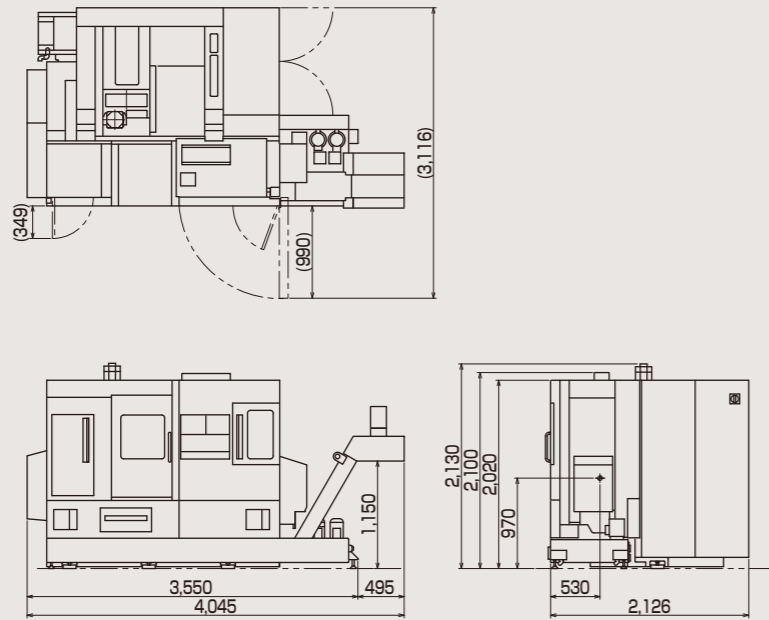
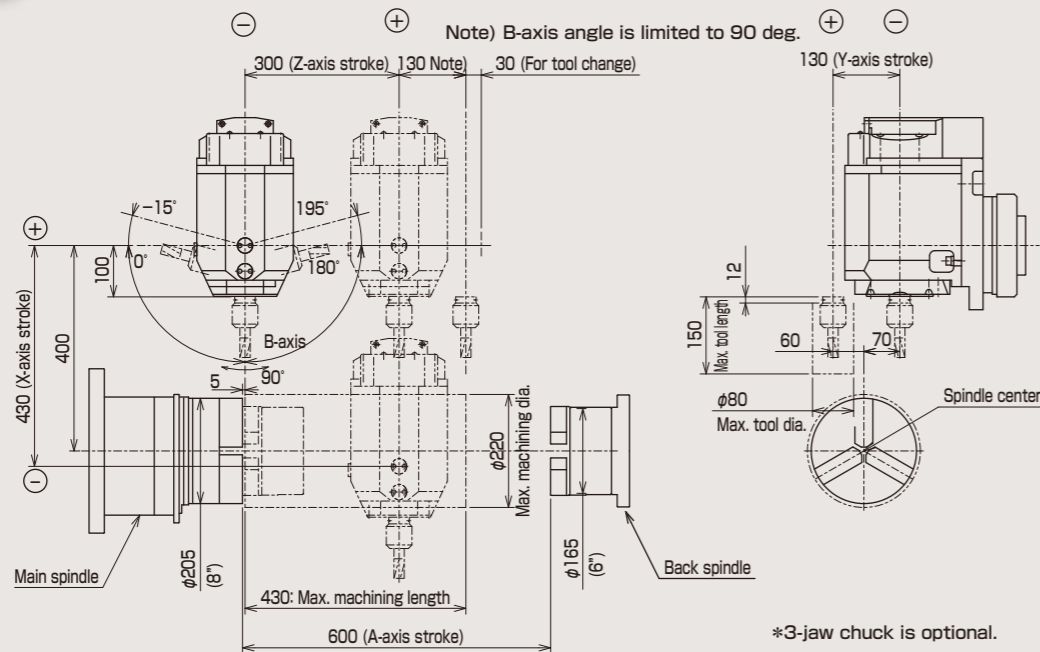


Layout



Tooling zone



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The specifications of this catalogue are subject to change without prior notice.

