

**DOOSAN**



# PUMA MX series

Multi-tasking Machine

**PUMA MX series**

PUMA MX1600

PUMA MX2100

PUMA MX2600

**MACHINE  
GREATNESS™**

**Basic information**

Basic Structure  
Cutting  
Performance

**Detailed Information**

Options  
Diagrams  
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**Customer Support Service**



# PUMA MX series

Doosan brand multi-tasking machine which can be used to carry out turning and milling work on complex parts in the same machine, finally obtaining the finished part. Its perfect combination of lathe and machining centre makes it possible to perform a wide range of simple and complex operations with unprecedented flexibility.

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PUMA MX1600/735

Series	Size	Max. turning length mm (inch)	Standard model	S-model	T-model	ST-model
PUMA MX1600/735	6-inch	700 (27.6)	○	○	○	○
PUMA MX1600		900 (35.4)	○	○	○	○
PUMA MX2100	8-inch	1020 (40.2)	○	○	○	○
PUMA MX2100L		1520 (59.8)	○	○	○	○
PUMA MX2600	10-inch	1540 (60.6)	-	-	○	○

- \* Standard model : Left spindle + Tail stock
- \* S- model : Left spindle + Right spindle
- \* T-model : Standard model + Lower turret
- \* ST-model : S-model + Lower turret



## Basic Structure

## Robust design

### Basic information

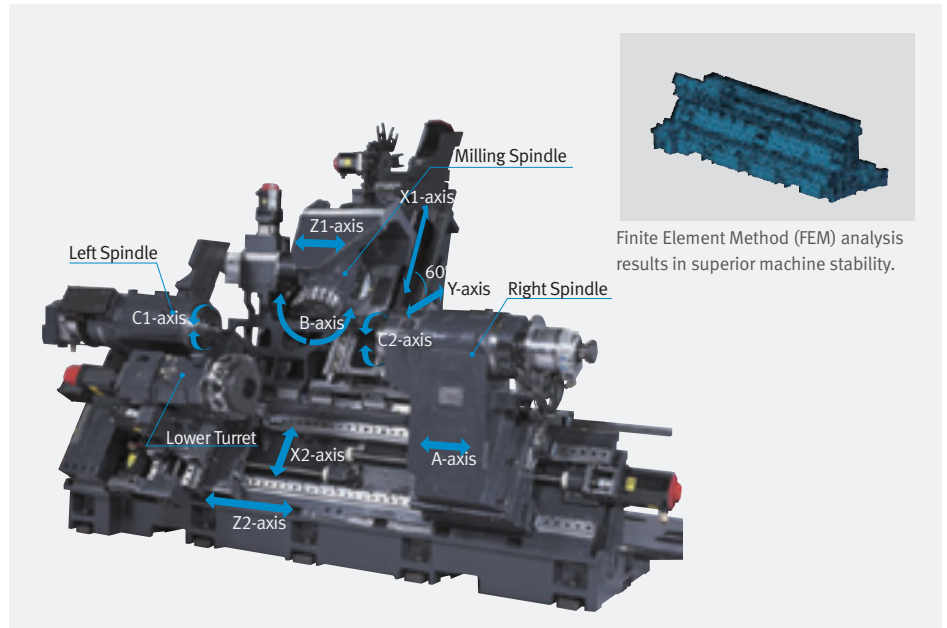
Basic Structure  
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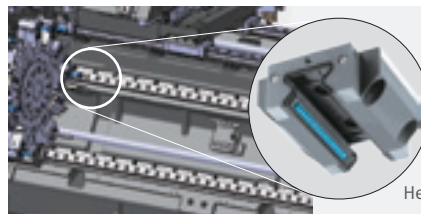
### Customer Support Service

The heavily ribbed torque tube design prevents twisting and deformation. All guide ways are wide wrap-around rectangular type further provide long-term stability and reliable production.



### Feed Axis

All carriages are mounted on roller-type, linear motion guides to provide high accuracy and rigidity while reducing non-cutting time.



