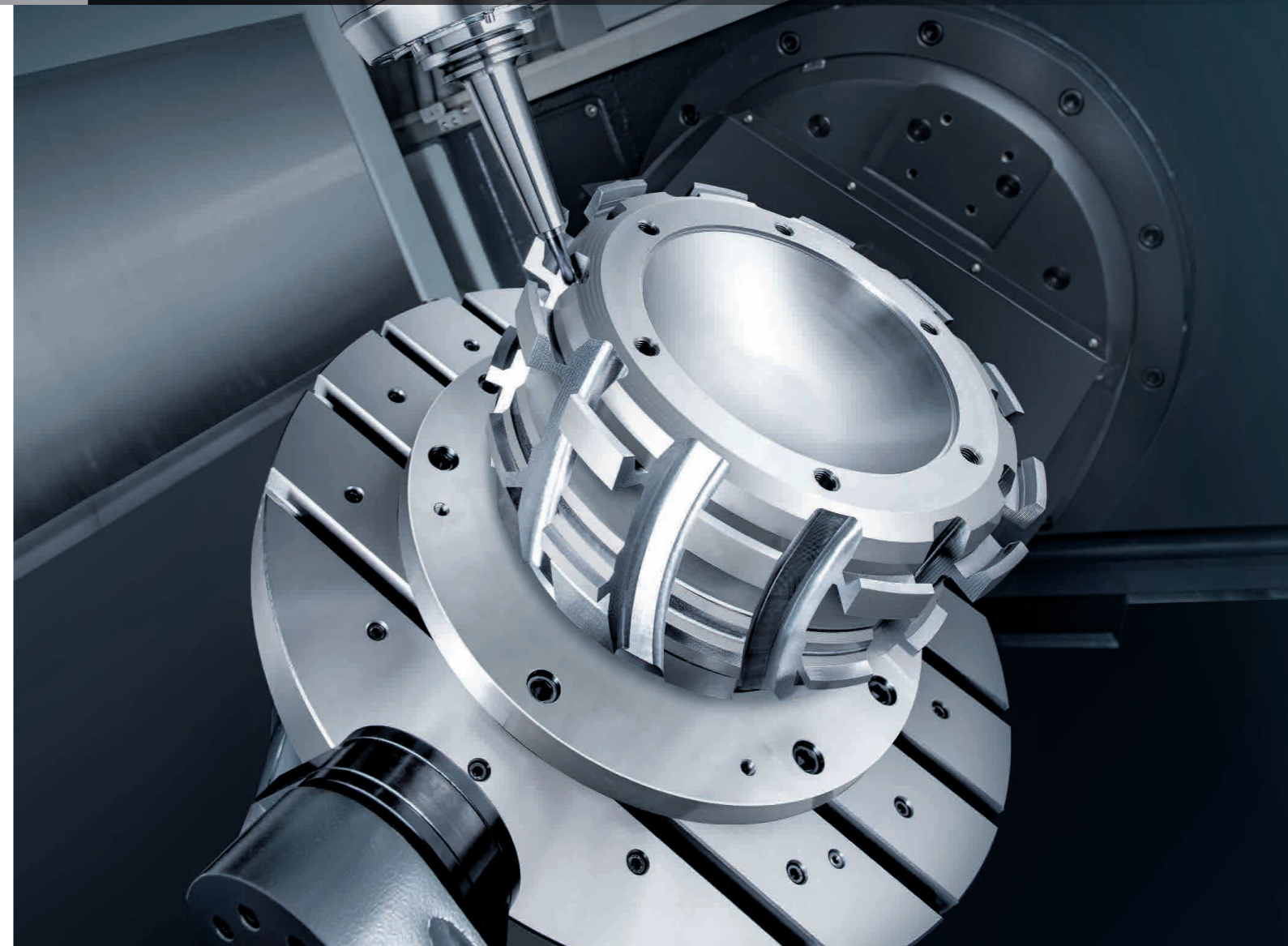


FCV-620  
series

# FCV-620 SERIES

High Speed 5 axes Machining Centers



## AWEA MECHANTRONIC CO.,LTD.

### HEADQUARTERS

629, Suezhetou Section, Kwanpu Rd., Wenshan Li,  
Hsinpu, Hsinchu 305, Taiwan  
TEL : +886-3-588-5191  
FAX : +886-3-588-5194  
Website : [www.awea.com](http://www.awea.com)

### CENTRAL TAIWAN SCIENCE PARK BRANCH

15, Keyuan 2<sup>nd</sup> Rd., Central Taiwan Science Park,  
Taichung 407, Taiwan  
TEL : +886-4-2462-9698  
FAX : +886-4-2462-8002  
E-mail : [sales@awea.com](mailto:sales@awea.com)