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PRECISION TSUGAMI

TSUGAMI

Turning Center

**TMA8HC**  
**TMA8FC**



Complete machining performed by single machine  
High-speed and compact turning center

Realizes shortening cycle time by increasing speed.

Realizes productive complex machining by the integration of  
lathe and machining center with excellent cost performance





# Light weight and compact model of high-performance turning center Shortens cycle time by increasing speed.

Realizes high-performance milling at overwhelming cost performance.

By process integration, reduces the number of operators and machines, and shortens the lead time.

Ideal machine for wide variety products in small quantities of complicated shape parts.

High-speed tool spindle (max. 20,000 min<sup>-1</sup>) which realizes high-performance machining is provided as standard.

High-speed and accurate B-axis unit is provided as standard.

Rapid traverse rate for all axes (X, Y, Z, and A axes) is 40 m/min.

Tool magazine: 60

Tool interface: CAPTO C4



## TMA8HC

High precision and high performance turning center with linear scale



Linear scale  
X-axis scale (standard), Y-axis scale (option), Z-axis scale (option)

## TMA8FC

All-in-one machine with 5-axis simultaneously controlled machining for the complex-shaped parts



Linear scale  
X-axis scale (standard), Y-axis scale (standard), Z-axis scale (standard)



# By high-speed and high-precision machining, shortens the cycle time of complicated shape parts.

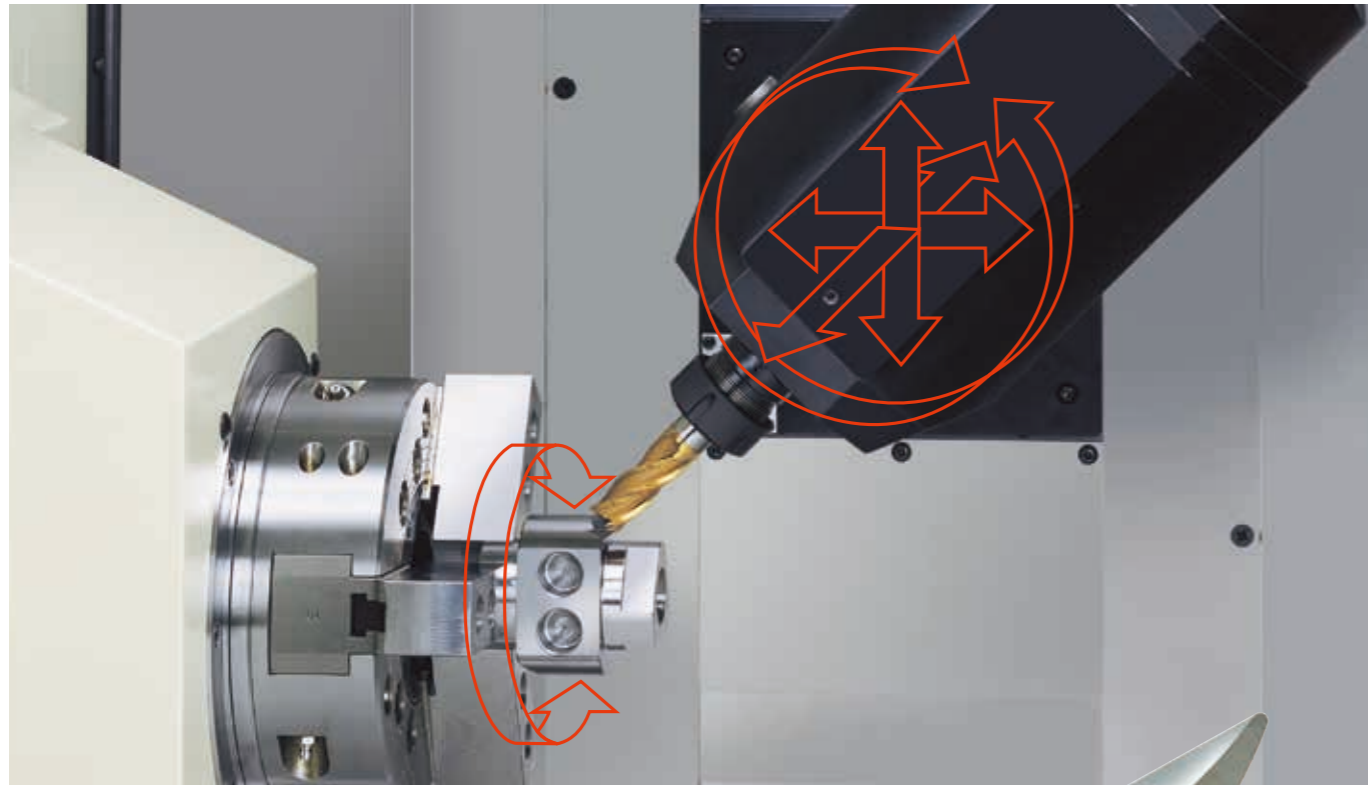
## ■ Tool spindle with B-axis swiveling mechanism