- Zero clearance from preload → High permissible
- load Low friction & wear (LM  $\mu = 0.002\sim 0.003$ )
- Simple maintenance over the long haul

Heavy-duty, high precision roller type LM guideways

### Axis travel

Model	Unit	PUMA MX1600 <sup>735</sup> / MX1600	PUMA MX2100 / MX2100L	PUMA MX2600
X1-axis	mm (inch)	450 (17.7)	565 (22.2)	630 (24.8)
Z1-axis	mm (inch)	735 / 935 (28.9 / 36.8)	1050 / 1550 (41.3 / 61.0)	1585 (62.4)
Y-axis	mm (inch)	170(±85) (6.7(±3.3))		230(±115) (9.1(±4.5))
B-axis	deg.	240(±120)		
A-axis	mm (inch)	735 / 935 (28.9 / 36.8)	1050 / 1550 (41.3 / 61.0)	1550 (61.0)
X2-axis	mm (inch)	165 (6.5)	187 (7.4)	220 (8.7)
Z2-axis	mm (inch)	725 / 925 (28.5 / 36.4)	1050 / 1550 (41.3 / 61.0)	1515 (59.6)

Note1) A-axis is just for right spindle in S/ST model of PUMA MX series.

Note2) X2/Z2-axis is just for lower turret in T/ST model of PUMA MX series.

### Rapid traverse

Model	Unit	PUMA MX1600 <sup>735</sup> / MX1600	PUMA MX2100 / MX2100L	PUMA MX2600
X1-axis	m/min (ipm)	36 (1417.3)		
Z1-axis	m/min (ipm)	36 (1417.3)		
Y-axis	m/min (ipm)	26 (1023.6)		
B-axis	m/min (ipm)	50 (1968.5)	42 (1653.5)	
A-axis	m/min (ipm)	30 (1181.1)		
X2-axis	m/min (ipm)	24 (944.9)		
Z2-axis	m/min (ipm)	36 (1417.3)		

Note1) A-axis is just for right spindle in S/ST model of PUMA MX series.

Note2) X2/Z2-axis is just for lower turret in T/ST model of PUMA MX series.

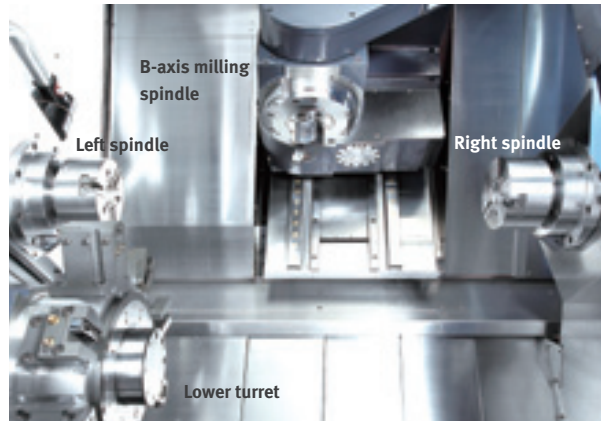


## Multi-axis control and its combination

ST model of PUMA MX series has whole controlled axis from 3 spindles (B-axis spindle to Left / Right spindle) with lower turret. Their perfect control combination is key factor to ensure multi-tasking performance.

### Perfect integration of key axes

Puma MX series provides unmatched flexibility with a wide variety of machine configurations. From simple turning and milling to complex multi-axis simultaneous machining, multiple operations can be completed within a single Puma MX.



