



HIGH PRODUCTIVITY 4-AXIS TURNING CENTER

# PUMA TL

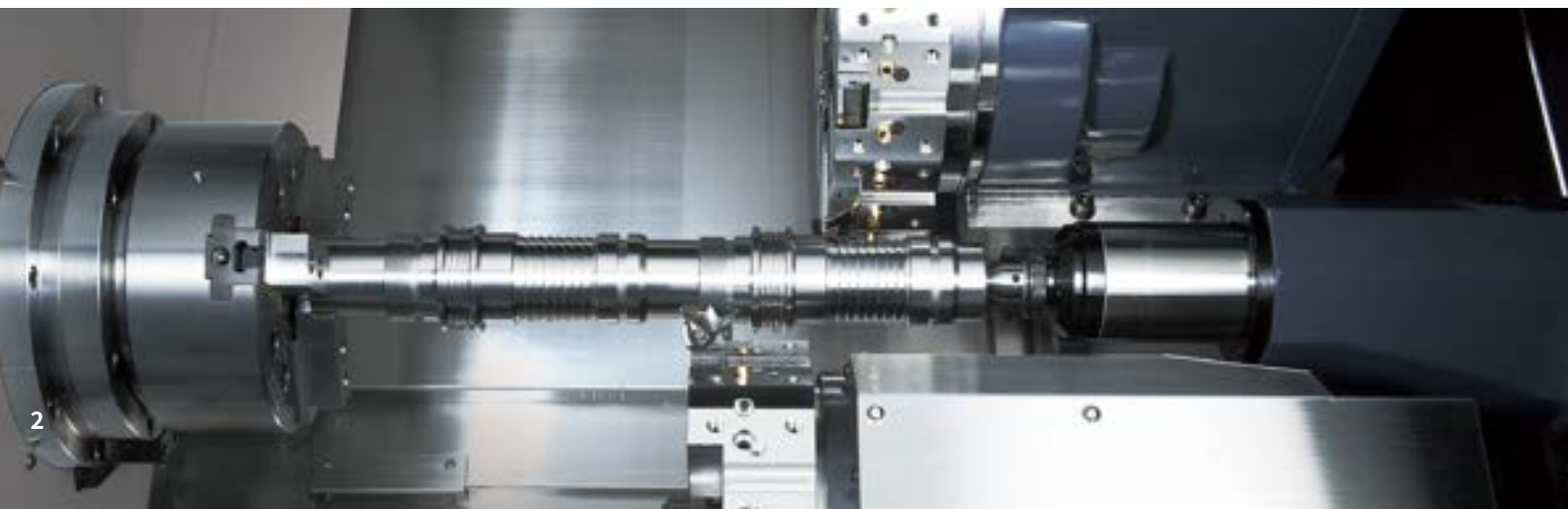
**2000/L/M/LM • 2500/L XL/M/LM/XLM**



# PUMA TL 2000 · 25000 SERIES

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The PUMA TL2000/2500 series has been engineered to increase productivity by delivering high efficiency. As a process-integrated machine the PUMA TL provides customers with new levels of performance and best-in-class machining capabilities.





## HIGH PERFORMANCE, HIGH PRODUCTIVITY MACHINING

These machines have class-leading machining capabilities that provide unrivalled performance and productivity for customers.

## MACHINING FLEXIBILITY

Provides outstanding performance, accuracy and productivity thanks to parts being machined, to completion, in single set ups.

## POWERFUL BUILT-IN SPINDLE MOTOR

The powerful built-in spindle motor enables a wide range machining operations to be performed - from heavy-duty cutting and high metal removal, through to super fine finishing using both turrets at the same time.

# BASIC STRUCTURE

The combination of an integrated, high-performance spindle motor with upper and lower multi-axis turrets has resulted in a machine perfectly engineered for high productivity and optimum efficiency.

The 4-axis linear-controlled machine delivers multi-axis performance and simultaneous control of both turrets to enable the efficient machining of shaft type workpieces.

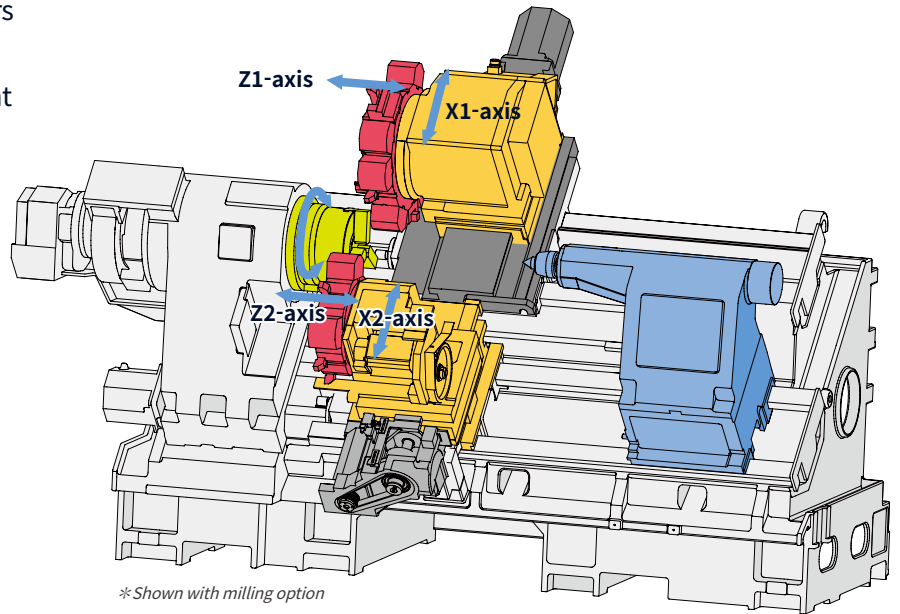
## Travel distance

X1-axis **250** mm  
9.8 inch

X2-axis **150** mm  
5.9 inch

Z1-axis **650 {1050/1300}** mm  
25.6 {41.3/51.2} inch

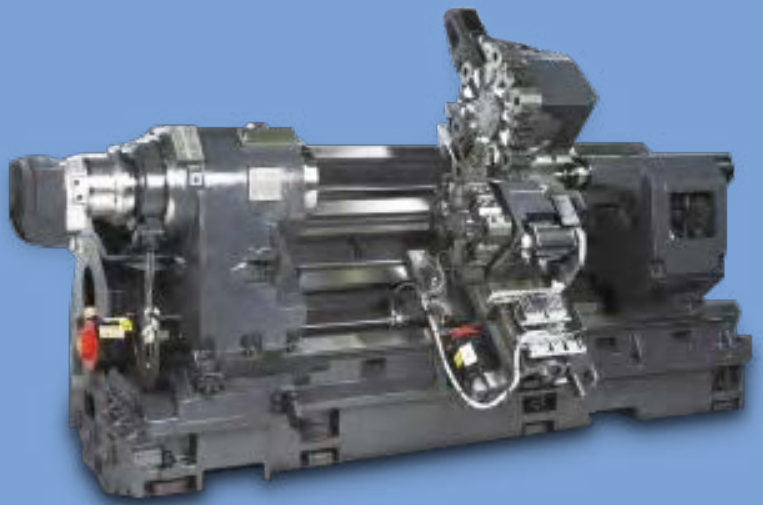
Z2-axis **630 {1030/1280}** mm  
24.8 {40.6/50.4} inch



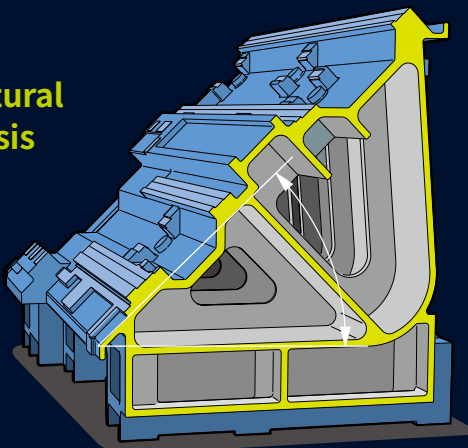
# ROBUST DESIGN

The heavily ribbed triangular torque frame is able to withstand eccentric loads.