**Max. spindle speed of tool spindle: 20,000 min<sup>-1</sup>**

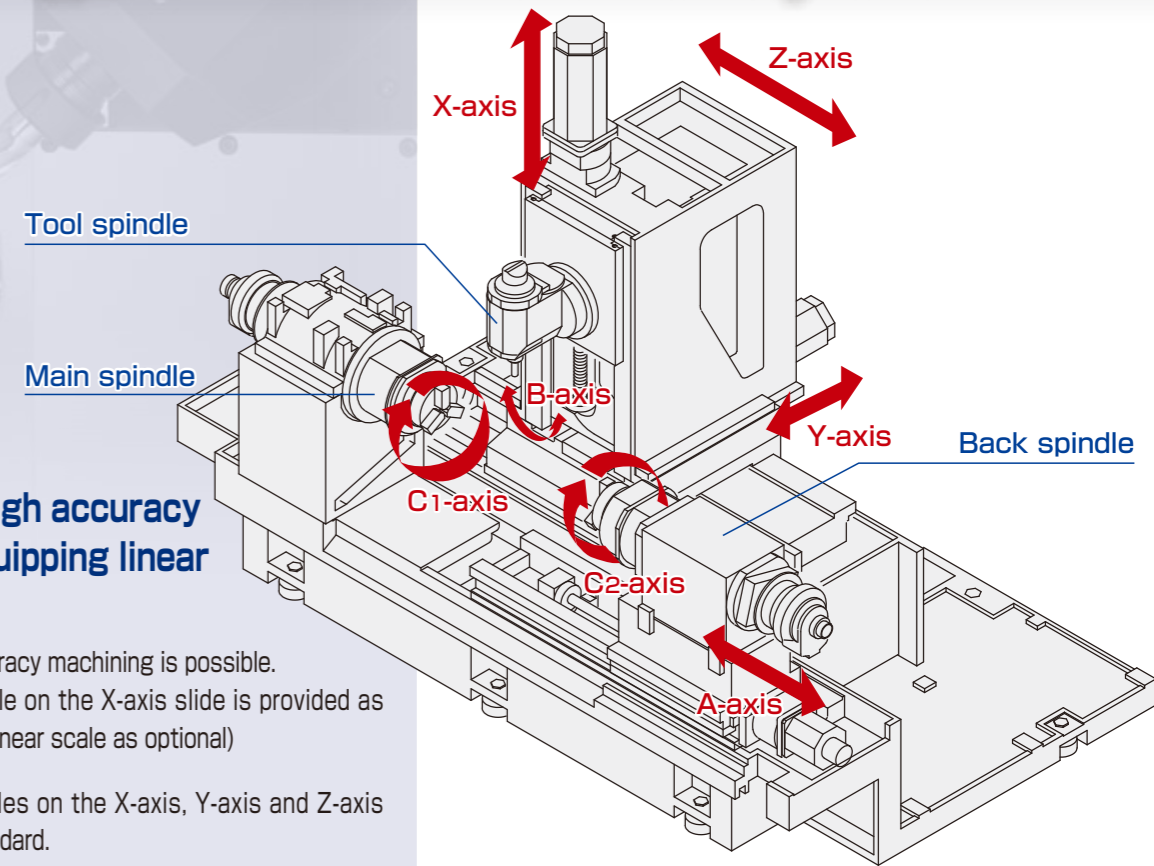
Single tool spindle structure that allows turning tools and milling tools to fit in the same tool spindle bore is adopted. B-axis swiveling mechanism with direct drive realizes high precision angular machining. Contour machining using continuous control function can be performed on TMA8FC.

