

KIWA Japan

KH-4500kai

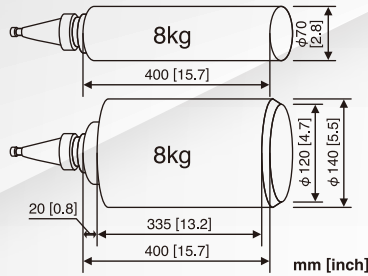
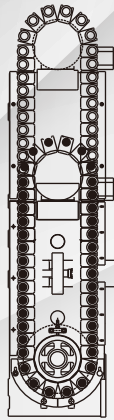
Horizontal Machining Center



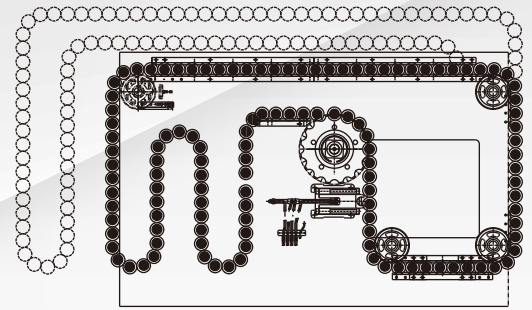
KIWA MACHINERY CO., LTD.

Expandable ATC

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



40 tools (●) → 60 tools (●+○)



120 tools (●) → 240 tools (●+○)

kai | 魁

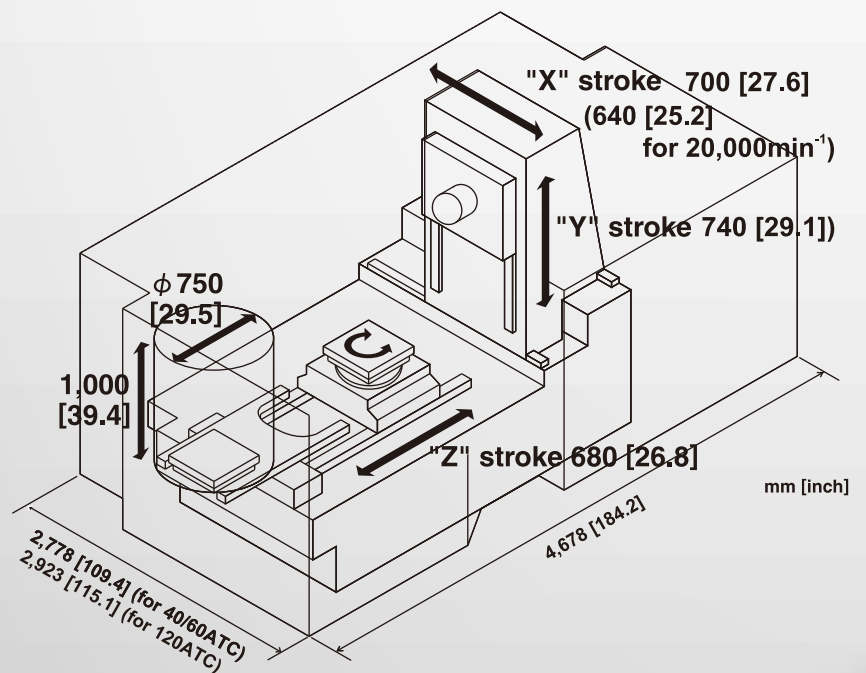
The KH-4500kai is the latest generation model of the KH-4500 series. Kiwa put a lot of meanings into the new model name, KH-4500kai.

kaizen 改善 = improvement

kairyo 改良 = enrichment

kaikaku 改革 = innovation

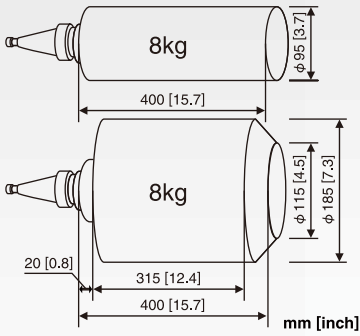
Kiwa expresses **kai** as 魁 in a Japanese character (KANJI). 魁 also has various meanings, such as Pioneer, Leader, taking the Initiative, Forerunner, to be the First (to do anything) etc.



