

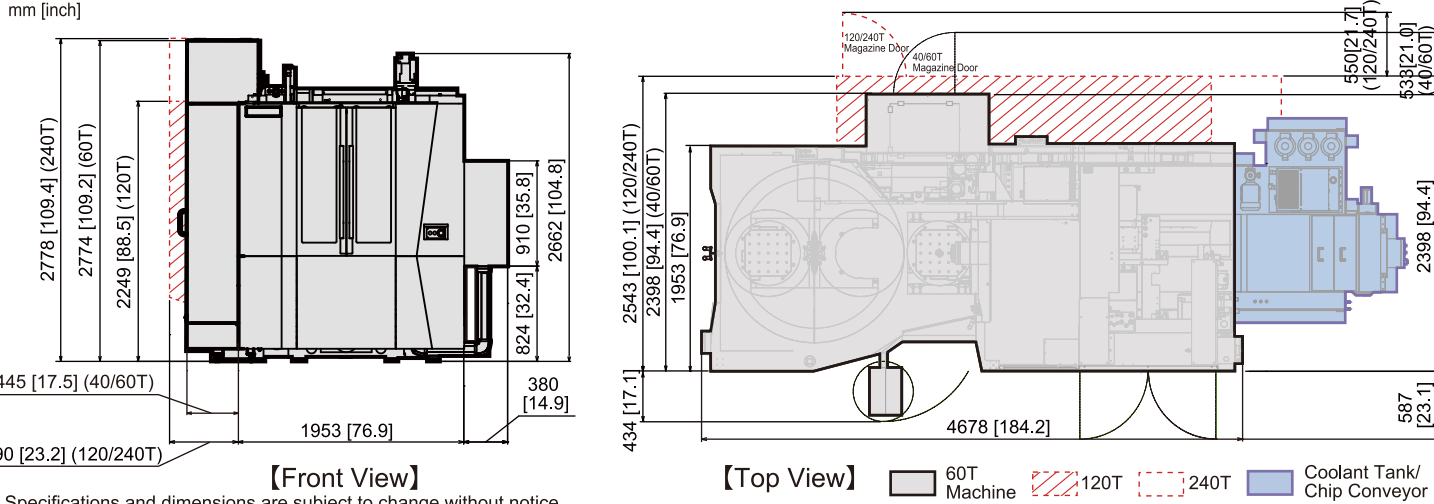
KH-4500kai

● TRAVEL			● AUTOMATIC TOOL CHANGER		
X, Y, Z axes	mm [inch]	700x740x680 [27.6x29.1x26.8] for 12,000/15,000min ⁻¹ (OP. 640x740x680 [25.2x29.1x26.8] for 20,000min ⁻¹)	Type of tool shank	BT40/CAT40 for 12,000/15,000min ⁻¹ (OP. HSK-A63 for 15,000/20,000min ⁻¹)	
			Type of pull-stud	JIS	
			Number of tools	40 (OP. 60 / 120 / 240)	
Spindle center to pallet surface	mm [inch]	50-790 [2.0-31.1]	Max. tool diameter (Adjacent pots full/empty)	mm [inch]	Dia. 70 [2.8] / Dia. 140 [5.5] for 40/60ATC Dia. 95 [3.7] / Dia. 185 [7.2] for 120/240ATC
Spindle nose to pallet center	mm [inch]	100-780 [3.9-30.7]	Max. tool length	mm [inch]	400 [15.7]
Pallet top height (from the floor)	mm [inch]	1,069 [42.1]	Max. tool weight	kg [lbs]	8 [17.6]
● PALLET			● MOTOR		
Pallet size (x 2 pallets)	mm [inch]	400x400 [15.7x15.7] (OP. 500x500 [19.7x19.7])	Spindle motor	kW [hp]	37/15 [50/20] for 12,000/15,000min ⁻¹ 25/22 [34/30] for 20,000min ⁻¹
Max. work piece diameter	mm [inch]	Dia. 750 [29.5]	Feed axes motors (X/Y/Z/B)	kW [hp]	4.5/4.5/4.5/2.7 [6.0/6.0/6.0/3.6]
Min. work piece height	mm [inch]	1,000 [39.4]	Lubrication pump motor	W [hp]	Oil: 18 [0.024] / Grease: 20 [0.027]
Max. load	kg [lbs]	500 [1,102]	Hydraulic pump	kW [hp]	2.2 [2.9]
Configuration	mm [inch]	25-M16 P=80 [3.1] (OP. P=100 [3.9] for 500mm pallet)	● SUPPLY		
Min. indexing degree	degrees	0.001	Electric voltage	V	200-220 (50/60Hz)
Indexing speed	sec./90 degrees	1.1	Electric power supply	KVA	50
Pallet clamping force/clamping system	kN	9.8 x4 cones / Mechanical lock	Air pressure	MPa [psi]	0.4 [58]
B-axis clamping torque	Nm	5,000	Air volume	liters [gal] / min.	360 [95]
● SPINDLE			● TANK		
Spindle speed	min ⁻¹	12,000 Direct drive (OP. 15,000 Direct drive / 20,000 Built-in)	Hydraulic unit tank	liters [gal]	20 [5.3]
Spindle rated torque	Nm	249 for 12,000/15,000min ⁻¹ (OP. 200 for 20,000min ⁻¹)	Coolant tank	liters [gal]	660 [174.4]
Spindle taper		ISO 7/24 Taper NT No.40	Lubrication tank	liters [gal]	Oil: 1.8 [0.5] / Grease cartridge: 0.7 [0.2]