The dual contact tool holder held by bore taper and end face of the tool spindle can perform powerful and high-accuracy machining. Employment of 11 kW powerful built-in motor performs milling as efficient as a machining center from low speed to the maximum speed of 20,000 min<sup>-1</sup>.

## ■ By 5-axis simultaneously controlled, 3D machining for complicated shape parts is possible. (TMA8FC)



Example: TMA8FC



## ■ Correspond to high accuracy machining by equipping linear scale

By linear scale, high accuracy machining is possible. TMA8HC: The linear scale on the X-axis slide is provided as standard. (Y and Z axes linear scale as optional)

TMA8FC: The linear scales on the X-axis, Y-axis and Z-axis slide are provided as standard.

## ■ Rapid traverse rate for all axes (X, Y, Z, and A axes) is 40 m/min.

## ■ High-speed tool change unit as standard ATC: 0.8 sec

The cam driven tool change unit performs the tool-to-tool change at 0.8 sec.



Automatic tool change unit

## ■ Tool magazine accessible from the machine front 60-tool ATC magazine is equipped

Easy changing and maintenance of tool holder by locating the magazine on the machine front side.



Tool magazine



# Basic structure that integrates lathe and machining center

## Orthogonal slide structure

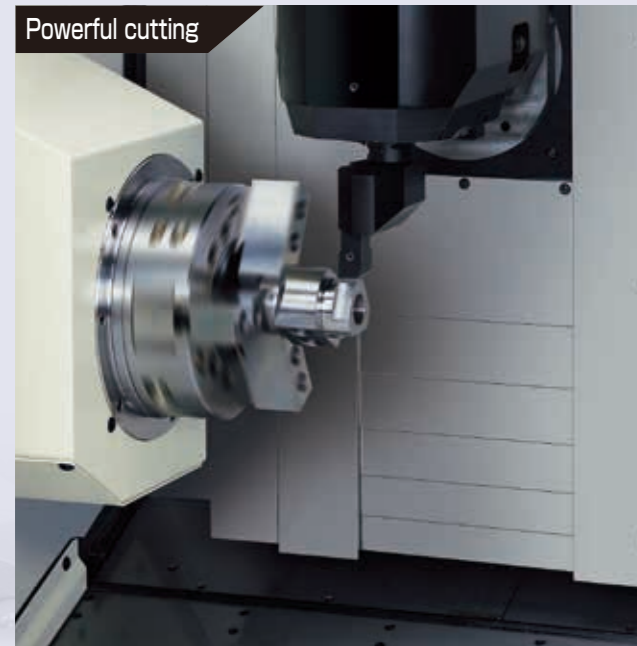
The X-, Y-, and Z-axes slide orthogonally to reflect high-precision machine structure into machining accuracy.

## Compact structure: mechanical, electric, hydraulic and pneumatic equipment stored in the main body

This space saving structure improves productivity per footprint.

## Spindle capable of powerful cutting

The temperature of spindle unit is controlled by cooling oil for prevention of heat generation from the bearings and the built-in motor. The thermally symmetrical structure also minimizes thermal displacement to ensure high-accuracy machining in long term



## Back spindle achieves 6-face machining.

C-axis function is provided as standard to the back spindle, and workpiece external surface and end face of the back spindle side can be machined in every 0.001 deg. Workpiece transfer from the main spindle to the back spindle during rotation is accurately performed by the synchronous spindle control.