KIWA Japan

KH-4500kai

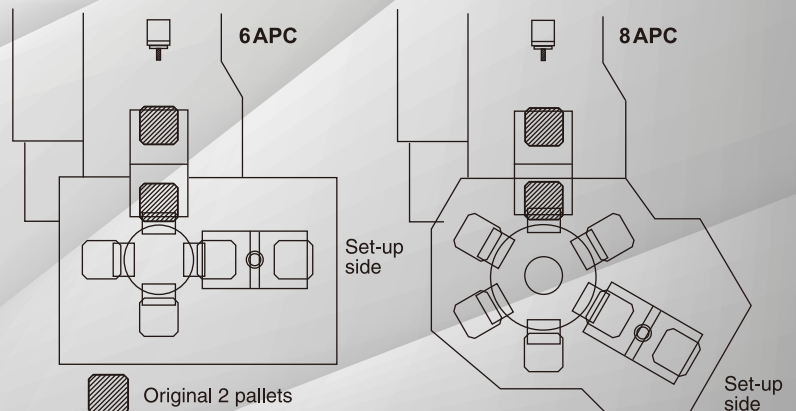
Horizontal Machining Center



- 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.



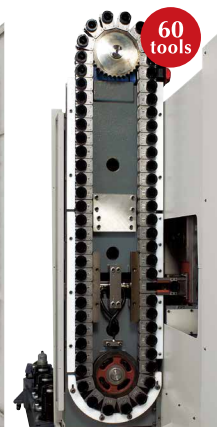
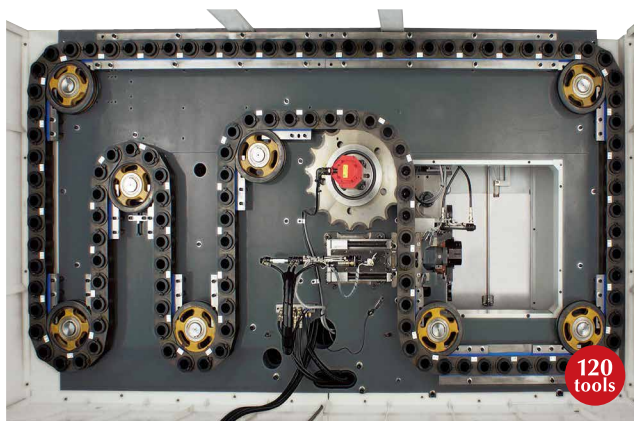
Expandability

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.



ATC

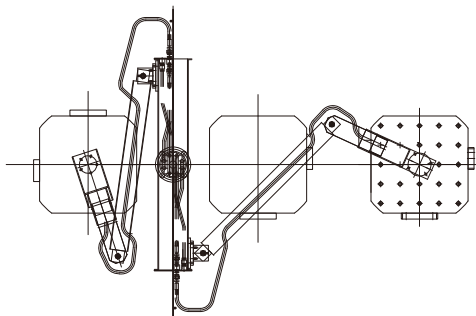
Simple Oval Shaped Magazine **40/60 tools**

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**

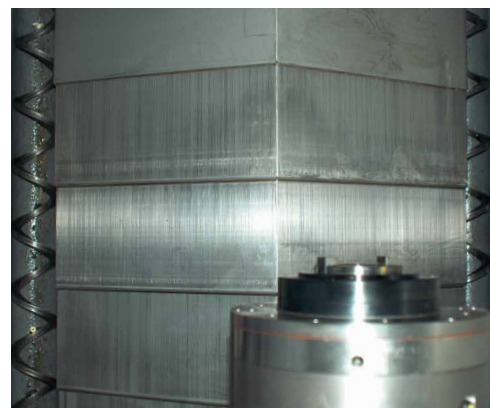
For clamping/unclamping of pneumatic/hydraulic fixtures, Kiwa can provide a flexible guide arm using a rotary joint. This allows free movement of the rotary table and protects hoses and cables inside. The KH-4500kai can accommodate a large work piece up to $\phi 750 \times 1,000\text{mm}$ [$\phi 29.5''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