ISO 9001



ISO 14001



# 5 AXES TECHNOLOGY

## Comprehensive 5 Axes Machine Product Lines

### Structural Features

- Vertical Type
- Horizontal Type
- Bridge Type
- Gantry Type

### Rotary-axis Features

- High Performance Trunnion Tables
- ITALIAN Made Two Axes Head

High-quality finishes in aerospace and die / mold applications

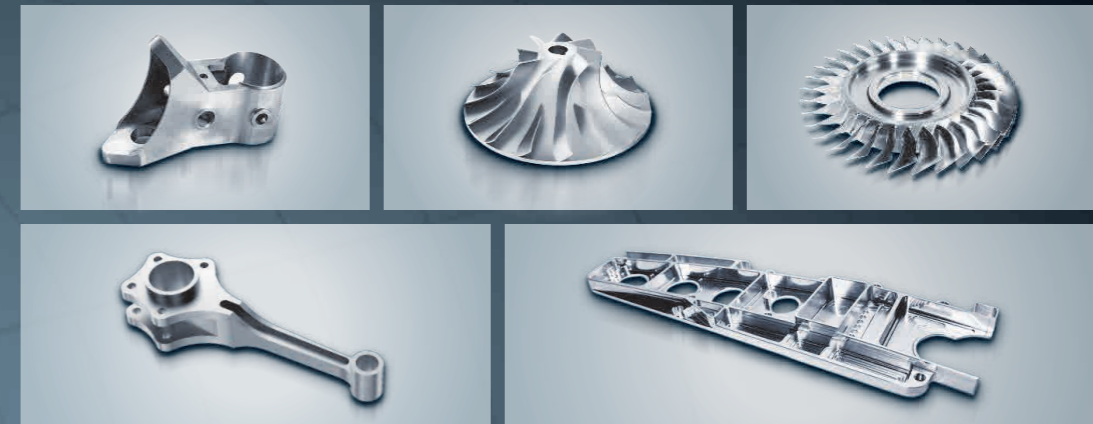
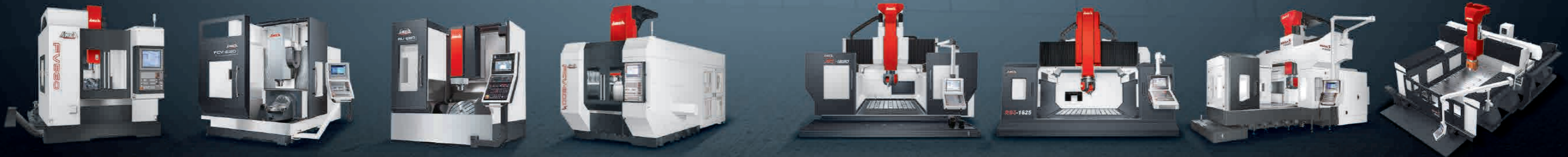


Table Size  
Ø 210 mm

Table Size ( X x Y )  
10,000 x 4,800 mm



### FV SERIES

#### High Performance Trunnion Table

A-axis : -42°~+120° \*1  
±100° \*2  
C-axis : ±360°  
Table size : Ø 350 mm\*1  
Ø 210 mm\*2

\*1 FV-960 \*2 FV-560

### FCV-620 SERIES

#### High Performance Rotary Table

B-axis : -50° ~ +110°  
C-axis : ±360°  
Table size : Ø 650 mm

### AU-680 SERIES

#### High Speed Trunnion Table

A-axis : -120° ~ +120°  
C-axis : ±360°  
Table size : Ø 680 mm

### FCV-800S SERIES

#### High Speed Trunnion Table

A-axis : -120° ~ +30°  
C-axis : ±360°  
Table size : Ø 850 mm  
Turning speed : 800 rpm

### AG5 SERIES

#### ITALIAN Made Two Axes Head

B-axis : ±100°  
C-axis : ±240°  
X / Y axes driven by high speed linear motors

### RG5 SERIES

#### ITALIAN Made Two Axes Head

B-axis : ±100°  
C-axis : ±240°  
Advanced feed system with cooling technology

### MEGA5 P SERIES

#### ITALIAN Made Two Axes Head

B-axis : ±100°  
C-axis : ±240°  
Bridge type structure

### MEGA5 G SERIES

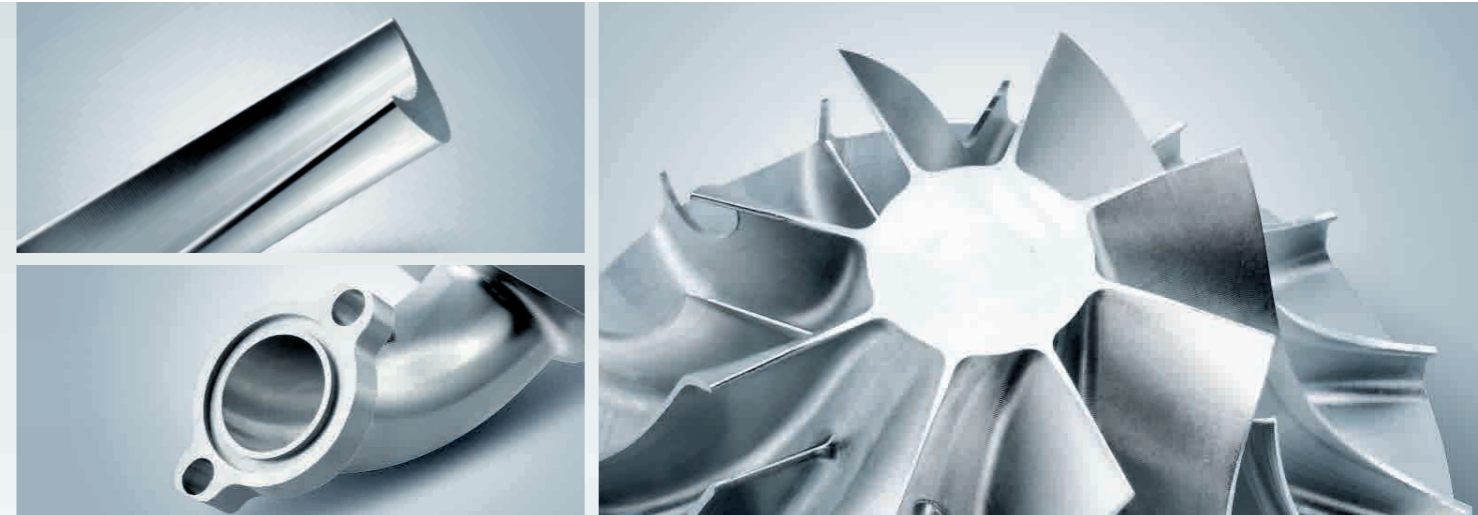
#### ITALIAN Made Two Axes Head

B-axis : ±100°  
C-axis : ±240°  
Gantry type structure

( Additional milling heads with different features and rotation angles are available on request. )

# FCV-620 series | High Speed 5 axes Machining Centers

FCV-620 series was designed to fulfill machining demands from small to medium-sized workpiece, either simultaneous 5-axis or 5-face programming. The combination of high speed spindle, rigid structure and high performance B / C rotary table provides you with excellent 5-axis simultaneous machining capability. FCV-620 series masters various machining demands on complex workpiece with ease and shorten the cycle time for normal workpiece, meeting your demands as of today and tomorrow.



