#### Standard machine specifications

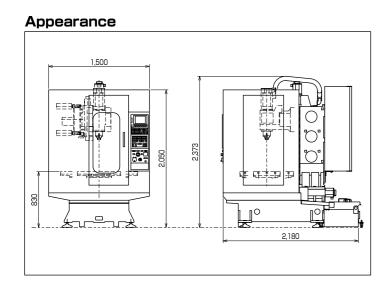
SpindleID taper7/24 taper No. 30Spindle speed200 to 20,000 min <sup>-1</sup> Motor output (10 min. 25%ED/Cont.) Note19.0/3.7 kWTableTable size650 x 400 mmTable height830 mmTable height830 mmTable height830 mmTable height830 mmTable height830 mmTable height14H8 x 3 P = 125 mmDistance between spindle face and table face150 to 500 mmMaximum weight on table250 kg (uniformed load)X-axis stroke500 mmY-axis stroke350 mmZ-axis stroke350 mmTeed rate1 to 30,000 mm/minCutting feed rate1 to 30,000 mm/minTool shankJIS B 6339-1998 BT30Pull studMAS4003-1982 P307-1Tool changing methodDouble armTool selectionRandom in nearest directionTool storage capacity Note220 tools (Max.mountable tool number: 21 tools)Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mmMaximum tool weight Note33.0 kgTank capacity130 LPower requirement60 L/minMachine size (Width x Depth x Height)1,500 x 2,180 x 2,373 mmMachine weight2,600 kg	Item		VA3
Motor output (10 min. 25%ED/Cont.) Note19.0/3.7 kWTable size650 x 400 mmTable height830 mmTable height830 mmTable height14H8 x 3 P = 125 mmDistance between spindle face and table face150 to 500 mmMaximum weight on table250 kg (uniformed load)X-axis stroke500 mmX-axis stroke500 mmZ-axis stroke350 mmFeed rate1 to 30,000 mm/minFeed rate1 to 30,000 mm/minCutting feed rate1 to 30,000 mm/minTool shankJIS B 6339-1998 BT30Pull studMAS4003-1982 P30T-1Tool changing methodDouble armTool storage capacity Note220 tools (Max.mountable tool number: 21 tools)Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mmMaximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mmMaximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mmMaximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mmMaximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mmMaximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mmMaximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mmMaximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mmMaximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mmMaximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mmMaximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mmMaximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mmMaximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm	Spindle	ID taper	7/24 taper No. 30
TableTable size650 x 400 mmTable height830 mmTable height830 mmTable size14H8 x 3 P = 125 mmDistance between spindle face and table face150 to 500 mmMaximum weight on table250 kg (uniformed load)X-axis stroke500 mmX-axis stroke500 mmY-axis stroke350 mmZ-axis stroke350 mmFeed rate1 to 30,000 mm/minTool shankJIS B 6339-1998 BT30Pull studMAS4003-1982 P30T-1Tool changing methodDouble armTool slorage capacity Note220 tools (Max. mountable tool number: 21 tools)Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\p		Spindle speed	200 to 20,000 min <sup>-1</sup>
Table height830 mmTableTable height830 mmTableT-slot size14H8 x 3 P = 125 mmDistance between spindle face and table face150 to 500 mmMaximum weight on table250 kg (uniformed load)X-axis stroke500 mmX-axis stroke500 mmZ-axis stroke350 mmFeed rateRapid traverse rate (X, Y, Z axis)Rapid traverse rate (X, Y, Z axis)48 m/minCutting feed rate1 to 30,000 mm/minTool shankJIS B 6339-1998 BT30Pull studMAS4003-1982 P30T-1Tool changing methodDouble armTool storage capacity Note220 tools (Max.mountable tool number: 21 tools)Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$) Note2<		Motor output (10 min. 25%ED/Cont.) Note1	9.0/3.7 kW
TableT-slot size14H8 x 3 P = 125 mmDistance between spindle face and table face150 to 500 mmMaximum weight on table250 kg (uniformed load)X-axis stroke500 mmX-axis stroke500 mmZ-axis stroke350 mmEeed rateRapid traverse rate (X, Y, Z axis)48 m/minCutting feed rate1 to 30,000 mm/minTool shankJIS B 6339-1998 BT30Pull studMAS4003-1982 P30T-1Tool changing methodDouble armTool storage capacity Note220 tools (Max. mountable tool number: 21 tools)Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$)		Table size	650 x 400 mm
