



TWIN-SPINDLE, TWIN-TURRET TURNING CENTERS WITH Y-AXES

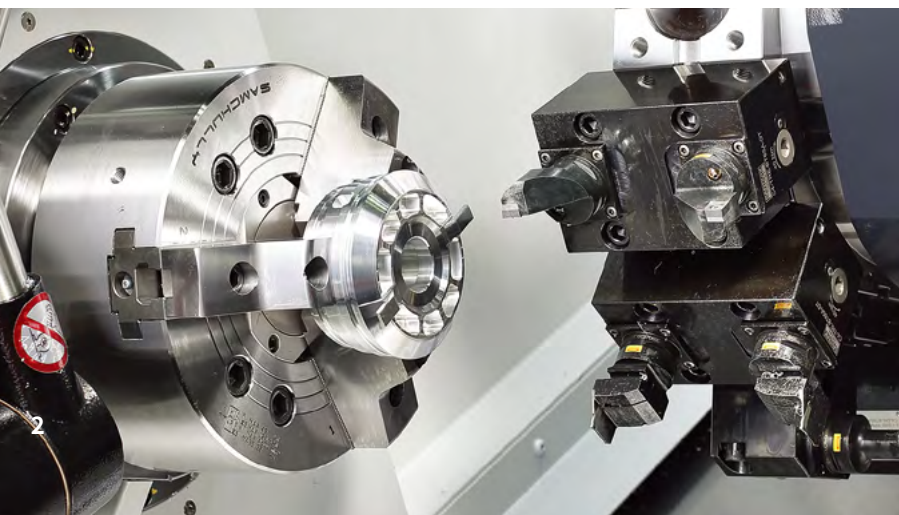
# PUMA TT

**1300SY/SYY • 2100SYY**



# PUMA TT SERIES · 1300SY/SYY · 2100SY

The PUMA TT2100SY and TT1300SY/SYY are 42-81mm (5-10 inch) bar capacity high productivity horizontal turning centers. They are equipped with twin opposed spindles and upper/lower turrets with Y-axis. The left and right spindles can process workpieces independently to achieve excellent productivity. The workpieces processed by the left and right spindles are discharged via an automatic system. The TT Series has become one of DN Solutions's bestselling products and is favored by customers all around the world.



The compact PUMA TT is packed with one-setup efficiency. Thanks to its 24 tool positions in the upper and lower turrets, you'll complete complicated parts that require plenty of tools in just one setup.



## DOUBLED PRODUCTIVITY

The left and right spindles and the upper and lower turrets operate independently to double the TT's productivity. Adding a lower Y-axis increased the productivity 20% more than having only upper Y-axis.

## FLEXIBLE SIZING

The TT's 5-, 6-, 8- and 10-inch chucks and 42 to 81mm bar capacity ensure customers can select the ideal machine.

## ADVANCED UNLOADER SYSTEM

The left and right spindles are equipped with independent upgraded part catcher and unloader systems to provide a fully automated manufacturing system. The enhanced parts unloader system sports 33% more productivity than the previous model.

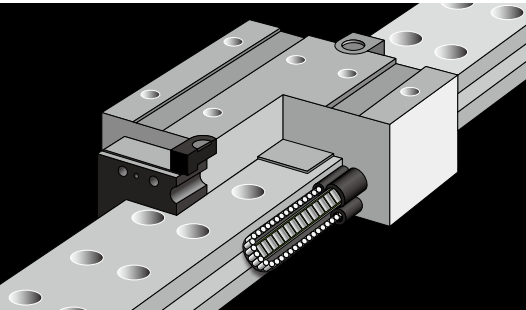
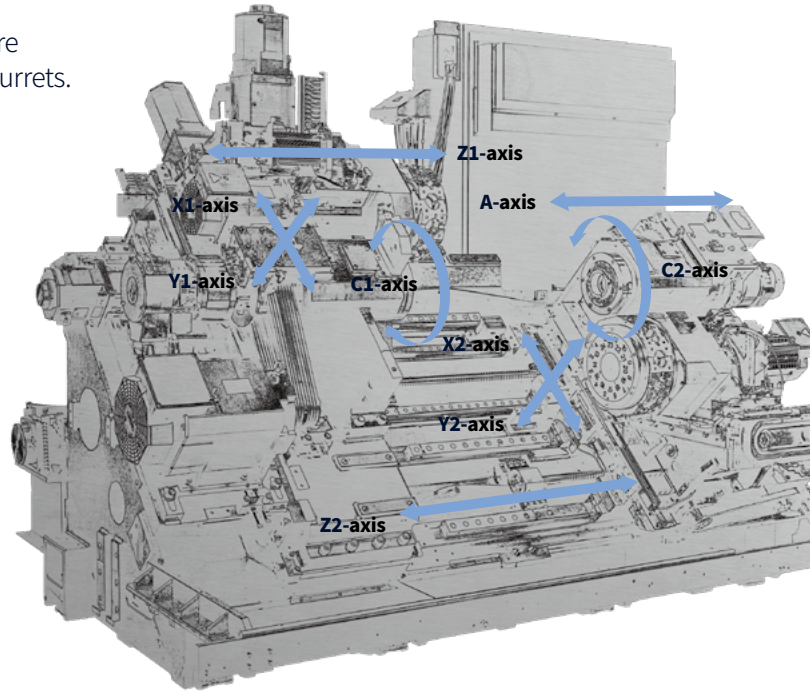
# BASIC STRUCTURE

All axis in the TT are equipped with roller LM guide ways for increased rigidity and high speed, providing maximum productivity.

## Feed axis construction

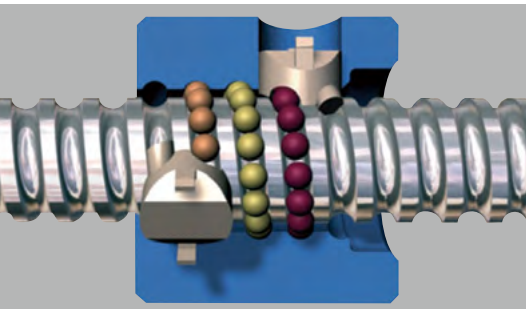
High productivity is achieved with a process-intensive structure comprising opposing types of spindles and upper and lower turrets.

Description		Unit	PUMA TT2100SY	PUMA TT1300SY / SY
Travel distance	X1, X2 axis	mm (inch)	X1 : 165 (6.5) X2 : 165 (6.5)	X1 : 135 (5.3)/X2 : 135 (5.3) (PUMA TT1300SY) X1 : 135 (5.3)/X2 : 150 (5.9) (TT 1300SY)
	Z1, Z2 axis	mm (inch)	Z1 : 700 (27.6) Z2 : 700 (27.6)	Z1 : 530 (20.9) Z2 : 530 (20.9)
	Y-axis	mm (inch)	100 (±50) (3.9 ±2.0)	80 (±40) (3.1 ±1.6)
	A-axis	mm (inch)	730 (28.7)	540 (21.3)
Rapid traverse rate	X1, X2 axis	m/min (ipm)		30 (1181.1)
	Z1, Z2 axis	m/min (ipm)		40 (1574.8)
	Y-axis	m/min (ipm)		15 (590.6)
	A-axis	m/min (ipm)		40 (1574.8)



## Linear motion guides

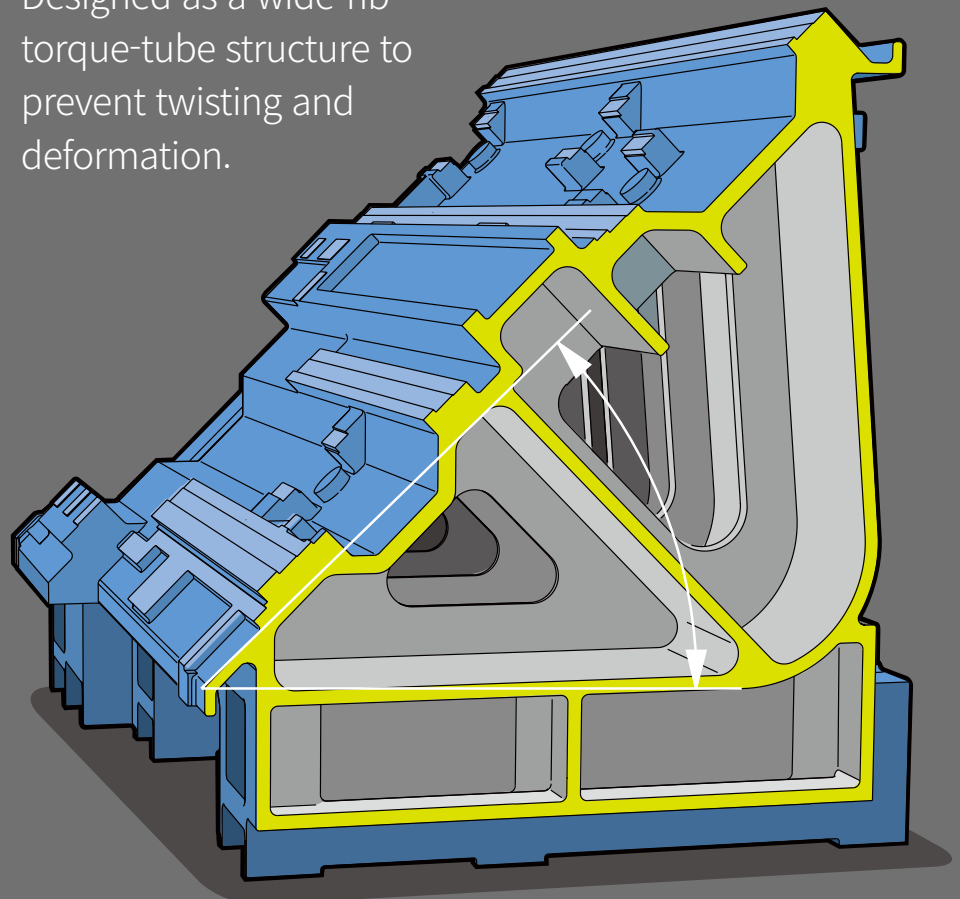
High rigidity and high speed structures with roller LM guides.



## Ball screw

Temperature fluctuations on the travel system have been minimized through the use of low friction ball screws.

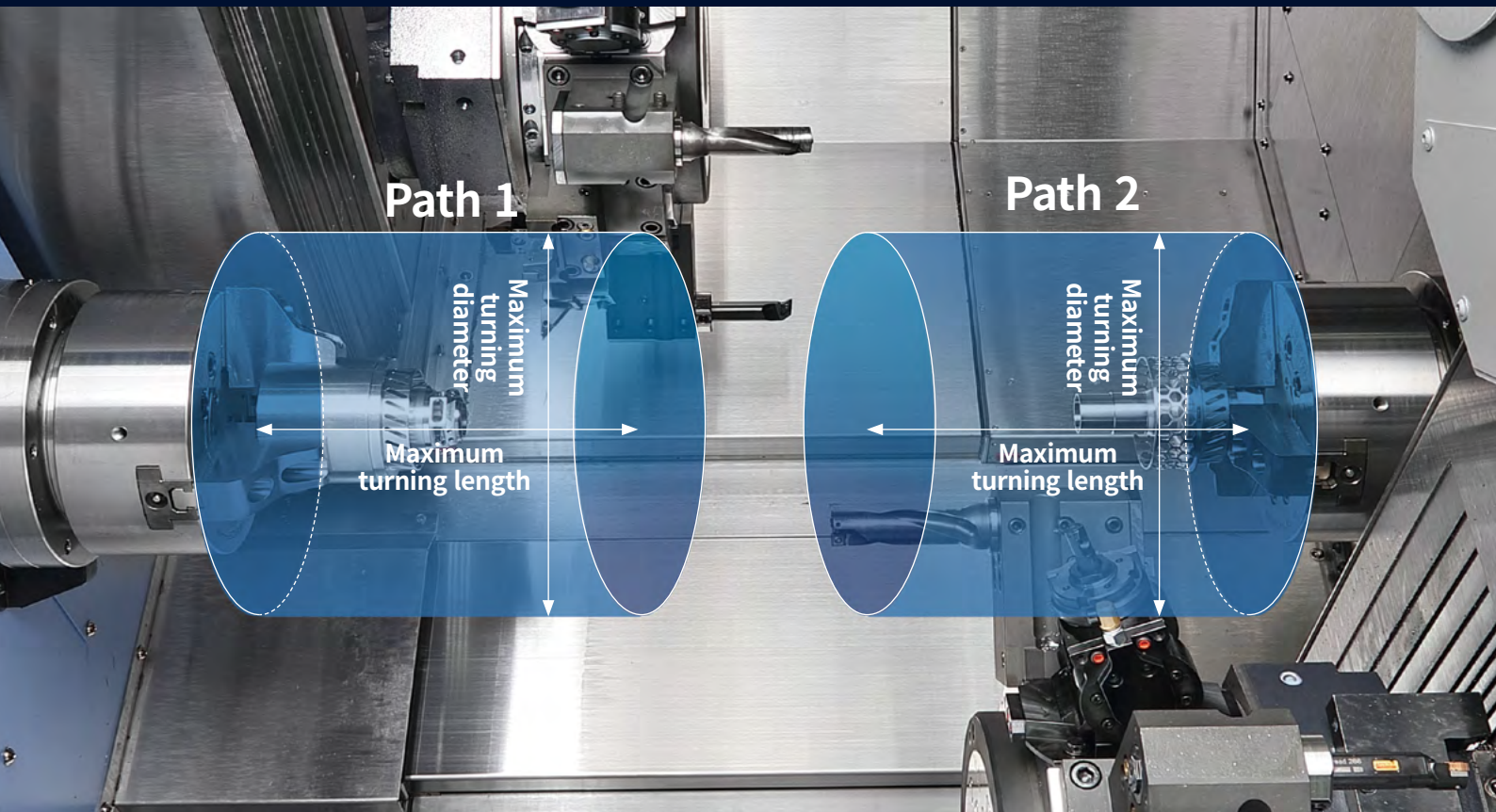
Designed as a wide-rib torque-tube structure to prevent twisting and deformation.