## High performance rotary table

Fast rotation of the B / C axes realizes swift positioning of work table and therefore providing highly efficient 5-face or 5-axis simultaneous machining capability. B-axis swiveling range  $-50^{\circ} \sim +110^{\circ}$  offers sufficient space for tools when machining large-sized workpiece.

## Outstanding dynamic performance

Rapid feed rate of X / Y / Z axes go up to 36 m/min together with rotating speed 25 rpm on B / C axes enable FCV-620 to perform dynamic response therefore non-cutting time can be shortened dramatically.

## Chips removal countermeasure

Coolant nozzles around spindle, chips wash down coolant system, chip conveyor and the large volume 310L coolant tank are equipped as standard functions which remove chips thoroughly and provide stable cooling efficacy of coolant in cutting.

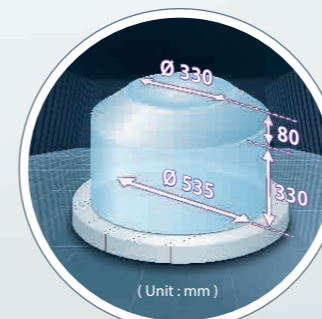
## The modular spindle design provides flexible options for diverse machining demands

// For high-speed machining of mold and light alloy parts

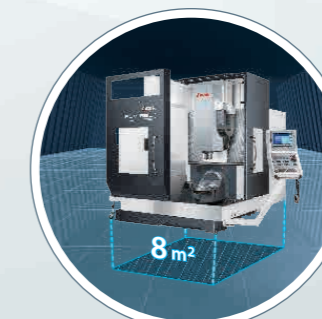
| Direct Drive Spindle |            |                               |
|----------------------|------------|-------------------------------|
| 12,000 rpm           | FANUC      | 95 Nm / 15 kW ( S2-30min )    |
|                      | HEIDENHAIN | 108 Nm / 17 kW ( S6-25% )     |
| 15,000 rpm           | FANUC      | 126 Nm / 18.5 kW ( S2-30min ) |
|                      | HEIDENHAIN | 108 Nm / 17 kW ( S6-25% )     |

// For machining of mold and high-precision parts.

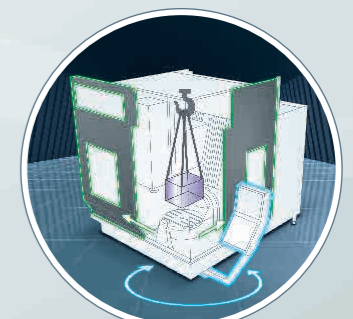
| Built-in Spindle |     |                          |
|------------------|-----|--------------------------|
| 16,000 rpm       | ATE | 99 Nm / 29 kW ( S6-60% ) |
| 24,000 rpm       |     |                          |



Abundant working area



Compact floor space

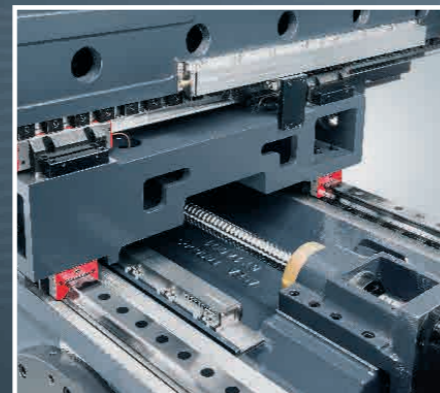


Convenient operating space

# FCV-620 series | High Rigidity Structure

Thick-ribbed structure with base of low gravity center guarantees superior static and dynamic rigidity of the FCV-620 series, which constitutes a solid basis to realize high-speed and high-accuracy 5-axis simultaneous machining.