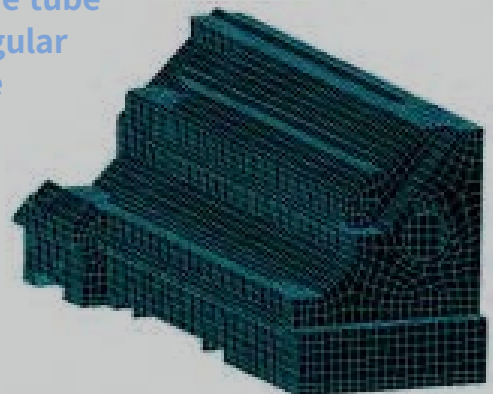
A 45° inclined wall is inserted into the triangular frame, under the center, to withstand high stresses caused by X-direction forces.



## FEM Structural Analysis



## Torque tube triangular frame



# MACHINING AREA

PUMA TL series machines feature the largest machining areas in their class and deliver high productivity and cost efficiencies.

## (A) Max. turning diameter (upper / lower turret)

PUMA TL2000[L] · PUMA TL2500[L/XL]

**370/240** mm

14.6/9.4 mm

## (B) Max. turning length

**600 {1000/1250}** mm

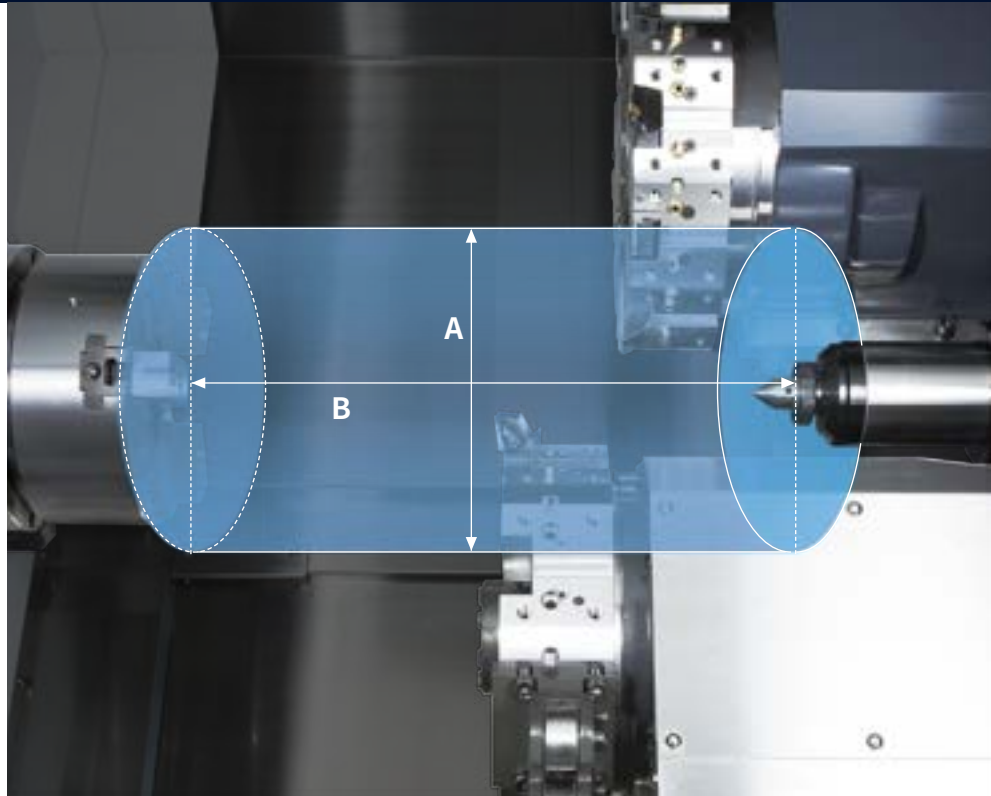
23.6 {39.4/49.2} inch

*\*{ } : Long bed models*

## Max. bar working diameter

**Ø65/76** mm

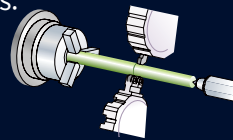
Ø2.6/3.0 inch



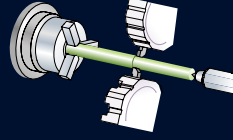
# MACHINING FLEXIBILITY

- Accuracy and time savings achieved from single set-ups.
- Unmanned operation achieved through automation.
- Less floor space and increased productivity.

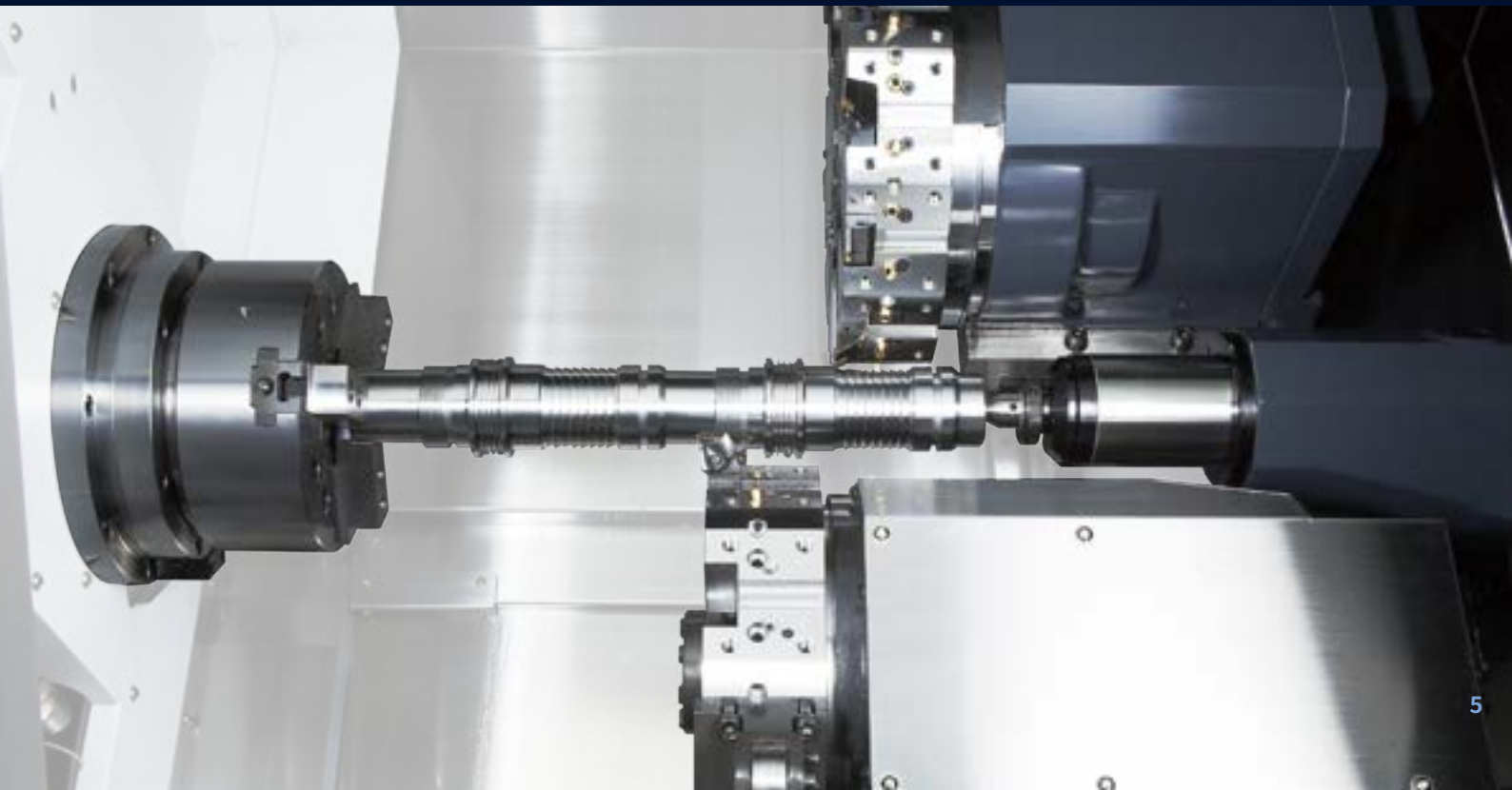
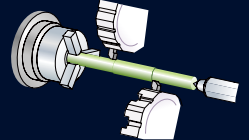
Long shaft working  
with steady rest  
prevents chatter



Balanced 4-axis  
turning



Simultaneous  
4-axis turning





# SPINDLE

The powerful built-in spindle motor enables a wide range of machining operations to be undertaken, from precise finishing to high metal removal using both turrets at the same time.