# FLEXIBLE MACHINING

PUMA TT1300SY · TT2100SY Maximum turning capabilities



## Max turning diameter / path length

PUMA TT1300SY/SY

**Ø175/120** mm  
Ø6.9/4.7 inch

PUMA TT2100SY

**Ø230/230** mm  
Ø9.1/1 inch

## Y1/Y2-axis stroke

PUMA TT1300SY/SY

**80 (±40)** mm  
3.1 (±1.6) inch

PUMA TT2100SY

**100 (±50)** mm  
3.9 (±2.0) inch

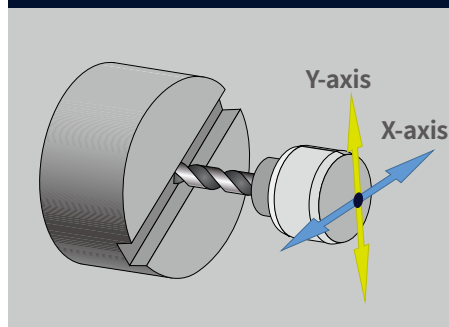
## Y1/Y2-axis rapid traverse

**15** m/min  
590.6 ipm

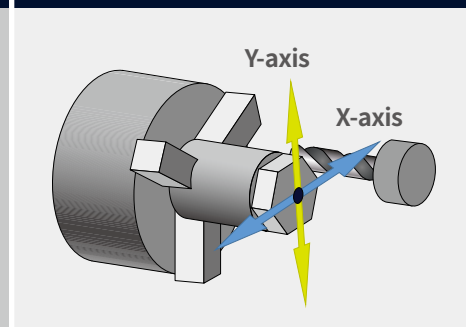
## Y-axis milling

A wide variety of multi-axis milling cycles can be achieved using the Y-axis.

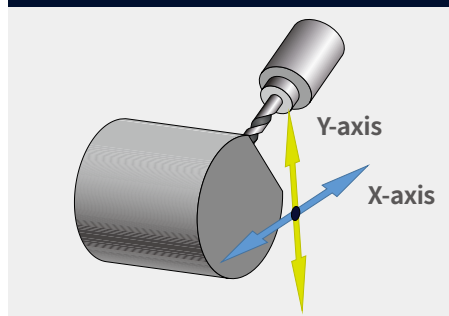
### Groove finish cutting using the Y-axis



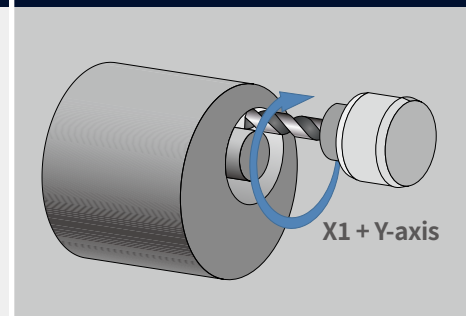
### Multi-face cutting



### Milling in an eccentric position



### Y & X-axis circular interpolation



# SPINDLE INFORMATION

Highly rigid, low vibration belt spindle design, applied taper rollers and two angular bearings enhance the reliability of the spindle. The best torque and power give the user the highest cutting performance possible.

## Max spindle speed

PUMA TT1300SY/SYY

**6000** r/min

PUMA TT2100SY

**5000** r/min

## Max power

PUMA TT1300SY/SYY

**11/5.5** kW  
14.8/7.4 hp

PUMA TT1300SYB

**15/7.5** kW  
20.1/10.1 hp

PUMA TT2100SY

**25/15** kW  
33.5/20.1 hp

PUMA TT2100SYB

**22/18.5** kW  
29.5/24.8 hp

## Max torque

PUMA TT1300SY/SYY

**93** N·m  
68.6 ft-lbs

PUMA TT1300SYB

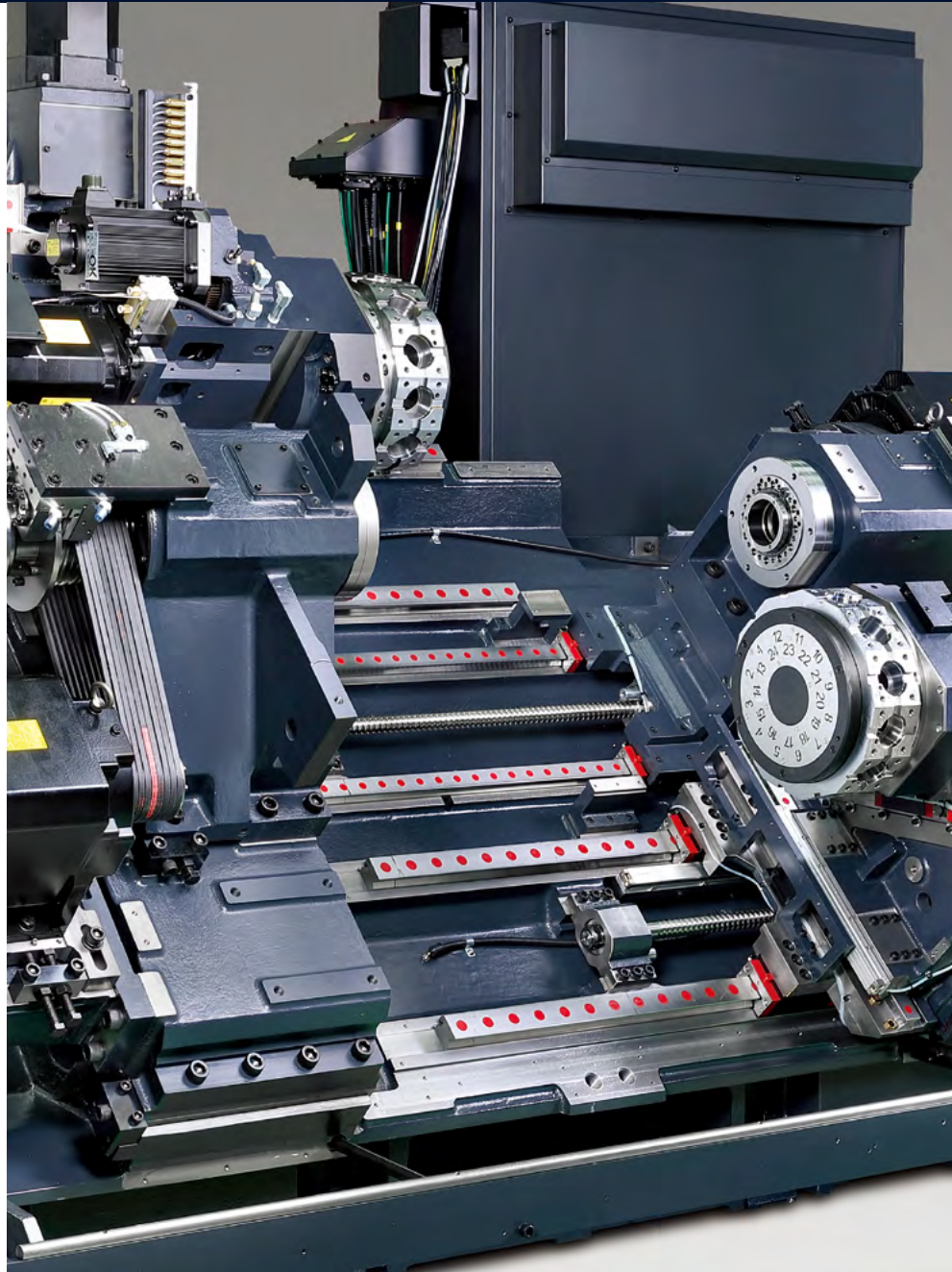
**116** N·m  
85.6 ft-lbs

PUMA TT2100SY

**223** N·m  
164.6 ft-lbs

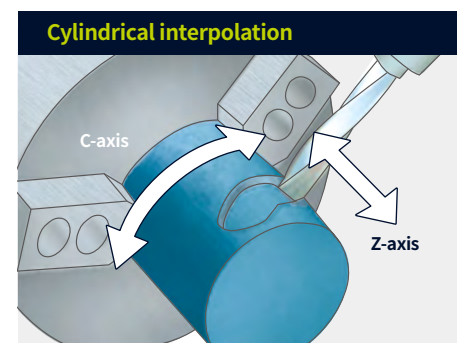
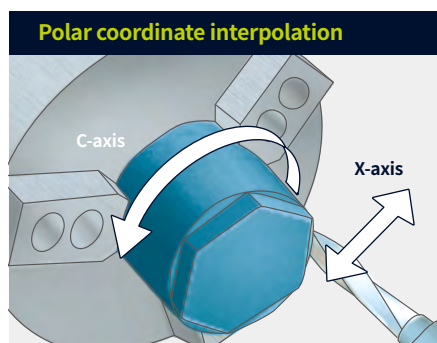
PUMA TT2100SYB

**244** N·m  
180.1 ft-lbs



## C-axis accuracy

The positioning and repeatability of the C-axis has been enhanced.





# TURRETS

Featuring stronger and faster turrets; upgraded servo motors for faster and more accurate tool rotation; and a stabilized structure for higher productivity and heavier-cutting capabilities.

## Turret indexing time

(1-face)

**0.12** seconds

## Number of tool stations

**12**

*(same for upper and lower turrets)*

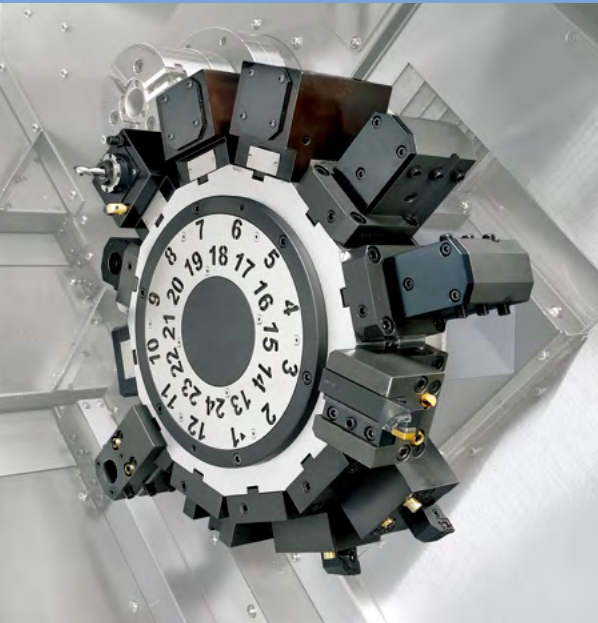
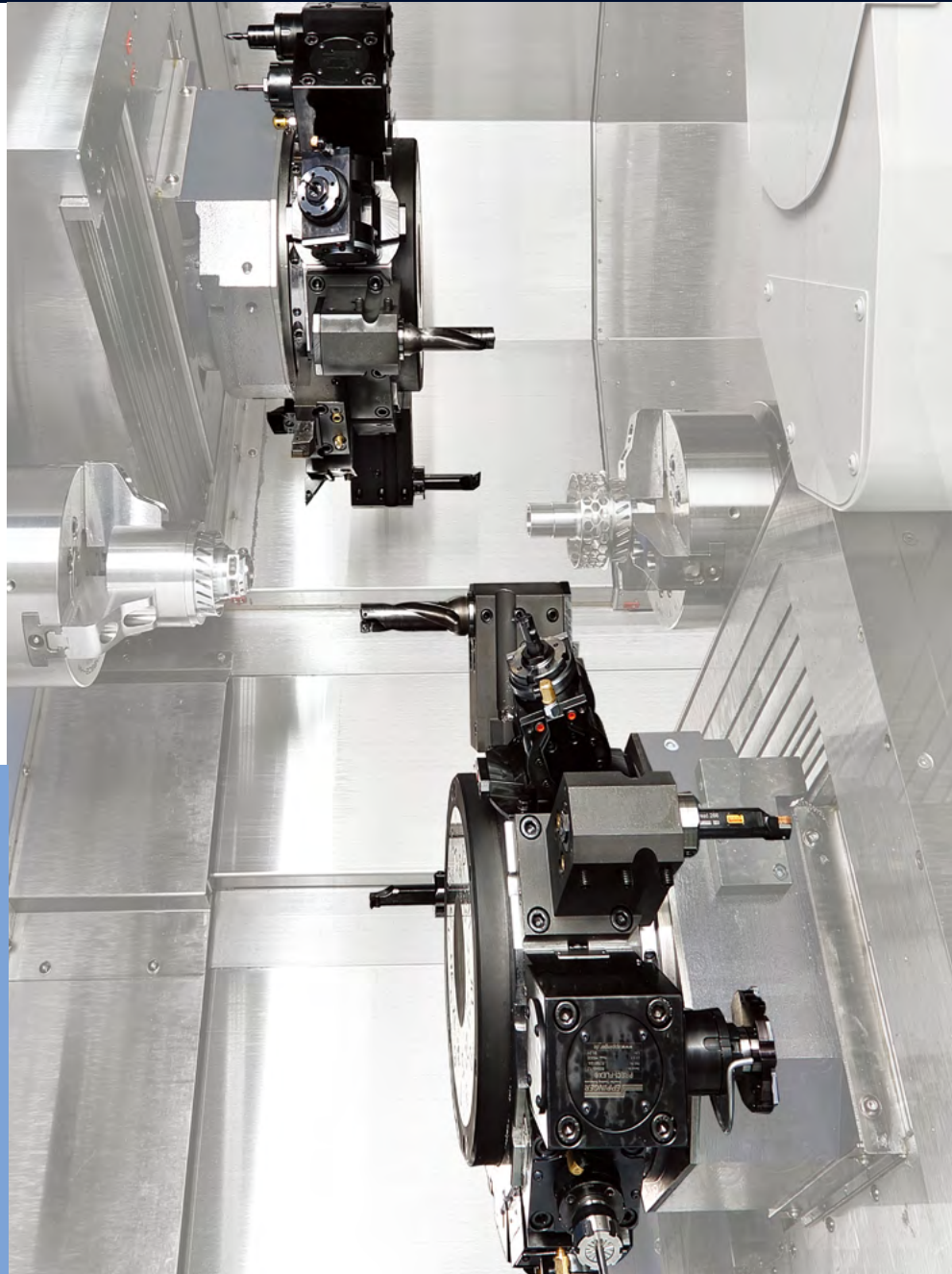
## Number of index positions

**24**

*(same for upper and lower turrets)*

## Turret with upgraded speed and rigidity

The newly-designed turret has passed stricter speed and side loading tests. In addition, the cross-roller bearing reduces backlash and improves accuracy due to its improved rigidity. Indexing time has been reduced by 20- 30% compared with previous models.