- Multi-process capability
- Shorter setup times
- Optimal cycle distribution
- Automated operation support

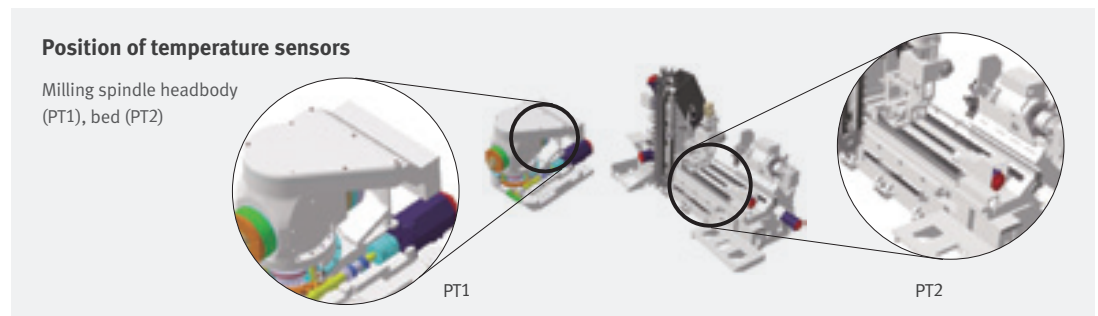


**PUMA MX series**

\* This photo is for the major unit combination of ST model

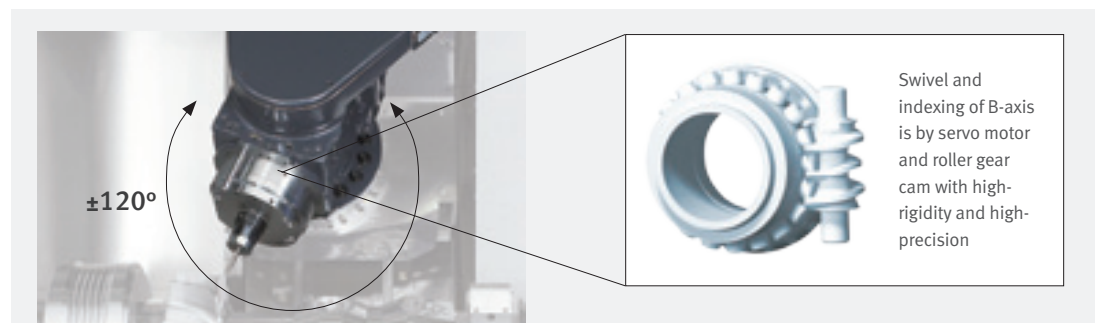
### Thermal compensation for B-axis

Milling spindle thermal growth can be compensated for spindle axis direction only. Effectively removes positional deviation of spindle nose due to changing rotational speed.



### B-axis swivel control

B-axis index that can have swivel positioning of every 0.001° in ±120° performs not only horizontal front face machining but also angular machining.



Within its swivel ±120°, B-axis can be indexed and braked precisely at 5° indexing (by coupling clamp)

**B-axis indexing time (in 90°)**

**PUMA MX1600 series**

**1.6 sec**

**PUMA MX2100/2600 series**

**2.0 sec**

# Spindle

## Basic information

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## Customer Support Service

Perfect combination of 3 key spindles to ensure machining stability under various cutting conditions.

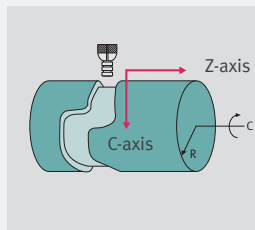
### Left / Right Spindle

Both spindles, left and right, are engineered to minimize the loss of precision through thermal distortion, and to ensure superior performance in applications ranging from heavy-duty cutting at high power and low speed, to fine finishing at high speed.

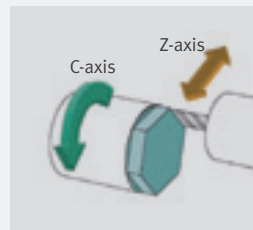


### Perfect C-axis control of both spindles

All C1/C2-axis can do positioning control of every 0.001° in 360°. Left spindle of PUMA MX1600 series can perform C1-axis positioning control of every 0.0001° in 360°.