## Max. spindle speed

PUMA TL2000/2000M  
**5000** r/min

PUMA TL2500/2500M  
**4000** r/min

## Max. spindle motor power

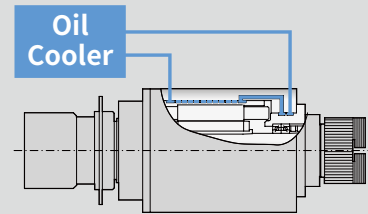
PUMA TL2000/2000M  
**22/15** kW  
29.5/20.1 Hp

PUMA TL2500/2500M  
**26/22** kW  
34.9/29.5Hp



## Oil cooling unit for spindles

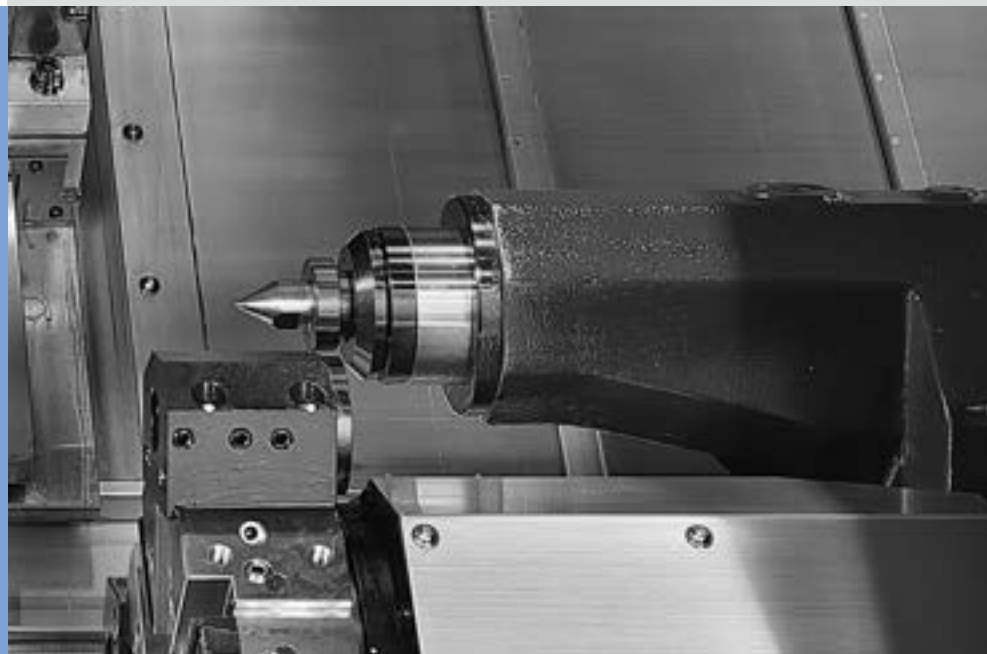
The spindle motor is surrounded by an oil jacket cooling system that helps minimize thermal displacement and ensures temperature consistency, irrespective of cutting conditions.



# TAIL STOCK

The widely spaced guideways and heavy-duty tailstock design deliver unsurpassed rigidity and reliability. The tailstock is positioned by a drive bar that engages with the carriage.

Tail stock quill type	-	MT#5
Tail stock quill diameter	mm (inch)	100 (3.9)
Tail stock quill travel	mm (inch)	120 (4.7)
Tail stock quill thrust force	kN	17 / 8.8 (PUMA TL2500XL/XLM)



# TURRET

Rotation of the turret is controlled by a servo-driven motor that ensures rapid and accurate tool selection. The M model features the unique BMT turret that provides superior performance in milling operations.

A total of 20 tool stations in the upper and lower turrets makes it possible to complete complicated parts, requiring many tools, in just one set-up. Reliable servo driven turrets reduce total cycle times required to machine parts.

**Turret indexing time** (1-station swivel)

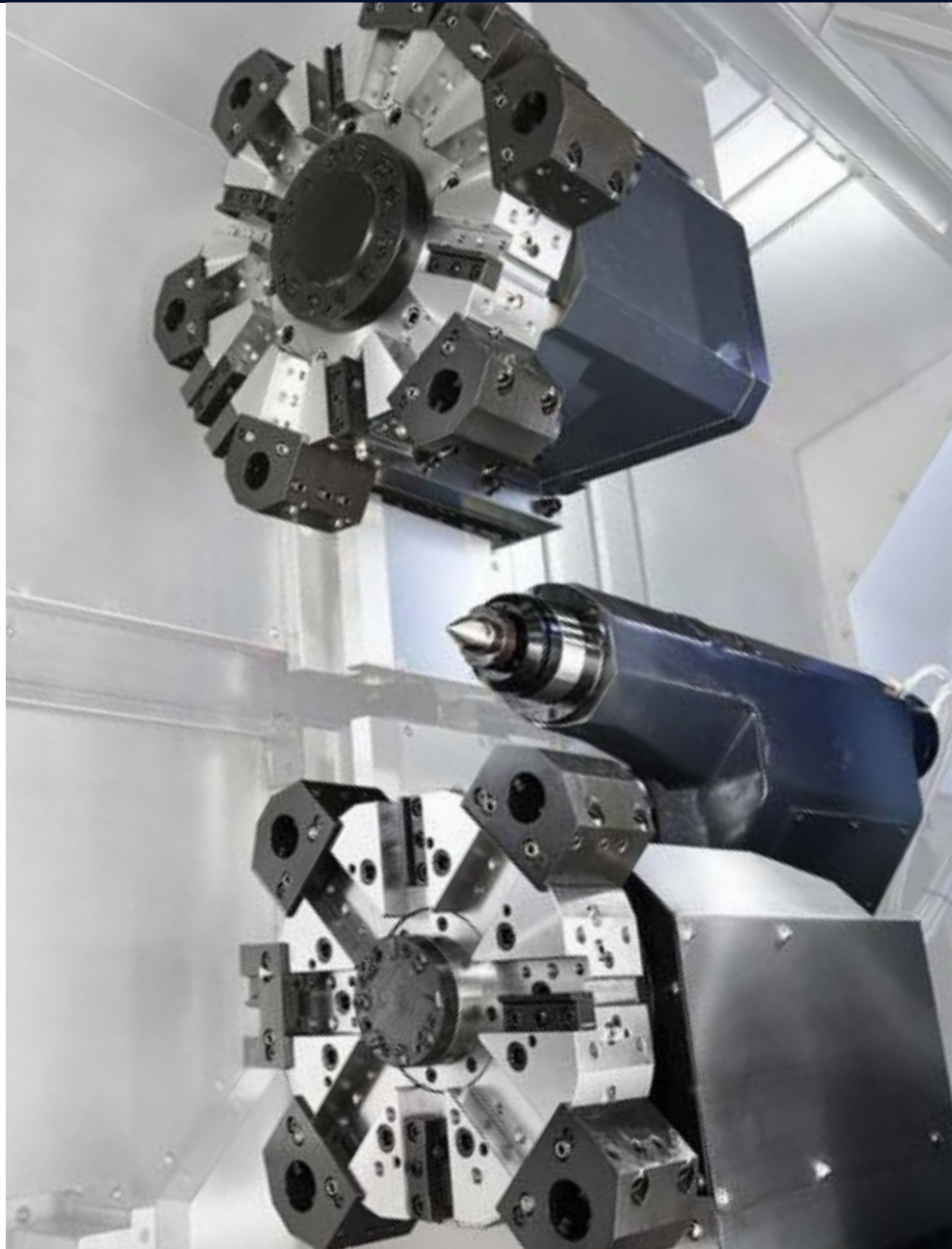
**0.15** sec

**No. of tool station** ((Upper+Lower turret)

**20 {12+8}** station

## Radial BMT

The turret features BMT55P style tooling in which the toolholders are mounted directly to the turrets periphery using 4 large bolts.

