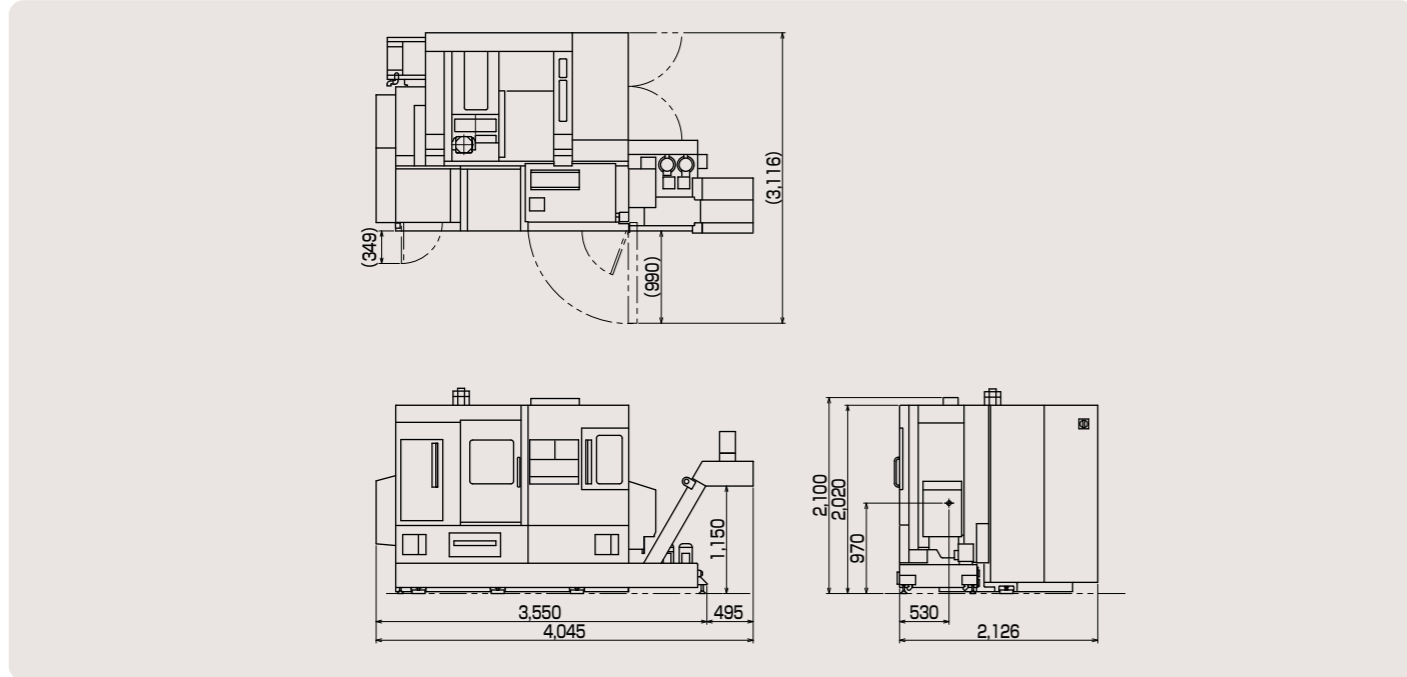
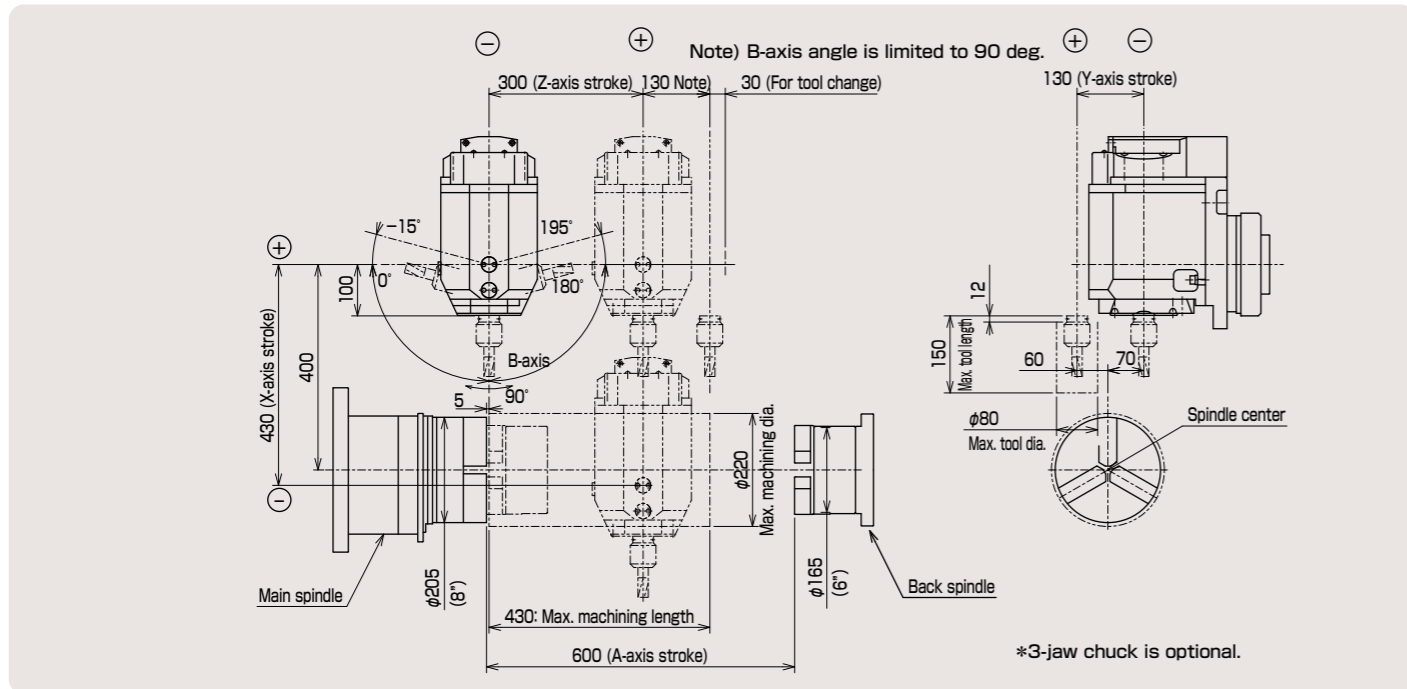