- Reduce non-cutting time by 10%
- Higher indexing speeds
- Improved accuracy

## Rotary tool structure is highly resistant to thermal displacement

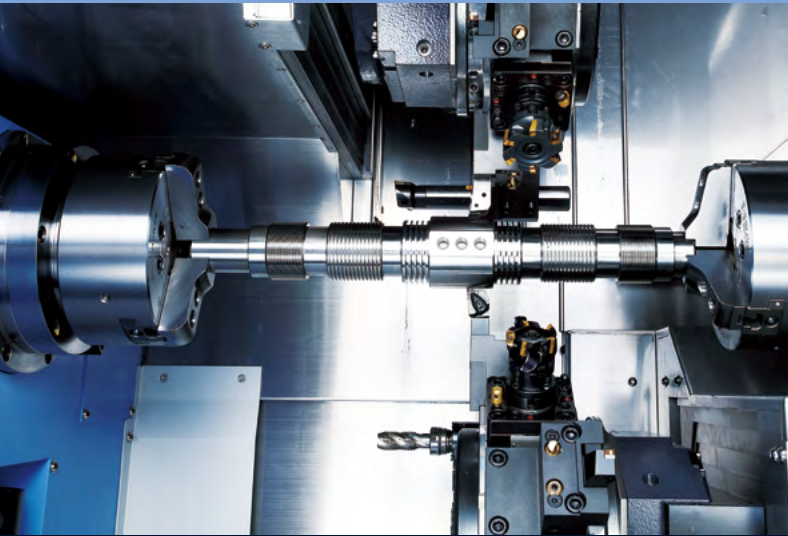
The milling turret, including rotary tools, features a BMT design for higher rigidity. In addition, the minimization of thermal error due to oil and air lubrication of the rotary tools delivers class-leading milling, drilling and tapping performance.

# CUTTING CONCEPTS

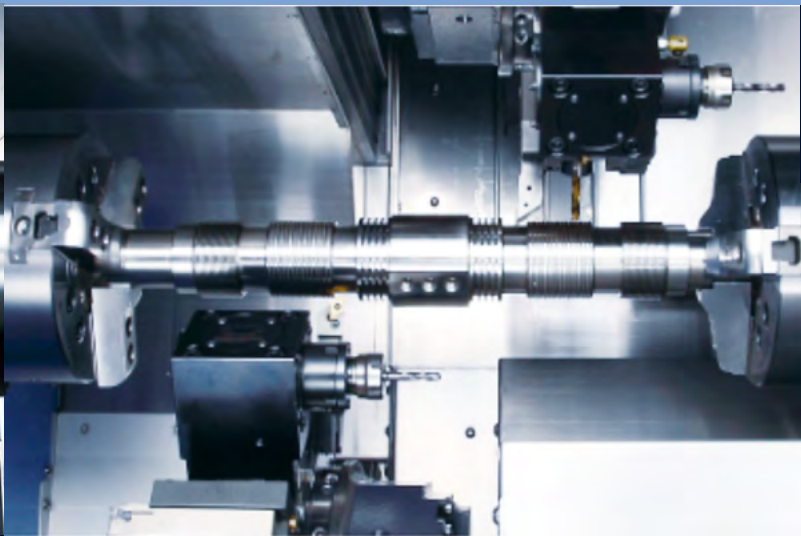
Multi-tasking with left and right spindles and upper and lower turrets optimizes productivity.

## “LONG SHAFT MACHINING BY SYNCHRONISING THE ROTATION OF BOTH SPINDLES” CONCEPT

PUMA TT Series turning centers can double productivity when machining long workpieces through the synchronized control of the left and right spindles and using both the upper and lower turrets for simultaneous machining.



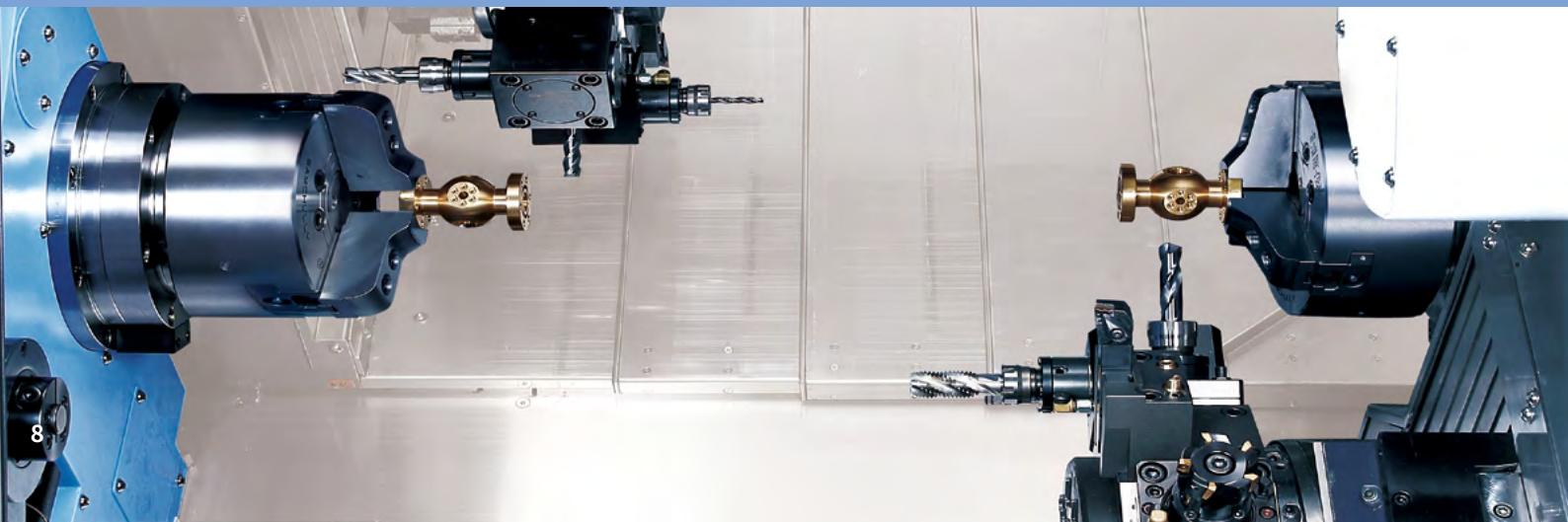
Turning at the same position is carried out using the upper and lower turrets simultaneously.



Different cutting processes can be carried out on a single workpiece using the upper and lower turrets simultaneously.

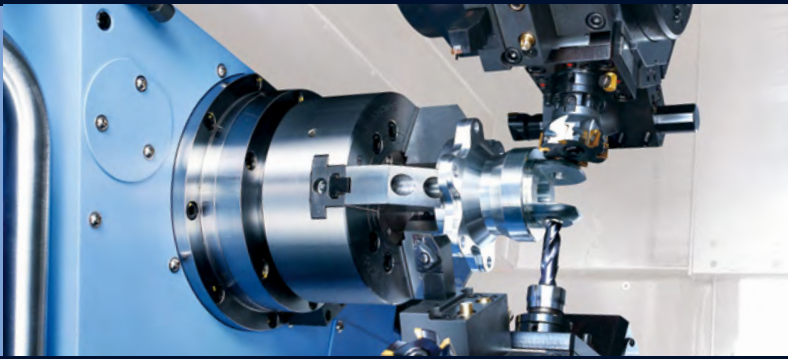
## “ONE MACHINE, TWO PARTS” CONCEPT

PUMA TT Series turning centers double productivity thanks to the independent, yet simultaneous, operation of the left and right spindles and the upper and lower turrets.



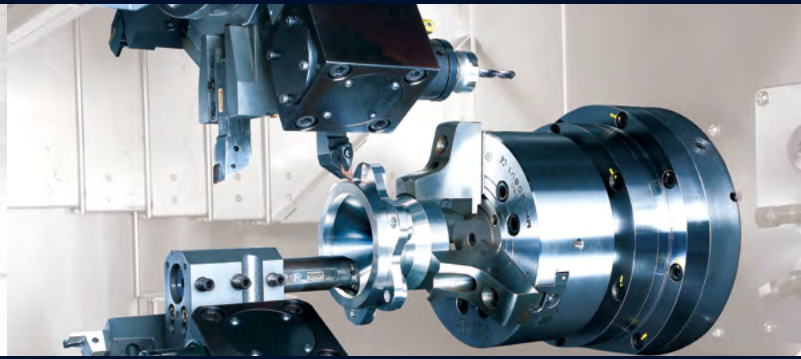


# CUTTING CONCEPTS



## LEFT SPINDLE

Upper and lower turret simultaneously machining with left spindle



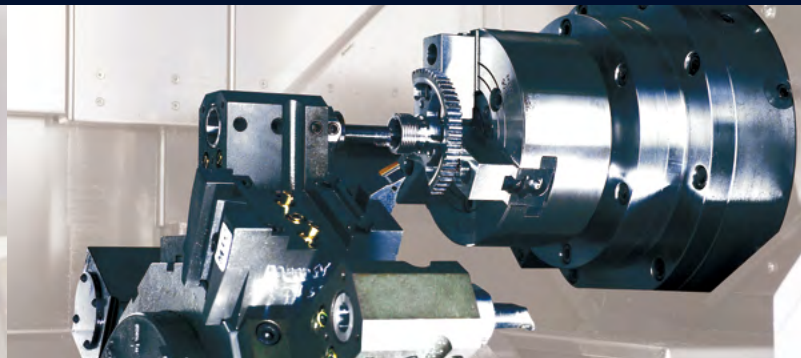
## RIGHT SPINDLE

Upper and lower turret simultaneously machining with right spindle



## LEFT SPINDLE

Gear hobbing and polygon turning



## RIGHT SPINDLE

Internal slotting operation

## “FIRST AND SECOND PROCESS SIMULTANEOUS MACHINING” CONCEPT

The PUMATT can produce different milled features using its spindles. Example: bolt hole pattern using the right spindle to a keyway machined feature using the left spindle.

### FIRST PROCESS:

Cutting with the left spindle

### PART TRANSFER:

Synchronized rotation and parts feed using the left and right spindles

### SECOND PROCESS:

Rear side cutting with the right spindle





# ONE MACHINE, TWO PROCESSES

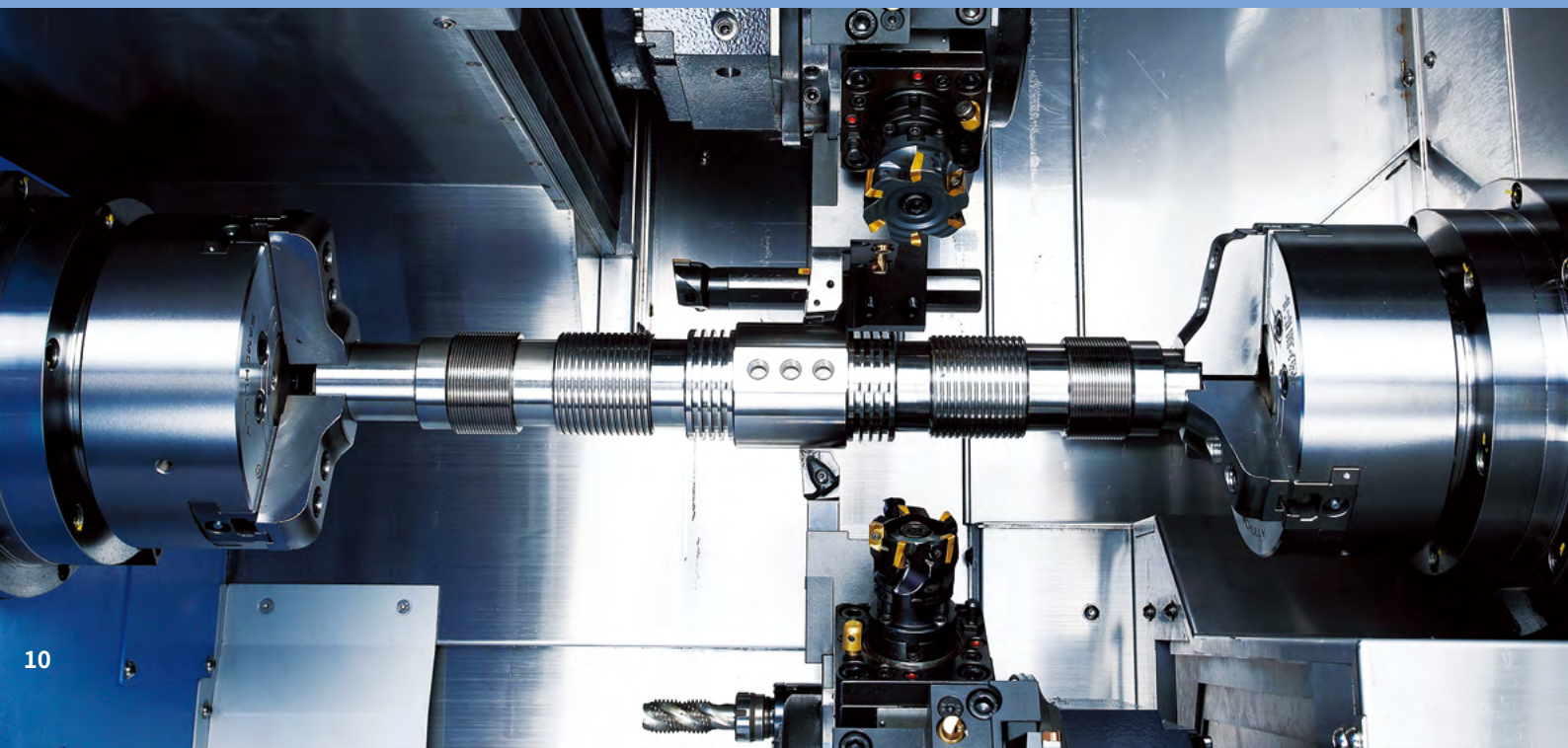
With the adoption of two opposing spindles and upper/lower turrets, the PUMA TT Series can machine both first and second operations simultaneously. Furthermore, the axis travel system, which features high rigidity roller LM guideways and a fast feed rate of 40 m/min, provides speed with process reliability.