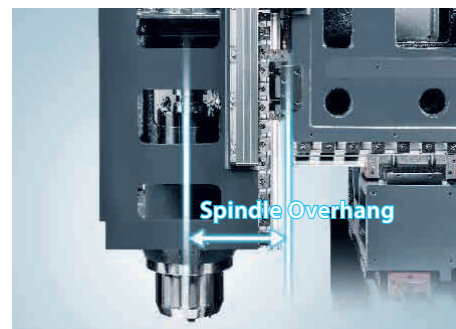
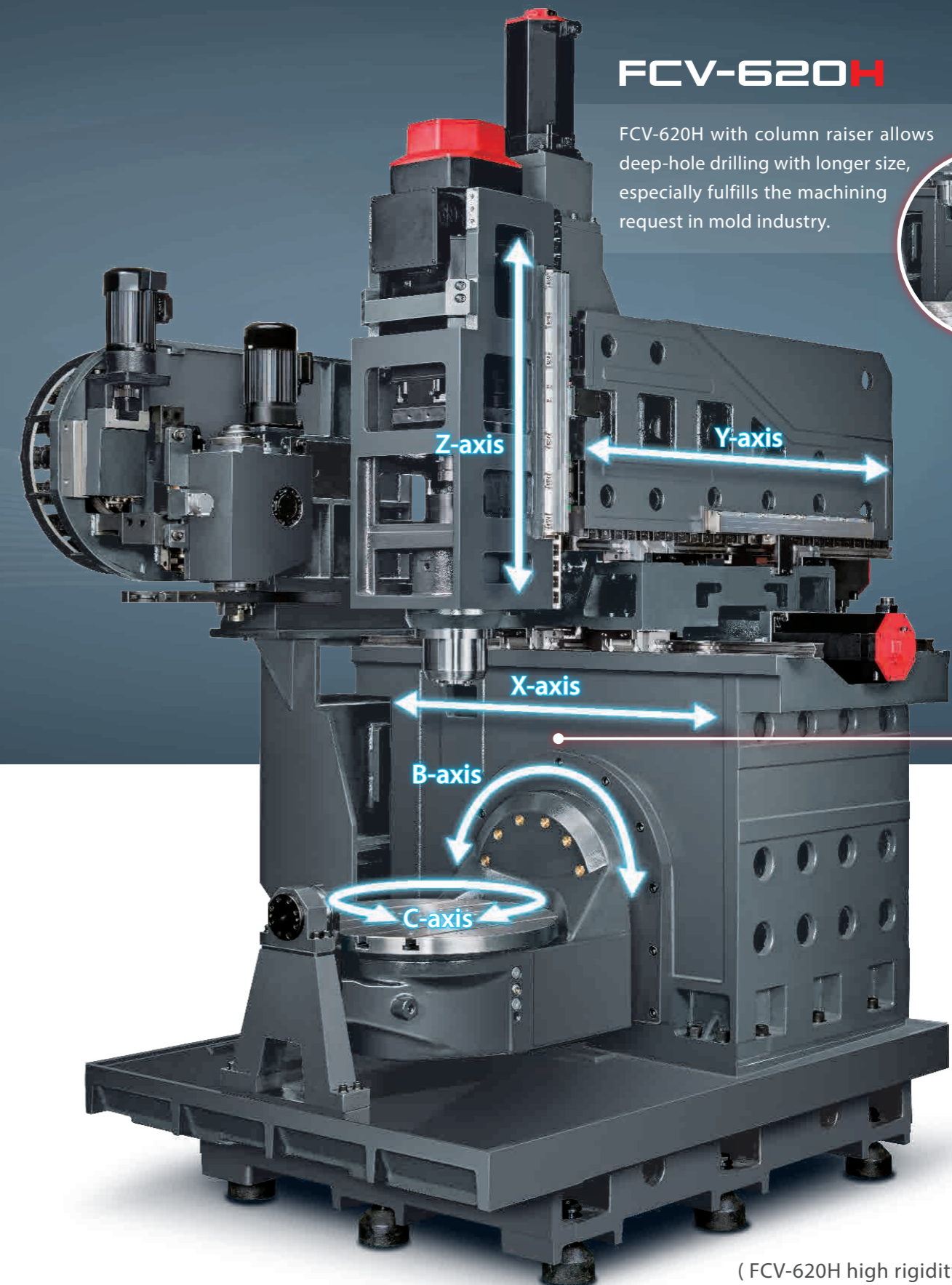
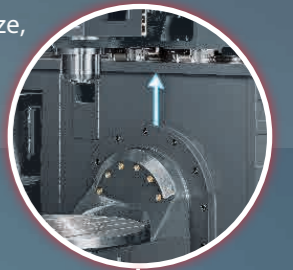
- Base, column and saddle all adopt high damping, low deformation one-piece Meehanite casting. The reinforced structure with thick-ribbed design possesses excellent anti-vibration capability and minimizes deformation.
- The Finite Element Analysis ( FEA ) provides the optimal machine design to build a light-weight, yet super rigid machine structure.
- X / Y / Z axes adopt roller type linear guide ways, featuring heavy cutting capability of box ways, advantages of fast movement and low wear of linear guide ways which significantly increase the rigidity and controllability.\*1
- Ball screws are directly driven by servo motors which provide ample thrust and fast acceleration / deceleration movement to ensure excellent dynamic response.



\*1 Optional high resolution linear scales up to 0.01  $\mu$  m offer high accuracy in machining.

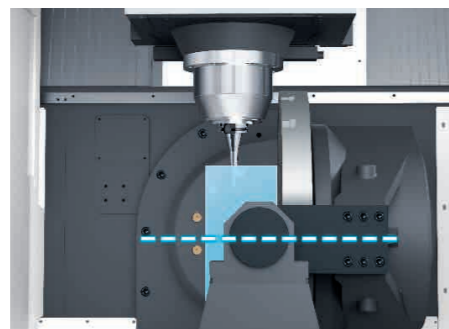
## FCV-620H

FCV-620H with column raiser allows deep-hole drilling with longer size, especially fulfills the machining request in mold industry.



Extremely short spindle overhang

The headstock is supported by 4 large-sized sliding blocks to achieve extremely short overhang with optimal design. The deformation caused by weight is minimized and thus enhancing cutting rigidity.



Accessibility of spindle nose

Sufficient Z-axis travel coordinates with minimal structure interference, allowing processing with shorter tools thus increasing cutting rigidity and accuracy substantially.



High reliability ATC system

Automatic tool magazine door activates only when performing tool exchange to avoid contamination made to the tools by fluid and chips. Standard 32T chain type tool magazine equipped with one-piece alloy steel ATC arm for performing efficient and reliable tool exchange.