## Connection of bar feeder for long unmanned operation

Up to  $\phi 65$  mm of bar stock is available. Optional collet chuck realizes accurate clamping and correspond to the machining of non-round shaped bar stock.

## Tool spindle indexing function

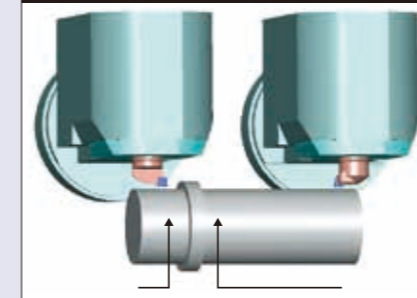
The unique 90° indexable tool spindle can reduce the number of tools and shorten the tool change time by using a multi turning holder with four turning tools or can turn back and front faces by the same tool.

Multi turning holder to index in 4 positions



The tool can be indexed at fixed positions in 90 deg steps (4 positions) and tools can be used efficiently.

Back/front machining by the same turning tool



## Light weight

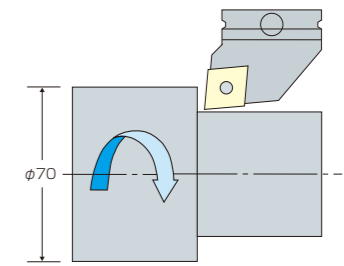
Weight reduction:  
7.1 t (HC/FC Model) / 8.5 t (H/F Model)

## Interference check function

Interference check function prevents the interference of tools and chucks.

## Machining capability

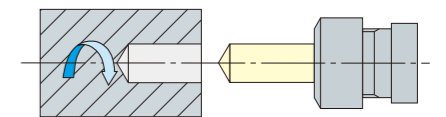
### Turning



	Cutting section area (mm <sup>2</sup> )
Main spindle	2.5
Back spindle	1.5

Workpiece material: JIS S45C

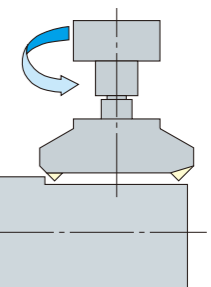
### Drilling



	Drilling dia. (mm)	Feedrate (mm/rev)	Spindle speed (min <sup>-1</sup> )
Main spindle	$\phi 30$	0.25	1,060
Back spindle	$\phi 20$	0.25	1,600

Workpiece material: JIS S45C

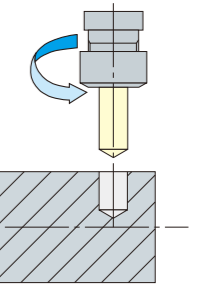
### Milling (tool spindle)



Cutter dia. (mm)	Width of cut (mm)	Depth of cut (mm)	Feedrate (mm/rev)	Spindle speed (min <sup>-1</sup> )
$\phi 50$ (4-flute cutter)	40	3	0.6	800

Workpiece material: JIS S45C

### Drilling (tool spindle)



Drilling dia. (mm)	Feedrate (mm/rev)	Spindle speed (min <sup>-1</sup> )
$\phi 20$	0.2	1,600

Workpiece material: JIS S45C

# Correspond to wide range of machining with abundant options

## Options



### Collet chuck units

Various collet chuck units appropriate for holding barstock are prepared.



### Workpiece catcher

Machined workpieces up to  $\phi 65$  mm x 250 mm x 5kg are discharged into a receiving box in front of the machine body.



### Coolant through tool spindle

Maximum 7 MPa high-pressure coolant can be discharged to a tool nose from an optional high-pressure coolant system.



### 3-jaw chuck

This 3-jaw chuck is suitable for chucking the short workpiece. It is possible to mount 8-inch chuck to the main work spindle and 6-inch chuck to the back work spindle.