● FEED			● SIZE		
Rapid feed (X/Y/Z)	mm/min. [ipm]	80,000 [3,150]	Floor space	mm [inch]	2,778x 4,678 [109.4x184.2] (2APC+40/60ATC) 2,923x 4,678 [115.1x184.2] (2APC+120ATC)
Cutting feed	mm/min. [ipm]	30,000 [1,181]	Machine height	mm [inch]	2,774 [109.2] (60ATC), 2,662 [104.8] (40/120ATC)
Table rotating speed	min ⁻¹	66.6	Machine weight	kg [lbs]	8,650 [19,030] (2APC+60ATC) 9,400 [20,680] (2APC+120ATC)
Acceleration (X/Y/Z)	G	1.0 / 1.0 / 1.0			
● AUTOMATIC PALLET CHANGER					
Number of pallets		2 (OP. 6 / 8)			
Pallet change system		Rotation			
APC time (Unclamp-Clamp)	sec.	7.5			

FANUC 31i-B Plus ● Standard Features □ Options

- Simultaneously controllable axes: 4 axes
 - Spindle override 50- 150% (each 10%)
 - Cutting feed override 0 - 200% (each 10%)
 - Rapid traverse rate override 1,2,4,8,15,25,50,100%
 - Rapid traverse bell-shaped acceleration/deceleration
 - Position switch
 - Manual handle feed 1 unit
 - Thread cutting, synchronous cutting
 - Workpiece coordinate system
 - Addition of workpiece coordinate system 48 sets
 - Programmable data input G10
- Custom macro
 - Canned cycles for drilling
 - Rigid tapping
 - Tool offset: 400 pcs
 - Tool radius/Tool nose radius compensation
 - Stored pitch error compensation
 - Part program storage: 4MB
 - Number of registrable programs: 1,000 pcs
 - Background editing
 - Run hour and parts count display
 - Helical interpolation
- AICCII + Expansion (400 look-ahead blocks)
 - Automatic corner override
 - Tool offset memory C
 - Tool life management function
 - Scaling
 - Single direction positioning
 - Optional chamfering/corner R
 - Programmable mirror image
 - Coordinate system rotation
 - Optional block skip
 - Cylindrical interpolation

MACHINE SIZE



Shipment of this machine requires the Japanese government's approval.

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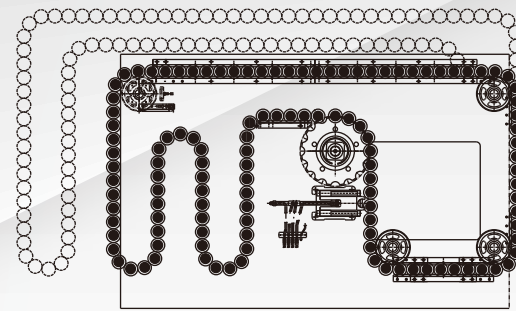
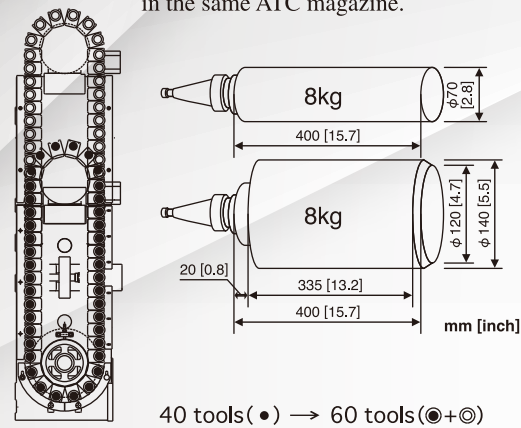
KIWA Japan
KH-4500kai
Horizontal Machining Center