( FCV-620H high rigidity structure )

# FCV-620 series | High Performance Rotary Table

The rotary table allows processing components with various complex surfaces to be done by a single setup. Cast in one-piece high rigidity cast iron, the structure of rotary table provides excellent anti-vibration capability to ensure optimal machining accuracy. The B-axis adopts bilateral support design for achieving superior dynamic performance while ensuring satisfactory machining accuracy.



| FCV-620             |   |            |
|---------------------|---|------------|
|                     | B-axis  | C-axis     |
| Table diameter      | Ø 650 mm  |            |
| Table load capacity | 300 kg ( B-axis 0° ~ 45° )<br>200 kg ( B-axis 45° ~ 90° ) |            |
| Rotary range        | -50° ~ 110°   | 360°       |
| Rotary speed        | 25 rpm  | 25 rpm     |
| Repeatability       | 5" arc.sec  | 5" arc.sec |

For machining which requires higher speed, precision and increased load capacity, **FCV-620S** is the answer. The rotary table adopts roller cam driving system featuring high transmission efficiency, enhanced rigidity and non-backlash. FCV-620S responds your demand for high efficiency machining on a variety of workpieces.

**500 kg**

Table load capacity

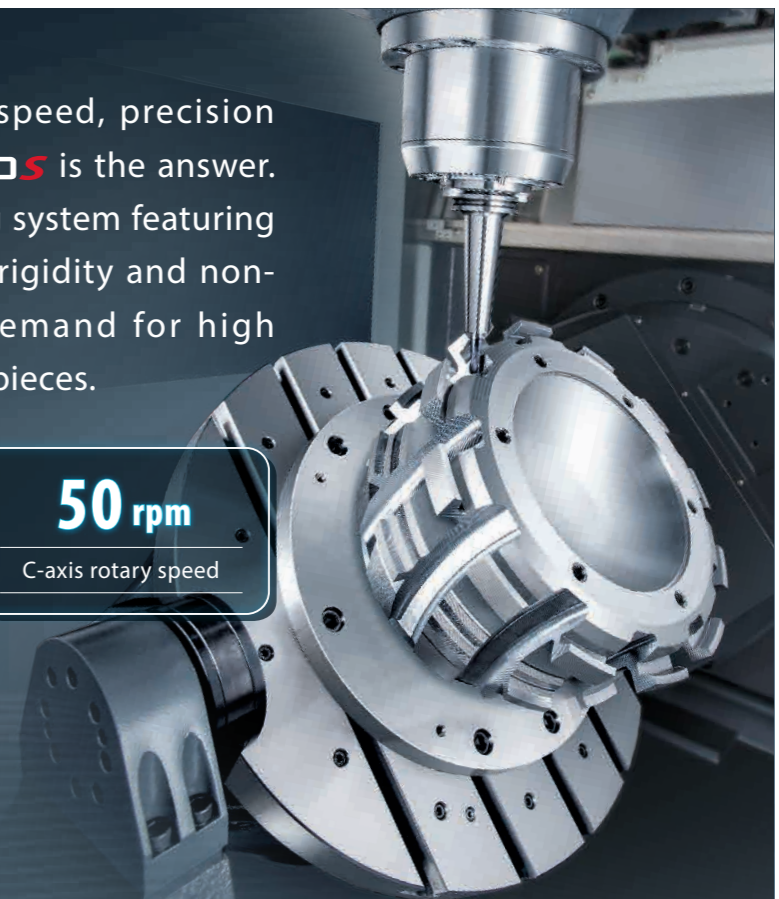
**33.3 rpm**

B-axis swiveling speed

**50 rpm**

C-axis rotary speed

| FCV-620S            |             |            |
|---------------------|-------------|------------|
|                     | B-axis      | C-axis     |
| Table diameter      | Ø 650 mm    |            |
| Table load capacity | 500 kg      |            |
| Rotary range        | -50° ~ 110° | 360°       |
| Rotary speed        | 33.3 rpm    | 50 rpm     |
| Repeatability       | 4" arc.sec  | 4" arc.sec |



Rotary table equipped with roller cam  
**FCV-620S**

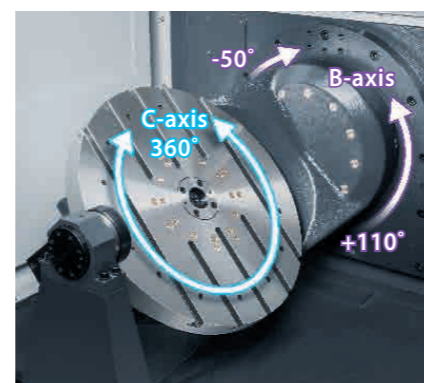


## High rigidity tailstock

Rotary table equips high rigidity tailstock support which ensures excellent machining accuracy during heavy loading or unbalancing force on table.

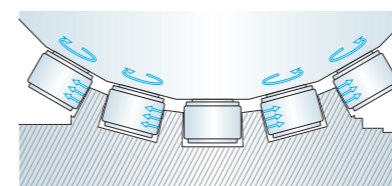
## Advanced B / C axes design

- Worm gear transmission driven by servo motor.
- B and C axes equipped with two sets of high precision needle roller bearings.
- Hydraulic disc type clamping system provides sufficient clamping force.
- HEIDEHAIN rotary encoder as standard accessory for ensuring consistent accuracy.



## Roller cam mechanism

- Rolling contact of rollers and cam shaft features advantages such as high rigidity, low thermal displacement and ultralow wear.
- Transmitting kinetic energy through rolling mechanism effectively reduces energy loss in driving, with superior transmission efficiency up to 90%.
- The engagement between roller and cam shaft is pre-loaded which significantly eliminates the backlash.



## Unique design

One-piece turret with embedded cross roller bearing, the structural rigidity is substantially superior to the regular segmented design.

The excellent rigidity of embedded cross roller bearing and ample clamping force provided by the circular hydraulic clamping system ensure stability of the rotating shaft.

# FCV-620 series | High Performance Spindle System

Modular spindle design for selecting the most suitable speed range, motor power and taper according to your requirements to fulfill different machining demands with FCV-620.



