



SYNERGI WORK X INC.

VBT SERIES

VBT SERIES

Horizontal Boring & Milling CNC Machining Center



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VBT-E-202502

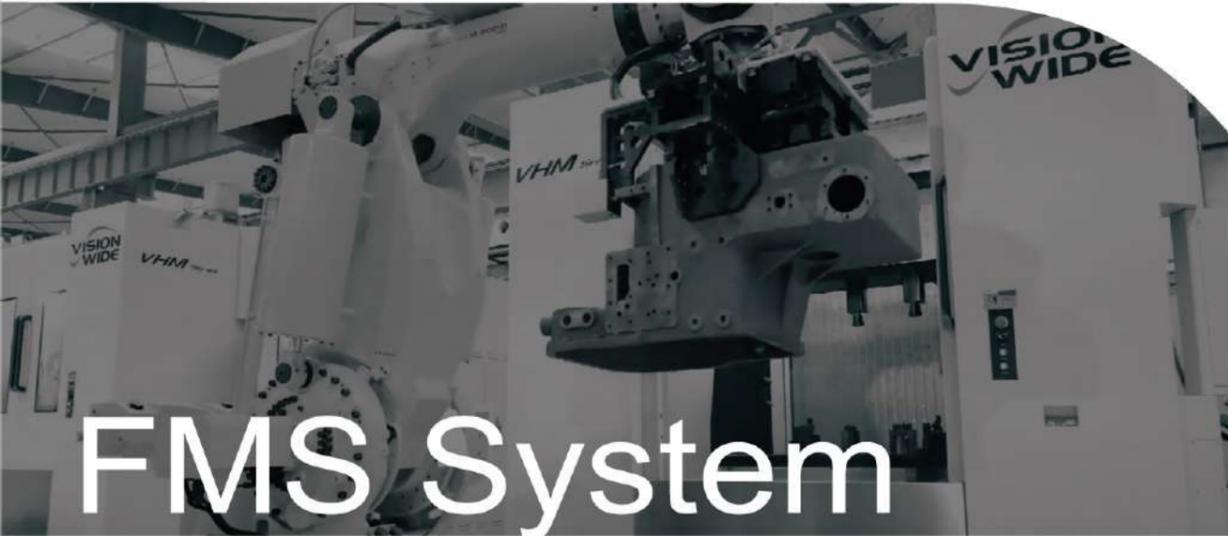


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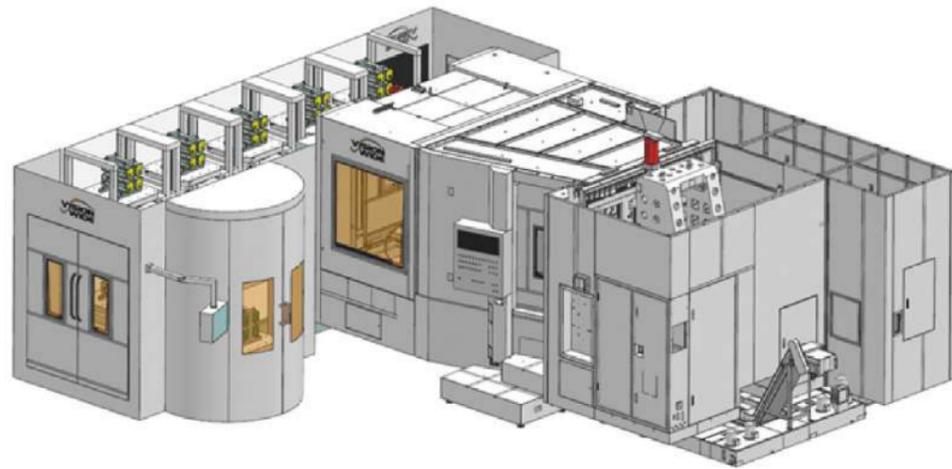
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High Precision.  
High Efficiency.

**VBT** SERIES



FMS System

FMS System by Large Horizontal Machining Centers



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High Speed.  
High Precision.  
High Efficiency.

**VBT** SERIES

## Large & High-Strength Horizontal Boring and Milling CNC Machining Center

- XZ axes are supported by high-precision roller linear guides, providing heavy-load precision positioning.
- Y axis is supported by a stable saddle, offering a high-strength structure for heavy-duty cutting.
- High-load rotary table with precise positioning and rotational accuracy.
- High-torque spindle and boring bar for rigid and precise boring machining.
- Multiple head attachments and extended heads enable automated multi-angle machining.

### Various spindle options for flexible adaptation to different materials:

Speed: 3,500 / 3,000 rpm

Power: 18.5 / 22 ~ 37 / 45 kW

Torque: 972 / 1,155 ~ 2,535 / 3,083 Nm

### Multiple table sizes for flexible workpiece adaptation:

#### VBT-110 / VBT-130

- 1,250 x 1,250 mm
- 1,400 x 1,600 mm
- 1,600 x 1,800 mm
- 1,800 x 2,200 mm
- 2,000 x 2,500 mm
- 2,500 x 2,500 mm
- 2,500 x 3,000 mm

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## Precision Machine Structures and Features

### Moving Column T-Structure

#### One-Piece Cast Column

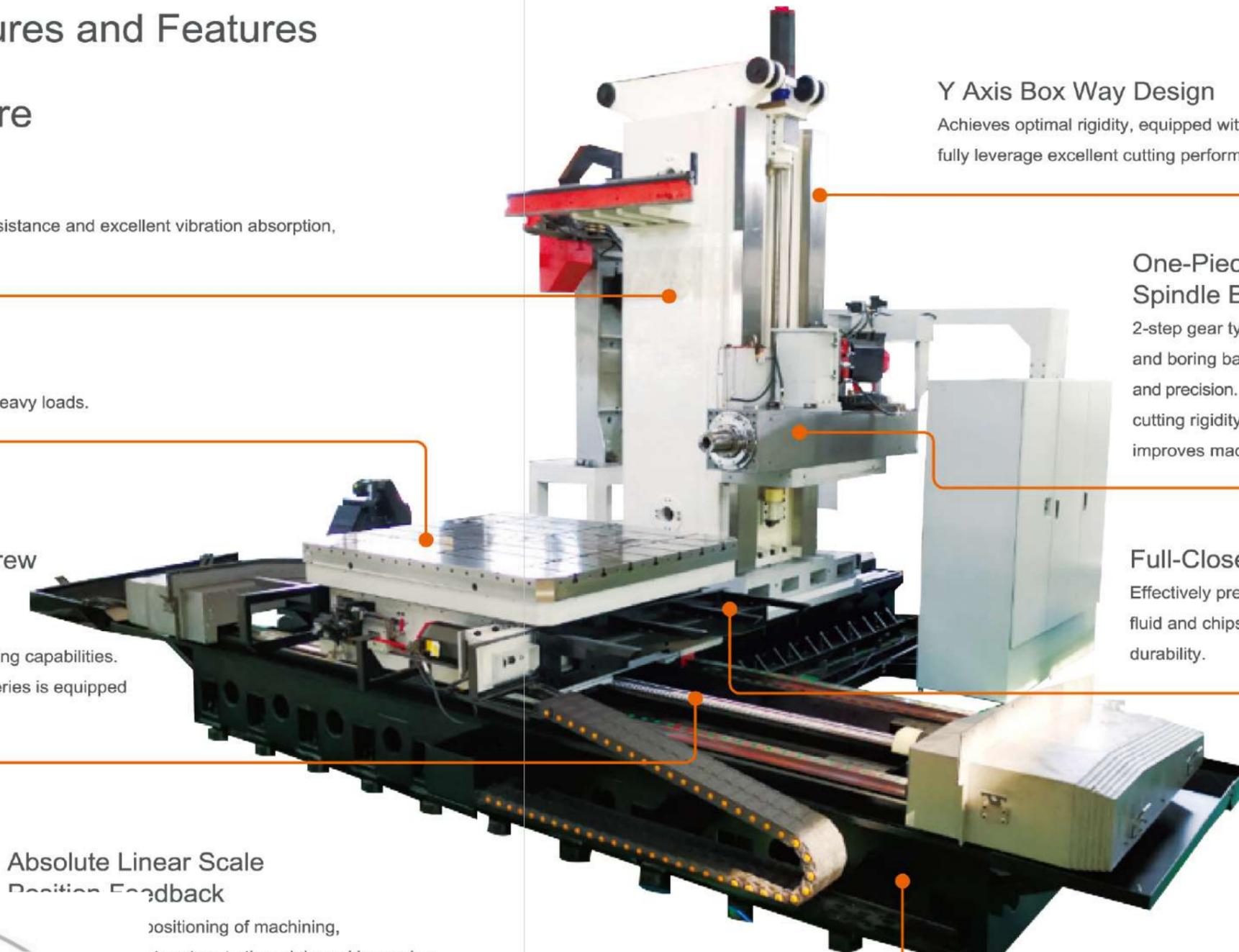
Stress-relief heat treatment for high vibration resistance and excellent vibration absorption, significantly enhancing machine stability.