Appearance



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

TMA8JC



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

Productive complex machine by the integration of
lathe and machining center



Complete machining performed by single machine
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.



Basic structure that enables complex machining is fitted into the compact body.

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

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

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

■ 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

■ Tool spindle with B-axis swiveling mechanism

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. 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 11kW powerful built-in motor performs milling as high-efficient as a machining center from low speed to the maximum speed of 20,000min⁻¹.

■ High-speed tool change unit as standard

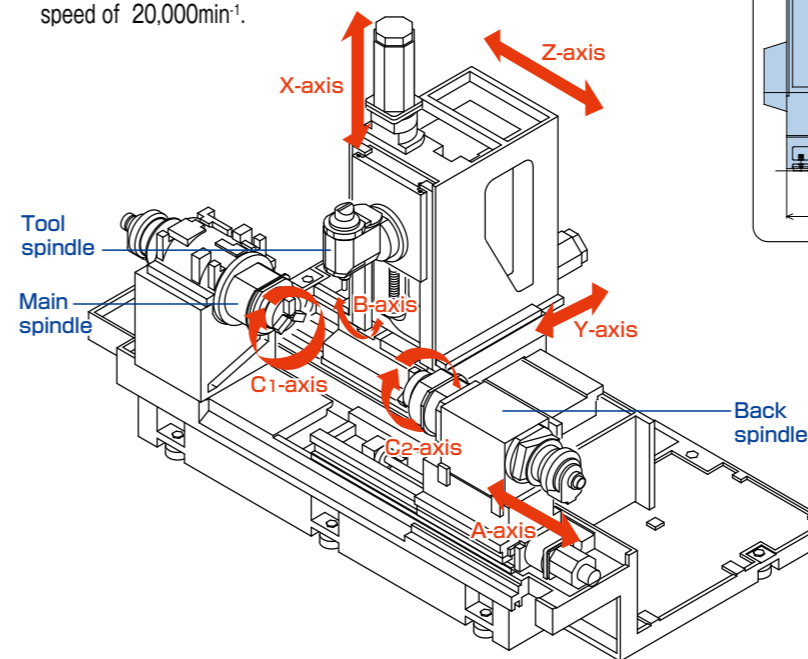
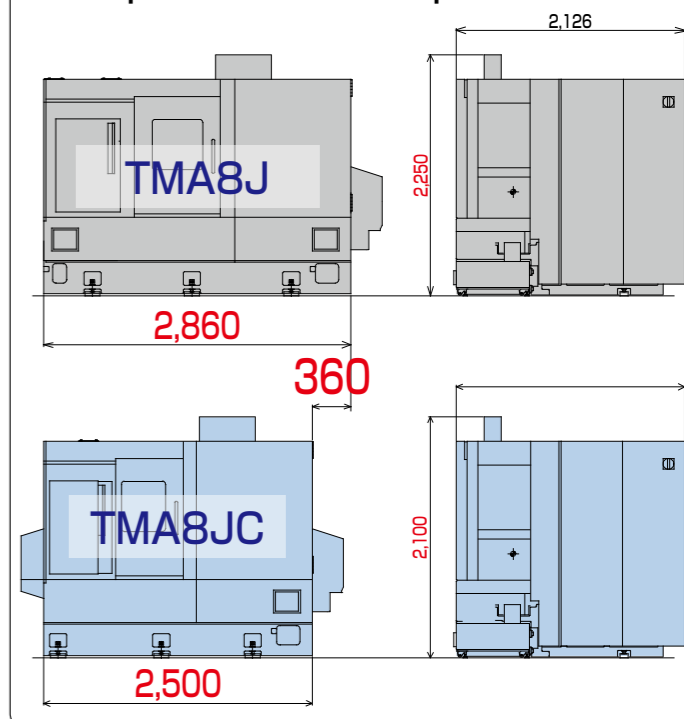
The cam driven tool change unit performs the tool-to-tool change at 0.8 sec.