Built-in Spindle

## High speed built-in spindle

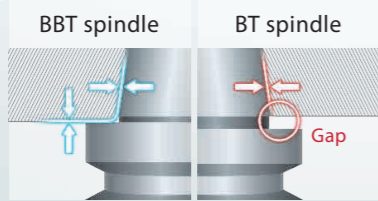
Built-in spindle efficiently lowers vibration of spindle while machining, which also extends life time of spindle and promote long period of machining accuracy.

## High speed direct drive spindle

Direct drive design efficiently isolates heat from motor, reduces thermal deformation and maintain long period of machining accuracy.

## BBT dual contact spindle

Optional BBT dual contact spindle to make the spindle taper and surface contact closely with tool holder which ensure highly cutting rigidity while high speed processing.



( Opt. HSK-A63 )

## Coolant through spindle ( CTS )

Optional coolant through spindle system ( max. 70 bar ) efficiently extend tool life by 25% ~ 400%\*1, achieving higher machining speed and chips removal rate in deep-hole drilling.



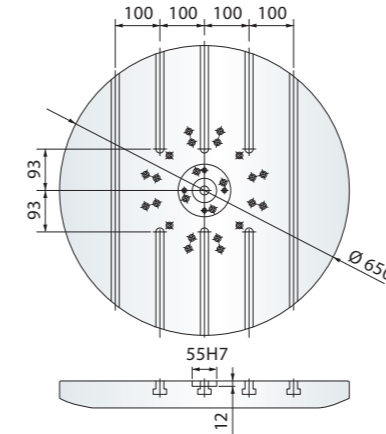
\*1 Depending on the machining conditions.

# FCV-620 series | Dimensions

( Unit : mm )

## Table Dimensions

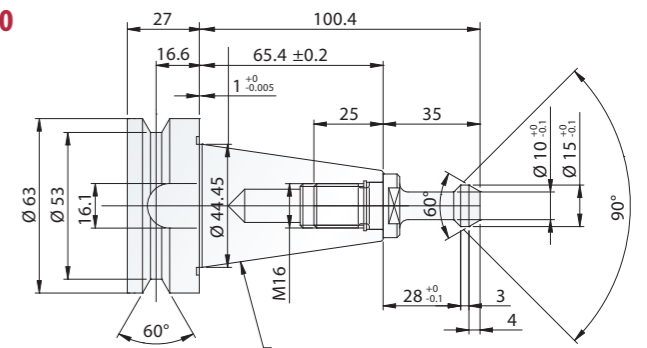
( Standard )



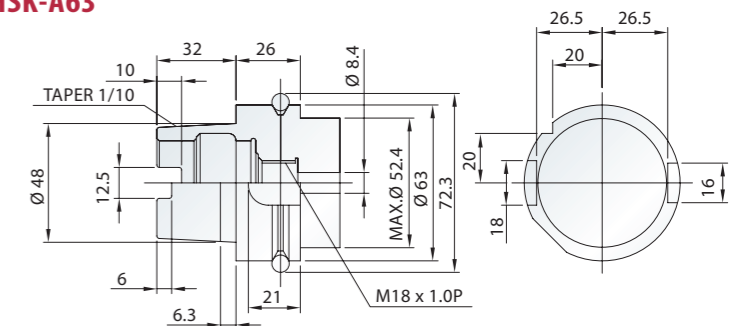
\* Please contact for the table size of FCV-620S.

## Tool Shank Dimensions

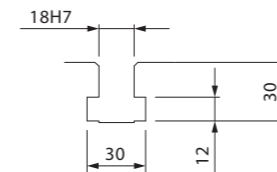
### BBT40



### HSK-A63

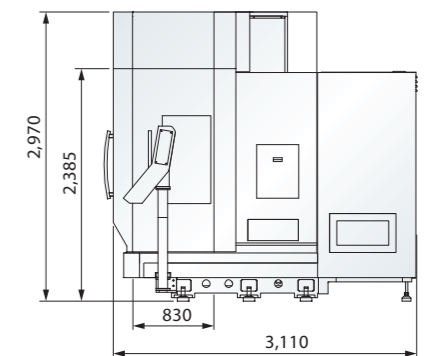
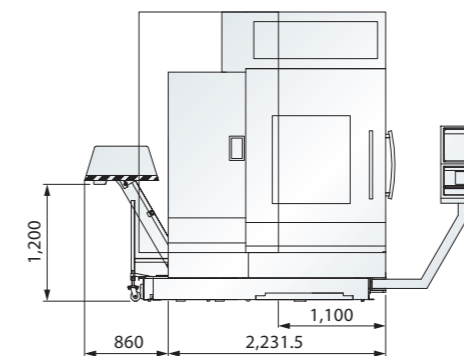
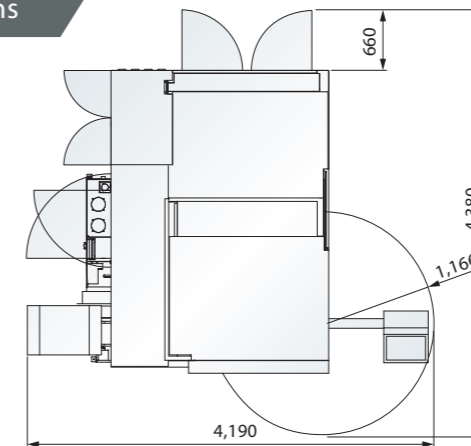