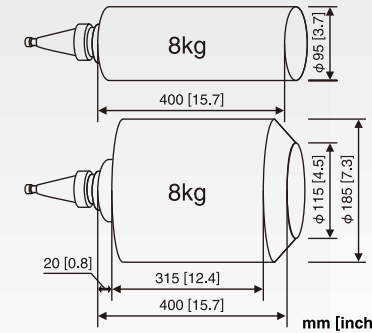
KIWA MACHINERY CO., LTD.

Expandable ATC

Kiwa's ATC system is expandable in the same ATC magazine.



120 tools (●) → 240 tools (●+○)



KIWA Japan

KH-4500kai

Horizontal Machining Center

kai | 魁

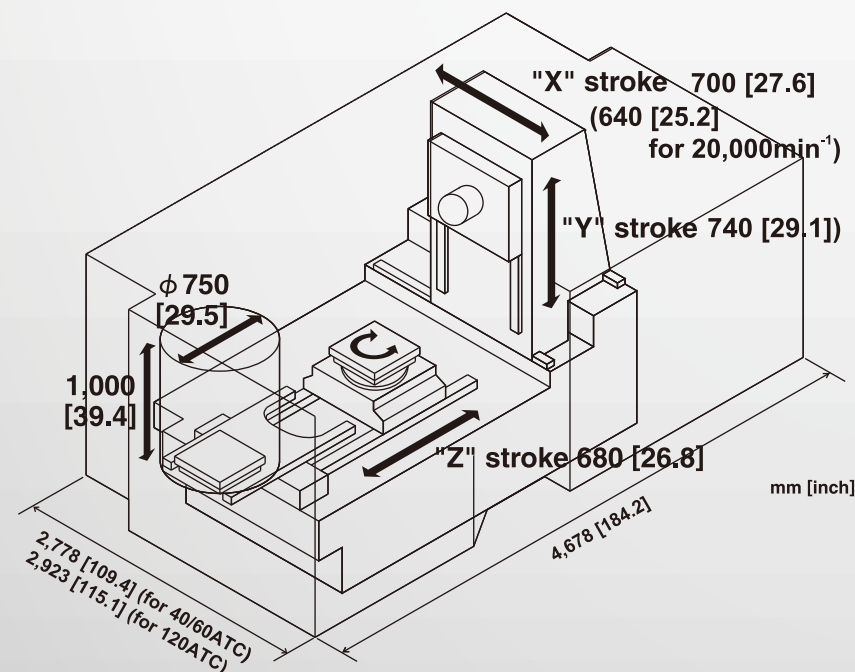
The KH-4500kai is the latest generation model of the KH-4500 series. Kiwa put a lot of meanings into the new model name, KH-4500kai.

kaizen 改善 = improvement

kaiyo 改良 = enrichment

kaiaku 改革 = innovation

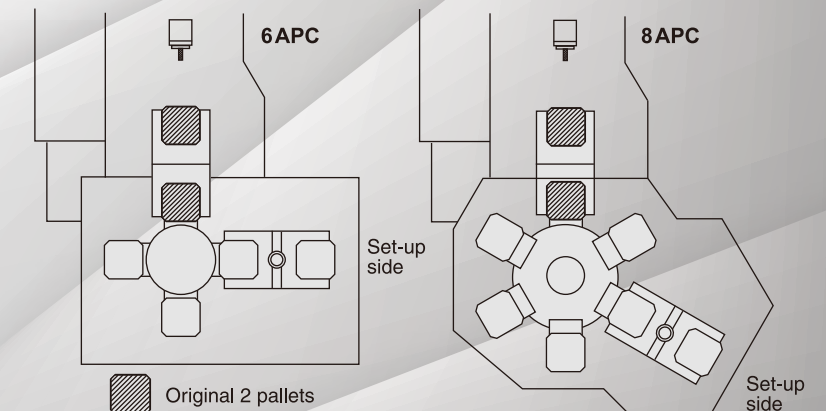
Kiwa expresses **kai** as 魁 in a Japanese character (KANJI). 魁 also has various meanings, such as Pioneer, Leader, taking the Initiative, Forerunner, to be the First (to do anything) etc.