### Tool checker

It equips the tool set function used for measuring the tool tip position easily as well as the drill break detection function.



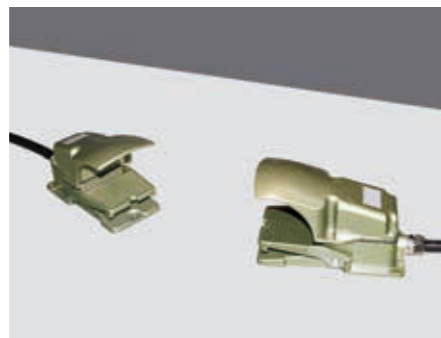
### Chip conveyor

Hinge type chip conveyor and scraper type chip conveyor are prepared.  
 ● Hinge type  
 The hinge type is suitable for discharging long and curled swarf. It is not suited for chips of brass or casting.  
 ● Scraper type  
 The scraper type is suitable for discharging chips of 150 mm or less.



### Oil mist collector

The oil mist collector collects oil mist to prevent your factory environment from deteriorating. Discharge port is provided on the body, and central control of mist is also possible.



### Foot switch

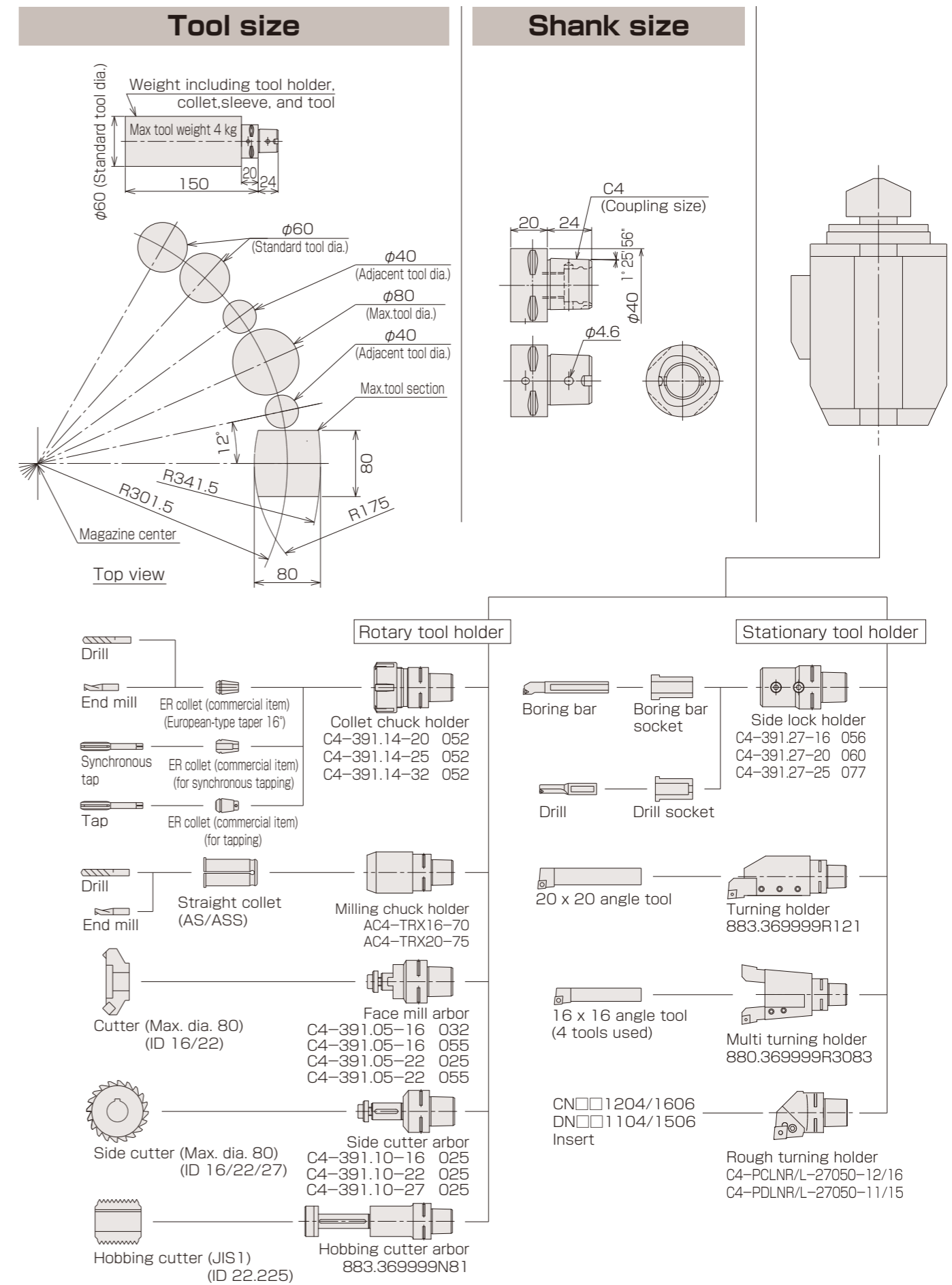
This foot switch is used for opening or closing the chuck on the main or back spindle. Single pedal foot switch is provided. By pressing foot switch each time, chuck clamp and unclamp changes alternately. Clamping or unclamping the workpiece becomes easier by the foot switch.