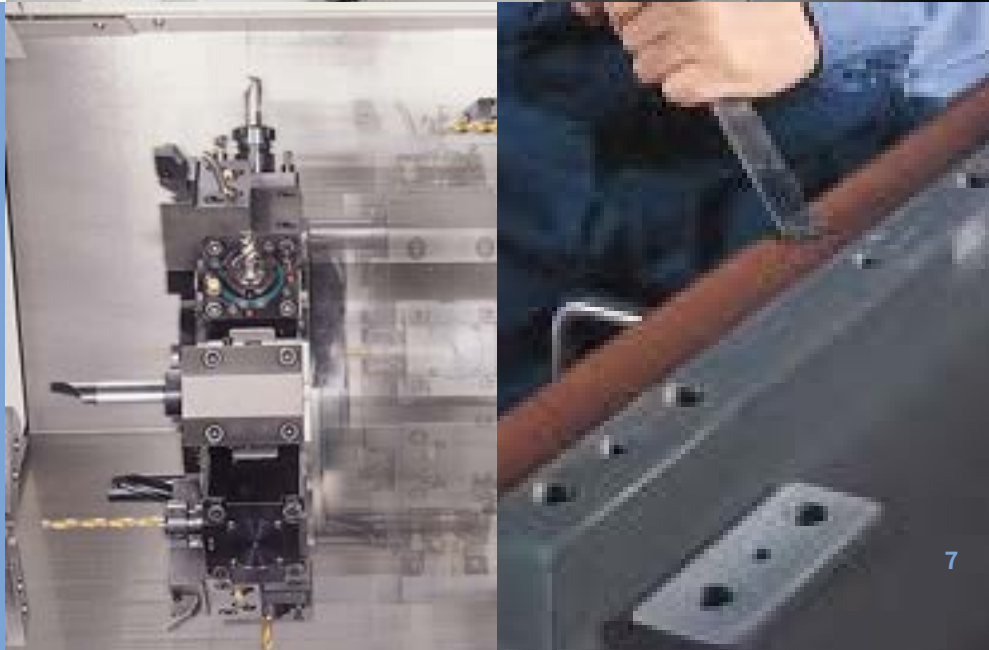


# AXIS SYSTEM

Each axis is powered by a maintenance-free digital AC servo motor. These high-torque motors are connected to the ball screws without intermediate gears for quiet and responsive slide movement with virtually no backlash.

**Rapid traverse rate** (X/Z-axis)

**20/24** m/min  
787.4/944.9 ipm



# STANDARD | OPTIONAL SPECIFICATIONS

A range of options is available to suit individual requirements.

Description	Features	PUMA TL2000/2500series
Chuck	210 mm (8 inch)	PUMA TL2000
	255 mm (10 inch)	PUMA PUMA TL2500
	None	○
Jaws	Soft Jaws	●
	Hardened & Ground Hard Jaws	○
Chucking option	Dual Pressure Chucking	○
	Chuck Clamp Confirmation	○
Tailstock	Tailstock quill for built-in(dead) center	○
Coolant pump	1.5 bar	●
	4.5/7/10/14.5/20/70 bar	○
Coolant options	Oil Skimmer	○
	Coolant Chiller	○
	Coolant Pressure Switch	○
	Cooling Flow Switch	○
	High Coolant Interface	○
	Chuck Coolant	○
	Coolant Gun	○
Chip processing options	Chip Conveyor_Side Type	○
	Chip Conveyor_Rear Type	○
	Chip Bucket	○
	Air Blow	○
	Mist Collector	○
Measurement & Automation	Tool setter (Manual –removable type / Auto)	○
	Parts Catcher And Box	○
	Auto Door	○
	Robot Interface (PMC I/O, Profibus)	○
	Bar Feeder Interface	○
	Bar puller	○
Customized Special Option	V Stand For Shaft Workpiece	○
	Automatic Top Door	○
	Coolant Chiller	○
	Chip Conveyor_Drum Filter Type	○
	Shower Coolant	○
	Air Limit Sensing On Chuck Preparation	○
	Rotary Type Window Wiper_Eletrical	○
	TSC For Main/Left Spindle	○
	TSA For Main/Left Spindle	○
	Work & Tool Counter	○
	Tool Setter Extension For Special Chuck	○
	Main/Left Spindle Air Curtain	○
	MQL System	○
	Chuck Pressure Switch	○
	Coolant Level Switch : Sensing Level - Low	○
Quick Change Tooling(CAPTO)	○	

\* Please contact your DN Solutions representative for detailed machine information.

● Standard ○ Optional X N/A

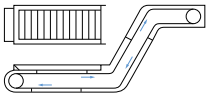
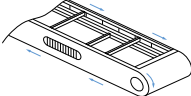
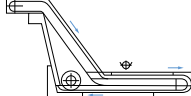




# PERIPHERAL EQUIPMENT

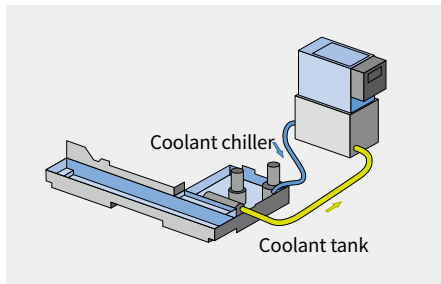
## Chip conveyor (right side) OPTION

The chip conveyor with its stable design delivers excellent chip disposal, superior operation and maintenance convenience. Users can select the optimum type of conveyor that meets their specific machining and floor space requirements.

Name	Hinged belt	Magnetic scrapper	Drum filter (Single type)
Application	Steel	Cast steel, iron	Steel, cast, nonferrous metals
Features	<ul style="list-style-type: none"> <li>• General use</li> <li>• Suitable for steel applications producing 30mm chips or longer</li> </ul>	<ul style="list-style-type: none"> <li>• Easy-to-understand manual</li> <li>• Chips are scraped up and discharged</li> </ul>	<ul style="list-style-type: none"> <li>• Suitable for long and short chips</li> <li>• Cooling water filtering function</li> </ul>
Shape			

## Coolant chiller (recommended) OPTION

A coolant chiller is recommended to help prevent temperature rises and to reduce thermal deformation when using a water-insoluble coolant or high-pressure coolant system (i.e., power over 1.5kW).



## Quick change capto OPTION

The Quick-Change tool system simplifies tool change operations. Recommended for users who need to change tools frequently or who need to reduce set-up times.



## Oil skimmer OPTION

The oil skimmer keeps coolant and lubricant isolated from each other for extending lifecycle of coolant.



## Optional equipment

Auto tool setter



Coolant blower



Signal tower



Collet chuck



MIST COLLECTOR

The mist collector absorbs airborne oil vapor and fine dusts in the system to improve working environment

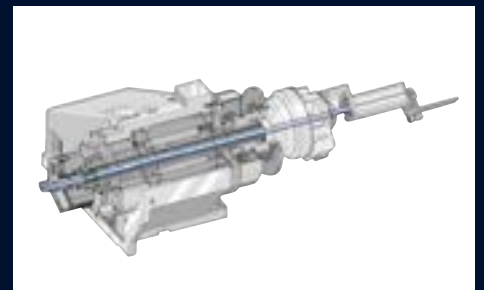


PART CATCHER

The part catcher automatically accepts parts completed of machining, and ejects them out of the system



Work ejector



# DN SOLUTIONS FANUC i PLUS

DN Solutions Fanuc i Plus maximizes customer productivity and convenience.

## 15" Screen + New OP

DN Solutions Fanuc i Plus' operation panel enhances operating convenience by incorporating common-design buttons and layout. It features a Qwerty keyboard for fast and easy data input and operation.

### DN Solutions Fanuc i Plus

- 15-inch color display
- Intuitive and user-friendly design

### USB and PCMCIA card QWERTY keyboard

- EZ-Guide i standard
- Ergonomic operator panel
- 2MB Memory
- Hot keys



### iHMI touchscreen OPTION

iHMI provides an intuitive interface that uses a touchscreen for quick and easy operation.

### Range of applications

Providing various applications related to planning, machining, improvement and utility, for customer convenience.