- Rear Chip Management Design
- Expandable APC and ATC, field installable
- Smaller Footprint, Larger Machine Capacities

Expandable APC

The APC system can be also expanded from the standard 2APC to 6 or 8 pallets in the field.



Expandability

most desirable specifications to your work

APC

2/6/8 pallets

In addition to the standard 2APC, the 6APC and 8APC system are available as a factory option, or the 2APC can be expanded to 6/8 pallets in the field. 500mm pallets are available as an option.



60 Tools



120 Tools



120 tools



60 tools



40 tools

ATC

Simple Oval Shaped Magazine **40/60 tools**

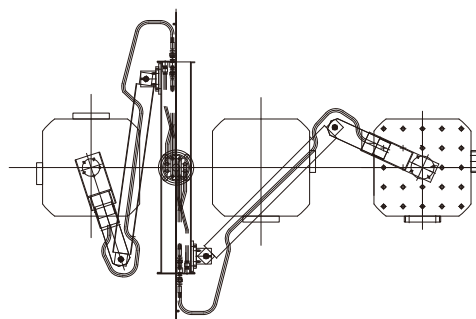
Larger Tool Storage Magazine **120/240 tools**

The ATC system is expandable in the field. (Note: Expansion can be done only in the same magazine type.)

Flexible Guide Arm for Fixture

OPTION

For clamping/unclamping of pneumatic/hydraulic fixtures, Kiwa can provide a flexible guide arm using a rotary joint. This allows free movement of the rotary table and protects hoses and cables inside. The KH-4500kai can accommodate a large work piece up to $\phi 750 \times 1,000 \text{mm}$ [$\phi 29.5'' \times 39.4''$]. This enables large sophisticated fixtures if required.

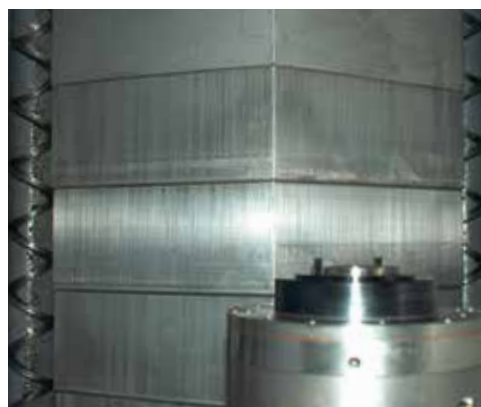


KH-4500kai

Chip Disposal

Rear Center Disposal

The KH-4500kai is equipped with Spiral chip augers as standard. An outside chip conveyor can be installed at the machine rear side.



High Speed Features

to improve productivity

Double Contact Spindle

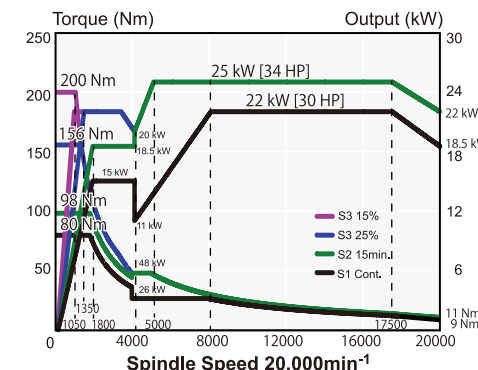
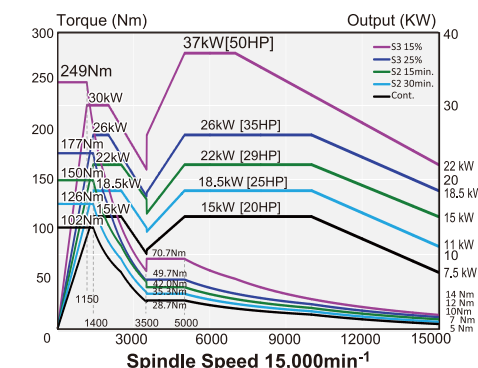
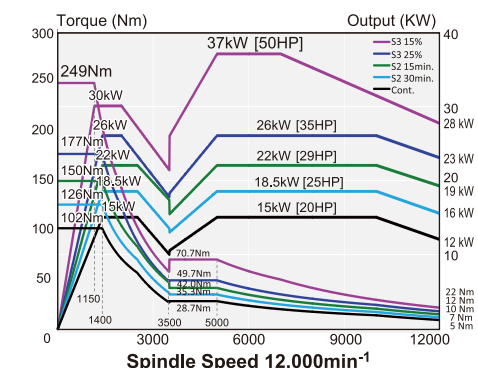
BT40/CAT40 12,000/15,000min⁻¹
HSK-A63 15,000/20,000min⁻¹