■ Light weight

Weight reduction 7.1t (JC Model) from 8.5t (J Model)

■ Compact

Comparison of floor space



Tool magazine accessible from the machine front

The standard 60-tool magazine is on the machine front so that operator can easily change and monitor tools.



Automatic tool change unit

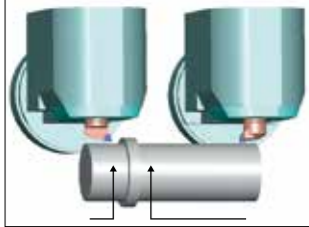


Tool magazine

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 a same tool.

Back/front machining by a same turning tool



Multi turning holder to index in 4 positions



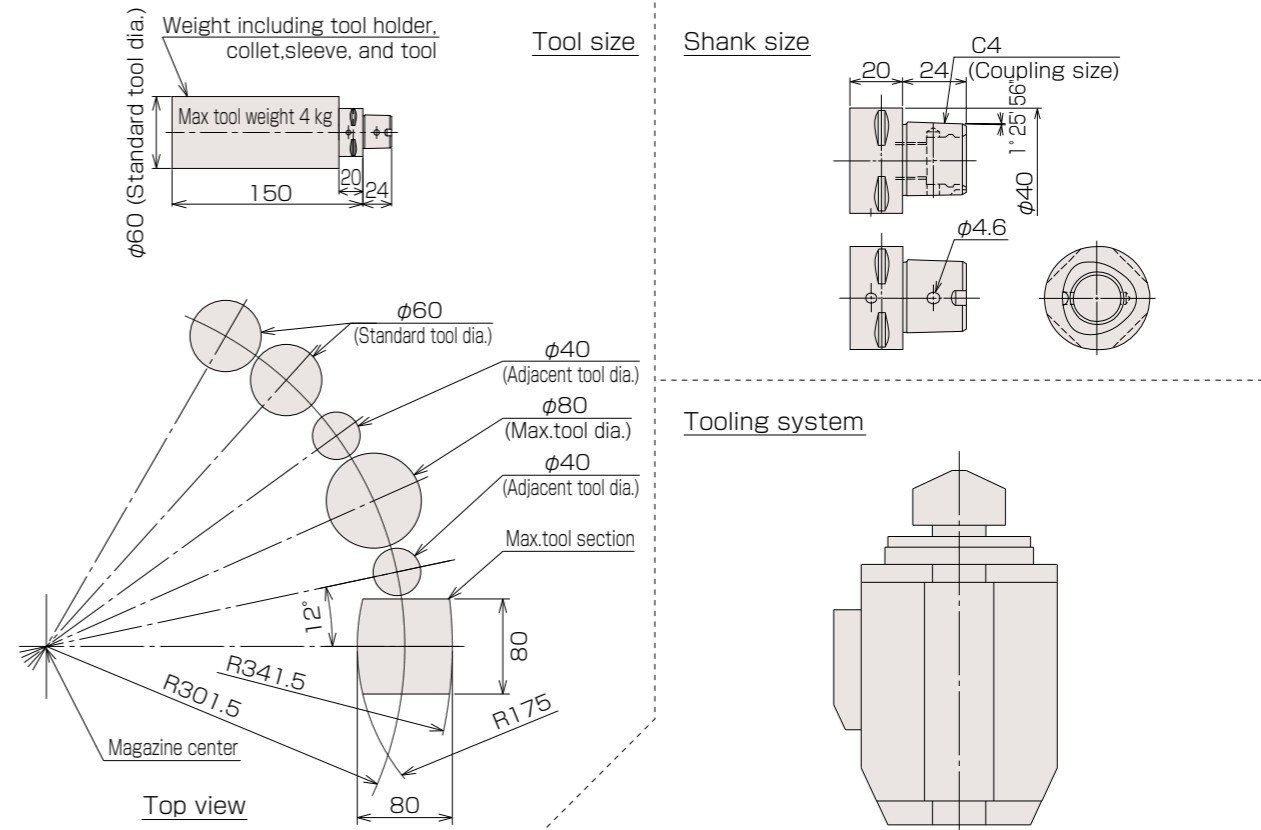
The tool can be indexed at fixed positions in 90 deg steps (4 positions) and tools can be used efficiently.