## NUMERIC CONTROL SPECIFICATIONS

FANUC

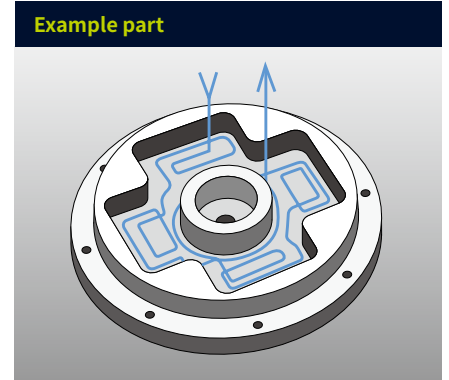
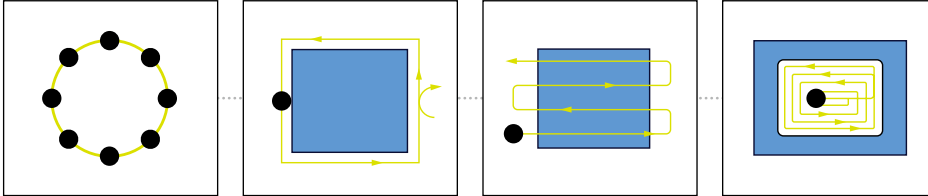
Division	Item	Specifications	2-Axis	M	2-Axis	M
			Fanuc 31i (F31i-B)	Fanuc 31i (F31i-B)	DN Solutions Fanuc i Plus	DN Solutions Fanuc i Plus
Controlled axis	Controlled axes		4 (X1,Z1,X2,Z2)	5 (X1,Z1,C1,X2,Z2)	4 (X1,Z1,X2,Z2)	5 (X1,Z1,C1,X2,Z2)
	Simultaneously controlled axes		2 axes (each path)	3 axes (each path)	2 axes (each path)	3 axes (each path)
Data input/output	Fast data server		○	○	○	○
	Memory card input/output		●	●	●	●
	USB memory input/output		●	●	●	●
Interface function	Embedded Ethernet		●	●	●	●
	Fast Ethernet		○	○	○	○
	Enhanced Embedded Ethernet function		●	●	●	●
Operation	DNC operation	Included in RS232C interface.	●	●	●	●
	DNC operation with memory card		●	●	●	●
Program input	Workpiece coordinate system	G52 - G59	●	●	●	●
Feed function	AI contour control I	G5.1 Q_, 40 Blocks	●	●	●	●
	AI contour control II	G5.1 Q_, 200 Blocks	○	○	○	○
Operation Guidance Function	EZ Guidei (Conversational Programming Solution)		●	●	●	●
	iHMI with Machining Cycle	Note *1) Only with 15" Touch LCD standard	X	X	○*1)	○*1)
	Multi path function	Supporting 2 or 3 path machine	●	●	●	●
	EZ Work		●	●	●	●
Setting and display	CNC screen dual display function		●	●	●	●
Network	FANUC MTConnect		✳	✳	✳	✳
	FANUC OPC UA		✳	✳	✳	✳
Others	Display unit	15" color LCD	●	●	●	●
		15" color LCD with Touch Panel	X	X	○	○
	Part program storage size & Number of registerable programs	1280M(512KB)_1000 programs	●	●	X	X
		5120M(2MB)_1000 programs	○	○	●	●

# DN SOLUTIONS FANUC i PLUS

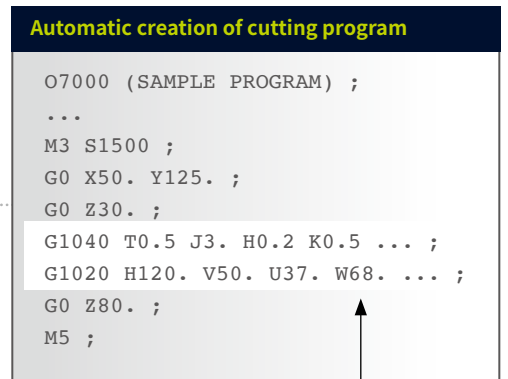
## EZ-Guide i

Using the DN Solutions EZ-Guide i, users can create a cutting program for any desired shape, including patterns, by entering just the dimensions.

Example programming : Cutting shape



Enter the dimensions of the shape



A cutting program is automatically created with the entered values.

## EZ Work

DN Solutions's EZ Work supports the user with functions relating to tool data, error diagnostics, set up and machine monitoring.

### Tool Load Monitoring Function

During cutting operation, abnormal load caused by wear or damage of the tool is detected and an alarm is triggered to prevent further damage.



Tool monitoring screen

### Convenience of Maintenance and Service

The condition and service procedures of the sensors are provided for easy maintenance and servicing of major units.