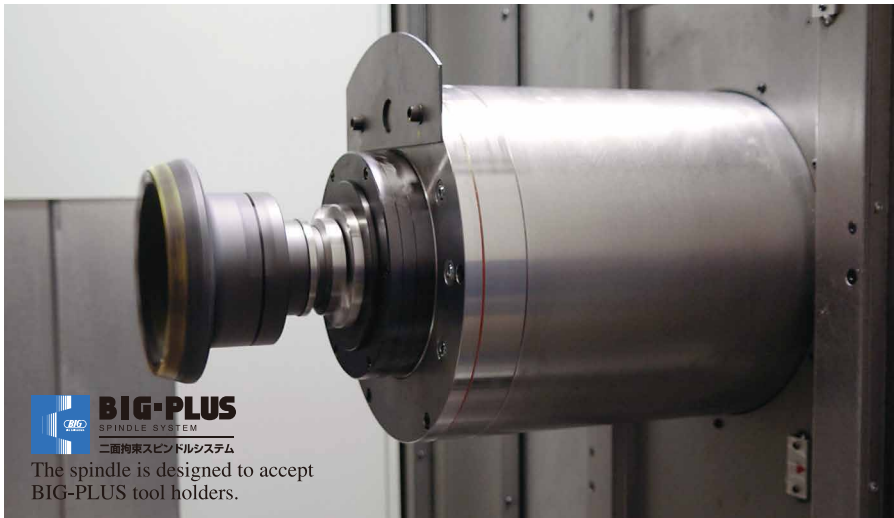
High Speed Features

to improve productivity

Double Contact Spindle

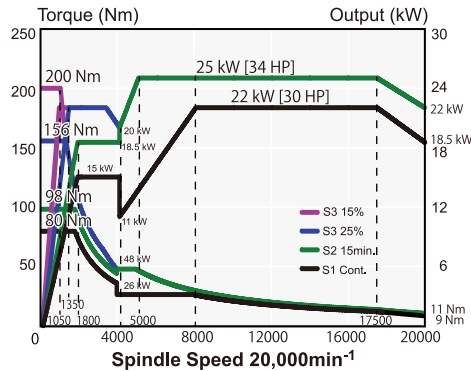
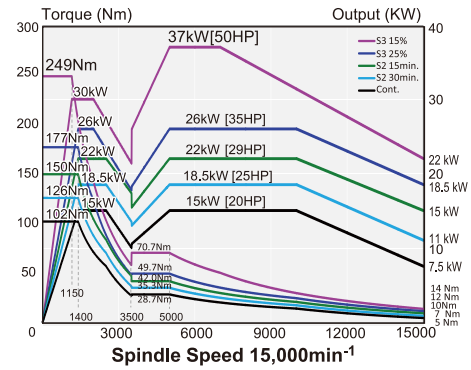
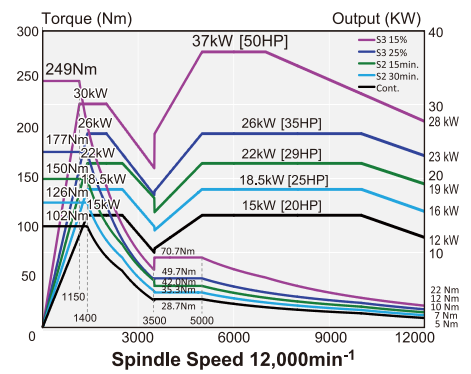
BT40/CAT40 12,000/15,000min⁻¹
HSK-A63 20,000min⁻¹

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

二重接触スピンドルシステム
The spindle is designed to accept BIG-PLUS tool holders.