## T-slot Dimensions

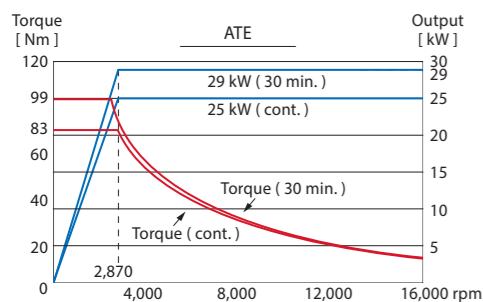


## Machine Dimensions

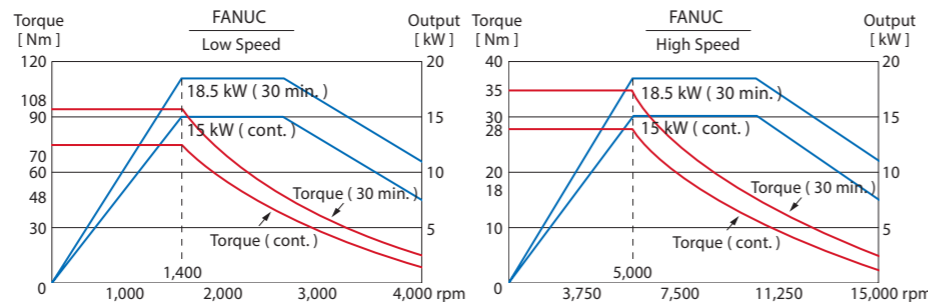
( HEIDENHAIN controller. )



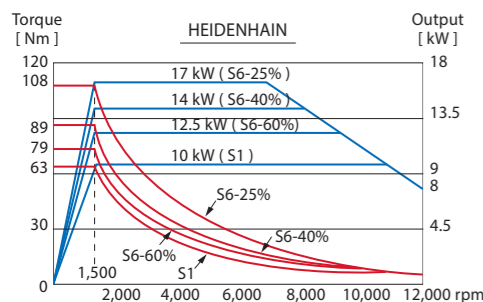
### 16,000 rpm Built-in Spindle



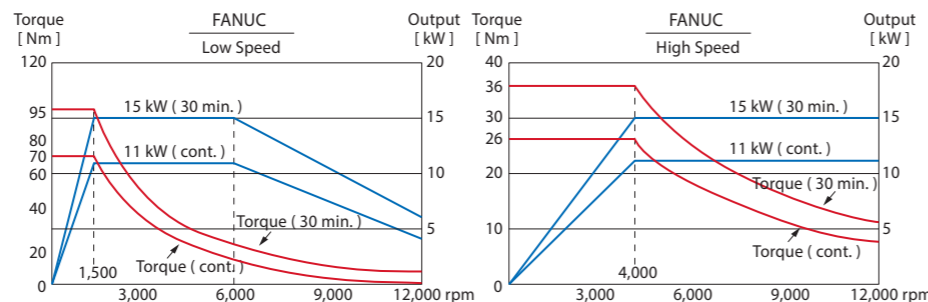
### 15,000 rpm Direct Drive Spindle



### 12,000 rpm Direct Drive Spindle



### 12,000 rpm Direct Drive Spindle

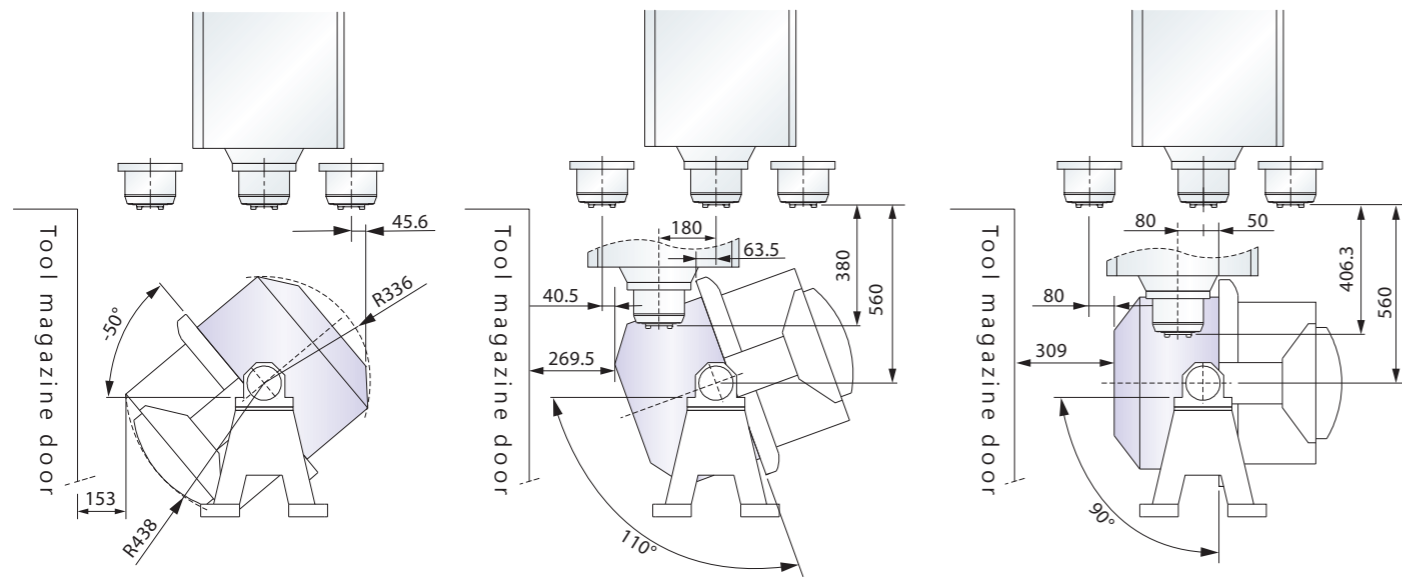


# FCV-620 series | Dimensions

( Unit : mm )

