Smaller Footprint, Larger Machine Capacities

Making full use of Kiwa’s experience, Kiwa has eliminated all possible wasted space on the KH-4500. As a result, the KH-4500 incorporates one of the largest work envelopes in its class. Kiwa has also maintained its speed and agility with over 1 G acceleration / deceleration on all axes. The rigidity has been greatly enhanced with the "stepped" base and column casting design. Keeping the traditions of the Kiwa design, the KH-4500 is fully expandable both for the APC and ATC portions of the machine. These features are field installable.

- Improved floor space 2,398mm [94.4"] width
- Improved rigidity and accuracy with the "stepped" base casting
- Largest work piece capacity $\phi$ 750 x 1,000mm [29.5" x 39.4”] (for 2 APC)
- 1 G plus acceleration / deceleration rates
- Expandable APC and ATC, field installable
Expandable APC

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

ATC
Simple Oval Shaped Magazine 40/60 tools
Larger Tool Storage Magazine 80/120/220/240 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
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 KJH-4500 can accommodate a large work piece up to Ø 750x1,000mm [Ø29.5”x39.4”]. This enables large sophisticated fixtures if required.

Front Side Disposal / Rear Side Disposal
Spiral chip augers (option) on both sides of the Z-axis help effective chip disposal. An outside chip conveyor can be installed at either the front side or the rear side. (The standard direction of chip disposal is the front side.)
High Speed Features
to improve productivity

Double Contact Spindle

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

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

High Speed Ballscrews

**Rapid Traverse** 80 m/min. [3,150 ipm] (X/Y/Z)
**Acceleration** 1 G (X/Y/Z)

B-axis Rotary Table

**Rotating Speed** 66.6 min⁻¹
**Ball Drive System**

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

Features
- No Backlash
- High Speed Indexing
- High Accuracy

Tool Change Time

**Tool to Tool** 0.9 sec. **Chip to Chip** 2.8 sec.

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 0.9 sec, C-C 2.8 sec.
**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].

The casting of the column, spindle head and pallets is made of Ductile iron (with spherical graphite impregnation), it contains properties that have 50% less distortion than "standard" castings. This casting and structure ensure a stable platform, 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 GuideWays**

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.)
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 overhead 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-4500 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.
**KH-4500 Standard Features**

### TRAVEL
- X, Y, Z axes: 640x610x680 [25.2"x24.0"x26.8"] (Opt. 700x740x680 [27.6"x29.1"x26.8"] for 12,000/15,000 min⁻¹) [Opt. 640x740x680 [25.2"x29.1"x26.8"] for 20,000 min⁻¹]
- Spindle center to pallet surface: 50-860 [2.0"-26.0"] (Opt. 50-750 [2.0"-31.0"] for Y-axis Sl, 740mm)
- Spindle nose to pallet center: 100-780 [3.9"-30.7"]
- Pallet top height (from the floor): 1,069 [42.1"]

### PALLETS
- Pallet size (x2 pallets): 400x400 [15.7"x15.7"] (Opt. 500x500 [19.7"x19.7"])
- Max. workpiece diameter: ∅ 750 [29.5"] for 2/8APC, ∅ 650 [25.6"] for 8/8APC
- Max. workpiece height: 1,000 [39.4"] for 2/8APC, 900 [35.4"] for 8/8APC
- Max. load: 500 [1,100] kg
- Configuration: 25-M16 P=80mm [3-1"] (P=100mm [3.9"] for 500mm pallet)
- Min. indexing degree: 0.001 degrees
- Indexing speed: 1.1 sec/30 degrees
- Pallet clamping force / clamping system: 9.8 x 4 cones / Mechanical lock
- B-axis clamping torque: 5,000 Nm

### SPINDLE
- Spindle speed: 12,000 Direct drive (Opt. 18,000 Direct drive / 20,000 Built-in)
- Spindle rated torque: 249 for 12,000/15,000 min⁻¹, 200 for 20,000 min⁻¹
- Spindle taper: ISO 7/24 Taper NT No. 40
- Through spindle coolant: 7.0 [1,000] (Opt. 15.0 [2,175])

### FEED
- Rapid feed (X/Y/Z): 80,000 [3,150] mm/min/pcs
- Cutting feed: 30,000 [1,181] mm/min/pcs
- Table rotating speed: 66 [2.6]
- Acceleration (X/Y/Z): 1.0 / 1.0 / 1.0