### Signal indicator

Three color lamp lights and it informs of the state of the machine. This is attached above the operation panel.

## Tooling system





Machine specifications

Item	TMA8HC	TMA8FC
Capability	Max. machining diameter	220 mm
	Max. barstock diameter	65 mm <sup>Note 1)</sup>
	Max. machining length	430 mm <sup>Note 2)</sup>
Stroke	X-axis stroke	430 mm
	Y-axis stroke	130 mm (+60/-70 mm)
	Z-axis stroke	300 mm + 130 mm + 30 mm <sup>Note 3)</sup>
	A-axis stroke	600 mm
Main spindle	Max. spindle speed	5,000 min <sup>-1</sup>
	Spindle end face	JIS A2-6
	C1-axis least index angle	0.001°
	Chuck size	8" <sup>Note 4)</sup>
	Collet chuck chucking dia.	φ8 mm to φ65 mm <sup>Note 5)</sup>
	Motor output	15/11 kW
Back spindle	Max. spindle speed	5,000 min <sup>-1</sup>
	Spindle end face	φ140 mm flat
	C2-axis least index angle	0.001°
	Chuck size	6" <sup>Note 4)</sup>
	Collet chuck chucking dia.	φ8 mm to φ51 mm <sup>Note 5)</sup>
	Motor output	11/5.5 kW
Tool spindle	Type of tool spindle	Single tool spindle with ATC
	Max. tool spindle speed	20,000 min <sup>-1</sup>
	Motor output	11/5.5 kW
	B-axis index angle	-15° to 195°
	B-axis least index angle	0.001° (Positioning)   0.001° (Continuous control)
	Tool spindle indexing angle/position	90°/4 positions
Automatic tool changer	Tool shank configuration	CAPTO (C4)
	Tool storage capacity	60
Rapid traverse rate	X-axis rapid traverse rate	40 m/min
	Y-axis rapid traverse rate	40 m/min
	Z-axis rapid traverse rate	40 m/min
	A-axis rapid traverse rate	40 m/min
	B-axis rapid traverse rate	150 min <sup>-1</sup>
	C1-axis, C2-axis rapid traverse rate	300 min <sup>-1</sup>
Machine size	Width x depth x height	3,550 mm x 2,126 mm x 2,130 mm
	Machine weight	7,100 kg

Note 1) Bar stock operation capability may be limited depending on the chuck or the related devices. Note 2) Among 430 mm of Z-axis stroke, the last 130 mm is limited with 90° of B-axis angle. Note 3) 130 mm is limited with 90° of B-axis angle. 30 mm is the stroke for changing tools. Note 4) 3-jaw chuck is optional. Note 5) Collet chuck specification is optional.