TWO OPPOSING SPINDLES AND UPPER AND LOWER TURRETS INSTALLED ON ONE MACHINE

## DIVERSE LINE-UP with LARGE CAPABILITY

Rotary tools can be selected for milling, tapping and drilling, while the Y-axis can be used for cutting inclined or curved surfaces. This process-intensive turning center is capable of conducting multiple processes, further widening its potential and appeal.





# STANDARD | OPTIONAL SPECIFICATIONS

A range of options is available to suit individual requirements.

Description	Features	PUMA TT2100SY	PUMA TT2100SYB	PUMA TT1300SY/SY	PUMA TT1300SYB/SYB
<b>Chuck (Left)</b>	135 mm (5 inch)	X	X	○	X
	165 mm (6 inch / TT1300SYB : 170 mm)	X	X	○	○
	210 mm (8 inch)	○	X	X	X
	254 mm (10 inch)	X	○	X	X
	None	●	●	●	●
<b>Chuck (Right)</b>	135 mm (5 inch)	X	X	●	●
	165 mm (6 inch)	X	X	○	○
	210 mm (8 inch)	●	●	X	X
	254 mm (10 inch)	X	X	X	X
	None	○	○	○	○
<b>Jaws (Left / Right)</b>	Soft jaws	●	●	●	●
	Hardened & ground hard jaws	○	○	○	○
<b>Chucking option</b>	Dual pressure chucking	○	○	○	○
	Chuck clamp confirmation	○	○	○	○
<b>Tailstock</b>	Tail center for turret	○	○	○	○
<b>Coolant pump (60 / 50Hz)</b>	4.5 Bar	●	●	●	●
	Power up(7/10/14.5/20 Bar)	○	○	○	○
<b>Coolant options</b>	Oil skimmer	○	○	○	○
	Coolant pressure switch	○	○	○	○
	Coolant level switch : Sensing level - low	○	○	○	○
	Cooling flow switch	○	○	○	○
	High coolant interface	○	○	○	○
	Chuck coolant (Left/Right)	○	○	○	○
	TSC for spindle (Left/Right)	○	○	○	○
	Coolant gun	○	○	○	○
<b>Chip processing options</b>	Chip conveyor_Side Type	○	○	○	○
	Chip conveyor_Rare Type	○	○	○	○
	Chip bucket	○	○	○	○
	Air blow (Left/Right)	○	○	○	○
	Mist collector	○	○	○	○
<b>Precision enhanced option</b>	Thermal compensation function (sensor type)	○	○	○	○
	Coolant chiller	○	○	○	○
	Linear scale (X1,X2,Z1,Z2,Y1,Y2)	○	○	○	○
<b>Measurement &amp; automation</b>	Tool setter(Automatic)	○	○	○	○
	Parts catcher and box	○	○	○	○
	Parts unloader and conveyor	○	○	○	○
	Work ejector	○	○	○	○
	Parts unloader operating while main spindle cutting(Real time customer macro)	○	○	○	○
	Auto door	○	○	○	○
	Cut-Off confirmation	○	○	○	○
	Work/Tool counter	○	○	○	○
	Robot interface (PMC I/O, Profibus)	○	○	○	○
	Bar feeder interface	○	○	○	○
<b>Optional devices</b>	CBS II	○	○	○	○
	Tool load monitoring	○	○	○	○
	Signal tower	○	○	○	○
	Air gun	○	○	○	○
	Air conditioner for electric cabinet	○	○	○	○
	Light for electric cabinet	○	○	○	○
	Extra M-code (4ea)	○	○	○	○
	Auto power Off	○	○	○	○
	Quick change tooling(CAPTO)	○	○	○	○

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

\* When using a semi-synthetic type or synthetic type, contact our sales representative or service center in advance.

● Standard ○ Optional X N/A

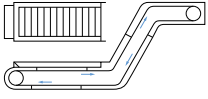
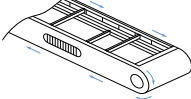
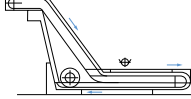


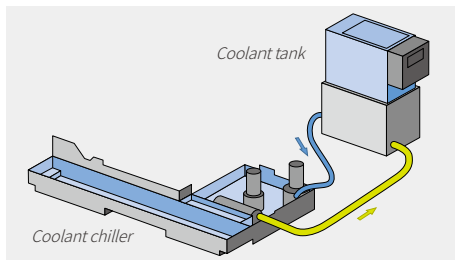
There is a high risk of fire when using non-water-soluble cutting fluids, processing flammable materials, neglecting the controlled and careful use of coolants and modifying the machine without the consent of the manufacturer. Always check the SAFETY GUIDELINES carefully before using the machine.

# 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

Coolant chiller is highly recommended to prevent temperature rise and minimize thermal deformation, when using a water-insoluble coolant or high-pressure coolant system of which the power is over 1.5 kw.



## 70 bar high pressure coolant OPTION

70 bar high pressure coolant suitable for high productivity.



## 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.

## Optional equipment

Auto tool setter



Coolant blower



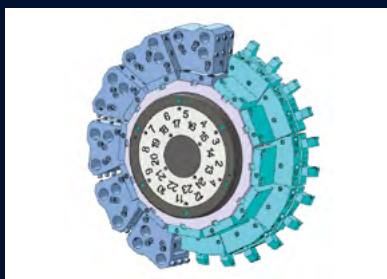
Signal tower



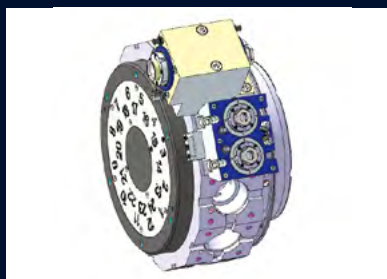
Collet chuck



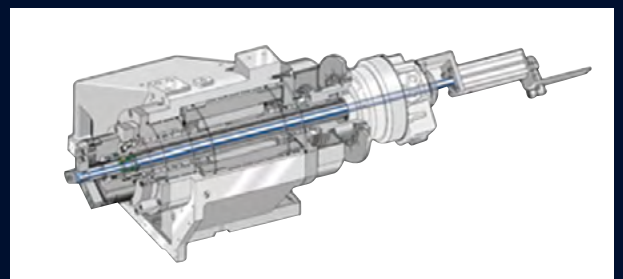
ID/OD special holder  
(each turret 12ea/tool 24ea)



Milling special holder  
(each turret 12ea/tool 24ea)

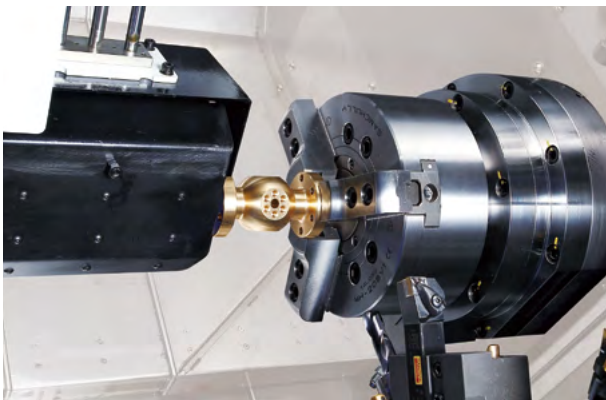
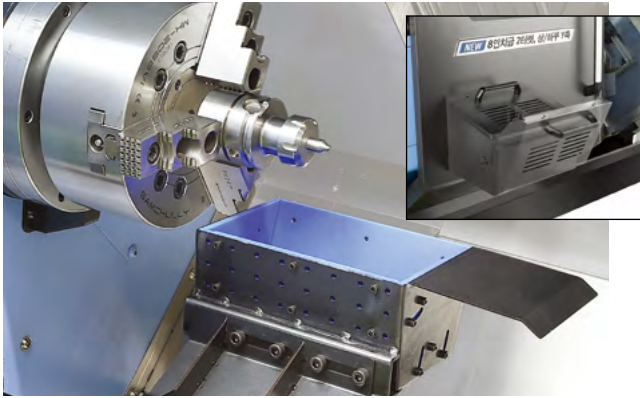


Work ejector





# PERIPHERAL EQUIPMENT



**MAXIMUM MATERIAL SIZES FOR UNLOADER /CONVEYOR SYSTEM**

## Max work diameter

PUMA TT1300SY/SYY

**Ø51** mm Ø2.0 inch

PUMA TT2100SY

**Ø65** mm Ø2.6 inch

## Max work length

PUMA TT1300SY/SYY

**100** mm 3.9 inch

PUMA TT2100SY

**150** mm 5.9 inch

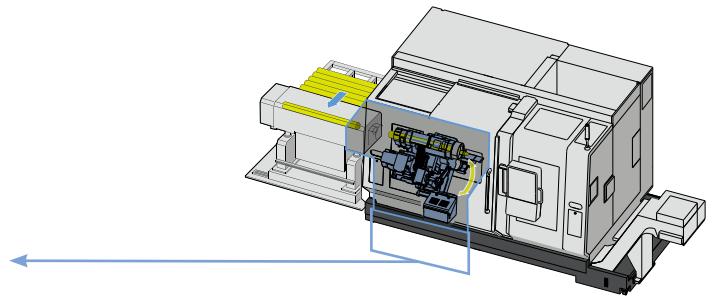
## Max work weight

PUMA TT1300SY/SYY

**1.6** kg 3.5 lbs

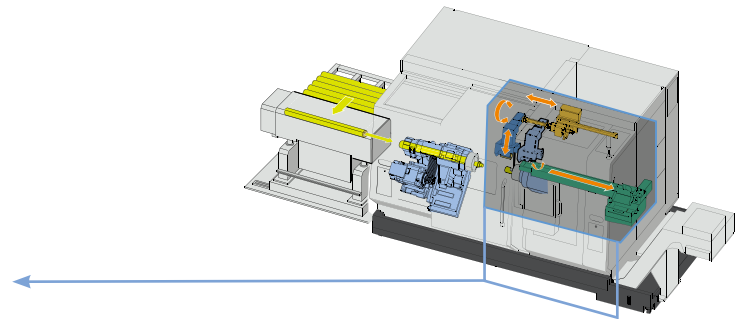
PUMA TT2100SY

**3** kg 6.6 lbs



## Left spindle parts catcher OPTION

Single operation parts produced on the left spindle, or bar remnants can be ejected into the bucket.



## Right spindle parts unloader and ejector OPTION

Work processed by the right spindle is delivered to the parts unloader by the work ejector and then discharged to the parts conveyor.



## Parts conveyor OPTION

Finished workpieces are transferred to the indexable output belt conveyor which discharges them to a receiving container.

# 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

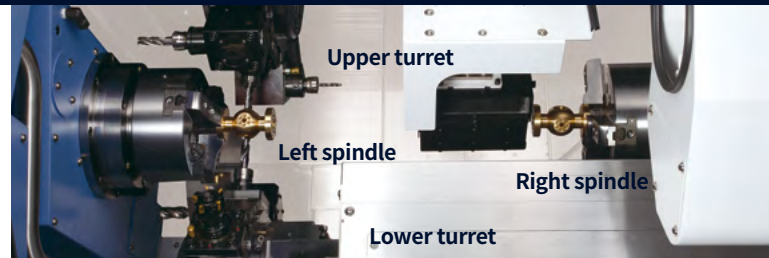
iHMI provides an intuitive interface that uses a touchscreen for quick and easy operation.

### Range of applications

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

### Real-time custom macro function OPTION

During operation of the parts unloader of the right spindle, this function allows the lower turret to conduct the cutting operation for the left spindle. This function also further improves the productivity.