C&Z-axis cylindrical interpolation

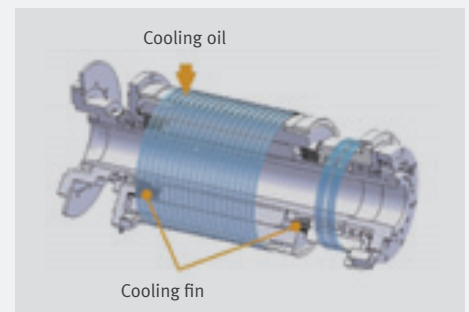


C&X-axis polar interpolation

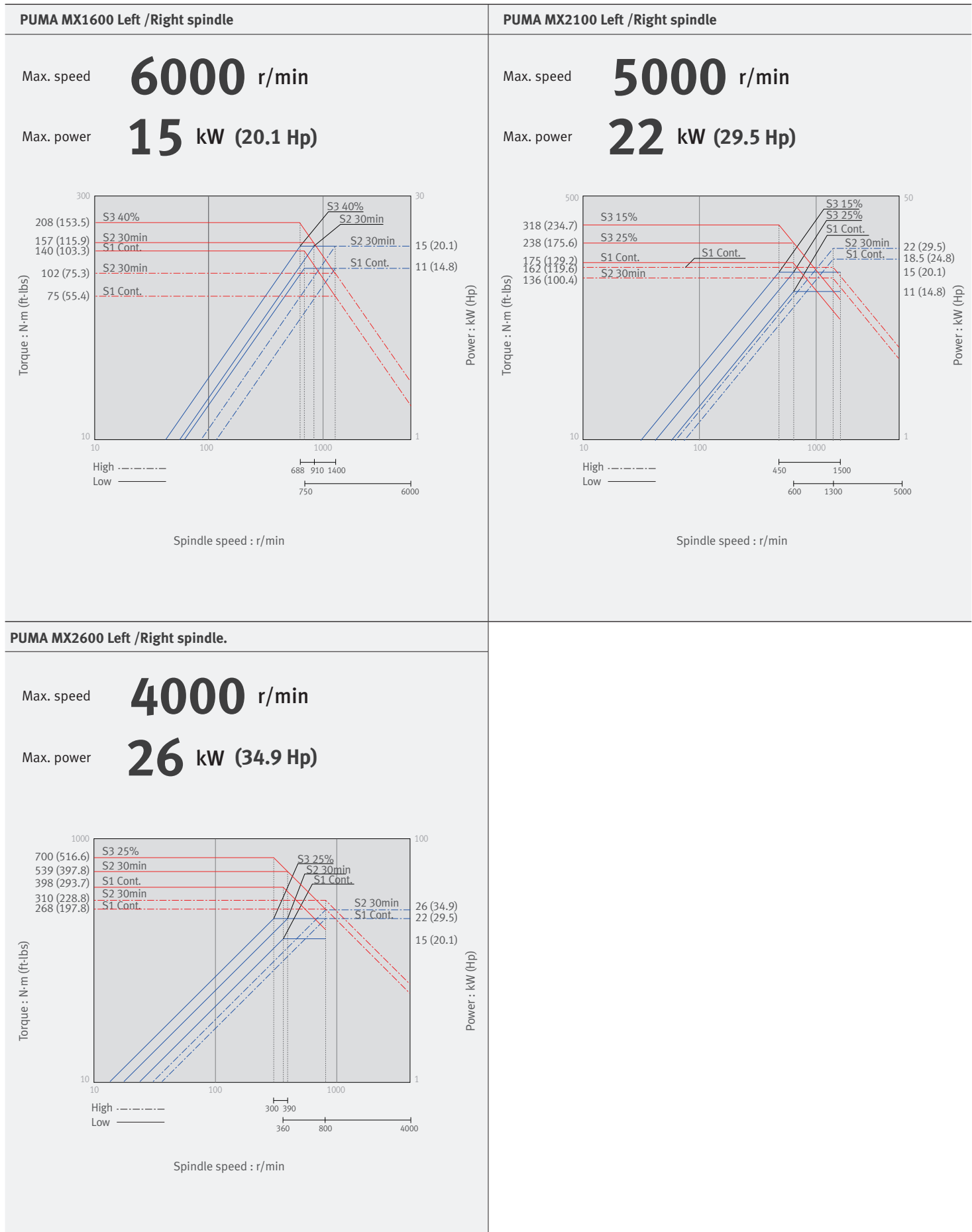
	C1/C2-axis contouring torque
PUMA MX1600 series	208N·m (153.5 lbf.ft)
PUMA MX2100 series	318N·m (125.5 lbf.ft)
PUMA MX2600 series	700N·m (516.6 lbf.ft)