The 12,000/15,000min⁻¹ spindles are driven by a spindle motor directly coupled to the spindle. The 20,000min⁻¹ spindle is driven by a built-in motor. The spindle is lubricated by a pressurized oil and air system. Fresh oil is constantly supplied to the spindle bearings, and this extends the bearing life and reduces heat. The spindle is pressurized so no coolant or chips can enter the spindle bearings.



BIG-PLUS
 SPINDLE SYSTEM
 二面接触スピンドルシステム

The spindle is designed to accept BIG-PLUS tool holders.



High Speed Ballscrews

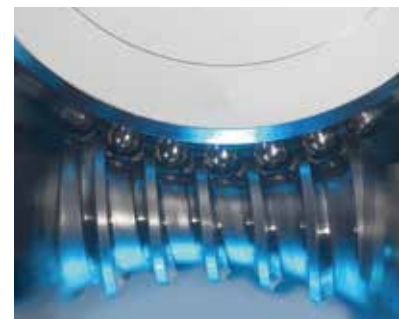
Rapid Traverse **80m/min.[3,150ipm]** (X/Y/Z)

Acceleration **1G** (X/Y/Z)

B-axis Rotary Table

Rotating Speed **66.6min⁻¹**

Ball Drive System



The KH-4500kai is equipped with a Z-axis rotary table of the Ball Drive System.

- No Backlash
- High Speed Indexing
- High Accuracy

Tool Change Time

Tool to Tool **1.1sec.** Chip to Chip **2.7sec**

ATC time is one of the most important factors to reduce the cycle time. Using new technology, Kiwa has engineered the ATC mechanism to be one of the fastest tool changer available today. ATC time (T-T) is 1.1 sec, C-C 2.7 sec.

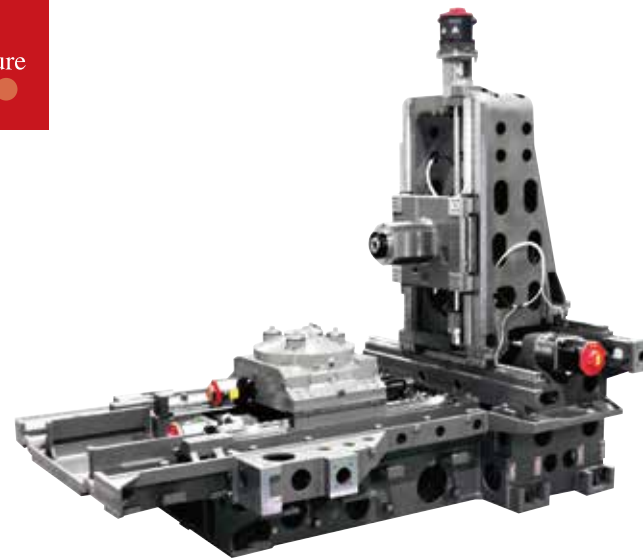


KH-4500kai

High Rigidity • High Accuracy
to support "high speed" structure

Box Type Bed

Kiwa has increased the height of the rear bed (step type casting) where the column is mounted. This minimizes distortion when moving the column in the X-axis direction. The bed has a box type six-wall structure and provides enough rigidity for the maximum pallet loading capacity of 500kg [1,100 lbs]. This casting structure ensures a stable platform, and the rigidity and accuracy are maximized for the life of the machine.

