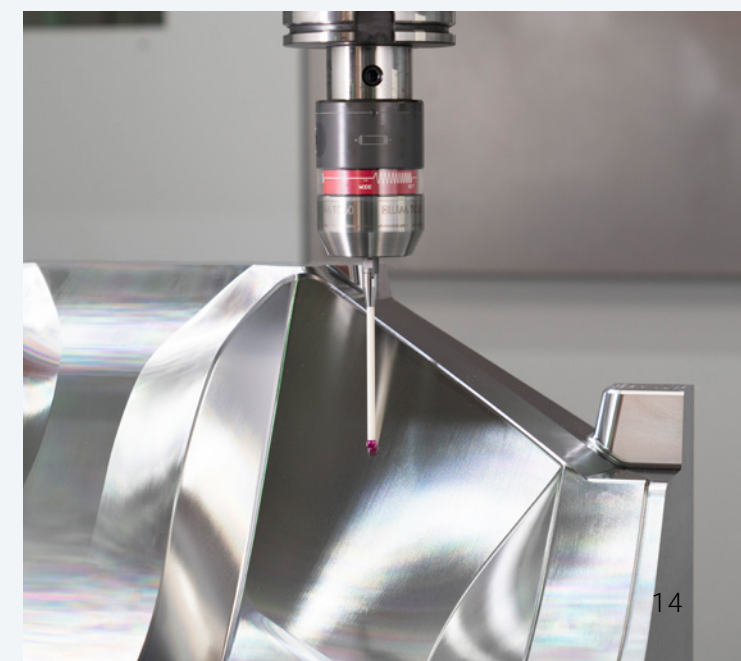
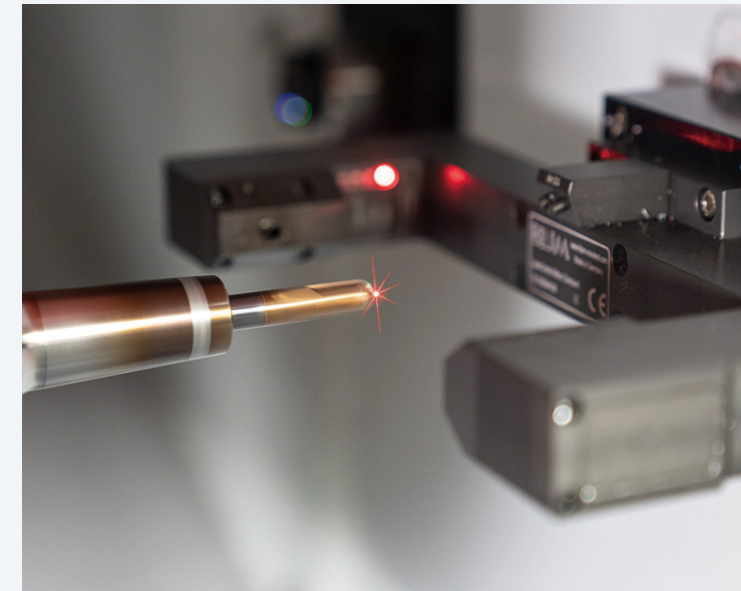
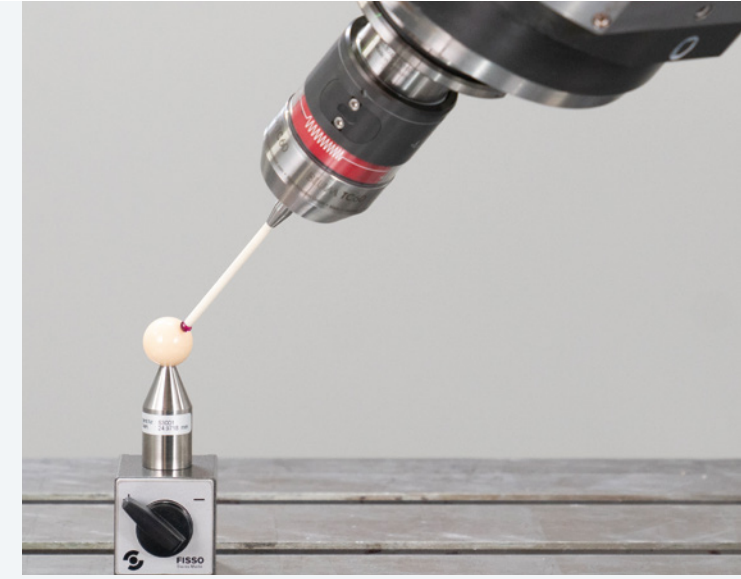
Machine Model			CompactB 2520	CompactB 3020	
A	Y-axis distance (A/B-axis 90°)	TCH-L13(A63)	mm	1,820	2,320
		L15(A63)	mm	2,034	2,534
		L15(A100)	mm	1,964	2,464
		TCH-19(A63)	mm	1,854	2,354
		TCH-19(A100)	mm	1,784	2,284
B	Z-axis opening height	TCH-L13(A63)	mm	1,350 (Z-axis 1,000) 1,500 (Z-axis 1,250)	
		L15(A63)	mm		
		L15(A100)	mm		
		TCH-19(A63)	mm		
		TCH-19(A100)	mm		
C	Z-axis distance (A/B-axis 90°)	TCH-L13(A63)	mm	690 (Z-axis 1,000) / 590 (Z-axis 1,250)	
		L15(A63)	mm	583 (Z-axis 1,000) / 483 (Z-axis 1,250)	
		L15(A100)	mm	618 (Z-axis 1,000) / 518 (Z-axis 1,250)	
		TCH-19(A63)	mm	673 (Z-axis 1,000) / 573 (Z-axis 1,250)	
		TCH-19(A100)	mm	673 (Z-axis 1,000) / 573 (Z-axis 1,250)	
D	Spindle to table distance	TCH-L13(A63)	mm	350 (Z-axis 1,000) / 250 (Z-axis 1,250)	
		L15(A63)	mm		
		L15(A100)	mm		
		TCH-19(A63)	mm		
		TCH-19(A100)	mm		
E	X-axis distance (A/B-axis 90°)	TCH-L13(A63)	mm	1,320	
		L15(A63)	mm	1,534	
		L15(A100)	mm	1,464	
		TCH-19(A63)	mm	1,354	
		TCH-19(A100)	mm	1,284	
X	X-axis travel	mm	2,000	2,000	
Y	Y-axis travel	mm	2,500	3,000	
Z	Z-axis travel	mm	1,000 (1,250)	1,000 (1,250)	