#### Robust Rotary Table

Ensures rotational rigidity and precision under heavy loads.

#### High-Precision C3 Grade Ballscrew and P-Class Heavy-Duty Roller Linear Guides

Ensures outstanding axial and radial heavy cutting capabilities. The X axis of VBT-130-2525 / VBT-130-2530 series is equipped with three linear guides.



#### Y Axis Box Way Design

Achieves optimal rigidity, equipped with a 2-step gear box to fully leverage excellent cutting performance.

#### One-Piece Rigid Spindle Box Design

2-step gear type spindle with integrated spindle and boring bar structure for outstanding rigidity and precision. Extended spindle support improves cutting rigidity, reduces tool overhang, and improves machining efficiency.

#### Full-Closed Z Axis Protection

Effectively prevents contamination from cutting fluid and chips, ensuring long-term operational durability.

#### One-Piece Formed X Axis Base

Hollow, multi-ribbed high-rigidity structure, achieving optimal rigidity and stability.



#### Absolute Linear Scale Position Feedback

Ensures precise positioning of machining, and allows for quick return to the origin and improving efficiency.

and

#### Water Recovery System

Eliminates pollution issues and complies with environmental regulations.

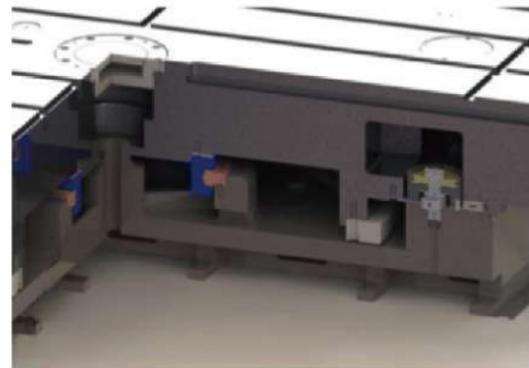


## Robust Rotary Table

### Rotary Table

Minimum division accuracy:  
0.001° -by servo control

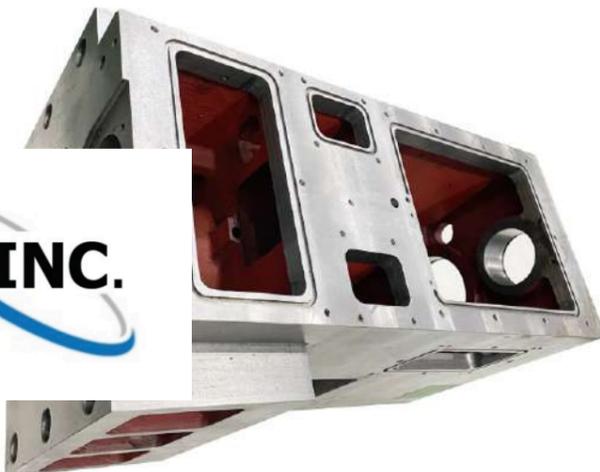
- Four-axes linkage with B axis ring scale and servo compensation.
- Ideal for linked machining (e.g., helical gears, motors, engines), especially for special angles or four-axes linkage requirements



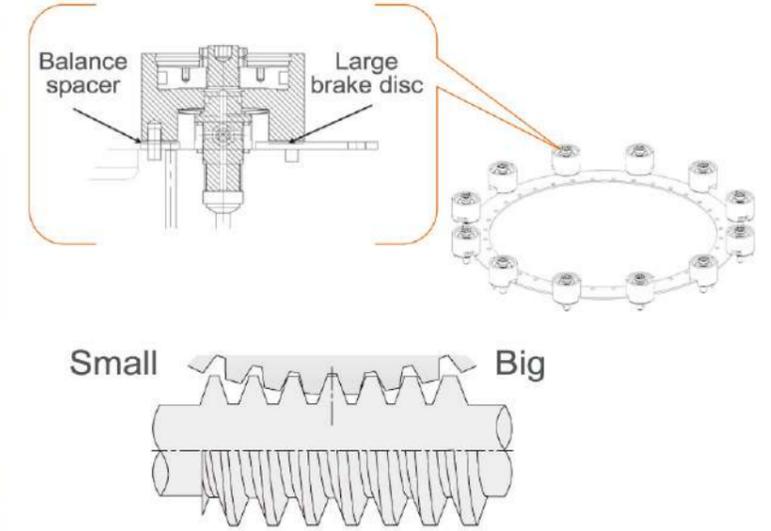
### Index Rotary Table (Opt.)

Minimum division accuracy:  
1° - Mechanical hirth coupling device

- Superior rigidity and precision from high-precision clutch tooth meshing.
- Ideal for machining high-torque components such as gear heads, drive seats, and connecting rods.