Turret maintenance and service screen

# POWER | TORQUE

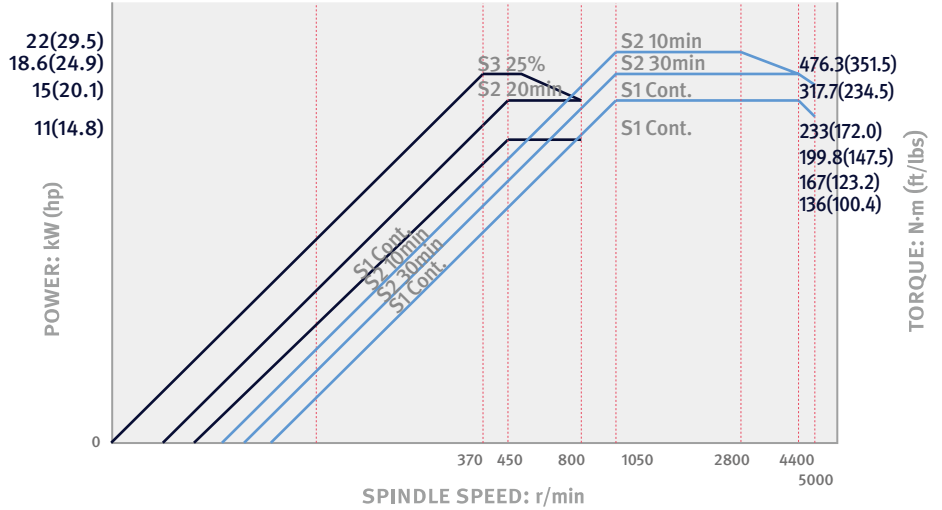
FANUC

## PUMA TL2000/2000M

Max. spindle speed : **5000** r/min

Max. power : **22** kW  
29.5 Hp

Max. torque : **476.3** N·m  
351.5 ft-lbs

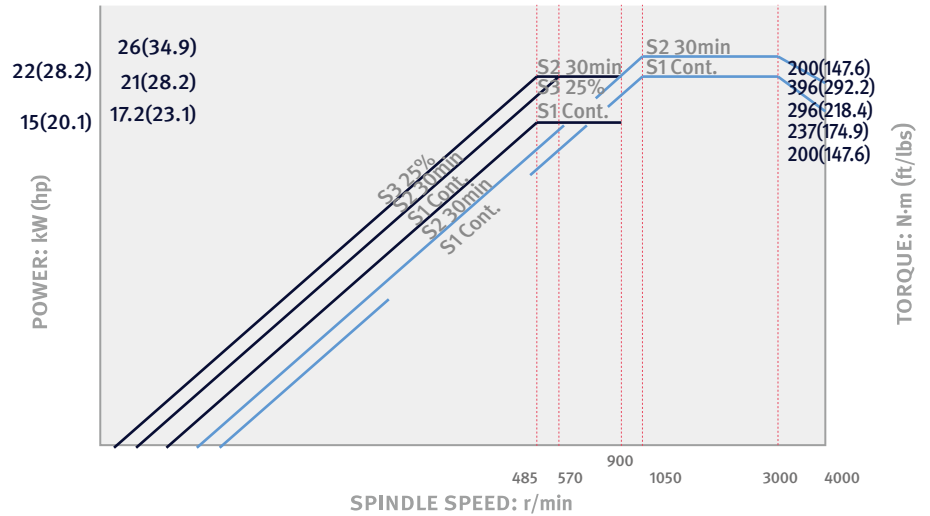


## PUMA TL2500/2500M

Max. spindle speed : **4000** r/min

Max. power : **26** kW  
34.9 Hp

Max. torque : **433** N·m  
391.6 ft-lbs

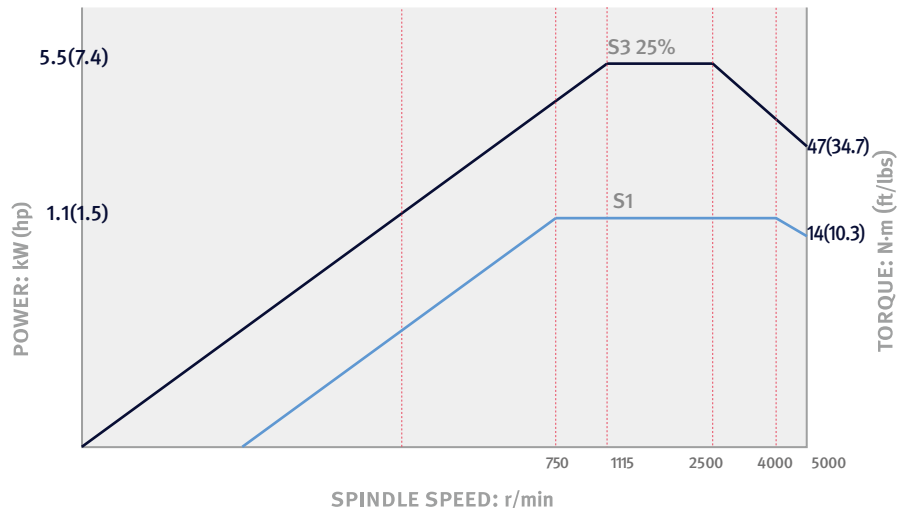


## Rotary tool

Max. spindle speed : **5000** r/min

Max. power : **5.5/1.1** kW  
7.4/1.5 Hp

Max. torque : **47** N·m  
34.7 ft-lbs



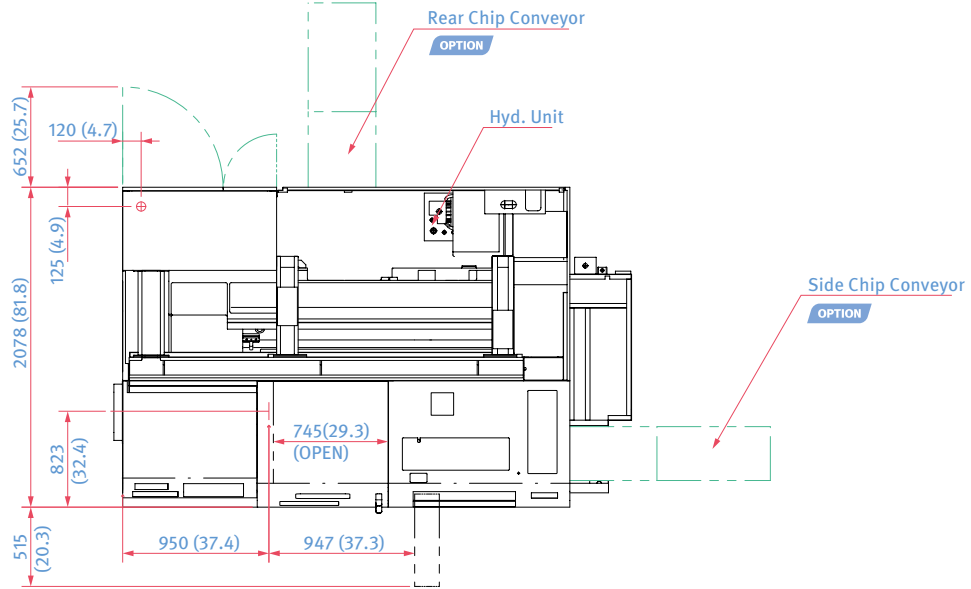


# EXTERNAL DIMENSIONS

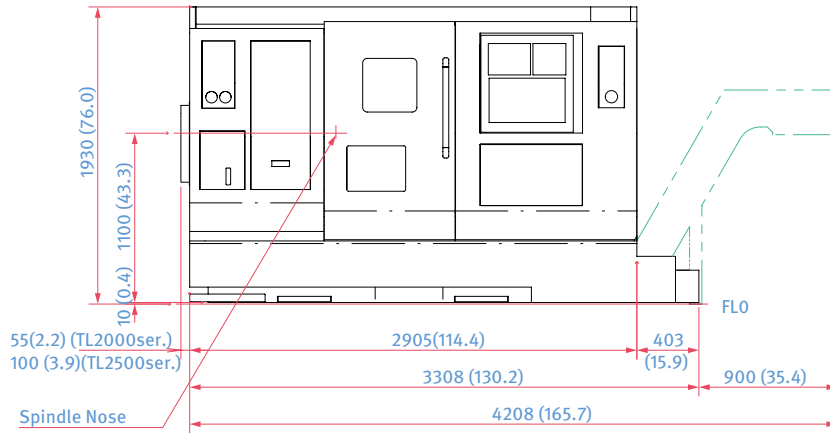
PUMA TL2000/2500

Unit : mm (inch)

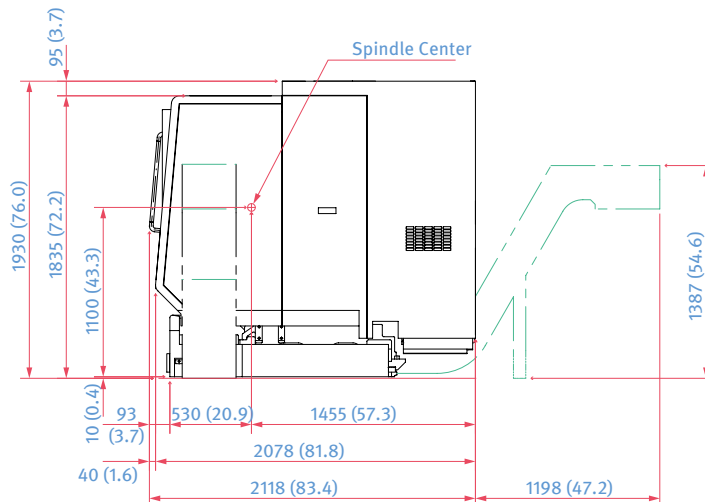
TOP



FRONT



SIDE



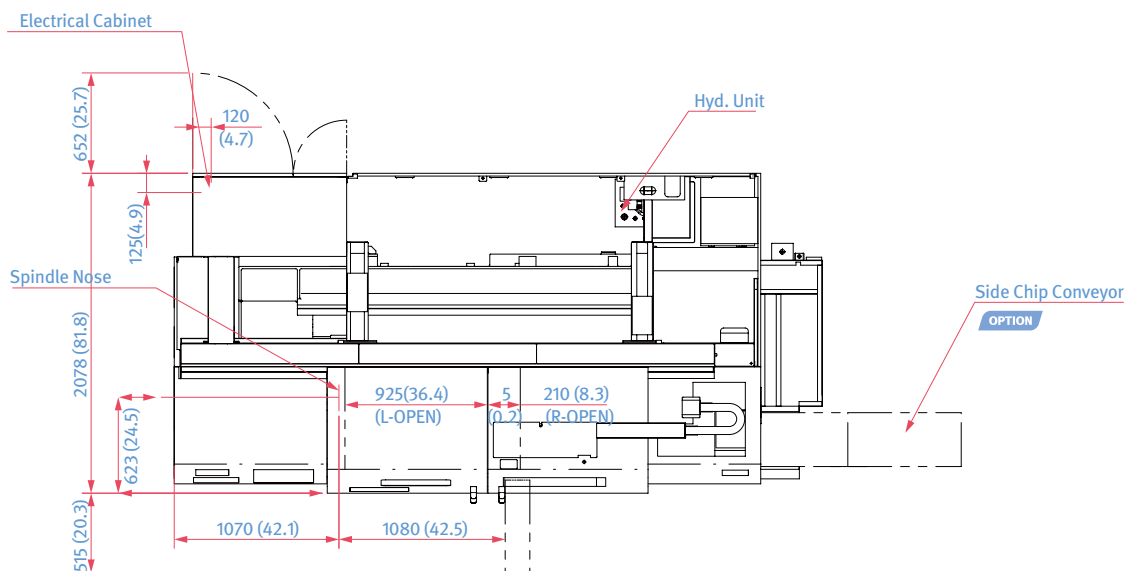
\* Some peripheral equipment can be placed in other areas.