Distance between spindle face and table face1 50 to 500 mmMaximum weight on table250 kg (uniformed load)X-axis stroke500 mmY-axis stroke500 mmZ-axis stroke350 mmZ-axis stroke350 mmFeed rate1 to 30,000 mm/minCutting feed rate1 to 30,000 mm/minTool shankJIS B 6339-1998 BT30Pull studMAS4003-1982 P30T-1Tool changing methodDouble armTool selectionRandom in nearest directionTool storage capacity Note220 tools (Max.mountable tool number: 21 tools)Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$) Note33.0 kgTonk capacity130 LPower requirement\$\phi 1 KVAMachine size (Width x Depth x Height)1,500 x 2,180 x 2,373 mm		Table height	830 mm
Maximum weight on table250 kg (uniformed load)A-axis stroke500 mmStrokeY-axis stroke400 mmZ-axis stroke350 mmFeed rateRapid traverse rate (X, Y, Z axis)48 m/minCutting feed rate1 to 30,000 mm/minCutting feed rate1 to 30,000 mm/minFool shankJIS B 6339-1998 BT30Pull studMAS4003-1982 P30T-1Tool changing methodDouble armTool selectionRandom in nearest directionTool storage capacity Note220 tools (Max.mountable tool number: 21 tools)Maximum tool size (\$\phi x L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x L\$) Note33.0 kgTool changing volume60 L/minMotor0.18 kWPower reuirement21 KVAMachine size (Width x Depth x Height)1,500 x 2,180 x 2,373 mm	Table	T-slot size	14H8 x 3 P = 125 mm
X-axis stroke500 mmStrokeY-axis stroke400 mmZ-axis stroke350 mmZ-axis stroke350 mmRapid traverse rate (X, Y, Z axis)48 m/minCutting feed rate1 to 30,000 mm/minCutting feed rate1 to 30,000 mm/minTool shankJIS B 6339-1998 BT30Pull studMAS4003-1982 P30T-1Tool changing methodDouble armTool storage capacity Note220 tools (Max.mountable tool number: 21 tools)Maximum tool size (\$\phi x\$ L\$) Note2\$\phi 60 x 250 mm\$Maximum tool size (\$\phi x\$ L\$) Note33.0 kgCoolantPump discharge volume60 L/minMotor0.18 kWPower requirement21 KVAMachine size (Width x Depth x Height)1,500 x 2,180 x 2,373 mm		Distance between spindle face and table face	150 to 500 mm
Stroke     Y-axis stroke     400 mm       Z-axis stroke     350 mm       Feed rate     Rapid traverse rate (X, Y, Z axis)     48 m/min       Cutting feed rate     1 to 30,000 mm/min       Cutting feed rate     1 to 30,000 mm/min       Feed rate     1 to 30,000 mm/min       Fool shank     JIS B 6339-1998 BT30       Pull stud     MAS4003-1982 P30T-1       Tool changing method     Double arm       Tool storage capacity Note2     20 tools (Max.mountable tool number: 21 tools)       Maximum tool size (\$\phi x L\$) Note2     \$\phi 60 x 250 mm\$       Maximum tool size (\$\phi x L\$) Note3     3.0 kg       Tank capacity     130 L       Pump discharge volume     60 L/min       Motor     0.18 kW       Power requirement     21 KVA       Machine size (Width x Depth x Height)     1,500 x 2,180 x 2,373 mm		Maximum weight on table	250 kg (uniformed load)
Z-axis stroke     350 mm       Feed rate     Rapid traverse rate (X, Y, Z axis)     48 m/min       Cutting feed rate     1 to 30,000 mm/min       Tool shank     JIS B 6339-1998 BT30       Pull stud     MAS4003-1982 P30T-1       Tool changing method     Double arm       Tool storage capacity Note2     20 tools (Max. mountable tool number: 21 tools)       Maximum tool size (\$\phi x\$ L) Note2     \$\phi 60 x 250 mm\$       Maximum tool size (\$\phi x\$ L) Note3     3.0 kg       Took capacity     130 L       Power requirement     0.18 kW       Power size (Width x Depth x Height)     1,500 x 2,180 x 2,373 mm	Stroke	X-axis stroke	500 mm
Rapid traverse rate (X, Y, Z axis)     48 m/min       Cutting feed rate     1 to 30,000 mm/min       Cutting feed rate     1 to 30,000 mm/min       Feed rate     Tool shank     JIS B 6339-1998 BT30       Pull stud     MAS4003-1982 P30T-1       Tool changing method     Double arm       Tool selection     Random in nearest direction       Tool storage capacity Note2     20 tools (Max.mountable tool number: 21 tools)       Maximum tool size (\$\phi x\$ L) Note2     \$\phi 60 x 250 mm\$       Maximum tool weight Note3     3.0 kg       Tank capacity     130 L       Pump discharge volume     60 L/min       Motor     0.18 kW       Power requirement     21 KVA       Machine size (Width x Depth x Height)     1,500 x 2,180 x 2,373 mm		Y-axis stroke	400 mm