## Efficient Transmission, Support and Clamping Device

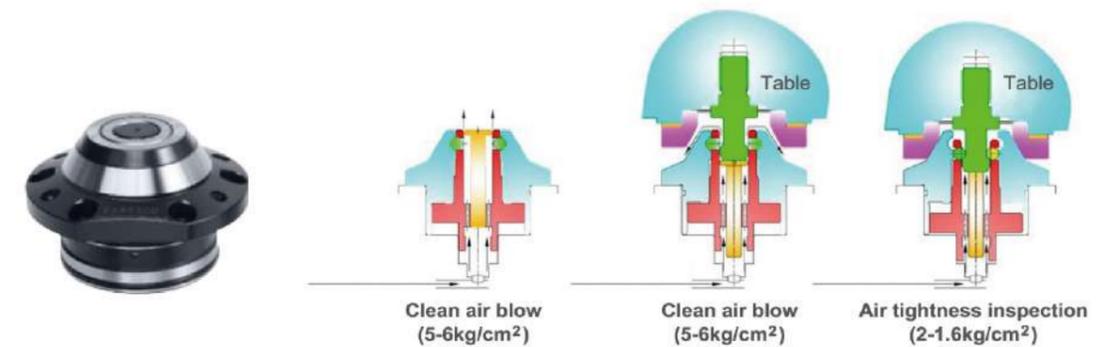


### Precision Assurance

- Hydraulic clamping system with multi-cylinder pistons and full-diameter braking to achieve symmetric load.
- Dual-thread worm gear transmission offers long lifetime, low backlash, and high-precision performance.
- YRT bearing with three-side support handles machining cutting torque from all directions, providing outstanding rigidity.

## Auto Pallet Change (APC)(Opt.)

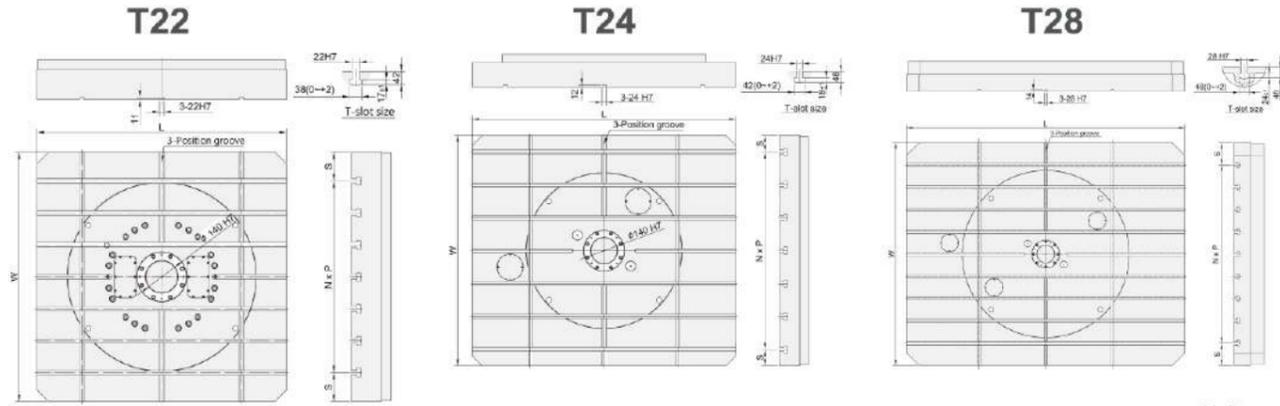
Precision assurance -  
Zero-point positioning system and airtight detection.



### Worktable Clamping and Positioning

- The exchange worktable uses 4 taper cones for fast, accurate positioning.
- Sealed cones prevent chips and coolant entry, when the worktable is exchanged.
- A powerful air blast clears chips during table exchange, and a low-pressure air detection ensures stability and positioning accuracy.

### Table Dimension



Unit: mm

| Model        | L x W         | T-slot width | N x P   | S   |
|--------------|---------------|--------------|---------|-----|
| VBT-110-1250 | 1,250 x 1,250 | T22          | 7 x 160 | 145 |
| VBT-110-1416 | 1,400 x 1,600 | T24          | 7 x 200 | 100 |
| VBT-130-1416 | 1,400 x 1,600 | T24          | 7 x 200 | 200 |
| VBT-110-1618 | 1,600 x 1,800 | T24          | 7 x 200 | 200 |
| VBT-130-1618 | 1,600 x 1,800 | T24          | 7 x 200 | 200 |
| VBT-130-1822 | 1,800 x 2,200 | T24          | 9 x 200 | 100 |
| VBT-130-2025 | 2,000 x 2,500 | T28          | 9 x 200 | 200 |
| VBT-130-2525 | 2,500 x 2,500 | T28          | 9 x 250 | 250 |
| VBT-130-2530 | 2,500 x 3,000 | T28          | 9 x 250 | 250 |

### High-Strength Boring Bar (W axis)

Boring Bar Travel up to 700mm

Effectively reaches deep into workpieces for cavity machining.



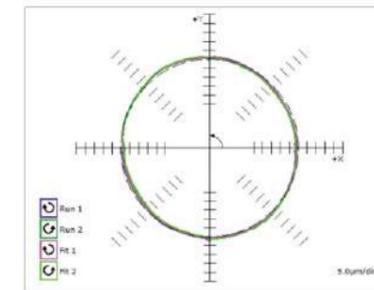
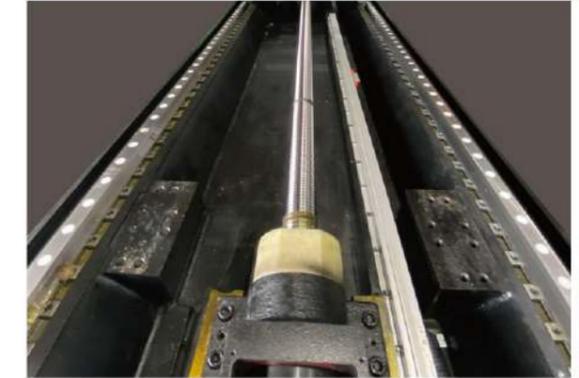
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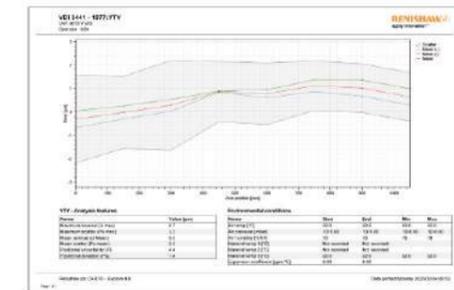
| Model   | Diameter (D) | Travel (W) |
|---------|--------------|------------|
| VBT-110 | ∅110 mm      | 550 mm     |
| VBT-130 | ∅130 mm      | 700 mm     |

### Excellent Precision Performance

- X, Y, Z axes are direct driven, achieving high positioning accuracy.
- The wide-span bed structure provides stable support for machine operation.
- X and Z axes with linear guides, Y axis with box way, perfectly combined for optimal rigidity and stable cutting performance.