## NUMERIC CONTROL SPECIFICATIONS

**FANUC**

Division	Item	Specifications	SY	SY
			DN Solutions Fanuc i Plus	DN Solutions Fanuc i Plus
Controlled axis	Controlled axes		8 (X1,Z1,C1,Y, X2,Z2,C2,A)	9 (X1,Z1,C1,Y1, X2,Z2,C2,Y2,A)
	Simultaneously controlled axes		4 axes (each path)	4 axes (each path)
Data input/output	Fast data server		○	○
	Memory card input/output		●	●
	USB memory input/output		●	●
	Large capacity memory(2GB)	Fanuc iPlus iHMI 적용시 선택 가능	○	○
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	○ <sup>*)</sup>	○ <sup>*)</sup>
	Multi path function	Supporting 2 or 3 path machine	●	●
	EZ Operation package		●	●
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	○	○
	Part program storage size & Number of registerable programs	1280M(512KB)_1000 programs	X	X
		5120M(2MB)_1000 programs	●	●

Network: FANUC MTConnect and FANUC OPC UA available.

● Standard ○ Optional X N/A ✱ Available

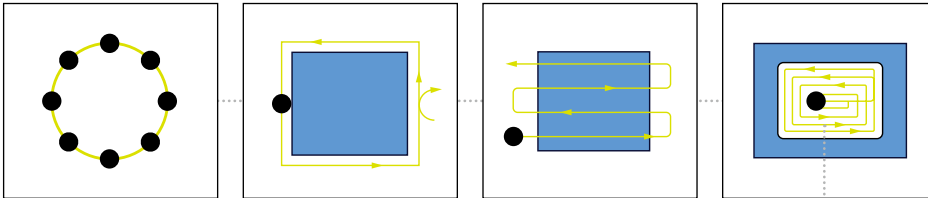


# DN SOLUTIONS FANUC i PLUS

## 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.

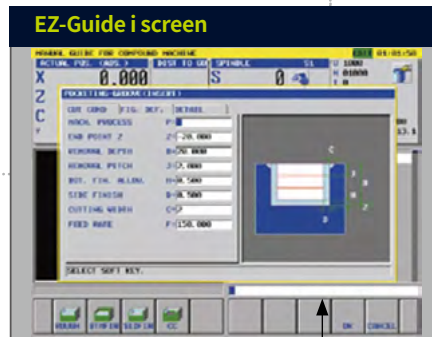
Example programming : Cutting shape



**Automatic creation of cutting program**

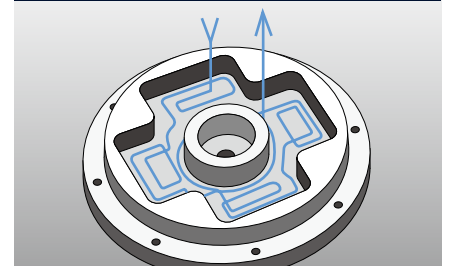
```
O7000 (SAMPLE PROGRAM) ;
...
M3 S1500 ;
G0 X50. Y125. ;
G0 Z30. ;
G1040 T0.5 J3. H0.2 K0.5 ... ;
G1020 H120. V50. U37. W68. ... ;
G0 Z80. ;
M5 ;
```

Enter the dimensions of the shape



A cutting program is automatically created with the entered values.

## Example part



## CBS, Chip Breaking Solution II

The servo axis vibrates in the direction of processing operations thereby improving chip control and preventing chip curling, and ensuring process stability, material transfer etc.

## Comparison of results between regular turning operations and CBS II machining

\*Only provided to chuck size 8 inch and under.



## EZ work

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

### Q-setter Automatic measurement



### Crash avoid check

Set the interference area between turret and sub spindle to avoid collision.

### Tool monitoring screen



### 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 management

### Parts unloader maintenance and service screen



### Convenience of maintenance and service

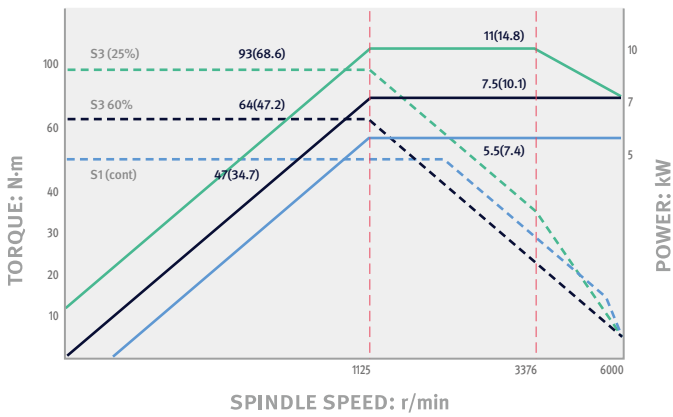
The condition and service procedures of the sensors are provided for easy maintenance and servicing of major units.

### Convenient set up for peripheral equipment

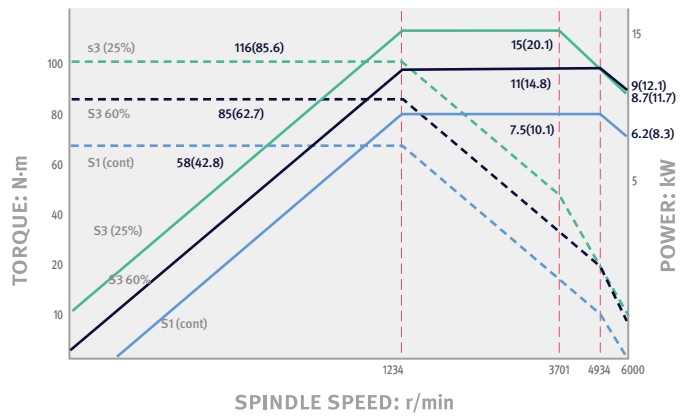
Helps tool setter guide, work setting, tailstock setting, and other measurement and parameter control to reduce setting-up time and facilitates operation.

# POWER | TORQUE

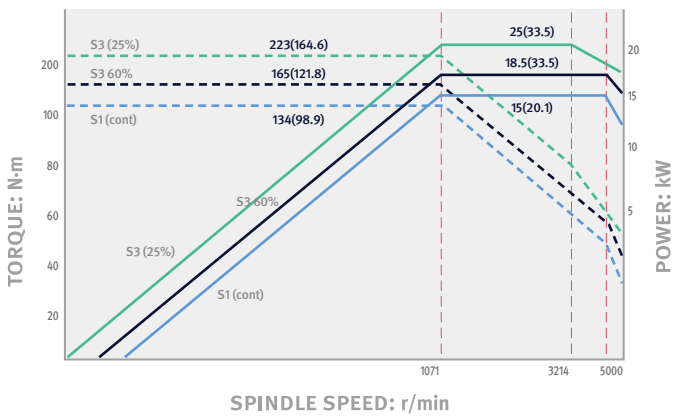
PUMA TT 1300SY/SYY (L/R Spindle)



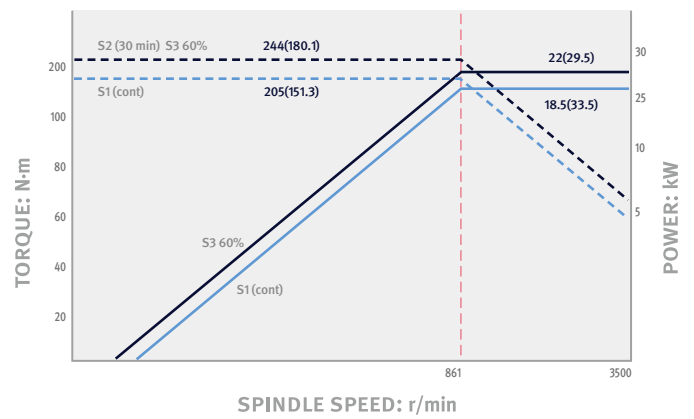
PUMA TT 1300SYB (L Spindle)



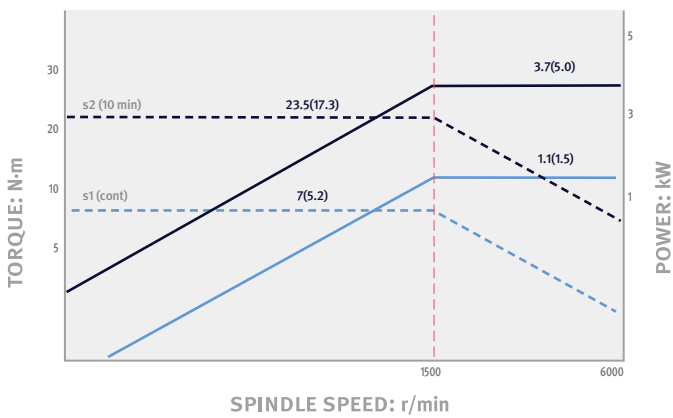
PUMA TT 2100SYY (L/R Spindle)



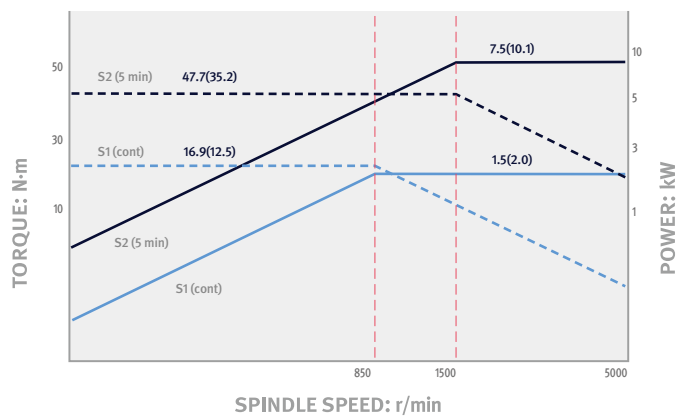
PUMA TT 2100SYB (L Spindle)



PUMA TT 1300SY/SYY : 6000 r/min (Turret)



PUMA TT 2100SYY : 5000 r/min (Turret)



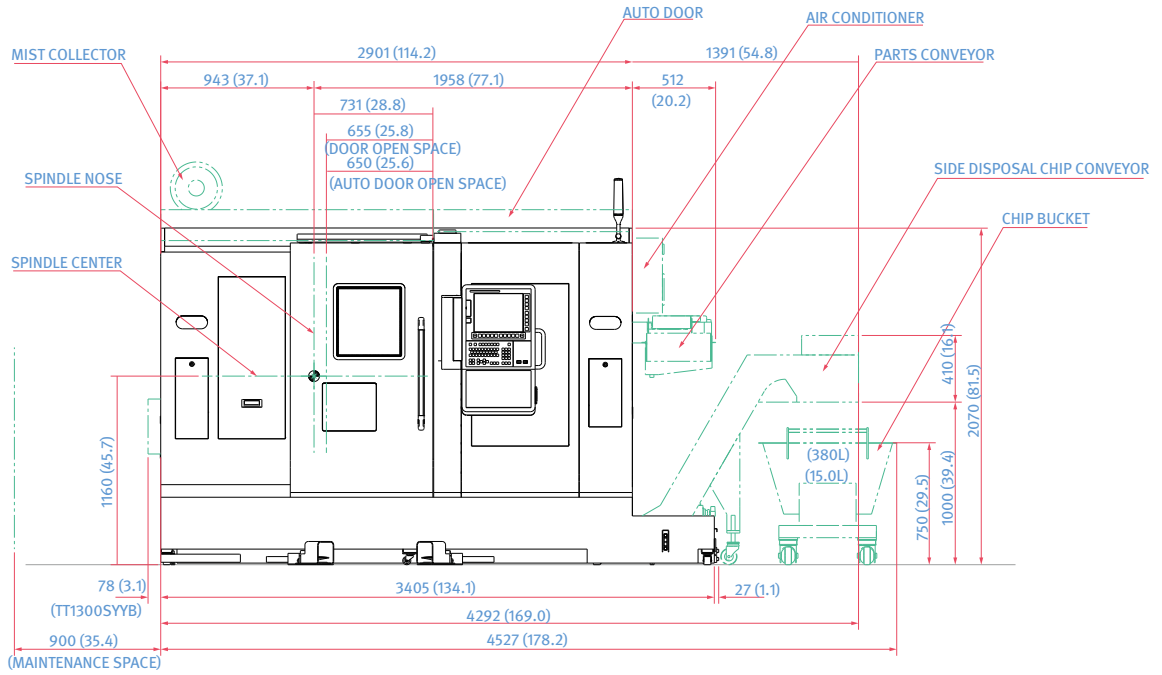


# EXTERNAL DIMENSIONS

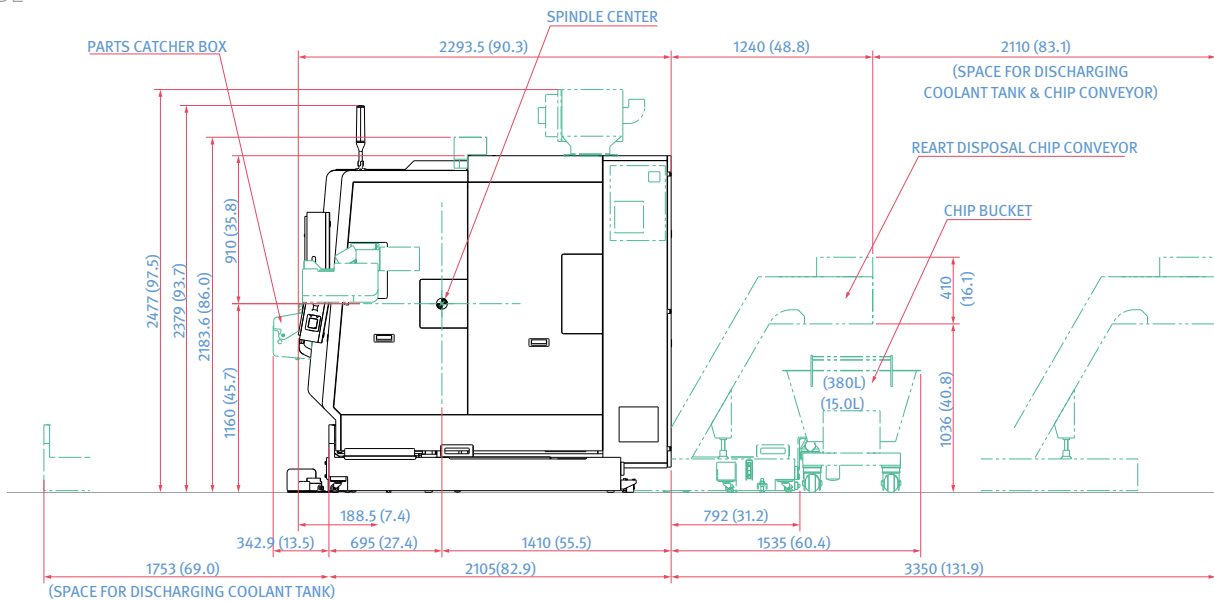
PUMA TT1300SY

Units : mm (inch)