### Oil cooling unit for left & right spindles

Both the left and right spindles employ an integral cooling system that circulates coolants through the entire spindle structure. This eliminates thermal distortion in all applications from heavy-duty cutting at high power and low speeds to fine and finish cutting at high speed.



## Left/Right Spindle Power-Torque Diagram





## Spindle

### Basic information

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### Customer Support Service

Perfect combination of 3 key spindles to ensure machining stability under various cutting conditions.

### Milling spindle

Oil-based coolants circulate through the milling spindle, allowing perfect integration of turning and milling applications. An air-gap sensor confirms the clamping status of both tools and parts.




**Milling Spindle**  
**12000 r/min**  
option 18000 r/min (on PUMA MX1600 series)

**Tool shank**

PUMA MX1600 series  
**CAPTO C5**

PUMX MX2100/2600 series  
**CAPTO C6**  
option HSK-A63



The 360° angular positioning of the milling spindle can accommodate multi insert turning tools that are equipped with two, three, or four inserts.

### Left & Right Spindle

Same-size integral motors on left and right spindles deliver enhanced flexibility and performance.

Model	Unit	PUMA MX1600	PUMA MX2100	PUMA MX2600
Spindle	-	Left/Right Spindle		
Standard chuck	inch	6	8	10
Spindle speed	r/min	6000	5000	4000
Power	kW	High : 15/11 (20.1/14.8)	High : 22/18.5 (29.5/24.8)	High : 26/22 (34.9/29.5)
	(Hp)	Low : 15/15/11 (20.1/20.1/14.8)	Low : 15/15/11 (20.1/20.1/14.8)	Low : 22/22/15 (29.5/29.5/20.1)
Torque	N·m (lbf.ft)	High : 102/75 (75.3/55.4)	High : 161/135 (118.8/99.6)	High : 310/262 (228.8/193.3)
		Low : 208/157/140 (153.5/116/103.3)	Low : 318/239/175 (234.7/176.4/129.2)	Low : 700/539/398 (516.6/397.8/293.7)
Condition	-	High: S2 30min/Cont.	High: S2 30min/S1 cont.	High: 30min/Cont.
		Low : S3 40%/S2 30min/Cont.	Low : S3 15%/S3 25%/Cont.	Low : S3 25%/S2 30min/Cont.

Note1) A-axis is just for right spindle in S/ST model of PUMA MX series.

Note2) X2/Z2-axis is jus for lower turret in T/ST model of PUMA MX series.