# TOOLING SYSTEM

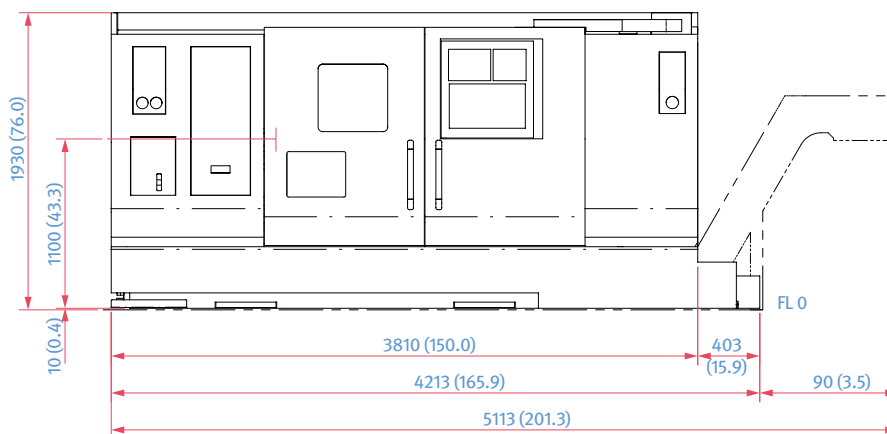
PUMA TL2000L/2500L

Unit : mm (inch)

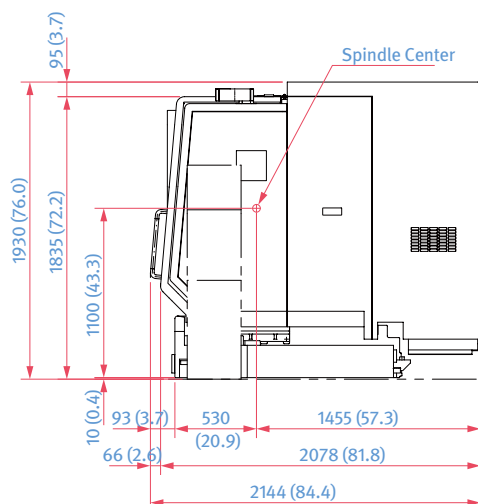
TOP



FRONT



SIDE

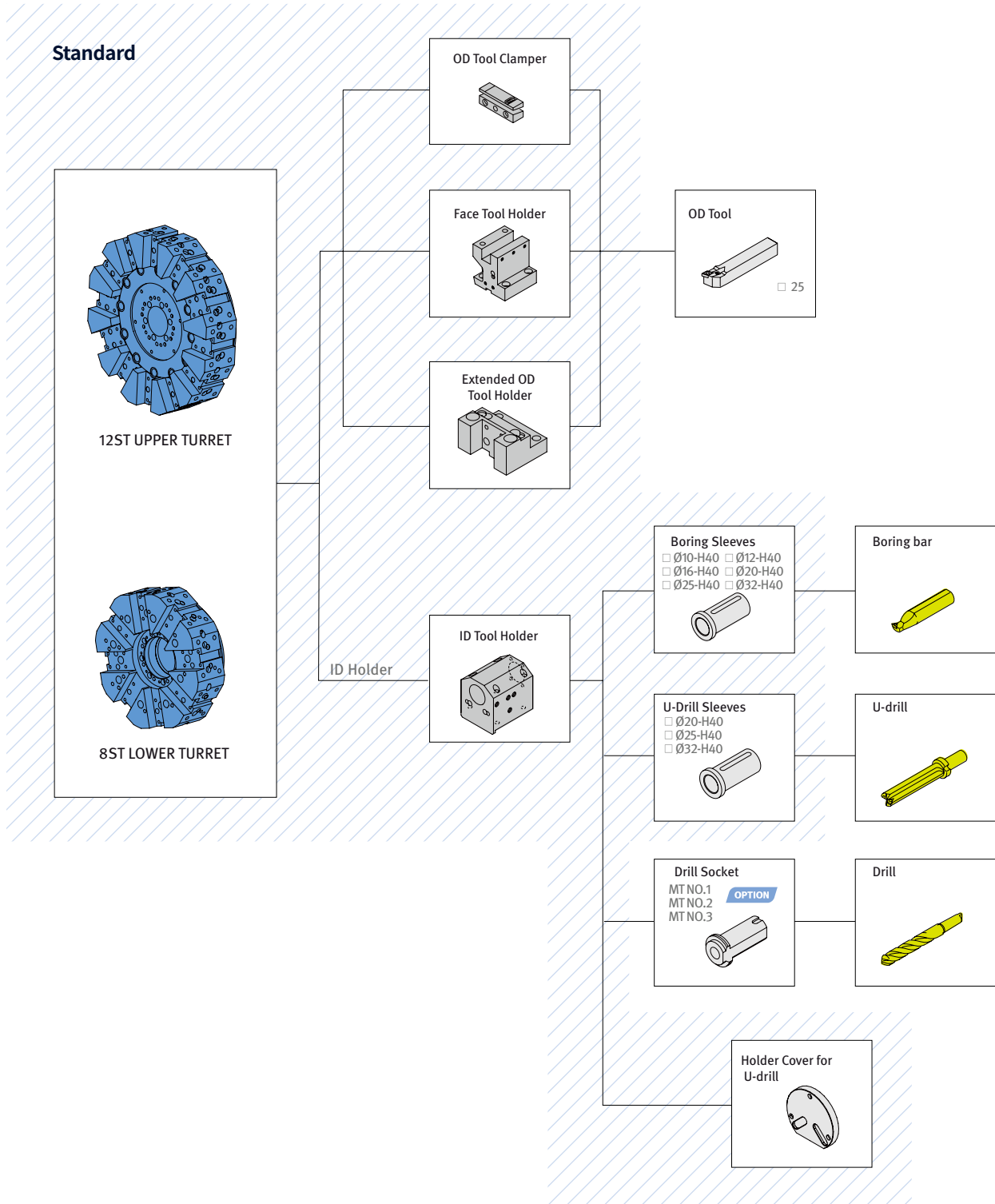




# TOOL INTERFACE

PUMA TL2000/2500 (Upper & Lower Turret)

Unit : mm (inch)