Feed rate     Cutting feed rate     1 to 30,000 mm/min       Tool shank     JIS B 6339-1998 BT30       Pull stud     MAS4003-1982 P30T-1       Tool changing method     Double arm       Tool selection     Random in nearest direction       Tool storage capacity Note2     20 tools (Max. mountable tool number: 21 tools)       Maximum tool size (\$\phi x\$ L) Note2     \$\phi 60 x 250 mm\$       Maximum tool weight Note3     3.0 kg       Tank capacity     130 L       Pump discharge volume     60 L/min       Motor     0.18 kW       Power requirement     21 KVA       Machine size (Width x Depth x Height)     1,500 x 2,180 x 2,373 mm		Z-axis stroke	350 mm
Cutting feed rate 1 to 30,000 mm/min   Tool shank JIS B 6339-1998 BT30   Pull stud MAS4003-1982 P30T-1   Tool changing method Double arm   Tool selection Random in nearest direction   Tool storage capacity Note2 20 tools (Max. mountable tool number: 21 tools)   Maximum tool size (\$\phi x L\$) Note2 \$\phi 60 x 250 mm\$   Maximum tool weight Note3 3.0 kg   Tank capacity 130 L   Power requirement 60 L/min   Machine size (Width x Depth x Height) 1,500 x 2,180 x 2,373 mm	Food rate	Rapid traverse rate (X, Y, Z axis)	48 m/min
ATC Pull stud MAS4003-1982 P30T-1   Tool changing method Double arm   Tool selection Random in nearest direction   Tool storage capacity Note2 20 tools (Max. mountable tool number: 21 tools)   Maximum tool size (\$\phi x\$ L) Note2 \$\phi 60 x\$ 250 mm   Maximum tool weight Note3 3.0 kg   Tank capacity 130 L   Power requirement 0.18 kW   Power :equirement 21 KVA   Machine size (Width x Depth x Height) 1,500 x 2,180 x 2,373 mm	reeurale	Cutting feed rate	1 to 30,000 mm/min
Tool changing method     Double arm       Tool selection     Random in nearest direction       Tool storage capacity Note2     20 tools (Max. mountable tool number: 21 tools)       Maximum tool size (\$\phi x L\$) Note2     \$\phi 60 x 250 mm\$       Maximum tool weight Note3     3.0 kg       Tank capacity     130 L       Power requirement     60 L/min       Machine size (Width x Depth x Height)     1,500 x 2,180 x 2,373 mm		Tool shank	JIS B 6339-1998 BT30
ATC   Tool selection   Random in nearest direction     Tool storage capacity Note2   20 tools (Max. mountable tool number: 21 tools)     Maximum tool size (\$\phi x L\$) Note2   \$\phi 60 x 250 mm\$     Maximum tool weight Note3   3.0 kg     Tank capacity   130 L     Power requirement   60 L/min     Machine size (Width x Depth x Height)   1,500 x 2,180 x 2,373 mm		Pull stud	MAS4003-1982 P30T-1
Tool storage capacity Note2     20 tools (Max. mountable tool number: 21 tools)       Maximum tool size (\$\phi x\$ L) Note2     \$\phi 60 x 250 mm\$       Maximum tool weight Note3     \$3.0 kg       Tank capacity     130 L       Pump discharge volume     \$60 L/min\$       Motor     \$0.18 kW       Power requirement     \$21 KVA       Machine size (Width x Depth x Height)     1,500 x 2,180 x 2,373 mm	ATC	Tool changing method	Double arm
Maximum tool size (\$\phi x L) Note2     \$\phi 60 x 250 mm\$       Maximum tool weight Note3     3.0 kg       Tank capacity     130 L       Pump discharge volume     60 L/min       Motor     0.18 kW       Power requirement     21 KVA       Machine size (Width x Depth x Height)     1,500 x 2,180 x 2,373 mm		Tool selection	Random in nearest direction
Maximum tool weight Note3     3.0 kg       Tank capacity     130 L       Pump discharge volume     60 L/min       Motor     0.18 kW       Power requirement     21 KVA       Machine size (Width x Depth x Height)     1,500 x 2,180 x 2,373 mm		Tool storage capacity Note2	20 tools (Max. mountable tool number: 21 tools)
Tank capacity     130 L       Coolant     Pump discharge volume     60 L/min       Motor     0.18 kW       Power requirement     21 KVA       Machine size (Width x Depth x Height)     1,500 x 2,180 x 2,373 mm		Maximum tool size ( $\phi$ x L) Note2	<i>¢</i> 60 x 250 mm
Power requirement     60 L/min       Machine size (Width x Depth x Height)     1,500 x 2,180 x 2,373 mm		Maximum tool weight Note3	3.0 kg
Motor     0.18 kW       Power requirement     21 KVA       Machine size (Width x Depth x Height)     1,500 x 2,180 x 2,373 mm	Coolant	Tank capacity	130 L
Power requirement     21 KVA       Machine size (Width x Depth x Height)     1,500 x 2,180 x 2,373 mm		Pump discharge volume	60 L/min
Machine size (Width x Depth x Height) 1,500 x 2,180 x 2,373 mm		Motor	0.18 kW
	Power requirement		21 KVA
Machine weight 2,600 kg	Machine size (Width x Depth x Height)		1,500 x 2,180 x 2,373 mm
	Machine weight		2,600 kg