**Long-Term Stable Precision**  
Circularity Accuracy: 5.0  $\mu\text{m}$   
(Actual measured value)



**High Positioning Precision**  
Positioning Accuracy (P) < 10  $\mu\text{m}/\text{m}$   
Repeatability (Ps) < 6  $\mu\text{m}/\text{m}$

### Polygon Mirror High-Precision Inspection



Unit: sec

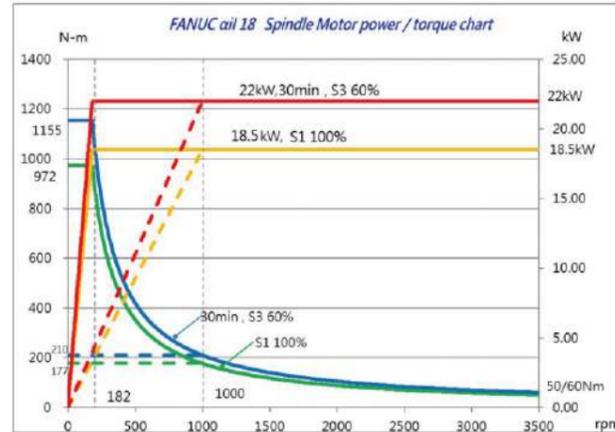
| Positioning output                  | P  | Ps (max) |
|-------------------------------------|----|----------|
| Linear scale Note 1                 | ±5 | ±4       |
| Clutch tooth positioning (1 degree) | ±4 | ±2       |

Note 1.: The positioning and repeatability accuracy of the linear scale is based on the optional linear scale system accuracy of ±4 seconds.

### Spindle Performance

#### Gear type spindle (VBT-110 STD)

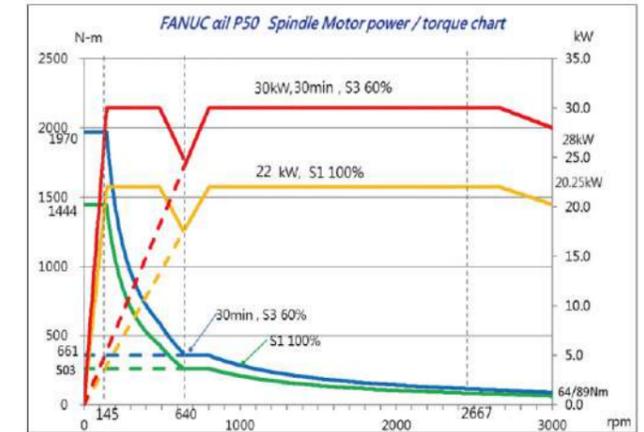
- Speed: 3,500rpm
- Power (S1 / S3): 18.5 / 22 kW
- Torque (S1 / S3): 972 / 1,155 Nm



| Type      | Material | Dia. (mm) | Speed (rpm) | Feed rate (mm/min) | Cutting depth (mm) | Cutting width (mm) | Removal rate (cc/min) |
|-----------|----------|-----------|-------------|--------------------|--------------------|--------------------|-----------------------|
| Face-mill | S45C     | 160       | 360         | 864                | 3.5                | 120                | 363                   |
| U-drill   | S45C     | 60        | 640         | 128                | -                  | -                  | 362                   |
| Tapping   | S45C     | M48 x 5   | 100         | 500                | -                  | -                  | -                     |

#### Gear type spindle (VBT-130 STD)

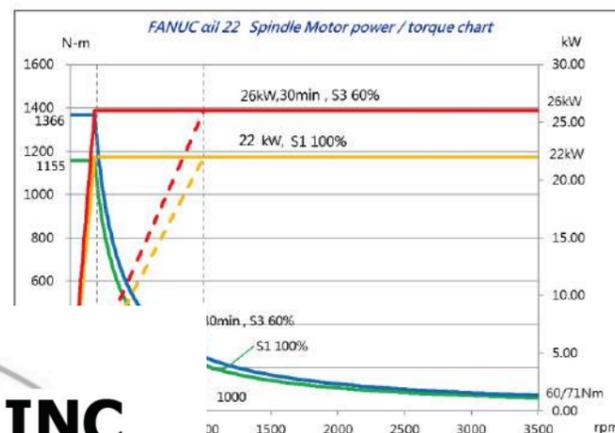
- Speed: 3,000rpm
- Power (S1 / S3): 22 / 30 kW
- Torque (S1 / S3): 1,444 / 1,970 Nm



| Type      | Material | Dia. (mm) | Speed (rpm) | Feed rate (mm/min) | Cutting depth (mm) | Cutting width (mm) | Removal rate (cc/min) |
|-----------|----------|-----------|-------------|--------------------|--------------------|--------------------|-----------------------|
| Face-mill | S45C     | 160       | 360         | 864                | 4.2                | 120                | 436                   |
| U-drill   | S45C     | 60        | 640         | 128                | -                  | -                  | 362                   |
| Tapping   | S45C     | M60 x 5   | 100         | 500                | -                  | -                  | -                     |

#### Gear type spindle (VBT-110 Opt.)

- Speed: 3,500rpm
- Power (S1 / S3): 22 / 26 kW
- Torque (S1 / S3): 1,155 / 1,366 Nm

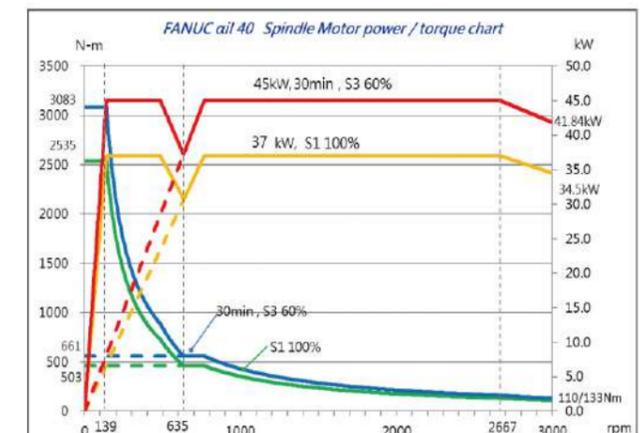


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| Type    | Material | Dia. (mm) | Speed (rpm) | Feed rate (mm/min) | Cutting depth (mm) | Cutting width (mm) | Removal rate (cc/min) |
|---------|----------|-----------|-------------|--------------------|--------------------|--------------------|-----------------------|
| U-drill | S45C     | 72        | 520         | 104                | -                  | -                  | 425                   |
| Tapping | S45C     | M60 x 5   | 100         | 500                | -                  | -                  | -                     |

#### Gear type spindle (VBT-130 Opt.)

- Speed: 3,000rpm
- Power (S1 / S3): 37 / 45 kW
- Torque (S1 / S3): 2,535 / 3,083Nm



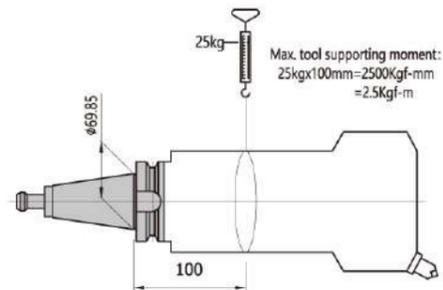
| Type      | Material | Dia. (mm) | Speed (rpm) | Feed rate (mm/min) | Cutting depth (mm) | Cutting width (mm) | Removal rate (cc/min) |
|-----------|----------|-----------|-------------|--------------------|--------------------|--------------------|-----------------------|
| Face-mill | S45C     | 160       | 360         | 864                | 7                  | 120                | 726                   |
| U-drill   | S45C     | 120       | 320         | 64                 | -                  | -                  | 724                   |
| Tapping   | S45C     | M80 x 6   | 100         | 500                | -                  | -                  | -                     |

## Flexible Tool Magazine Configuration

- Supports various tool capacities to meet different machining needs.
- Optimized tool change sequences for reduced cycle time.
- Compatible with a wide range of tool sizes and types.
- Enhances automation and adaptability for complex machining tasks.