Back spindle achieves 6-face machining.

C-axis function is provided as standard on 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.

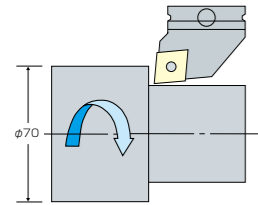


Tooling system



Machining capability

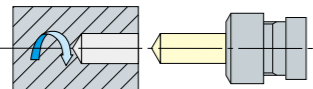
Turning



	Cutting section area (mm ²)
Main spindle	2.5
Back spindle	1.5

Workpiece material: JIS S45C

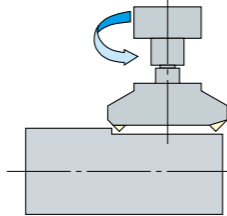
Drilling



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

Workpiece material: JIS S45C

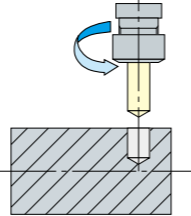
Milling (tool spindle)



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

Workpiece material: JIS S45C

Drilling (tool spindle)



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

Workpiece material: JIS S45C

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 5 kg are discharged into a receiving box in front of the machine body.



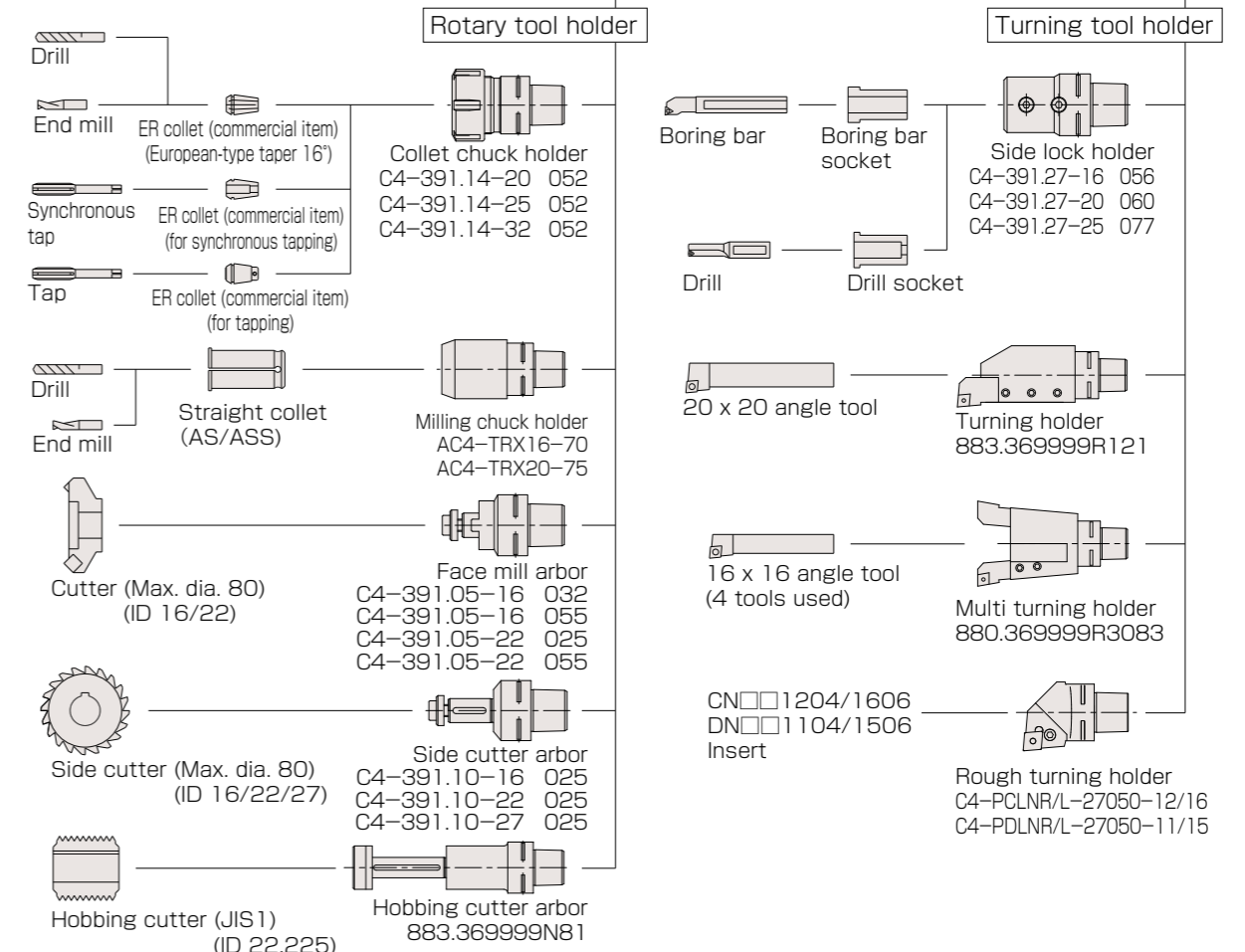
Oil mist collector

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.



Coolant through tool spindle

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



Machine specifications

Item	Specifications	
Capability	Max. machining diameter	220 mm
	Max. barstock diameter	65 mm ^{Note 1)}
	Max. machining length	430 mm ^{Note 2)}
Stroke	X-axis stroke	430 mm
	Y-axis stroke	130 mm (+60/-70 mm)
	Z-axis stroke	300 mm + 130 mm + 30 mm ^{Note 3)}
	A-axis stroke	600 mm
Main spindle	Max. spindle speed	5,000 min ⁻¹
	Spindle end face	JIS A2-6
	C1-axis least index angle	0.001° (Continuous control)
	Chuck size	8" ^{Note 4)}
	Collet chuck chucking dia.	φ25 mm to φ65 mm ^{Note 5)}
	Motor output	15/11 kW
Back spindle	Max. spindle speed	5,000 min ⁻¹
	Spindle end face	φ140 mm flat
	C2-axis least index angle	0.001° (Continuous control)
	Chuck size	6" ^{Note 4)}
Tool spindle	Motor output	11/5.5 kW
	B-axis index angle	-15° to 195°