#### Standard NC specifications

	項目	VA3
	NC unit	FANUC Oi-MD
Control unit	Axis name	X, Y, Z
Control unit	Least input increment	0.001 mm
	Position detector	Absolute pulse coder
	Rapid traverse override	F0, 25, 50, 100%
Feed function	Feed per minute	mm/min
	Federate override	0 to 200%
	Optional block skip	1
Programming	Workpiece coordinate system	G54 to G59
	Canned cycle for drilling	Standard
Miscellaneous function/	Auxiliary function	M3 digits
Spindle function	Spindle function	S5 digits
	Tool function	T2 digits
Tool function/	Tool offset pairs	400
Tool offset function	Tool length compensation	Standard
	Cutter and tool nose radius compensation	Standard
Edition	Part program storage size	512 Kbyte
Euruon	Registered programs	400
	Multi-language display	Standard
Cotting/Diaplay	Self-diagnosis function	Standard
Setting/Display	Alarm display	Standard
	Alarm history display	Standard
Input/output interface	Memory card, RS232C, USB	Standard
Others	Display unit	8.4" color LCD

Note1: Spindle motor output varies according to the spindle speed.

Note2: If the tool size is larger than  $\phi$ 60, adjacent tool pot cannot be used. Tool storage capacity is restricted. Note3: Maximum tool weight depends on the position of the center of gravity. Stated value is a reference value.



#### Machine standard accessories

Coolant splash guard
Coolant system (chip pan and coolant tank)
Air blower for tool cleaning (Through-spindle at ATC operation)
Automatic lubrication unit
Pneumatic unit
Internal illumination light (LED)

Machine option		
Signal indicator		
Coolant flow on bed		
CNC rotary table (1 axis)		
Oil mist collector		
Oil skimmer		
Touch-switch type tool breakage detector		

NC option

Part program storage size 2 MB Al contour control II Bell-type acceleration/ deceleration before look ahead interpolation





High speed and high accuracy vertical machining center Wide tooling zone corresponding various applications.

Export permission by the Japanese Government may be required for exporting our products in accordance with the Foreign Exchange and Foreign Trade Law. Please contact our sales office before exporting our products.



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

CAT.NO.E313168.JUN.3T(H)

### **PRECISION TSUGAMI**

#### HIGH SPEED VERTICAL MACHINING CENTER





# Realizing high speed and high accuracy Wide tooling zone



Wide tooling zone



The spindle is separated from the ATC arm and the tool magazine. Regardless of the magazine interference, tooling zone is fully usable.



The tool can be inserted directly into the spindle or removed from the spindle manually from the front of the machine.



## Standard

#### Coolant tank 130 L (Standard)

Large capacity (130 L) coolant tank is provided as standard to correspond to the wide variety of tooling.



#### LED illumination light (Standard)

Eco-friendly LED internal illumination light is provided as standard.



# High speed

- 20.000 min<sup>-1</sup> max. spindle speed

- with swiveling arm.

## Wide tooling zone Long stroke

## Option

#### CNC rotary table 1 axis (Option)

TSUGAMI

By mounting the CNC rotary table, contour control processing of 4-axis simultaneous control is possible.





High rapid traverse speed of X, Y and Z axes with 48 m/min High speed ATC is realized by simultaneous tool changing

Tool changing time (Cut to Cut) :1.6 sec. at tool weight 1.5 kg or less

 X-axis stroke: 500 mm Y-axis stroke: 400 mm Z-axis stroke: 350 mm

## ATC, Tool magazine

• The main spindle is separated from the ATC arm and the tool magazine, only the main spindle moves vertically. 20 tools can be stored in the tool magazine as standard. (Maximum mountable tool numbers: 21 tools)

