

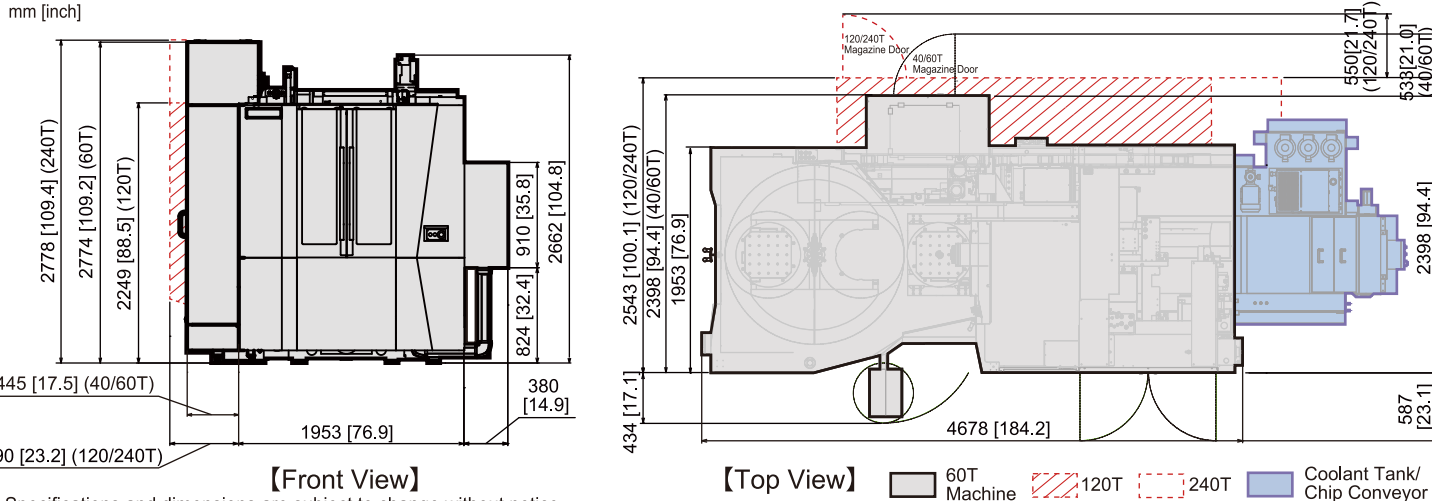
KH-4500kai

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

- FANUC 31i-B** ● 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
  - Tread 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: 200 pcs
  - Tool radius/Tool nose radius compensation
  - Stored pitch error compensation
  - Part program storage: 128 KB
  - Number of registrable programs: 1,000 pcs
  - Background editing
  - Run hour and parts count display
  - Helical interpolation
  - AI contour control I (30 look-ahead blocks)
  - Automatic corner override
  - Tool offset memory C
  - Tool life management function
  - Optional block skip
  - Scaling
  - Single direction positioning
  - Cylindrical interpolation
  - Optional chamfering/corner R
  - Programmable mirror image
  - Coordinate system rotation

MACHINE SIZE



Specifications and dimensions are subject to change without notice.

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

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2019.02E

**KIWA** Japan  
**KH-4500kai**  
Horizontal Machining Center

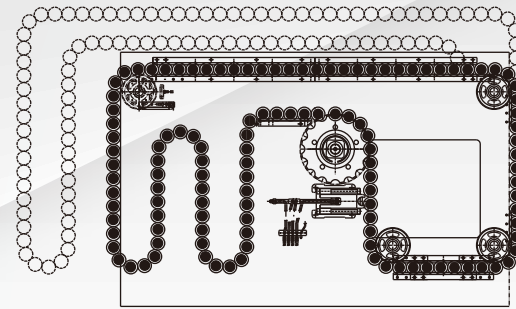
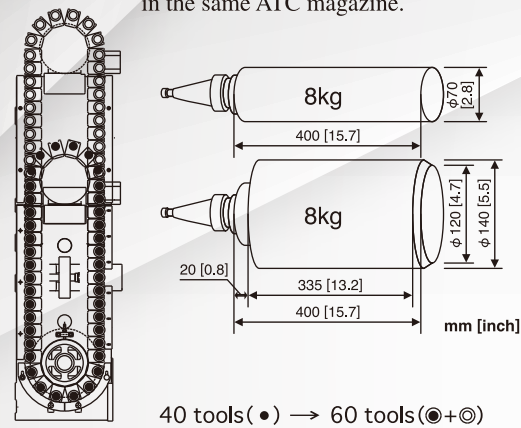


KIWA MACHINERY CO., LTD.