## FRONT



## SIDE



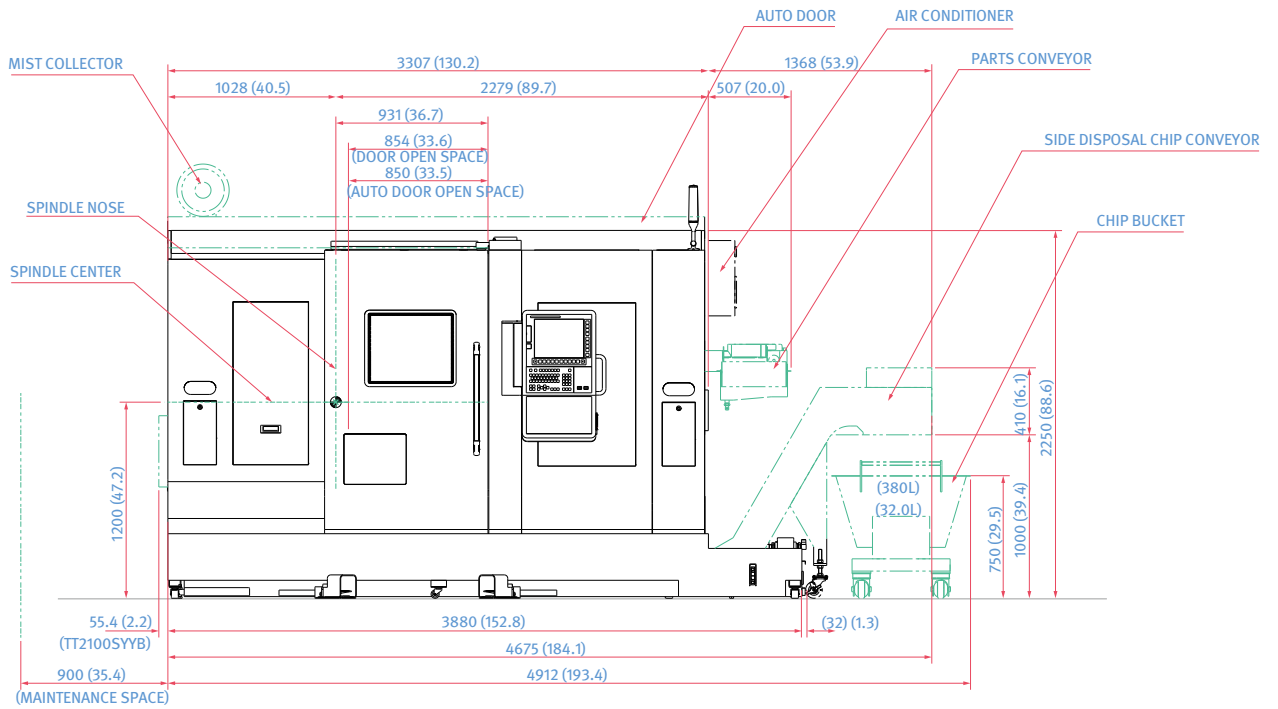
\* Some peripheral equipment can be placed in other areas.

# EXTERNAL DIMENSIONS

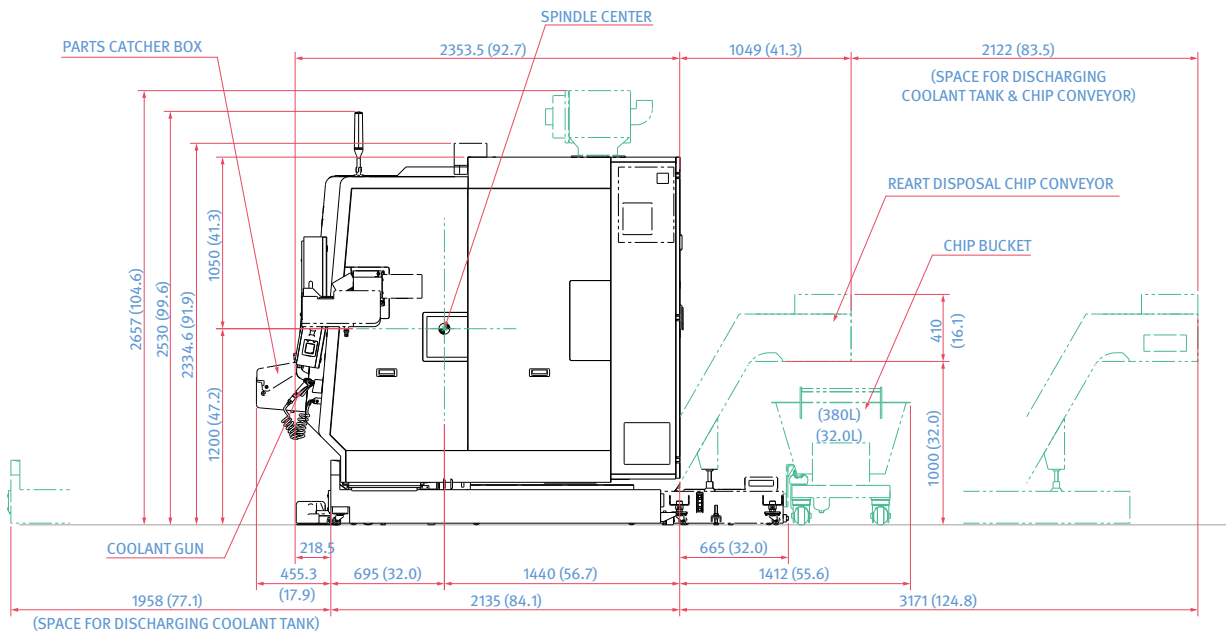
PUMA TT2100SY

Units : mm (inch)

## FRONT



## SIDE

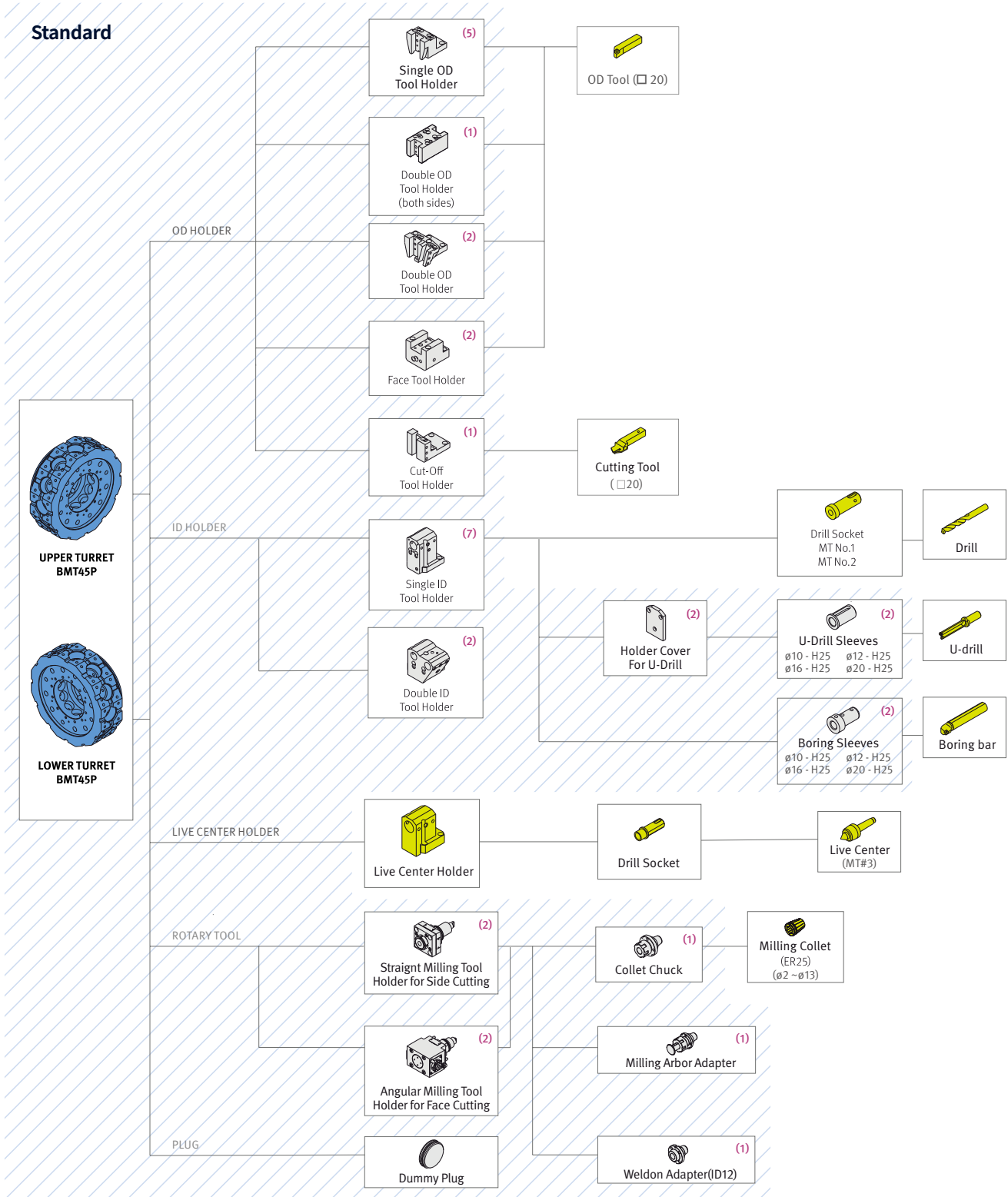




# TOOLING SYSTEM

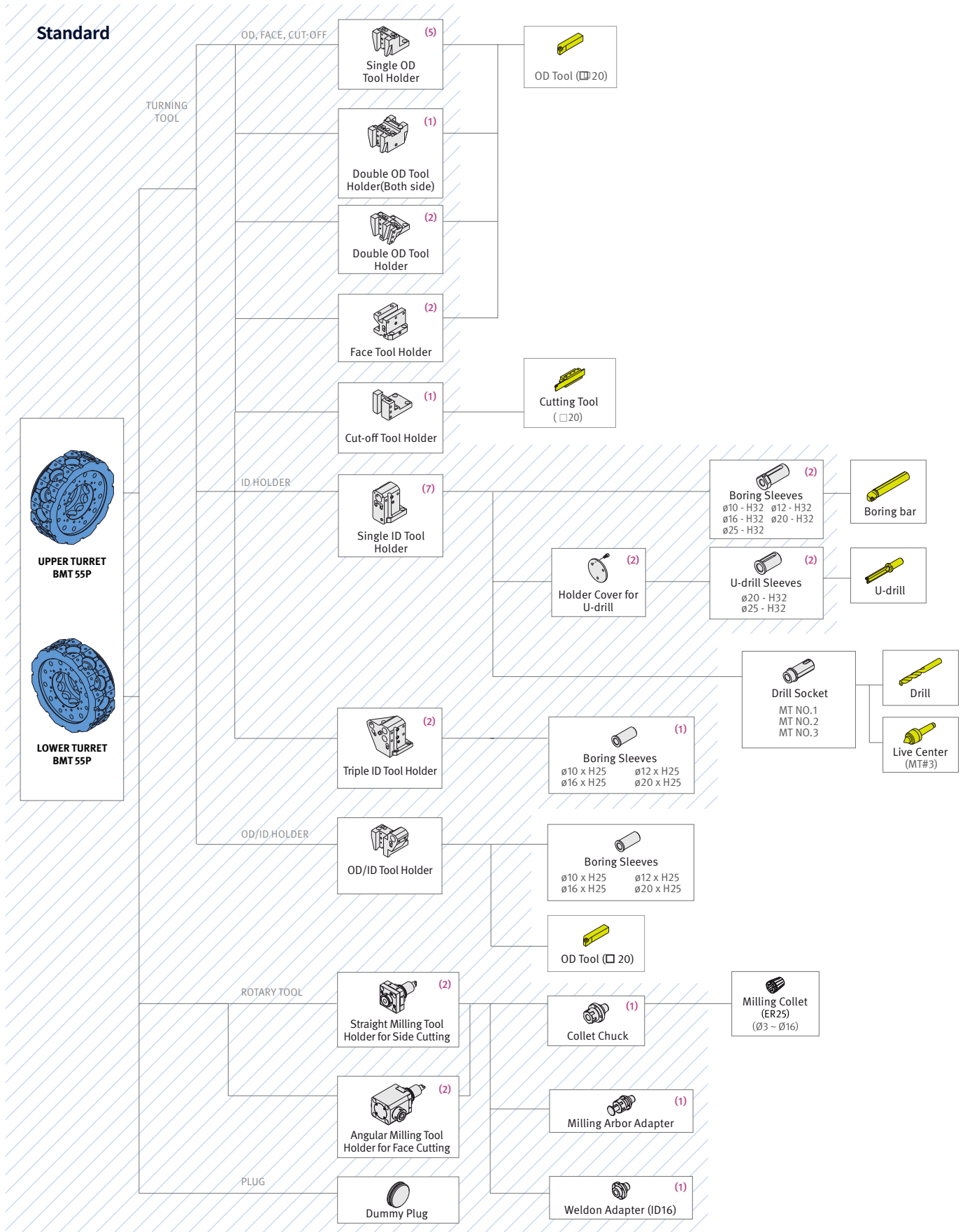
PUMA TT1300SY/SY

Units : mm (inch)