# FCV-620 series | Specifications

## Interference Diagram



## Work Range

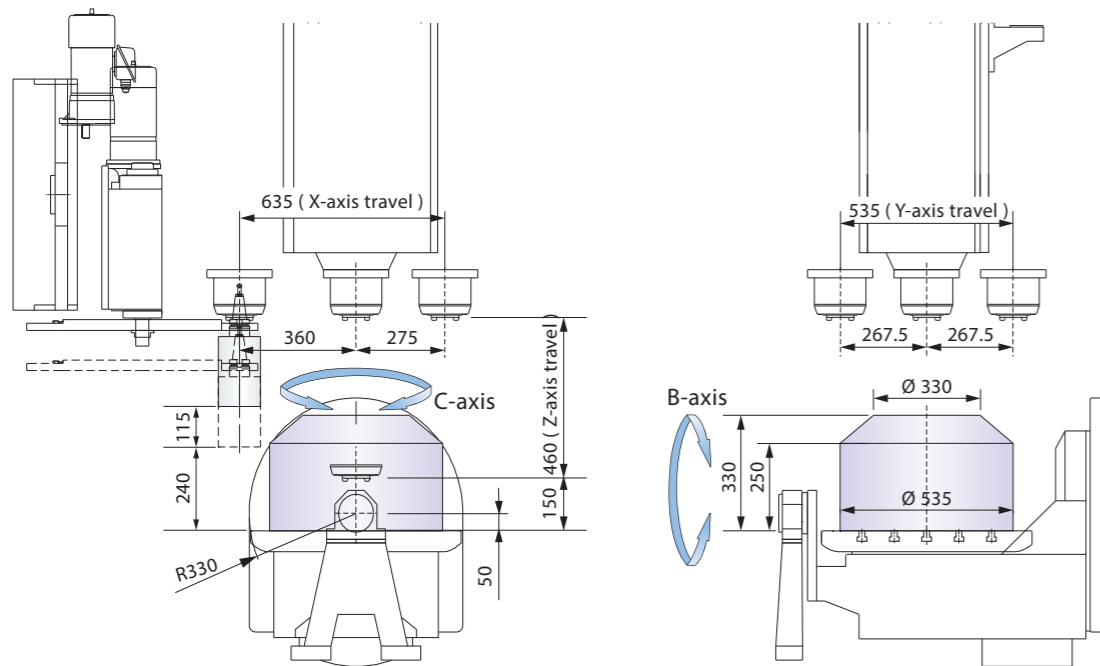


Table load capacity | 0° ~ 45° : 300 kg  
60° ~ 90° : 200 kg

|  |                    | FCV-620  |
|--|--------------------|--|
| <b>SPECIFICATIONS</b>                      |                    |  |
| X-axis travel                              | mm                 | 635  |
| Y-axis travel                              | mm                 | 535  |
| Z-axis travel                              | mm                 | 460  |
| B / C axes swivel / rotary range           |                    | -50° ~ +110° / 360°  |
| B / C axes swivel / rotary speed           | rpm                | 25   |
| Distance from spindle nose to table center | mm                 | 150 ~ 610  |
| <b>WORK TABLE</b>                          |                    |  |
| Table diameter                             | mm                 | Ø 650  |
| Table load capacity ( 0° ~ 45° )           | kg                 | 300  |
| Table load capacity ( 45° ~ 90° )          | kg                 | 200  |
| T-slot ( width x no. x space )             | mm                 | 18 x 5 x 100   |
| <b>SPINDLE</b>                             |                    |  |
| Spindle taper                              |                    | BBT40 / HSK-A63  |
| Spindle speed                              | rpm                | Direct drive spindle 12,000 ( 15,000 )<br>Built-in spindle 16,000 ( 24,000 ) |
| Spindle motor ( cont. / 30 min )           | kW                 | 11 / 15 ( FANUC 12,000 rpm )   |
| <b>FEED RATE</b>                           |                    |  |
| X / Y / Z axes rapid feed rate             | m/min.             | 36   |
| Cutting feed rate                          | m/min.             | 1 ~ 10   |
| <b>TOOL MAGAZINE</b>                       |                    |  |
| Tool magazine capacity                     | T                  | 32 ( 40 / 60 )   |
| Max. tool length                           | mm                 | 250  |
| Max. tool weight                           | kg                 | 6  |
| Max. tool diameter / adj. pocket empty     | mm                 | Ø 75 / Ø 127   |
| <b>ACCURACY</b>                            |                    |  |
| Positioning accuracy ( ISO230-2 )          | mm                 | 0.007  |
| Repeatability ( ISO230-2 )                 | mm                 | 0.005  |
| <b>GENERAL</b>                             |                    |  |
| Control system                             |                    | HEIDENHAIN TNC 640 / FANUC Oi-MF*1   |
| Pneumatic pressure requirement             | kg/cm <sup>2</sup> | 6  |
| Power requirement                          | kVA                | 50   |
| Machine weight                             | kg                 | 8,500  |

\*1 For 4+1 axes

Specifications are subject to change without notice.

## Standard Accessories

- B / C axes rotary encoder
- Spindle cooling system
- Spindle air curtain
- Coolant nozzle around spindle
- Chips flush coolant system
- Centralized automatic lubricating system
- Chain type 32T magazine
- Coolant system with pump and tank
- Caterpillar type chip conveyor and bucket
- Roof enclosure splash guard
- Heat exchanger for electric cabinet
- Air gun and water gun
- RS-232 interface and Ethernet port
- Tool box and foundation bolts
- Operation and maintenance manual

## Optional Accessories

- Coolant through spindle ( CTS )
- Compensation system for spindle thermal extension
- Anti-drop system for sudden power outage
- X / Y / Z axes optical linear scale
- Chain type 40T / 60T magazine
- Oil skimmer
- Automatic tool length measurement
- Automatic work piece measurement
- Transformer