### Max weight and moment.



Note: The center of gravity must be within 100mm, from tool gauge line \*when tool weight is 25kg\* .

### ● Arm-type tool change



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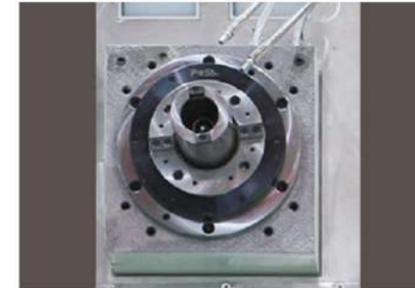
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● 40 tools

● Opt.: 60 / 90 / 120 / 180 / 240 tools

## Powerful Cooling System



### Coolant nozzles upon spindle

An efficient cooling system compatible with a wide variety of tool types, aiding in the removal of chips from the workpiece.



### Coolant through spindle system

**20 / 40 / 70 bar (Opt.)**

Works with through-coolant tools to provide the most effective cooling, aiding in chip removal from the hole.



### Chip clean flushing device at roof (only for enclosed sheet metal guard -with roof)

Wide-range high-flow cutting fluid cleans workpiece, quickly removing chips to the chip removal system, enhancing efficiency.

## Various Guard Types



Rotary Table Water Tray  
and Operator Protection Cover



Rotary Table  
Safety Guard <sup>1</sup>



Enclosed Sheet  
Metal Guard (with roof) <sup>2</sup>

Note: 1. Applicable to tables of 1,600 x 1,800 mm or smaller  
2. STD when equipped with APC



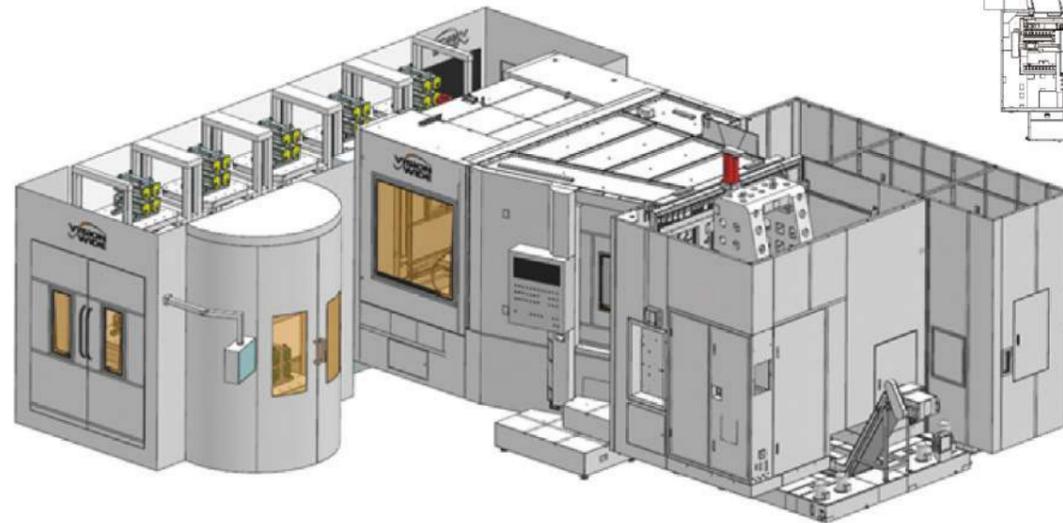
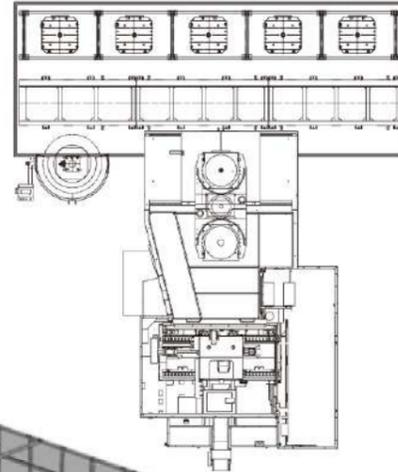
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## Automated Integration Application

### Single Machine 12-Position Worktable Exchange System

Achieve single-machine automation, versatile machining, and increased productivity.

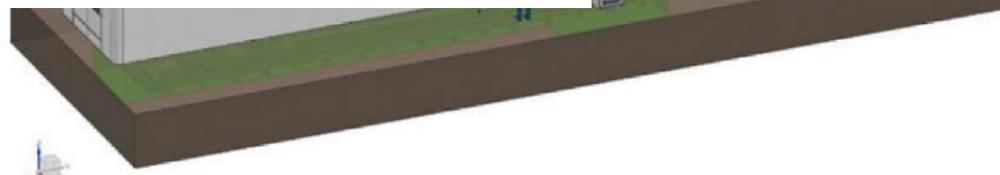
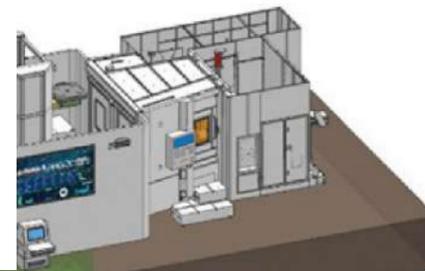


### Customized Design for Multi-Station Worktable Exchange System (Turning Cart)

Support customer needs with the best automation solutions.

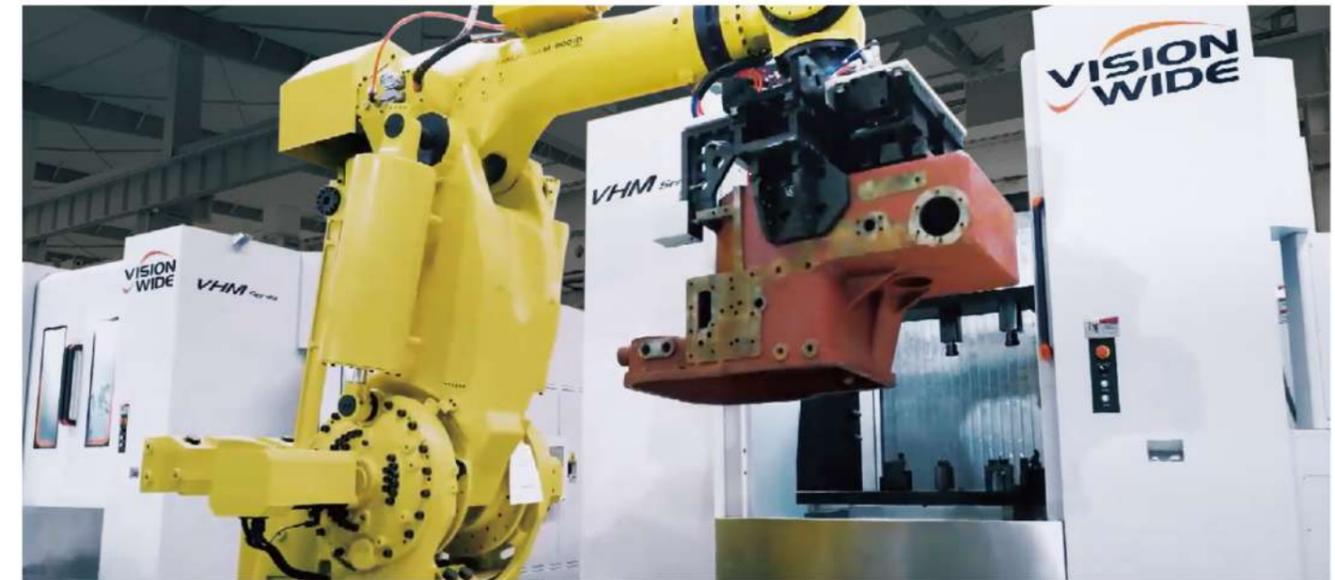
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### Multi-Machine Automated Robotic Production Line