### Milling Spindle

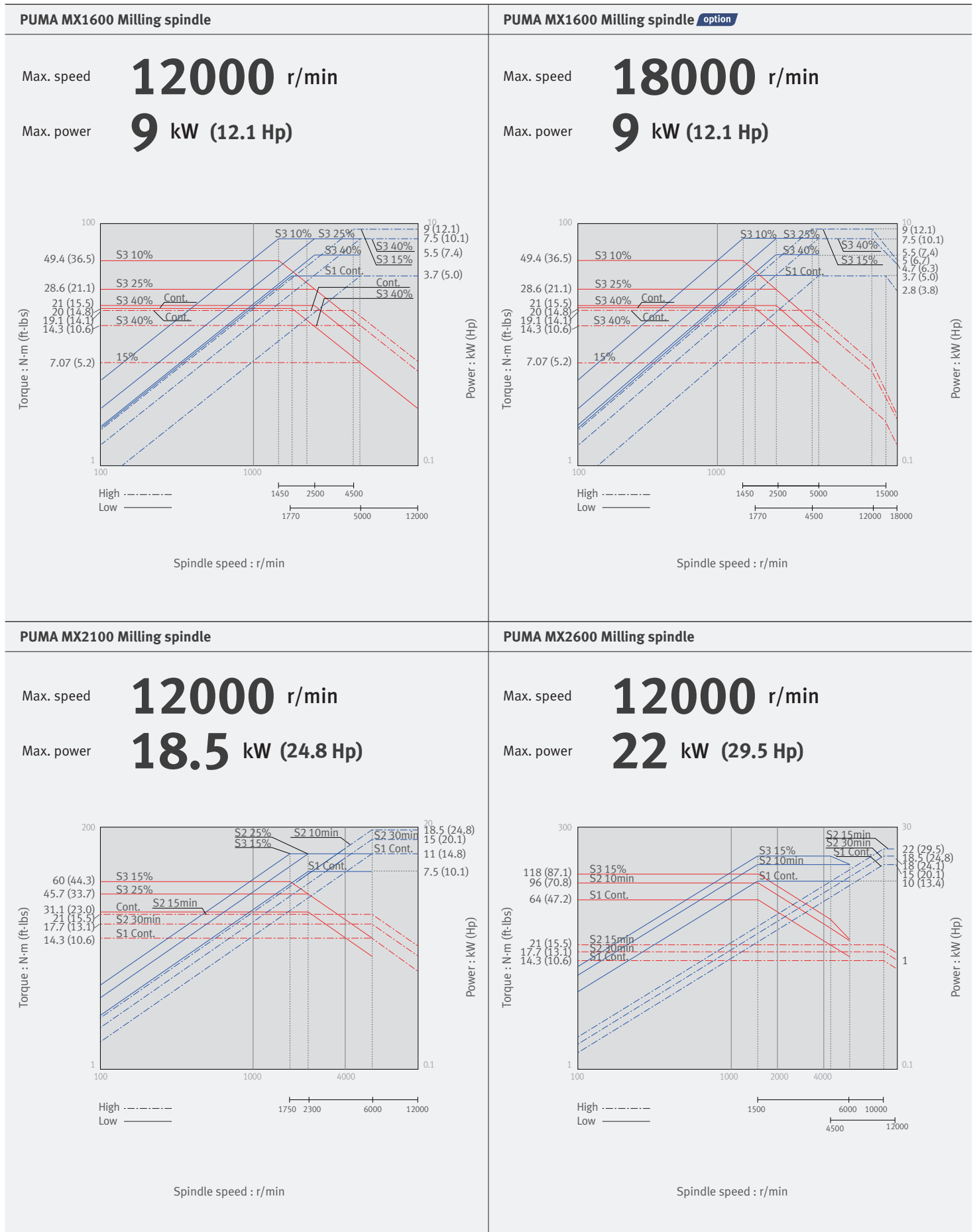
Model	Unit	PUMA MX1600	PUMA MX2100	PUMA MX2600
Spindle	-	Milling spindle		
Tool shank	inch	CAPTO C5		CAPTO C6
Spindle speed	r/min	12000 {18000 <small>option</small> }	12000	
Power	kW (Hp)	High : 9/7.5/3.7 (12.1/10.1/4.7)	High : 18.5/15/11 (24.8/20.1/14.8)	High : 22/18.5/15 (29.5/24.8/20.1)
		Low : 7.5/7.5/5.5/3.7 (10.1/10.1/7.4/4.7)	Low : 11/11/11/7.5 (14.8/14.8/14.8/10.1)	Low : 18.5/15/10 (24.8/20.1/13.4)
Torque	N·m (lbf.ft)	High : 19.1/14.3/7.1 (14.1/10.6/5.2)	High : 29/24/18 (21.4/17.7/13.3)	High : 21/18/14 (15.5/13.3/10.3)
		Low : 49.4/28.6/21/20 (36.5/21.1/15.5/14.8)	Low : 81/60/46/31 (59.8/44.3/33.9/22.9)	Low : 118/95/64 (87.1/70.1/47.2)
Condition	-	High : S3 15%/S3 40%/Cont.	High : S2 10min/S2 30 min/Cont.	High : S2 15%/S2 40%/Cont.
		Low : S3 10%/S3 25%/S3 40%/Cont.	Low : S5 10%/S3 15%/S3 25%/Cont.	Low : S3 15%/S3 40%/Cont.