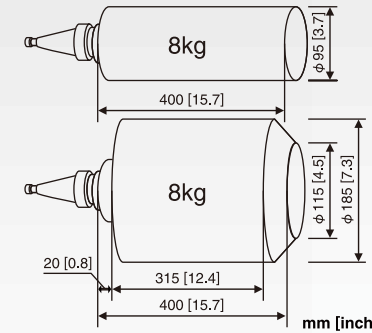
# **KIWA** Japan **KH-4500kai** Horizontal Machining Center

## Expandable **ATC**

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



120 tools(●) → 240 tools(●+○)



# kai | 魁

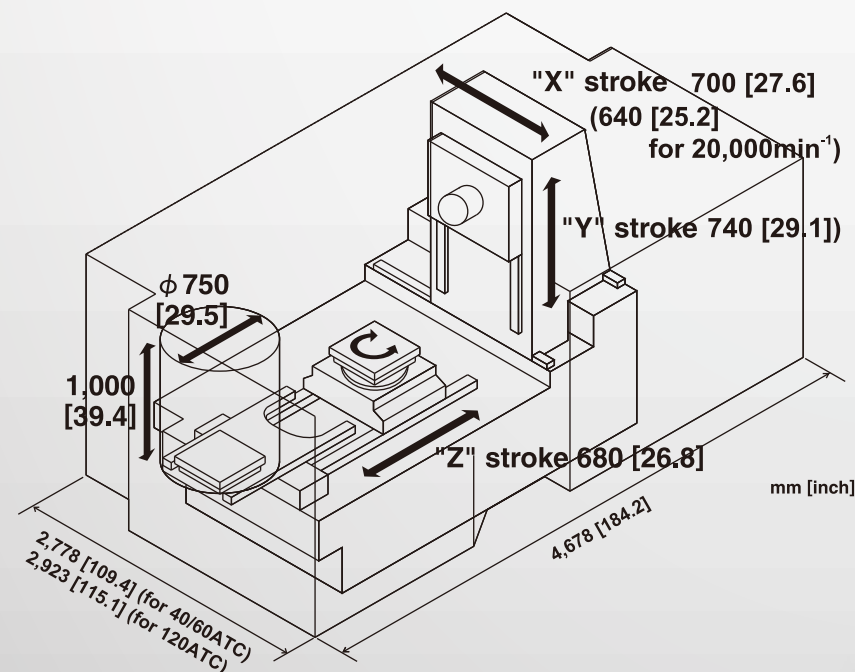
The KH-4500kai is the latest generation model of the KH-4500 series. Kiwa put a lot of meanings into the new model name, KH-4500**kai**.

**kaizen** 改善 = improvement

**kairyo** 改良 = enrichment

**kaiaku** 改革 = innovation

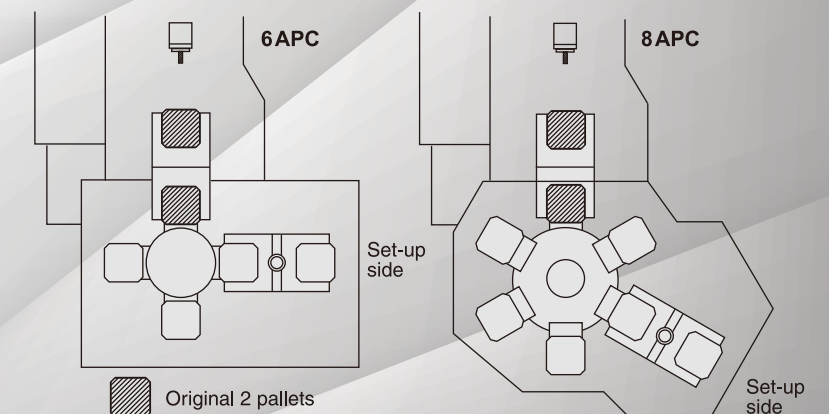
Kiwa expresses **kai** as 魁 in a Japanese character (KANJI). 魁 also has various meanings, such as Pioneer, Leader, taking the Initiative, Forerunner, to be the First (to do anything) etc.



- 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.