Utilizing robotic arms for loading and unloading, compatible with multiple machine connections to achieve full production line automation.

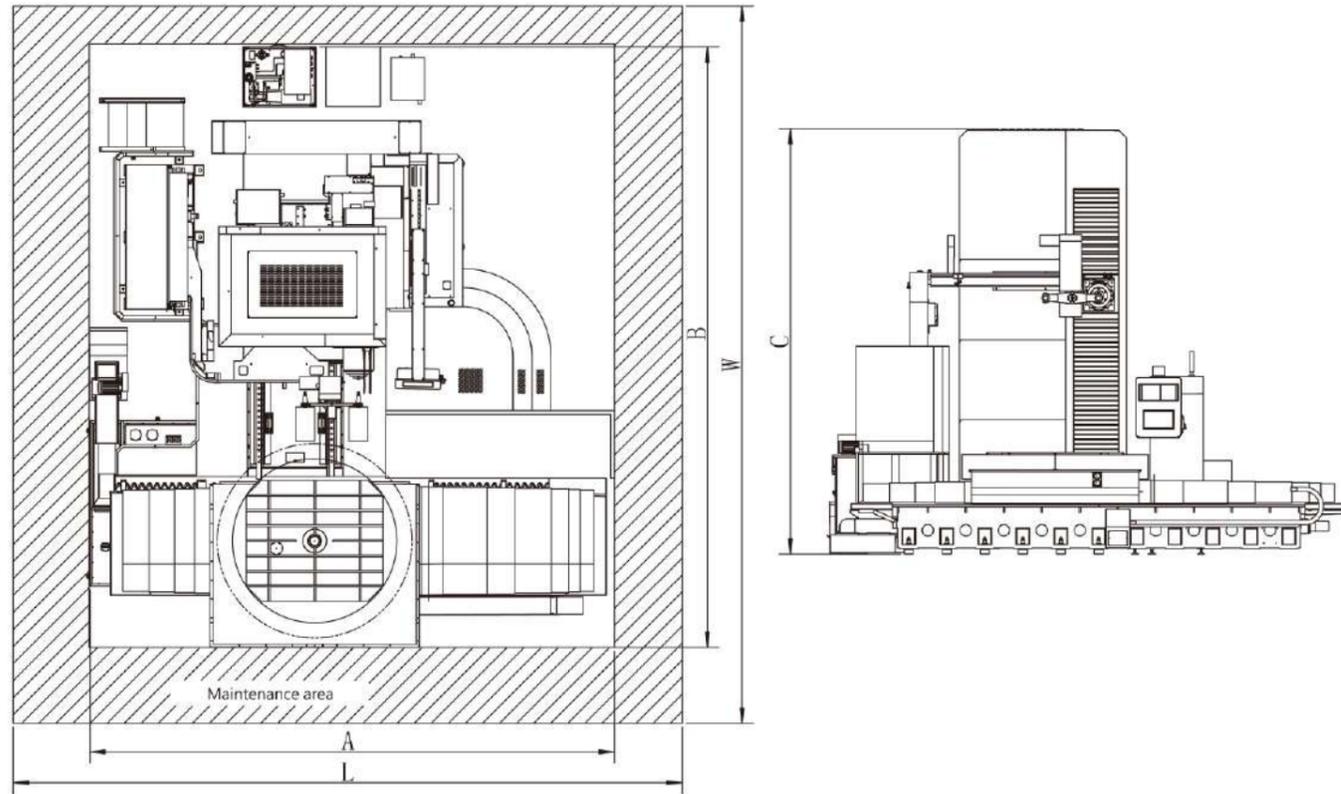


### Multi-Machine, Multi-Station Gantry Handling and Loading System

Complete line planning for versatile production, achieving an automated production line.