# TOOLING SYSTEM

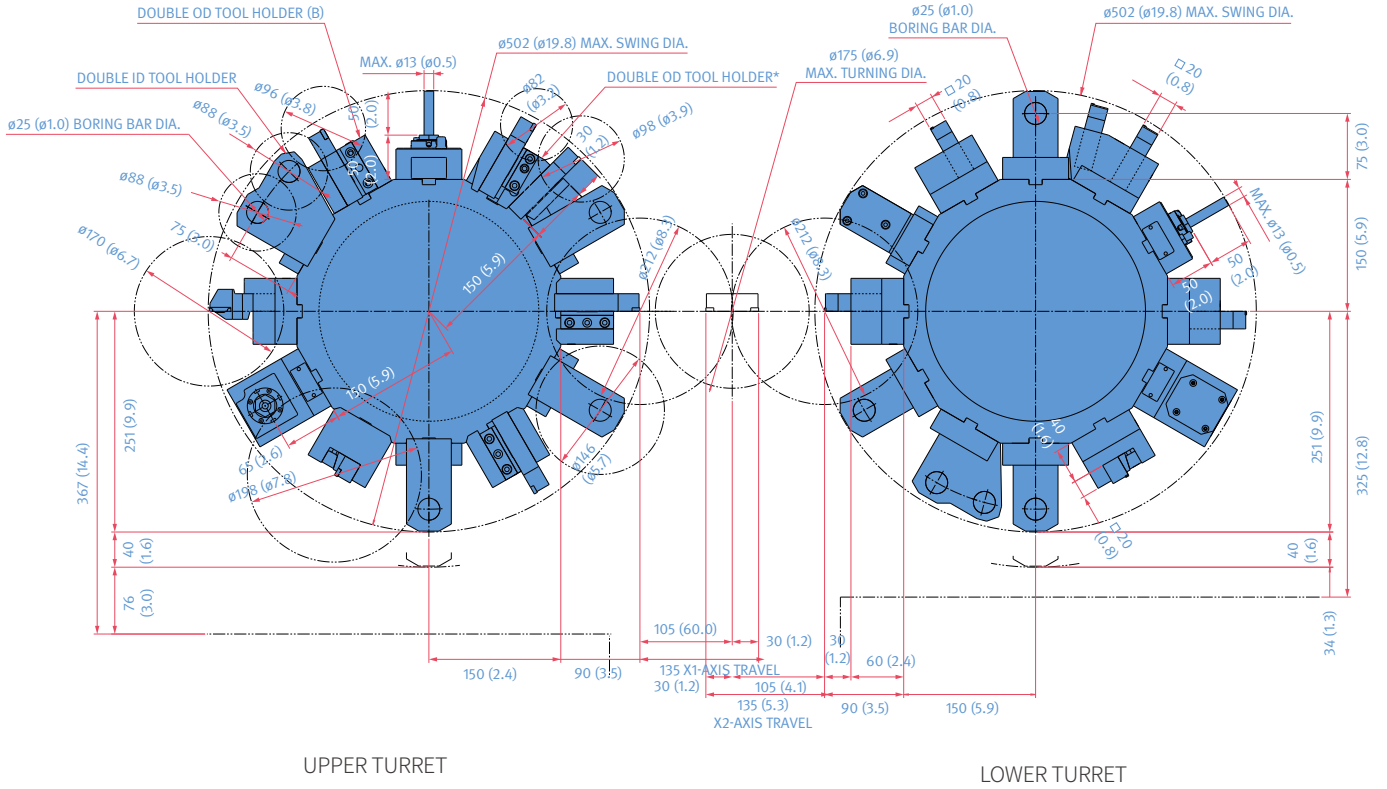
PUMA TT2100SY



# TOOL INTERFACE

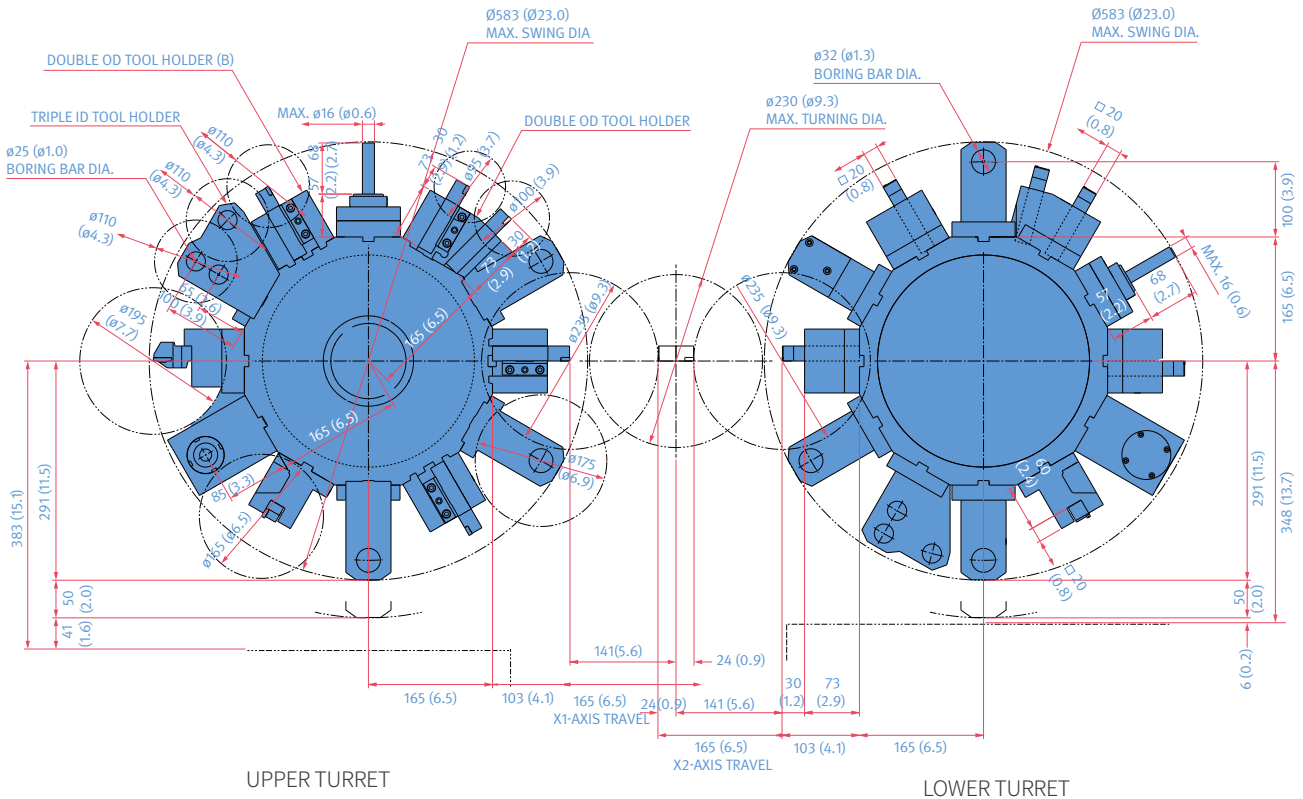
## PUMA TT1300SY/SYY

Unit: mm (inch)



## PUMA TT2100SY

Unit: mm (inch)

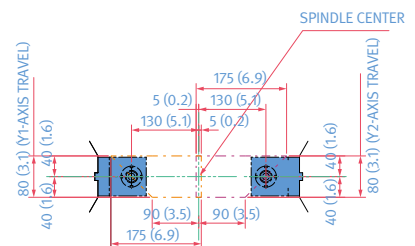
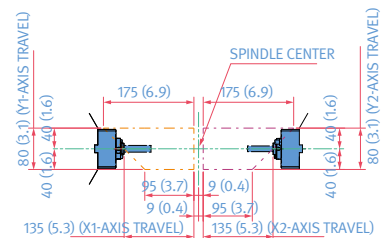
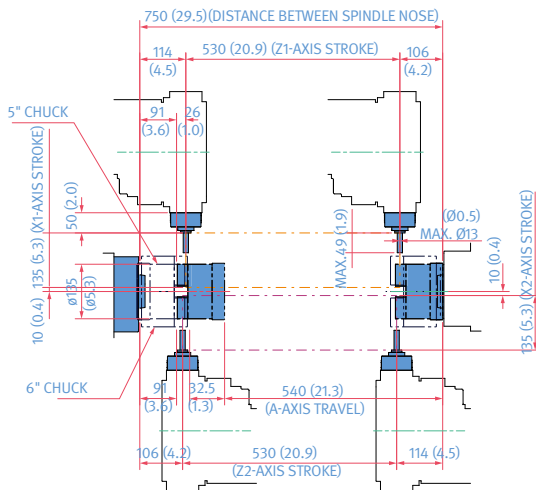
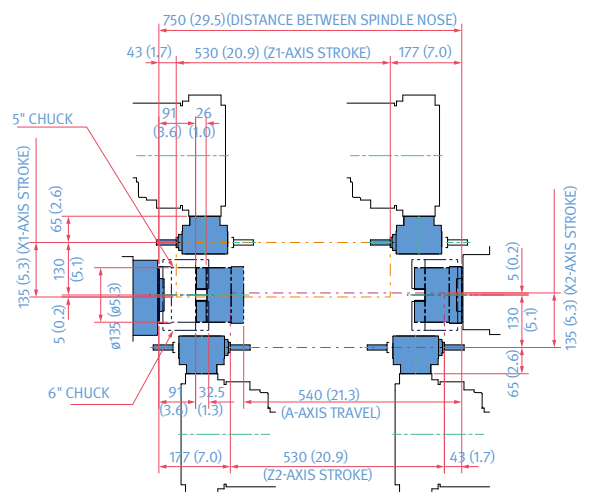
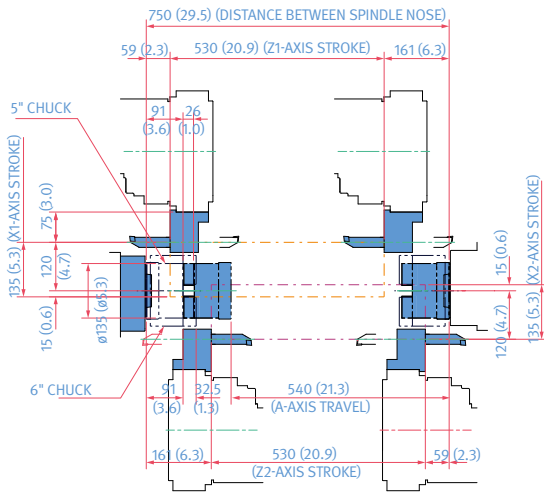
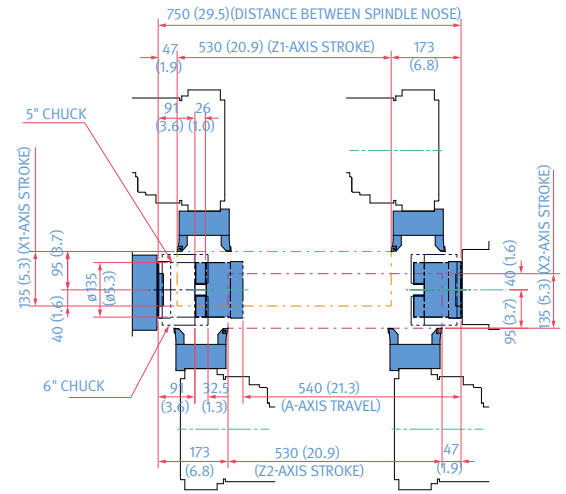
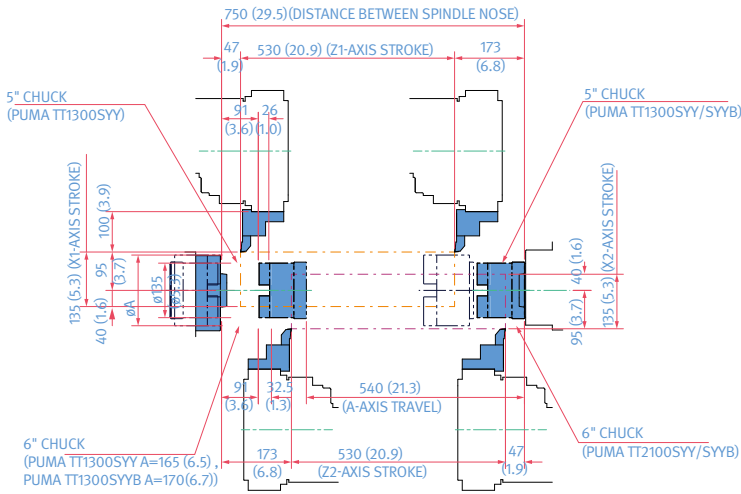