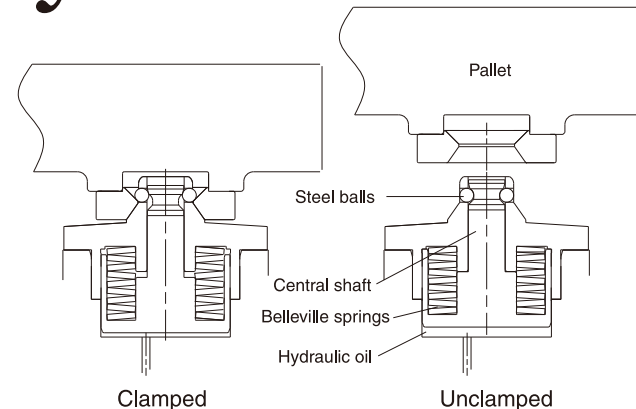


Pallet Clamping System

The pallet is securely clamped by four taper cones with a clamping force of 9.8KN x 4 cones. To unclamp the pallet, a hydraulic cylinder presses belleville springs, a central shaft moves upward and steel balls retract. To clamp the pallet, belleville springs loosen, the central shaft moves downward and steel balls lock (mechanical clamp) the pallet. There is no hydraulic pressure when the table is clamped. This ensures a stable and accurate pallet clamp. Air blow prevents chips from settling on each cone during pallet change.

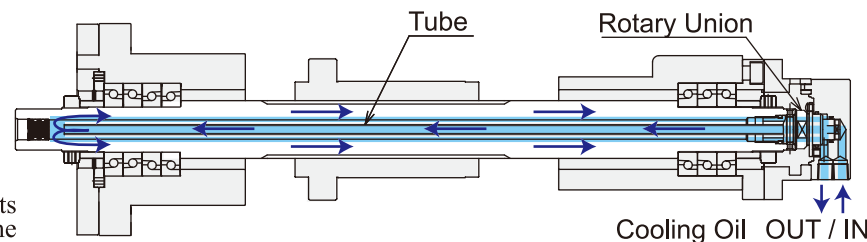


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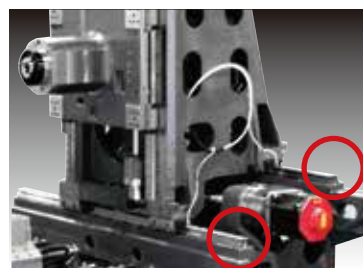
Ballscrew Cooling

Oil circulates inside the ballscrew and controls its temperature according to the temperature of the machine body, minimizing its thermal expansion.



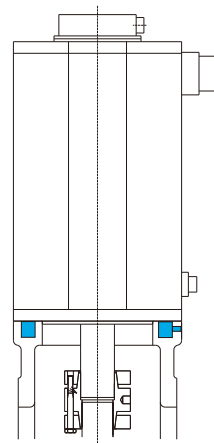
Stepped Layout of X-axis Guide Ways

X-axis roller guide ways are set on stepped bed. This stepped layout increases rigidity while the column weight was reduced. Reducing the column weight realizes high acceleration.



Y-axis Cooling System

Cooling oil flows inside the mounting plate to minimize Y-axis thermal expansion. This prevents the heat transfer from the Y-axis servo motor to the column and ballscrew. (Note: This cooling system is available only when a machine is equipped with a spindle oil chiller.)



Easy Operation & Maintenance
to reduce non-cutting time

Excellent Access to Work Piece

A long nose spindle improves accessibility to work pieces.

Swivel Type Control Box

The control box is located at the operator's left hand side and swings to the position most comfortable for the operator. The operator can press buttons on the control panel, while looking at the spindle and work pieces.

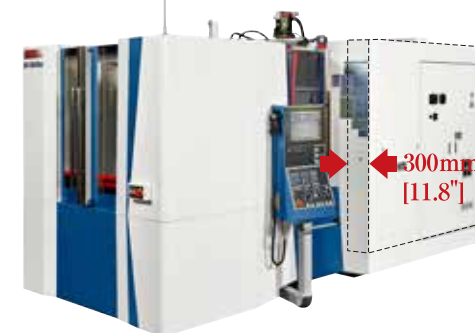


Operator Door & Set-up Doors

The operator door and set-up doors open widely providing excellent access to pallets and fixtures. The set-up doors have no rails on the upper side. Loading/unloading from above is easy using a hoist or over head crane.

Slim Electrical Box

Kiwa designed the electrical box as slim as possible. The electrical box including its doors is 300mm [11.8"] in depth and easily accessible for maintenance.



Daily Maintenance

Lubrication unit, Hydraulic unit and Air system are grouped together in one location at the rear of the machine for easy maintenance. For service work on major parts, safety guards are designed to be removed easily by one person.



Roller Type Guide Ways

The KH-4500kai uses roller guide ways. Compared with ball type guide ways of the same size, the roller type has higher load capacity and almost double the rigidity. A caterpillar type roller track ensures smooth motion and correct positioning. This improves accuracy especially in circular cutting and contour cutting.