120 Tools



120 tools



60 tools



40 tools

## ATC

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

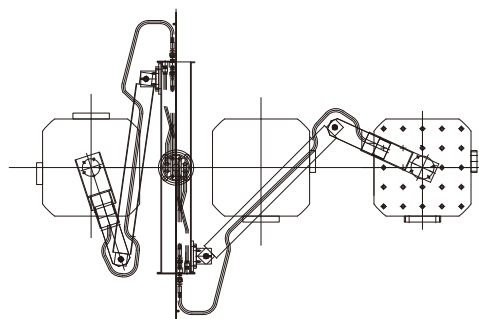
Larger Tool Storage Magazine **120/240 tools**

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**

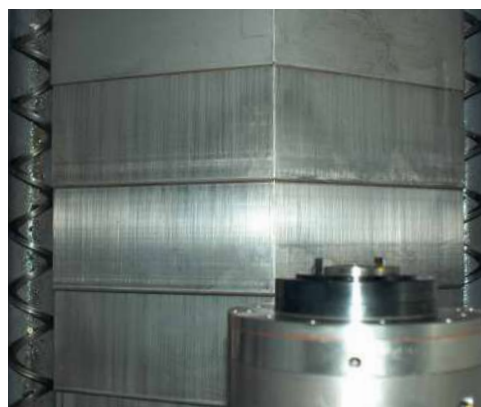
For clamping/unclamping of pneumatic/hydraulic fixtures, Kiwa can provide a flexible guide arm using a rotary joint. This allows free movement of the rotary table and protects hoses and cables inside. The KH-4500kai can accommodate a large work piece up to  $\phi 750 \times 1,000 \text{mm}$  [ $\phi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



## 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.



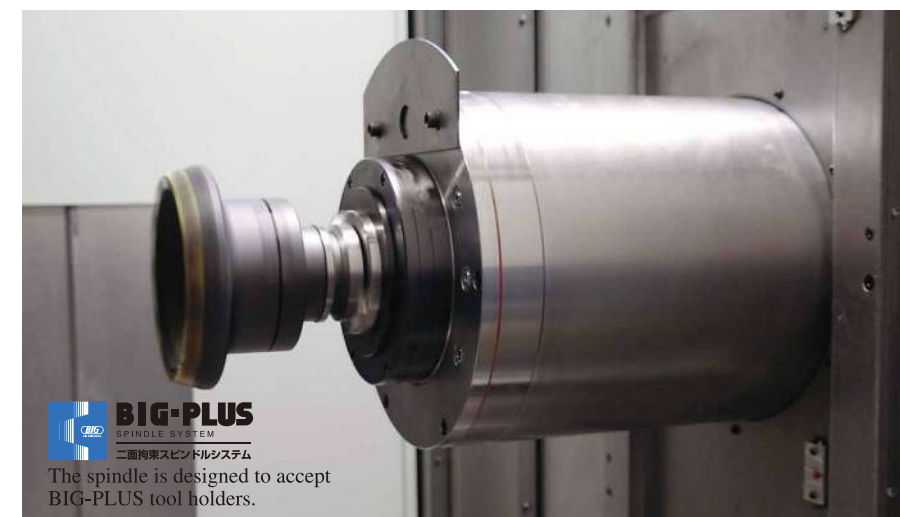
## High Speed Features

to improve productivity

## Double Contact Spindle

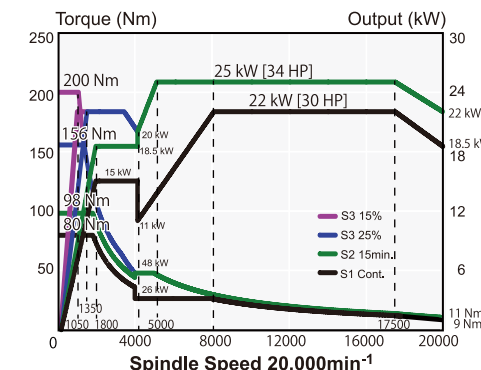
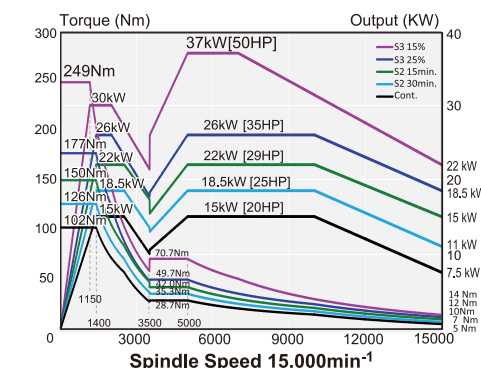
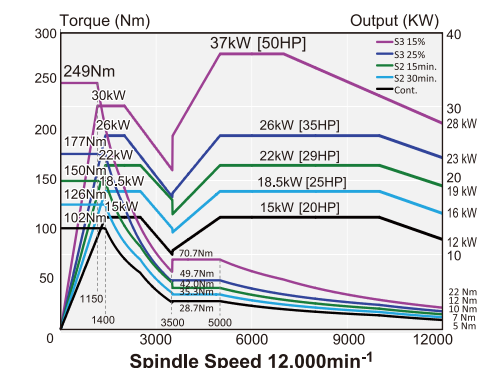
**BT40/CAT40 12,000/15,000min<sup>-1</sup>**  
**HSK-A63 15,000/20,000min<sup>-1</sup>**