Options

Item	TMA8HC	TMA8FC
Advanced function system	Linear scale	Y-axis scale and Z-axis scale are prepared.   X-axis scale, Y-axis scale and Z-axis scale as standard
Automation & unmanned operation system	Tool checker	
	Bar feeder interface	
	Work catcher	
Chip disposal system	Workpiece ejector	
	Chip conveyor	Selectable from two types (hinge type and scraper type).
Coolant system	Chip carrier	
	Coolant through tool spindle	
	High-pressure coolant system	
	Mist collector	
Workpiece chucking	Oil skimmer	
	3-jaw chuck unit	For the main and back spindles
	Collet chuck unit	For the main and back spindles
	Chucking pressure change (two automatic shifts)	Available for the main and back spindles.
	Chuck foot switch	
Safety	Automatic fire extinguisher	
	Automatic power shutdown	
Others	Signal indicator	

NC specifications

Item	TMA8HC	TMA8FC	
NC unit	FANUC Oi-TF	FANUC 31i-B5	
Display unit	10.4" color LCD		
Controllable axes	6 axes (Simultaneously controllable axes: 4 axes)	7 axes (Simultaneously controllable axes: 5 axes)	
Interpolation function	Linear interpolation, circular interpolation, polar coordinate interpolation, cylindrical interpolation, threading		
Part program storage size	1 Mbyte		
Number of registerable programs	1,000		
Edit function	Background editing, programmable data input		
Operation control	Run time & parts number display		
Tape code	Automatic recognition of EIA/ISO		
Command method	Standard: G code system A		
Least input increment	0.001 mm 0.001°		
Max. programmable value	±99999.999 mm / (±8 digits)		
Program command	Workpiece coordinate system (G52 to G59), machine coordinate system, 3-dimensional coordinate conversion		
Canned cycle	Canned cycle, multiple repetitive cycle, canned cycle for drilling		
Spindle control	Direct command of S 5-digit, 0 - 120% override per 10%, constant surface speed control, main/back-spindle synchronization, Cs contour control, rigid tapping		
Tool offset	Tool geometry offset and tool wear offset, cutter and tool nose radius compensation		
Number of tool offsets	128	200	
Tool function	T 5-digit (Upper 2 digits: Tool number, Lower 3 digits: Offset number)		
Feed type	Rapid traverse, cutting feed (per revolution, per minute, cutting feedrate clamp), override (cutting feed, rapid feed)		
Manual operation	JOG feed, handle feed, reference position return		
Data input/output interface	Memory card, USB memory, RS232C		
Operation function	Automatic operation, MDI operation, single block, feed hold, optional block skip, dry run		
Safety function	Abnormal load detection, stored stroke limit		
Functions for high-speed and accurate machining with 5 axes	Interpolation function	—	Nano smoothing G5.1
	Feed function	—	AI contour control II
	Program input	—	Tilted working plane command/Cutting point command
	Tool function/Tool compensation	—	Tool center control/Tool offset for Milling and Turning function
	Input/output function & device	—	Data server function

NC options

Item	TMA8HC	TMA8FC
Part program storage size	2 Mbyte	
Number of tool offsets	200	—
Helical interpolation	Machining of a large-diameter thread and a solid cam is available by helically moving a tool.	
Addition of optional block skip	The block with a code "/2 to /9" 9 is neglected by a switch.	
AI contour control II	High-speed and accurate machining enabled by look-ahead function	Standard

TMA8HC Machine model name

Machine model name varies depending on the attached scale specifications.

Specifications	Machine model name
Without Y-axis scale and Z-axis scale	TMA8HC
With Y-axis scale	TMA8HC-Y
With Z-axis scale	TMA8HC-Z
With Y-axis scale and Z-axis scale	TMA8HC-YZ

\*X-axis scale as standard

Torque characteristics