High Speed Ballscrews

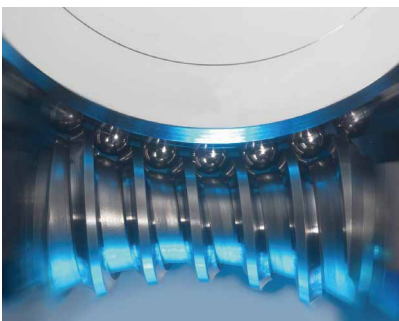
Rapid Traverse **80m/min.[3,150ipm]** (X/Y/Z)

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.

- Features
- No Backlash
 - High Speed Indexing
 - High Accuracy

Tool Change Time

Tool to Tool **1.5sec.** Chip to Chip **2.8sec.**

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 1.5 sec, C-C 2.8 sec.

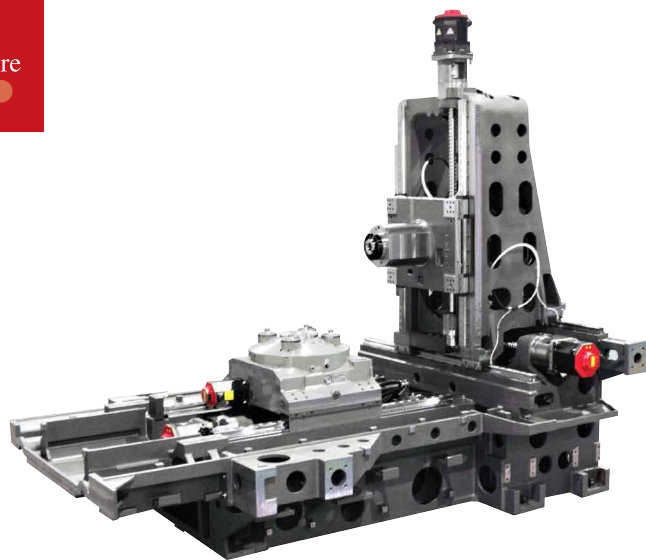


High Rigidity • High Accuracy
to support "high speed" structure

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]

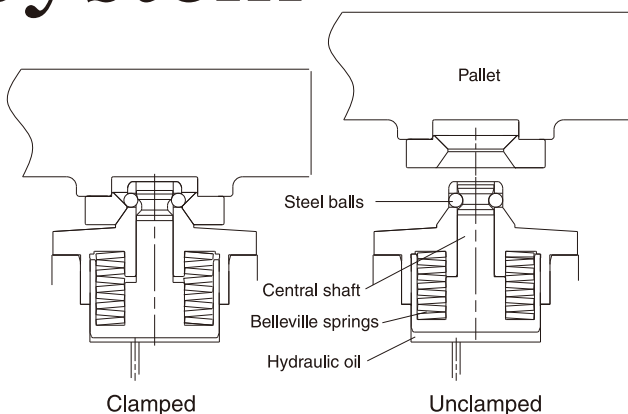
The casting of the column, spindle head and pallets is made of Ductile iron (with spherical graphite impregnation), it contains properties that have 50% less distortion than "standard" castings. This casting and structure ensure a stable platform, rigidity and accuracy are maximized for the life of the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



Pallet Clamping System

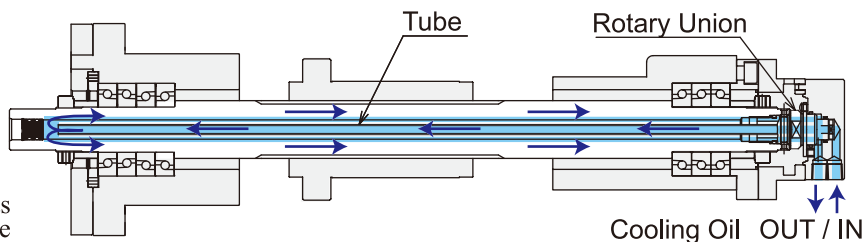
The pallet is securely clamped by four taper cones with a clamping force of 9.8KN x 4 cones. To unclamp the pallet, a hydraulic cylinder

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.