	B-axis least index angle	0.001° (positioning)
	Tool spindle indexing angle/position	90°/4 positions
	Max. tool spindle speed	20,000 min ⁻¹
	Type of tool spindle	Single tool spindle with ATC
Automatic tool changer	Tool shank configuration	CAPTO (C4)
	Tool storage capacity	60
Rapid traverse rate	X-axis rapid traverse rate	40,000 mm/min
	Y-axis rapid traverse rate	40,000 mm/min
	Z-axis rapid traverse rate	40,000 mm/min
	A-axis rapid traverse rate	40,000 mm/min
	C-axis rapid traverse rate	300 min ⁻¹
Machine size	Width x depth x height	3,550 mm x 2,126 mm x 2,100 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

Automation & unmanned operation system	Tool checker	
	Bar feeder interface	
	Work catcher	
	Workpiece ejector	
	Automatic power shutdown	
Chip disposal system	Chip conveyor	Selectable from two types (floor type and scraper type).
	Chip carrier	
Coolant system	Coolant through tool spindle	
	High-pressure coolant system	
	Mist collector	
	Oil skimmer	
Workpiece chucking	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	
Others	Signal indicator	

NC specifications

Item	Specifications
NNC unit	FANUC Oi-TF
Display unit	10.4" color LCD
Controllable axes	6 axes (Simultaneously controllable axes: 4 axes)
Interpolation function	Linear interpolation, circular interpolation, polar coordinate interpolation, cylindrical interpolation, threading
Part program storage size	1 Mbyte
Number of registerable programs	800
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
Tool function	T 5-digit (Upper 2 digits: Tool number, Lower 3 digits: Offset number), tool life management
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

NC options

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" is neglected by a switch.
AI contour control	High-speed and accurate machining enabled by look-ahead function

Torque characteristics