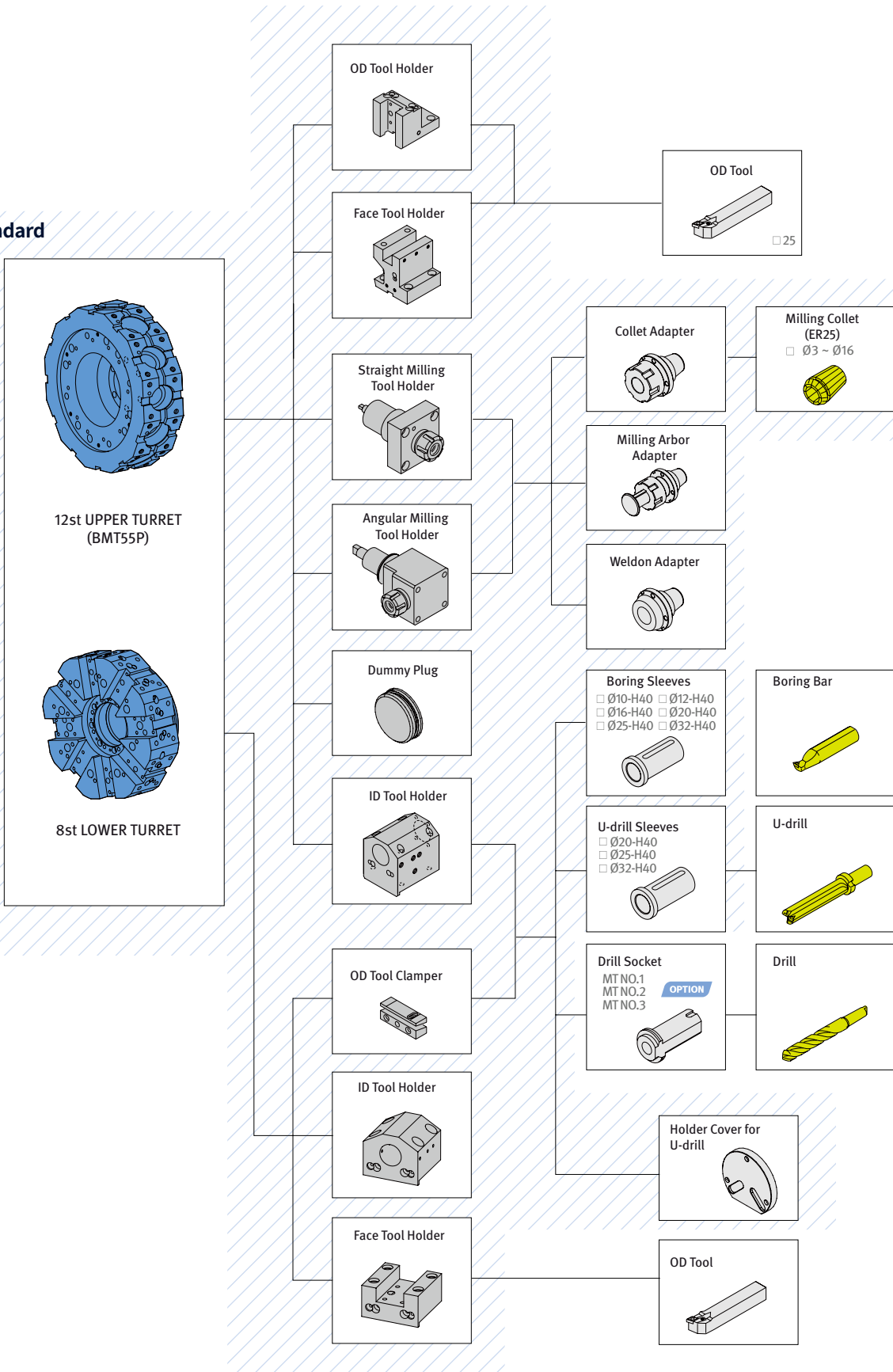


# TOOL INTERFACE

PUMA TL2000M/2500M (Upper & Lower Turret)

Unit : mm (inch)

## Standard







# MACHINE SPECIFICATIONS

PUMA TL2000/2500 series

Description		Unit	PUMA TL2000 [L]	PUMA TL2000M [LM]	PUMA TL2500 [L/XL]	PUMA TL2500M [LM/XLM]	
Capacity	Swing over bed	mm (inch)	600 (23.6)				
	Swing over saddle(Upper)	mm (inch)	430 (16.9)				
	Recom. Turning diameter	mm (inch)	210 (8.3)		255 (10.0)		
	Max. Turning diameter (Upper/Lower turret)	mm (inch)	370/240 (14.6/9.4)	350/240 (13.8/9.4)	370/240 (14.6/9.4)	350/240 (13.8/9.4)	
	Max. Turning length	mm (inch)	600 [1000/1250] (23.6 [39.4/49.2])				
	Bar working diameter	mm (inch)	ø65 (2.6)		ø76 (3.0)		
Feedrate	Travel distance	X1 / 2-axis	mm (inch) X1 : 250 (9.8) / X2 : 150 (5.9)				
		Z1 / 2-axis	mm (inch) Z1 : 650 [1050/1300] (25.6 [41.3/51.2]) / Z2 : 630[1030/1280]( 24.8 [40.6/50.4])				
	Rapid traverse	X1 / 2-axis	m/min (ipm) 20 (787.4)				
		Z1 / 2-axis	m/min (ipm) 24 (944.9)				
Spindle	Spindle speed	r/min	5000		4000		
	Spindle nose	ASA	A2#6		A2#8		
	Spindle bearing diameter (Front)	mm (inch)	110 (4.3)		130 (5.1)		
	Spindle through hole diameter	mm (inch)	76 (3.0)		86 (3.4)		
	Cs Spindle Index angle	deg	-	360 (in 0.001deg. increment)	-	360 (in 0.001deg. increment)	
Motor	Left spindle motor(Int.)	kW (Hp)	22/18.5/15 (29.5/24.8/20.1) (10min/30min/S1 Cont.)		26/22 (34.9/29.5) (30min/S1 Cont.)		
	Rotary tool spindle motor*	kW (Hp)	-	5.5 (7.4)	-	5.5 (7.4)	
	Servo motor	X1-axis	kW (Hp)	3.0 (4.0)			
		X2-axis	kW (Hp)	1.6 (2.1)			
		Z1-axis	kW (Hp)	3.0 (4.0)			
		Z2-axis	kW (Hp)	3.0 (4.0)			
Coolant pump		0.9 (1.2)					
Turret	No. of tool stations	ea	12(Upper) + 8(Lower)				
	OD tool height	mm (inch)	25 (1.0)				
	Boring bar diameter	mm (inch)	40 (1.6)				
	Indexing time	sec	0.15				
	Rotary tool spindle speed*	r/min	-	5000	-	5000	
Tail Stock	Quill diameter	mm (inch)	100 (3.9)				
	Quill bore taper	ASA	MT#5				
	Quill travel	mm (inch)	120 (4.7)				
Power Source	Power consumption	kVA	39.37	40.7	47.84	49.17	
Machine dimensions	Length	mm (inch)	3250 [3900/4510] (128.0 [153.5/177.6])				
	Width	mm (inch)	2118 [2144/2630] (83.4 [84.4/103.5])				
	Height	mm (inch)	1930 (76.0) [PUMA 2500XL/XLM: 2115(83.3)]				
	Weight	kg (lb)	7200 [8400] (15432.1 [18518.6])		7300 [8500/9600 (PUMA TL2500XL)/9700(PUMA TL2500XLM)] (16093.5 [18739.0(PUMA TL2500XL)/ (21164.1)(PUMA TL2500XLM)])		
Control	NC system	-	DN Solutions Fanuc i Plus {Fanuc 31i}				

\* Rotary tool spindle is available on only upper turret of PUMA TL2000M[LM] / PUMA TL2500M[LM/XLM]. [ ] : Long bed machines



The DN Solutions promise, MACHINE GREATNESS, has two important meanings. The first is simple: DN Solutions makes great machines. The second is a challenge to our end-users. With a product line that is this comprehensive, accurate and reliable, we equip our customers to machine greatness. **The big question: *Why should you choose DN Solutions over other options?***

Here's why...

## MACHINE GREATNESS™



WHAT YOU MAKE AND HOW YOU MAKE IT MATTERS—SO MAKE IT GREAT WITH DN SOLUTIONS.

### UNBEATABLE MACHINES

You won't find a more comprehensive range or a better combination of value, performance and reliability anywhere else.

### ROBUST PRODUCT LINE

We offer an impressive range of machine models and hundreds of configurations. Whatever your machining needs and requirements, there's a DN Solutions for you.

### READILY AVAILABLE - ANYWHERE IN THE WORLD

Machining centres (including 5-axis machines), lathes, multi-tasking turning centres and mill-turn machines, and horizontal borers with best-in-class specifications are all available...ready to install.

### EXPERT SERVICE

Our dedicated, experienced and knowledgeable team is totally committed to improving your productivity, growth and success.

# CUSTOMER SUPPORT AND SERVICES

**We're there for you whenever you need us.**

We help our customers operate at maximum efficiency by providing them with a range of tried, tested and trusted services - from pre-sales consultancy to post-sales support.



## FIELD SERVICES

- On-site service
- Machine installation and testing
- Scheduled preventive maintenance
- Machine repair service



## PARTS SUPPLY

- Supplying a wide range of original DN Solutions spare parts
- Parts repair service



## TRAINING

- Programming, machine setup and operation
- Electrical and mechanical maintenance
- Applications engineering



## TECHNICAL SUPPORT

- Supports machining methods and technology
- Responds to technical queries
- Provides technical consultancy

# RESPONDING TO CUSTOMERS ANYTIME, ANYWHERE

## DN Solutions Global Network

DN Solutions provides systems-based professional support services, before and after the machine tool sale, by responding quickly and efficiently to customers. By supplying spare parts, product training, field service and technical support, we provide the expert care, attention and assistance our customers expect from a market leader.



Global sales and service support network

<b>4</b>	<b>Corporations</b>
<b>156</b>	<b>Dealer networks</b>
<b>51</b>	<b>Technical centers</b> Technical Center, Sales Support, Service Support, Parts Support
<b>200</b>	<b>Service posts</b>
<b>3</b>	<b>Factories</b>





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\* For more details, please contact DN Solutions.

\* Specifications and information contained within this catalogue may be changed without prior notice.