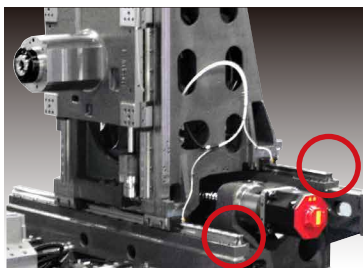
Ballscrew Cooling

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



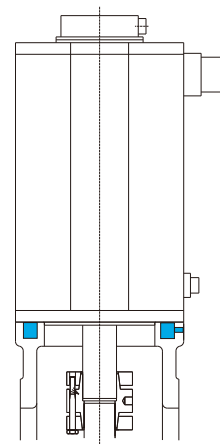
Stepped Layout of X-axis Guide Ways

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

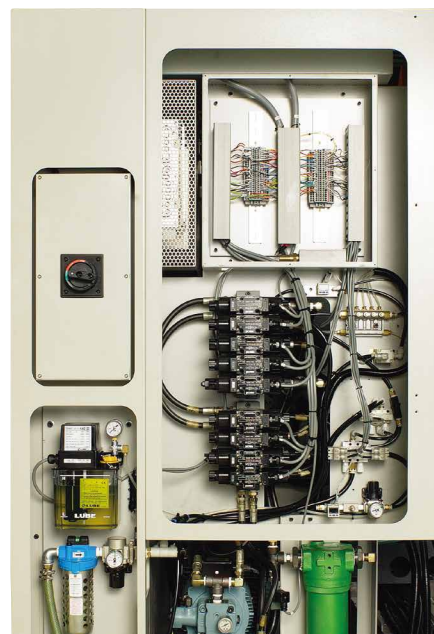
Kiwa designed the electrical box as slim as possible. The electrical box including its doors is 300mm [11.8"] in depth and easily accessible for maintenance.



Daily Maintenance

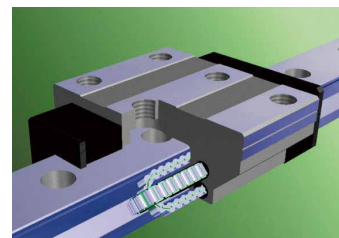
Lubrication unit, Hydraulic unit and Air system are grouped together in one location at the rear of the machine for easy maintenance.

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.