The 12,000/15,000min<sup>-1</sup> spindles are driven by a spindle motor directly coupled to the spindle. The 20,000min<sup>-1</sup> 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

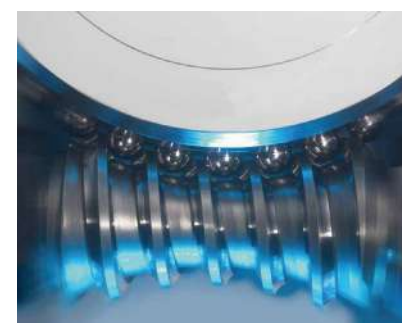
Rapid Traverse **80m/min.[3,150ipm]** (X/Y/Z)

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

## B-axis Rotary Table

Rotating Speed **66.6min<sup>-1</sup>**

**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**

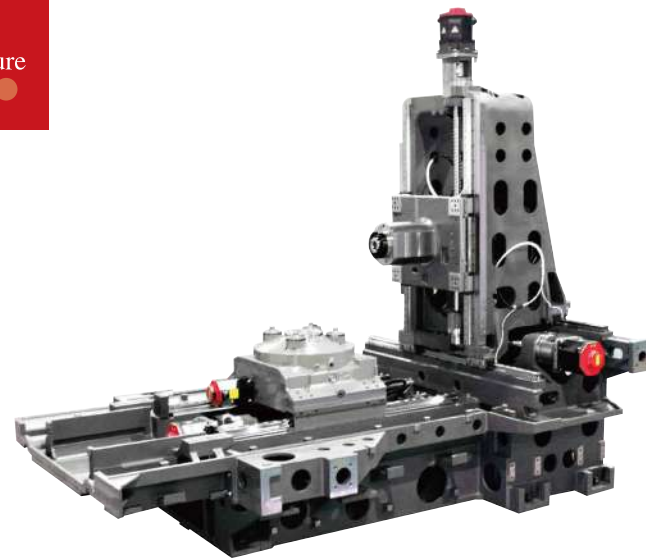
ATC time is one of the most important factors to reduce the cycle time. Using new technology, Kiwa has engineered the ATC mechanism to be one of the fastest tool changer available today. ATC time (T-T) is 1.1 sec, C-C 2.7 sec.



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

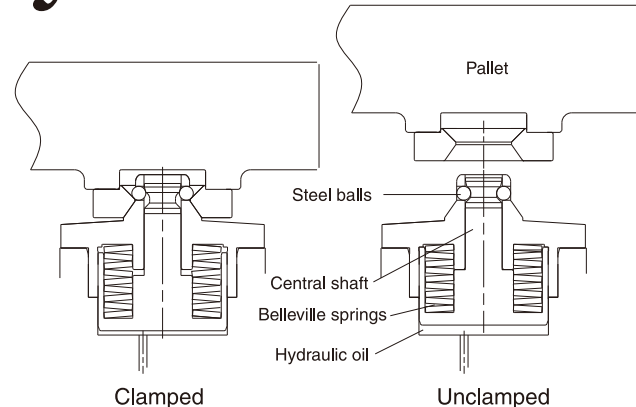
## Box Type Bed

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.



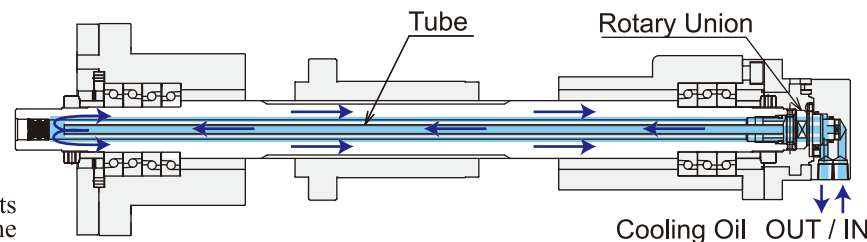
## Pallet Clamping System

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.



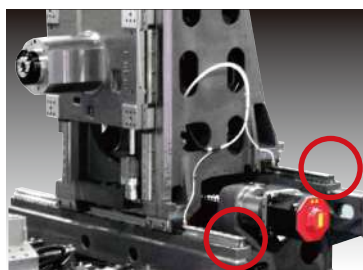
## Ballscrew Cooling

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



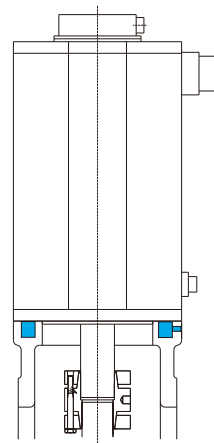
## Stepped Layout of X-axis Guide Ways

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.