### Machine Dimension

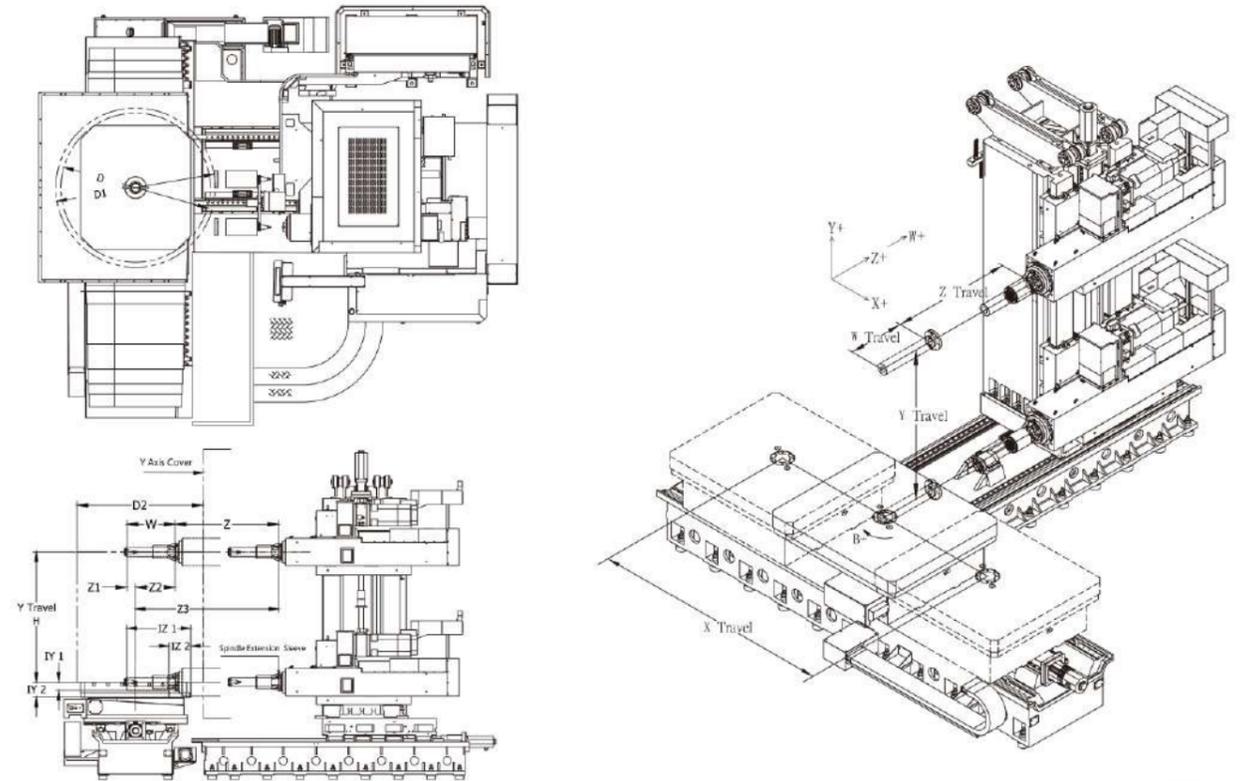


Unit: mm

| Model        | A             | B     | C             | L               | W               |
|--------------|---------------|-------|---------------|-----------------|-----------------|
| VBT-110-1250 | 5,500 / 6,000 | 7,700 | 4,600 / 5,000 | 7,500 / 8,000   | 9,200           |
| VBT-110-1416 | 6,000 / 6,500 | 7,850 | 4,600 / 5,000 | 8,000 / 8,500   | 9,350           |
|              |               |       |               | 8,300 / 8,800   | 9,500           |
|              |               |       |               | 8,000 / 8,500   | 9,300 / 9,850   |
|              |               |       |               | 8,300 / 8,800   | 9,500 / 10,000  |
|              |               |       |               | 9,000 / 9,500   | 9,700 / 10,200  |
|              |               |       |               | 10,350 / 10,850 | 9,900 / 10,400  |
|              |               |       |               | 11,250 / 11,750 | 10,600 / 11,200 |
|              |               |       |               | 12,000 / 12,500 | 10,700 / 11,200 |

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### Working Range



Unit: mm

| Model        | X axis travel | Y axis travel | Z axis travel | W axis travel | Distance from spindle nose to table center | Distance from spindle center to table surface | Spindle and table interference zone (Y & Z axis at negative limit) |      |             |      | Max. swing dia. of table | Max. swing dia. of workpiece 1&2 | Max. swing dia. of workpiece (Z axis negative limit) 1 |
|--------------|---------------|---------------|---------------|---------------|--|---|--|------|-------------|------|--------------------------|----------------------------------|--|
|              |               |               |               |               |  |   | Y direction  |      | Z direction |      |                          |                                  |  |
|              |               |               |               |               |  |   | IY 1   | IY 2 | IZ 1        | IZ 2 |                          |                                  |  |
| VBT-110-1250 | 2,000 / 2,500 | 1,600         | 1,500         | 550           | -125~425~1,925                             | 0~1,600<br>0~2,000                            | 120  | 200  | 750         | 190  | 1,680                    | 2,300                            | 1,700  |
| VBT-110-1416 | 2,000 / 2,500 | 1,600         | 1,500         | 550           | -25~525~2,025                              | 0~1,600<br>0~2,000                            | 120  | 200  | 725         | 165  | 2,050                    | 2,500                            | 1,700  |
| VBT-110-1618 | 2,000 / 2,500 | 2,000         | 1,500         | 550           | -25~525~2,025                              | 0~2,000                                       | 120  | 200  | 825         | 265  | 2,300                    | 2,500                            | 1,700  |
| VBT-130-1416 | 2,000 / 2,500 | 2,000         | 1,500 / 2,000 | 700           | -40~660~2,160 /<br>-40~660~2,860           | 0~2,000<br>0~2,500                            | 130  | 200  | 740         | 180  | 2,050                    | 2,320 / 3,320                    | 2,100  |
| VBT-130-1618 | 2,000 / 2,500 | 2,000         | 1,500 / 2,000 | 700           | -40~660~2,160 /<br>-40~660~2,860           | 0~2,000<br>0~2,500                            | 130  | 220  | 840         | 265  | 2,300                    | 2,320 / 3,320                    | 2,100  |
| VBT-130-1822 | 2,000 / 2,500 | 2,500         | 1,500 / 2,000 | 700           | 60~760~2,260 /<br>60~760~2,760             | 0~2,500<br>0~3,000                            | 130  | 220  | 840         | 250  | 2,700                    | 3,320 / 3,520                    | 2,300  |
| VBT-130-2025 | 3,000 / 3,500 | 2,500         | 1,500 / 2,000 | 700           | 60~760~2,260 /<br>60~760~2,760             | 0~2,500<br>0~3,000                            | 130  | 220  | 940         | 350  | 3,050                    | 3,320 / 3,520                    | 2,300  |
| VBT-130-2525 | 3,500 / 4,000 | 2,500         | 2,000 / 2,500 | 700           | 165~865~2,865 /<br>165~865~3,365           | 0~2,500<br>0~3,000                            | 130  | 220  | 960         | 370  | 3,450                    | 3,720 / 4,720                    | 2,500  |
| VBT-130-2530 | 4,500 / 5,000 | 3,000         | 2,000 / 2,500 | 700           | 165~865~2,865 /<br>165~865~3,365           | 0~3,000<br>0~3,500                            | 130  | 220  | 960         | 370  | 3,600                    | 3,720 / 4,720                    | 2,500  |

Note: 1. Worktable center and spindle center are aligned on the same axis.  
2. With a tool length of 500 mm and in tool retracted condition.