KH-4500kai

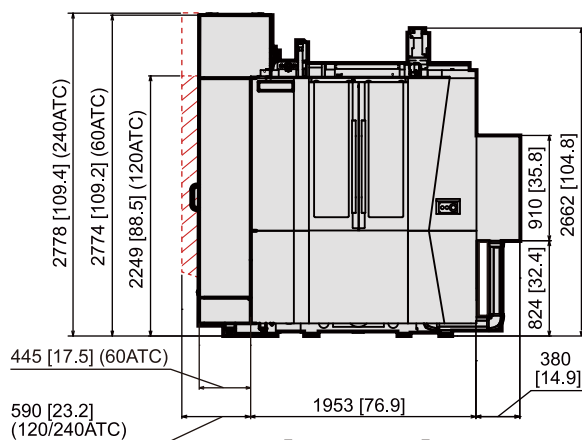
● TRAVEL		● AUTOMATIC TOOL CHANGER		
X, Y, Z axes	mm [inch]	700x740x680 [27.6x29.1x26.8] for 12,000/15,000min ⁻¹ (OP. 640x740x680 [25.2x29.1x26.8] for 20,000min ⁻¹)	Type of tool shank	BT40/CAT40 for 12,000/15,000min ⁻¹ (OP. HSK-A63 for 20,000min ⁻¹)
Spindle center to pallet surface	mm [inch]	50-790 [2.0-31.1]	Type of pull-stud	JIS
Spindle nose to pallet center	mm [inch]	100-780 [3.9-30.7]	Number of tools	40 (OP. 60 / 120 / 240)
Pallet top height (from the floor)	mm [inch]	1,069 [42.1]	Max. tool diameter	mm [inch] Dia. 70 [2.8] / Dia. 140 [5.5] for 40/60ATC (Adjacent pots full/empty)
● 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] for 2APC	Tool selection system	Random for 40/60ATC, Fixed tool pot for 120/240ATC
Min. work piece height	mm [inch]	1,000 [39.4] for 2APC	Tool to tool / Chip to chip	sec. 1.5 / 2.8
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 ⁻¹ 25/22 [34/30] for 20,000min ⁻¹
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/clamping 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 (Allowable range 190 to 220) 50/60Hz
Spindle speed	min ⁻¹	12,000 Direct drive (OP. 15,000 Direct drive / 20,000 Built-in)	Electric power supply	KVA 50
Spindle rated torque	Nm	249 for 12,000/15,000min ⁻¹ (OP. 200 for 20,000min ⁻¹)	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		Hydraulic unit tank
Rapid feed (X/Y/Z)	mm/min, [ipm]	80,000 [3,150]	Coolant tank	liters [gal] 660 [174.4]
Cutting feed	mm/min, [ipm]	30,000 [1,181]	Lubrication tank	liters [gal] Oil: 1.8 [0.5] / Grease cartridge: 0.7 [0.2]
Table rotating speed	min ⁻¹	66.6	● SIZE	
Acceleration (X/Y/Z)	G	1.0 / 1.0 / 1.0	Floor space	mm [inch] 2,778x4,678 [109.4x184.2] (2APC+40/60ATC) 2,923x4,678 [115.1x184.2] (2APC+120ATC)
● AUTOMATIC PALLET CHANGER		Machine height		mm [inch] 2,774 [109.2] (60ATC), 2,662 [104.8] (40/120ATC)
Number of pallets		2 (OP. 6 / 8)	Machine weight	kg [lbs] 8,650 [19,030] (2APC+60ATC) 9,400 [20,680] (2APC+120ATC)
Pallet change system		Rotation		
APC time (Unclamp-Clamp)	sec.	7.5		

FANUC 31i-B ● Standard Features □ Options

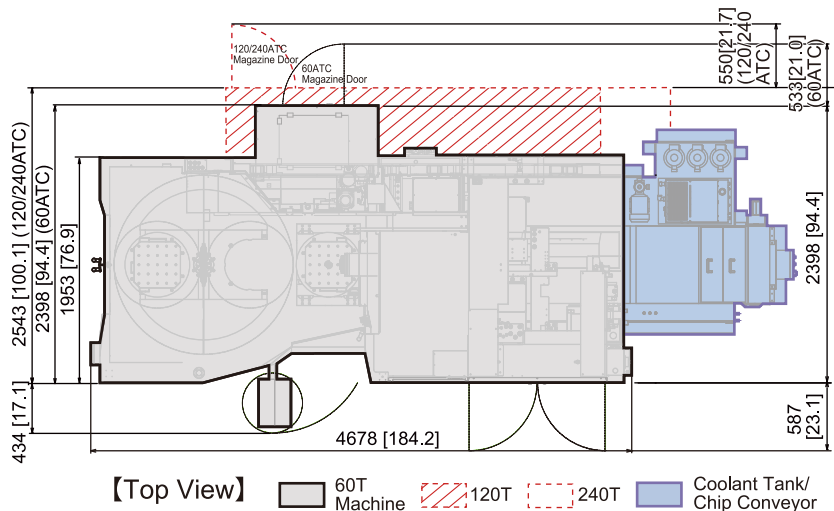
- Simultaneously controllable axes: 4 axes
- Spindle override 50- 150% (each 10%)
- Cutting feed override 0 - 200% (each 10%)
- Rapid traverse rate override 1,2,4,8,15,25,50,100%
- Rapid traverse bell-shaped acceleration/deceleration
- Position switch
- Manual handle feed 1 unit
- Tread cutting, synchronous 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

mm [inch]



【Front View】



【Top View】

60T Machine
 120T
 240T
 Coolant Tank/ Chip Conveyor

Specifications and dimensions are subject to change without notice.

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

KIWA MACHINERY CO., LTD.

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