Standard Configuration

- HEIDENHAIN TNC-640 controller. (5-axis continuous)
- HEIDENHAIN handwheel-HR520
- Side Type Milling Head TCH-L13(A63)
- European Spindle HSK-A63/56Nm/33kW/24,000rpm
- 30 tools magazine
- X/Y-axis linear motor drive
- Z-axis adopt double server motor with dual ball screws drive
- 12 roller linear guide ways(X/Y/Z each 4)
- A/C Axis high resolution angle encoder
- 4 HEIDENHAIN linear scale (2 sets for X-axis, Y/Z-axis each 1 set)
- Cooler for X/Y Linear motors, milling head torque motors and spindle
- Cutting oil mist device
- Spindle coolant nozzles
- Spindle oil mist lubrication system
- Twin chip augers and front chip conveyor with a disposal cart
- Sub-coolant tank with filter system
- Oil skimmer
- Front and rear working door safety interlock
- Waterproof work light
- Electrical cabinet with air-conditioning system, 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

- Side Type Milling Head L15 HSK-A63/87Nm/55kW/24,000rpm HSK-A100/124Nm/65kW/15,000rpm
- Fork Type Milling Head TCH19 HSK-A63/87Nm/55kW/24,000rpm HSK-A100/124Nm/65kW/15,000rpm
- 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 tool measuring system
- BLUM probe for workpiece measuring system
- 60 tools magazine
- Coolant through spindle 20/30/40/50 bar
- Oil mist collector
- Automatic roof cover
- Stainless steel interior sheet metal
- Transformer
- Voltage stabilizer



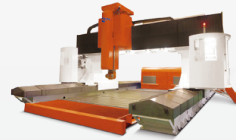
ALL SERIES MACHINES



JET
Moving Column Type
5-Axis Profile Machine Center



GIANT
Moving Column Mobile Crossbeam Type
5-Axis Machine Center



Loader
Moving Column Type
5-axis Machine Center



LinmaxBTwin
Double Gantry Type High Speed
5-Axis Machine Center



LinmaxB
Gantry Type High Speed
5-Axis Machine Center



CompactB
Gantry Type High Speed
5-Axis Machine Center



FocusS
Double Column
5-Axis Machine Center



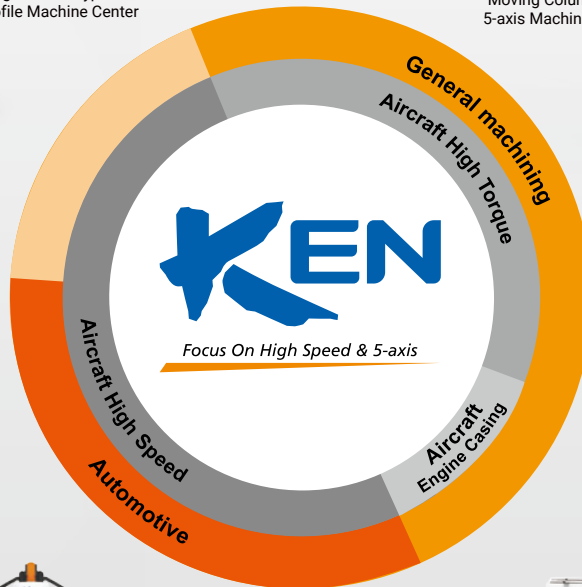
SABER
Double Column High Torque
5-Axis Machining Center



RHINO
Horizontal High Torque
5-Axis Machine Center



FocusSR
Double Column
5-Axis Machine Center



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