### AUTOMATIC TOOL CHANGER
- Type of tool shank: BT40 / CAT40 for 12,000/15,000 min⁻¹ (Opt. HSK-A63 for 20,000 min⁻¹)
- Type of pull-stud: JIS
- Number of tools: 60 (Opt. 40 / 80 / 120 / 220 / 240)
- Max. tool diameter (Adjacent spots fully empty): ∅ 70 [2.8"] / ∅ 140 [5.5"] for 40/60ATC, ∅ 95 [3.7"] / ∅ 185 [7.2"] for 80/120/220/240 ATC
- Max. tool length: 400 [15.7"]
- Max. tool weight: 8 [17.6] kg
- Tool selection system: Random for 40/60ATC, Fixed tool post for 80/120/220/240 ATC
- Tool to tool / Chip to chip: 0.9 (1.7: Heavy tool programmable) / 2.8 (3.6: Heavy tool programmable)

### AUTOMATIC PALLETT CHANGER
- Number of pallets: 2 (Opt. 6 / 8)
- Pallet change system: Rotation
- APC time (Undamp - Climp): 6.4 sec.

### MOTOR
- Spindle motor: 37/15 [50/20] for 12,000/15,000 min⁻¹, 25/22 [34/30] for 20,000 min⁻¹
- Feed axis motor (X/Y/Z/B): 4.5/4.5/6.7/2.7 [6.0/6.0/6.3/3.6]
- Lubrication pump motor: 18 [0.024] kW
- Coolant pumps: 600 [0.8] x 3 pcs
- Hydraulic pump: 2.2 [2.9] kW

### SUPPLY
- Electric voltage: 200 (Allowable range 190 to 220V) 50/60Hz
- Electric power supply: KVA 50
- Air pressure: 0.4 [58] MPa
- Air volume: m³ [pcf/min]: 360 [95]

### TANK
- Hydraulic unit tank: 20 [5.3] liters
- Coolant tank: 550 [145.3] liters
- Lubrication unit tank: 1.8 [0.5] liters

### SIZE
- Floor space: 2.398x4.539 [94.4"x178.7"] (APC=4500/60ATC), 2.541x4.539 [100.0"x178.7"] (APC=60/120ATC)
- Machine height: 2.766 [108.9] [66ATC], 2.584 [101.7] [40/60/120ATC]
- Machine weight: 9,200 [20,240] (APC=4500ATC), 9,950 [21,890] (APC=120ATC)

**Machine Option**
- Overhead hydraulic arms
- Linear scale
- Inside chip conveyor (Spiral type)
- Automatic power off
- Machine color
- Interface for danger prevention

**FANUC 31i (Standard)**
- Simultaneously controlled axes: 4 axes
- Spindle override 50-150% (each 10%)
- Cutting feed override 0-200% (each 10%)
- Rapid traverse override: 1, 2, 4, 8, 15, 25, 50, 100%
- Rapid traverse bell-shaped acceleration / deceleration
- Inch / metric conversion
- Position switch
- Manual handle feed 1 unit
- Helical interpolation
- Thread cutting, synchronous cutting
- AT contour control
- Workpiece coordinate system
- Addition of workpiece coordinate system: 48 sets (Opt. 300 sets)
- Custom macro
- Canned cycle for drilling
- Automatic corner override
- Rigid tap
- Tool life management function
- Tool offset memory C
- Tool offset: 200 pcs for 60ATC, 400 pcs for 120ATC
- Tool radius / Tool nose radius compensation
- Stored pick error compensation
- Parts program storage: 512KB
- Number of registrable programs expansion 1: Max. 1,000 programs
- Background editing
- Run hour and parts count display

**FANUC 31i (Option)**
- Stored stroke check 2, 3
- Manual handle interruption
- Single direction positioning
- Cylindrical interpolation
- F1-digit feed
- Addition of optional block skip
- Polar coordinate command
- Optional chamfering / corner R
- Programmable mirror image
- Scaling
- Coordinate system rotation
- Playback function
- Multi-language display (Chinese/French/German/Italian/Korean/ Spanish)

Specifications and accessories are subject to change without notice.

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

Manufactured by:
KIWA MACHINERY CO., LTD.
522-51 Harada Kuramochi-cho,
Nabari, MIE 518-0752, JAPAN
TEL: 0595-64-4758 FAX: 0595-64-7529
www.kiwa-mc.co.jp
overseas@kiwa-mc.co.jp

Imported by:
Methods Machine Tools Inc
Headquarters:
65 Union Avenue
Sudbury MA 01776
TEL: 978-443-5388 FAX: 978-440-9405
www.methodsmachine.com
sales@methodsmachine.com

2017.02US