# WORKING RANGE

PUMA TT1300SY/SYB

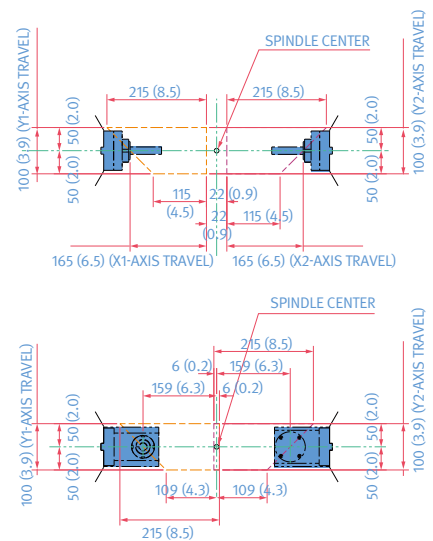
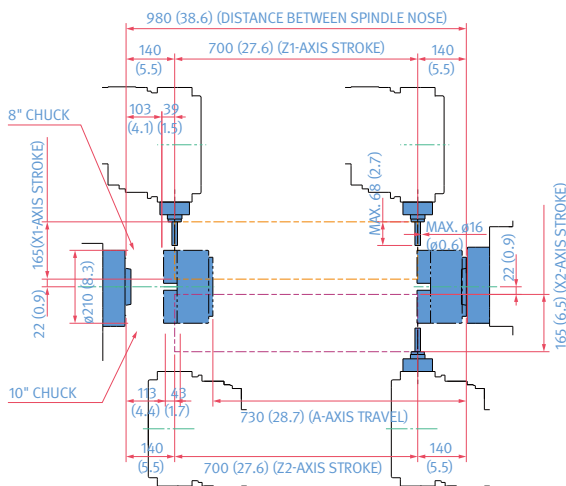
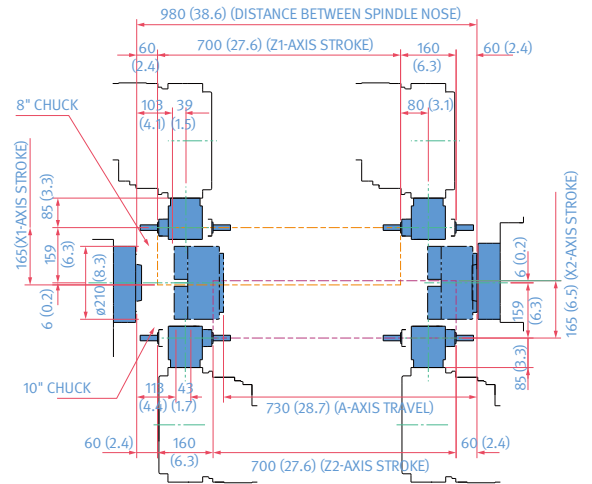
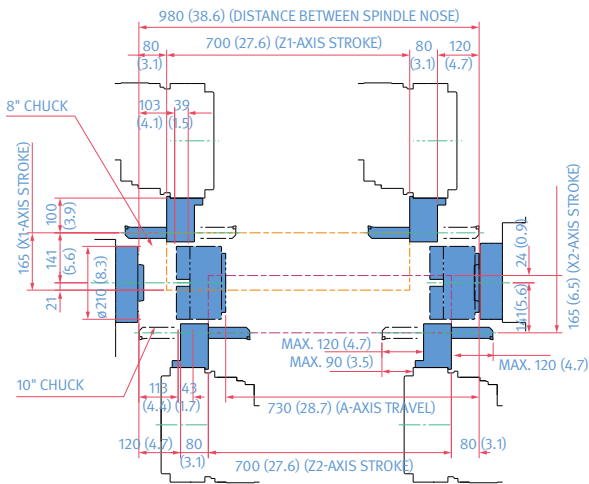
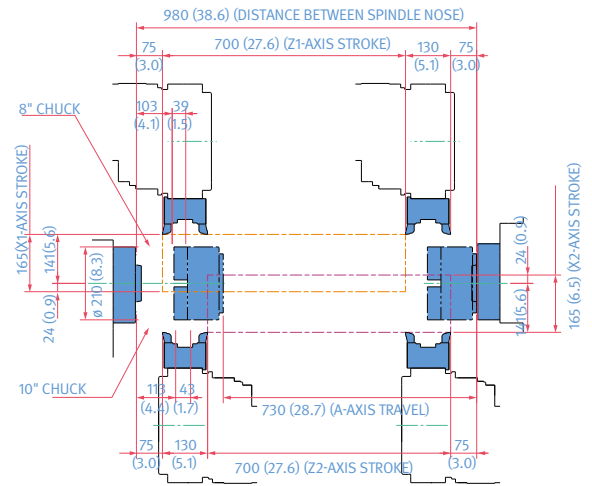
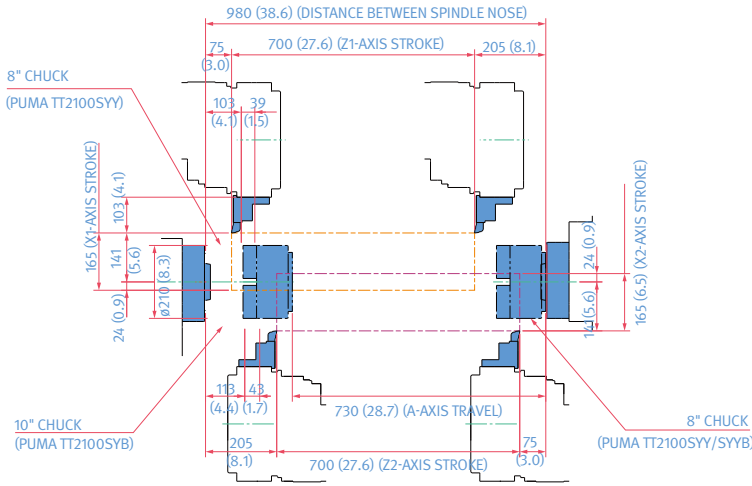
Unit: mm (inch)



# WORKING RANGE

PUMA TT2100SY

Unit: mm (inch)



# MACHINE SPECIFICATIONS

PUMA TT1300SY · 2100SY

Description		Unit	PUMA TT2100SY	PUMA TT2100SYB	PUMA TT1300SY/SY	PUMA TT1300SYB/SYB
Capacity	Swing over bed	mm (inch)	230 (9.1)		175 (6.9)	
	Swing over saddle	mm (inch)	230 (9.1)		175 (6.9)	
	Recommended turning diameter	mm (inch)	210 (8.3)		135 (5.3)	170 (6.7)
	Maximum turning diameter	mm (inch)	Upper turret: 230 (9.1) Lower turret: 230 (9.1)		Upper turret: 175 (6.9) Lower turret: 175 (6.9)	
	Maximum turning length	mm (inch)	230 (9.1)		120 (4.7)	
	Chuck size (left spindle)	inch	8/8	10/8	5/5	6/5
	Bar working diameter	mm (inch)	65/65 (2.6/2.6)	81/65 (3.2/2.6)	42/42 (1.7/1.7)	51/42 (2.0/1.7)
Travel	Travel distance	X1/X2-axis	165 (6.5)		TT 1300SY: 135/150 (5.3/5.9) PUMA TT1300SY: 135/135 (5.3/5.3)	
		Z1/X2-axis	700 (27.6)		530 (20.9)	
		Y-axis	100 (±5.0) (3.9 (±2.0))		80 (±40) (3.1 (±1.6))	
		A-axis	730 (28.7)		540 (21.3)	
Feedrates	Rapid traverse rate	X1/X2-axis	30 (1181.1)		30 (1181.1)	
		Z1/X2-axis	40 (1574.8)		40 (1574.8)	
		Y-axis	15 (590.6)		15 (590.6)	
		A-axis	40 (1574.8)		40 (1574.8)	
Left spindle	Maximum spindle speed	r/min	5000	3500	6000	
	Maximum spindle power	kW (Hp)	25/18.5/15 (44.9/24.8/20.1) (S3 25%/S3 60%/cont.)	22/18.5 (44.9/24.8) (S3 60%/cont.)	11/7.5/5.5 (14.8/10.1/7.4) (S3 25%/S3 60%/cont.)	15/11/7.5 (20.1/14.8/10.1) (S3 25%/S3 60%/cont.)
	Maximum spindle torque	N·m (ft-lbs)	223 (164.6)	244 (180.1)	93 (68.6)	116 (85.6)
	Spindle nose	ASA	A2 #6	A2 #8	A2 #5	
	Spindle bearing diameter (front)	mm (inch)	110 (4.3)	130 (5.1)	80 (3.1)	90 (3.5)
	Spindle through hole	mm (inch)	76 (3.0)	91 (3.6)	53 (2.1)	61 (2.4)
	Minimum spindle indexing angle (C-axis)	deg	0.001		0.001	
Right spindle	Maximum spindle speed	r/min	5000		6000	
	Maximum spindle power	kW (Hp)	25/18.5/15 (44.9/24.8/20.1) (S3 25%/S3 60%/continuous)		11/7.5/5.5 (14.8/10.1/7.4) (S3 25%/S3 60%/continuous)	
	Maximum spindle torque	N·m (ft-lbs)	223 (164.6)		93 (68.6)	
	Spindle nose	ASA	A2 #6		A2 #5	
	Spindle bearing diameter (front)	mm (inch)	110 (4.3)		80 (3.1)	
	Spindle through hole	mm (inch)	76 (3.0)		53 (2.1)	
	Minimum spindle indexing angle (C-axis)	deg	0.001		0.001	
Turret	Number of tool stations (upper+lower)	ea	24 + 24 position		24 + 24 position	
	Holder mount type	-	BMT55P		BMT45P	
	OD tool size	mm (inch)	20 x 20 (0.8 x 0.8)		20 x 20 (0.8 x 0.8)	
	Maximum boring bar size (main/sub)	mm (inch)	ø32 (ø1.3)		ø25 (ø1.0)	
	Turret indexing time (1 station swivel)	s	0.12		0.12	
	Maximum rotary tool speed	r/min	5000		6000	
	Maximum rotary tool speed power	kW (Hp)	7.5/1.1 (10.1/1.5) (S2 5-min/continuous)		3.7/1.1 (5.0/1.5) (S3 25%/continuous)	
	Maximum rotary tool speed torque	N·m (ft-lbs)	47.7 (35.2)		17.5 (12.9)	
Power source	Electric power supply (rated capacity)	kVA	69.40	72.90	49.68 / 50.17	51.68 / 52.17
Machine dimensions	Length	mm (inch)	3880 (152.8)		3405 (134.1)	3510 (138.2)
	Width	mm (inch)	2360 (92.9)		2300 (90.6)	
	Height	mm (inch)	2250 (88.6)		2070 (81.5)	
	Weight	kg (lb)	9500 (20943.6)	9600 (21164.1)	8000 (17636.7)	8100 (17857.2)
CNC	NC system	DN Solutions Fanuc i Plus {Fanuc 31i}*				

\*[]: Option

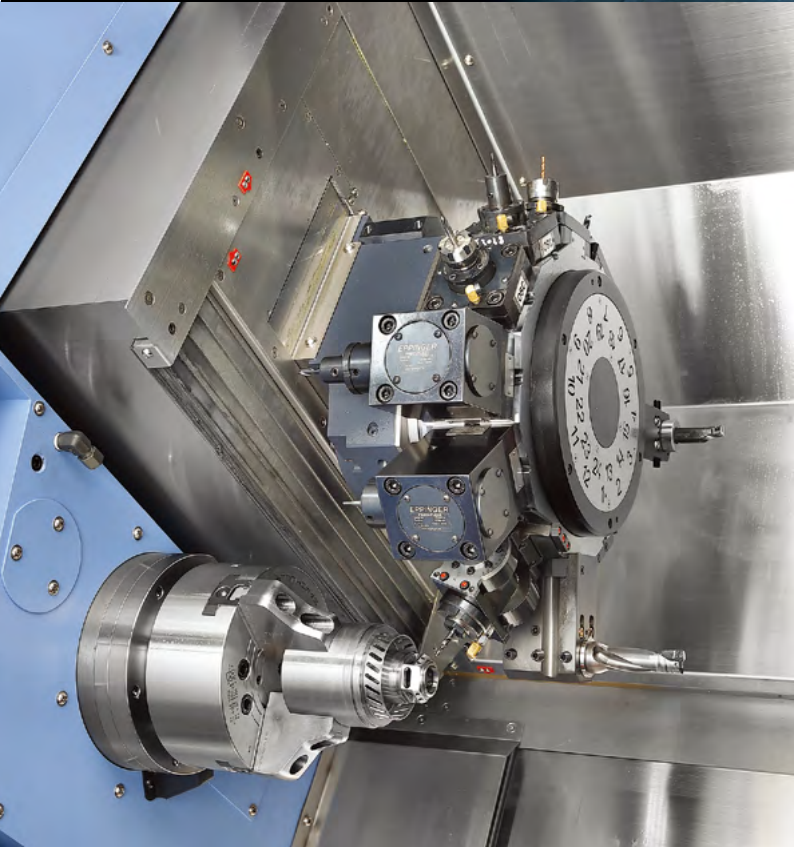


# WHY Y-AXIS?

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## DOUBLE THE PRODUCTIVITY

Adding a single Y-axis to your machine allows for single-setup efficiency and a new level of accuracy. But if you add a dual Y-axis—as you can in the PUMA TT series—the productivity difference is so striking that you won't ever go back.



## DUAL POWER

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The PUMA TT series doubles productivity with independently-operating left/right spindles and upper/lower turrets. What's more, the lower Y-axis increases productivity 20% more than having only an upper Y-axis. (PUMA TT1300/2100SY)

## MORE VERSATILITY

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With a Y-axis (or, in the case of the PUMA TT, a dual Y-axis), machine shops are capable of a wide variety of multi-axis milling cycles. That means there's a greater potential for done-in-one parts.



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.



# 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>51</b>	<b>Technical centers</b> Technical center, Sales support, Service support, Parts support
<b>4</b>	Corporations	<b>200</b>	<b>Service posts</b>
<b>155</b>	Dealer networks	<b>3</b>	<b>Factories</b>



## 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





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\* For more details, please contact DN Solutions.

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