### Specification

| Model   | Unit  | VBT-110                  |                          |                        |
|---|-------|--------------------------|--------------------------|------------------------|
|   |       | VBT-110-1250             | VBT-110-1416             | VBT-110-1618           |
| <b>Travel</b>                                 |       |                          |                          |                        |
| X axis travel                                 | mm    | 2,000 / 2,500 (Opt.)     | 2,000 / 2,500 (Opt.)     | 2,000 / 2,500 (Opt.)   |
| Y axis travel                                 | mm    | 1,600 / 2,000 (Opt.)     | 1,600 / 2,000 (Opt.)     | 2,000                  |
| Z axis travel                                 | mm    | 1,500                    | 1,500                    | 1,500                  |
| W axis travel                                 | mm    | 550                      | 550                      | 550                    |
| <b>Rotary Table</b>                           |       |                          |                          |                        |
| Table size (L x W)                            | mm    | 1,250 x 1,250            | 1,400 x 1,600            | 1,600 x 1,800          |
| Min. division accuracy                        | °     | 0.001 / 1 (Opt.)         | 0.001 / 1 (Opt.)         | 0.001                  |
| Reference hole                                | mm    | ∅140 H7                  | ∅140 H7                  | ∅140 H7                |
| Max. table load (central area)                | kg    | 5,000                    | 6,000 / 10,000 (Opt.)    | 15,000 / 20,000 (Opt.) |
| T-slot (width x number x pitch)               | mm    | 22 x 7 x 160             | 24 x 7 x 200             | 24 x 7 x 200           |
| <b>Spindle</b>                                |       |                          |                          |                        |
| Distance from spindle nose to table center    | mm    | -125~425~1,925           | -25~525~2,025            | -25~525~2,025          |
| Distance from spindle center to table surface | mm    | 0~1,600 / 0~2,000 (Opt.) | 0~1,600 / 0~2,000 (Opt.) | 0~2,000                |
| Spindle type                                  | -     | Gear type                | Gear type                | Gear type              |
| Spindle speed                                 | rpm   | 3,500                    | 3,500                    | 3,500                  |
| Spindle power (cont. / 30 min.)               | kW    | 18.5 / 22                | 18.5 / 22                | 18.5 / 22              |
| Spindle torque (cont. / 30 min.)              | Nm    | 972 / 1,155              | 972 / 1,155              | 972 / 1,155            |
| Spindle taper                                 | -     | BT-50                    | BT-50                    | BT-50                  |
| <b>Feed</b>                                   |       |                          |                          |                        |
| Cutting feed rate (X / Y / Z / W)             | m/min | 10 / 10 / 10 / 6         | 10 / 10 / 10 / 6         | 10 / 10 / 10 / 6       |
| Rapid traverse (X / Y / Z)                    | m/min | 15 / 15 / 15 / 6         | 15 / 15 / 15 / 6         | 15 / 15 / 15 / 6       |
| <b>Accuracy (Measured by scale)</b>           |       |                          |                          |                        |
| Positioning accuracy (ISO-230-2 & VDI 3441)   | mm    | P 0.01                   | P 0.01                   | P 0.01                 |
| Repeatability (ISO-230-2 & VDI 3441)          | mm    | Ps 0.006                 | Ps 0.006                 | Ps 0.006               |
| Table positioning accuracy                    | sec   | +5                       | +5                       | ±5                     |
|   |       |                          |                          | ±4                     |
|   |       |                          |                          | 40                     |
|   |       |                          |                          | ∅125 / ∅250            |
|   |       |                          |                          | 500                    |
|   |       |                          |                          | 25 / 30 (Opt.)         |
| Tool shank                                    | -     | BT-50                    | BT-50                    | BT-50                  |

| VBT-130                              |                          |                                    |                          |                                      |                          |
|--------------------------------------|--------------------------|------------------------------------|--------------------------|--------------------------------------|--------------------------|
| VBT-130-1416                         | VBT-130-1618             | VBT-130-1822                       | VBT-130-2025             | VBT-130-2525                         | VBT-130-2530             |
| 2,000 / 2,500 (Opt.)                 | 2,000 / 2,500 (Opt.)     | 3,000 / 3,500 (Opt.)               | 3,000 / 3,500 (Opt.)     | 3,500 / 4,000 (Opt.)                 | 4,500 / 5,000 (Opt.)     |
| 2,000 / 2,500 (Opt.)                 | 2,000 / 2,500 (Opt.)     | 2,500 / 3,000 (Opt.)               | 2,500 / 3,000 (Opt.)     | 2,500 / 3,000 (Opt.)                 | 3,000 / 3,500 (Opt.)     |
| 1,500 / 2,000 (Opt.)                 | 1,500 / 2,000 (Opt.)     | 1,500 / 2,000 (Opt.)               | 1,500 / 2,000 (Opt.)     | 2,000 / 2,500 (Opt.)                 | 2,000 / 2,500 (Opt.)     |
| 700                                  | 700                      | 700                                | 700                      | 700                                  | 700                      |
| 1,400 x 1,600                        | 1,600 x 1,800            | 1,800 x 2,200                      | 2,000 x 2,500            | 2,500 x 2,500                        | 2,500 x 3,000            |
| 0.001                                | 0.001                    | 0.001                              | 0.001                    | 0.001                                | 0.001                    |
| ∅140 H7                              | ∅140 H7                  | ∅140 H7                            | ∅140 H7                  | ∅140 H7                              | ∅140 H7                  |
| 6,000 / 10,000 (Opt.)                | 15,000 / 20,000 (Opt.)   | 20,000                             | 20,000 / 30,000 (Opt.)   | 35,000 / 40,000 (Opt.)               | 40,000 / 45,000 (Opt.)   |
| 24 x 7 x 200                         | 24 x 7 x 200             | 24 x 9 x 200                       | 28 x 9 x 200             | 28 x 9 x 250                         | 28 x 9 x 250             |
| -40~660~2,160 / -40~660~2,660 (Opt.) |                          | 60~760~2,260 / 60~760~2,760 (Opt.) |                          | 165~865~2,865 / 165~865~3,365 (Opt.) |                          |
| 0~2,000 / 0~2,500 (Opt.)             | 0~2,000 / 0~2,500 (Opt.) | 0~2,500 / 0~3,000 (Opt.)           | 0~2,500 / 0~3,000 (Opt.) | 0~2,500 / 0~3,000 (Opt.)             | 0~3,000 / 0~3,500 (Opt.) |
| Gear type                            | Gear type                | Gear type                          | Gear type                | Gear type                            | Gear type                |
| 3,000                                | 3,000                    | 3,000                              | 3,000                    | 3,000                                | 3,000                    |
| 22 / 30                              | 22 / 30                  | 22 / 30                            | 22 / 30                  | 22 / 30                              | 22 / 30                  |
| 1,444 / 1,970                        | 1,444 / 1,970            | 1,444 / 1,970                      | 1,444 / 1,970            | 1,444 / 1,970                        | 1,444 / 1,970            |
| BT-50                                | BT-50                    | BT-50                              | BT-50                    | BT-50                                | BT-50                    |
| 10 / 10 / 10 / 5                     | 10 / 10 / 10 / 5         | 10 / 10 / 10 / 5                   | 10 / 10 / 10 / 5         | 10 / 10 / 10 / 5                     | 10 / 10 / 10 / 5         |
| 15 / 12 / 15 / 5                     | 15 / 12 / 15 / 5         | 12 / 10 / 12 / 5                   | 12 / 10 / 12 / 5         | 12 / 10 / 12 / 5                     | 12 / 10 / 12 / 5         |
| P 0.01                               | P 0.01                   | P 0.01                             | P 0.01                   | P 0.01                               | P 0.01                   |
| Ps 0.006                             | Ps 0.006                 | Ps 0.006                           | Ps 0.006                 | Ps 0.006                             | Ps 0.006                 |
| ±5                                   | ±5                       | ±5                                 | ±5                       | ±5                                   | ±5                       |
| ±4                                   | ±4                       | ±4                                 | ±4                       | ±4                                   | ±4                       |
| 40                                   | 40                       | 40                                 | 40                       | 40                                   | 40                       |
| ∅125 / ∅250                          | ∅125 / ∅250              | ∅125 / ∅250                        | ∅125 / ∅250              | ∅125 / ∅250                          | ∅125 / ∅250              |
| 500                                  | 500                      | 500                                | 500                      | 500                                  | 500                      |
| 25 / 30 (Opt.)                       | 25 / 30 (Opt.)           | 25 / 30 (Opt.)                     | 25 / 30 (Opt.)           | 25 / 30 (Opt.)                       | 25 / 30 (Opt.)           |
| BT-50                                | BT-50                    | BT-50                              | BT-50                    | BT-50                                | BT-50                    |