Note1) A-axis is just for right spindle in S/ST model of PUMA MX series.

Note2) X2/Z2-axis is jus for lower turret in T/ST model of PUMA MX series.



## Milling Spindle Power-Torque Diagram





## Tailstock

### Basic information

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More easier and faster set-up of the tailstock using M-code program by servo motor and ball screw

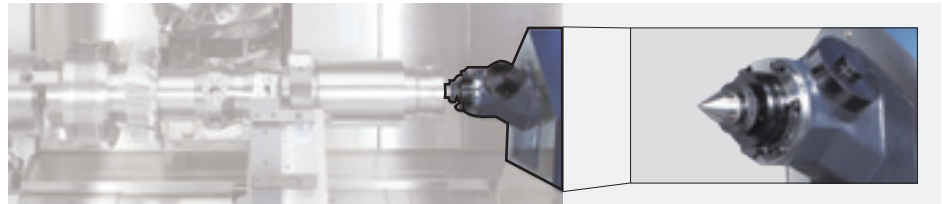
### Detailed Information

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### Customer Support Service

### Servo driven tailstock

Servo tailstock make part set-up faster and easier. The operator inputs the proper M-code information in the control and tailstocks move to its proper positions automatically by linear motion control of servo motor and ball screw. No manual adjustments are required.



Model	Tailstock travel mm (inch)	Max. quill thrust force kN(lbs)	Tailstock center
PUMA MX1600 <sup>735</sup> / MX1600	735 / 935 (28.9 / 36.8)	3.5 (786.8)	Built-in dead center MT#4
PUMA MX2100/L	1050 / 1550 (41.3 / 61)	7 (1573.6)	
PUMA MX2600T	1550 (61)	10 (22480)	Built-in dead center MT#5



## Lower Turret

Strong and rigid lower turret in multi-tasking is to provide more powerful manufacturing performance and a variety of new applications

### Servo driven Lower turret on T/ST model

Turret rotation, acceleration and deceleration are controlled by a high-torque servo motor. Unclamp and rotation are virtually simultaneous. The fast index response keeps cycle times short.

### Lower turret selections to match user applications

PUMA MX1600/2100/2600 T/ST series - Rotary tool spindle speed : 6000/5000/4000 r/min

	Lower turret T/ST series	Lower turret	Tool number	PUMA MX1600 <sup>735</sup>	PUMA MX1600	PUMA MX2100	PUMA MX2600
For Turning		DI base - 8 station	8	Standard	-	-	-
		DI base - 12 station	12	-	-	-	<b>option</b>
For Turn- milling		BMT 45P - 16 station	16	<b>option</b>	Standard	-	-
		BMT 55P - 12 station	12	-	-	Standard	-
		BMT 65P - 12 station	12	-	-	-	Standard

\* This photo is BMT55P with 12-station on PUMA MX2100ST

### Lower turret for a variety of new applications

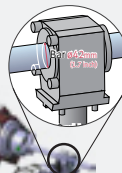
#### Case1) Guide Bush\* **option**

Lower turret to support small and thin parts for biomedical complex shaped using guide bush



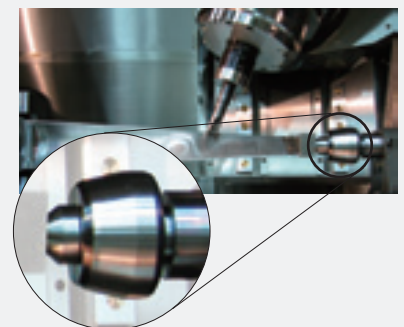
#### Fixed guide bush

Bar dia.  $\phi 22\text{mm} \sim \phi 42\text{mm}$   
( $\phi 0.9\text{inch} \sim \phi 1.7\text{inch}$ )



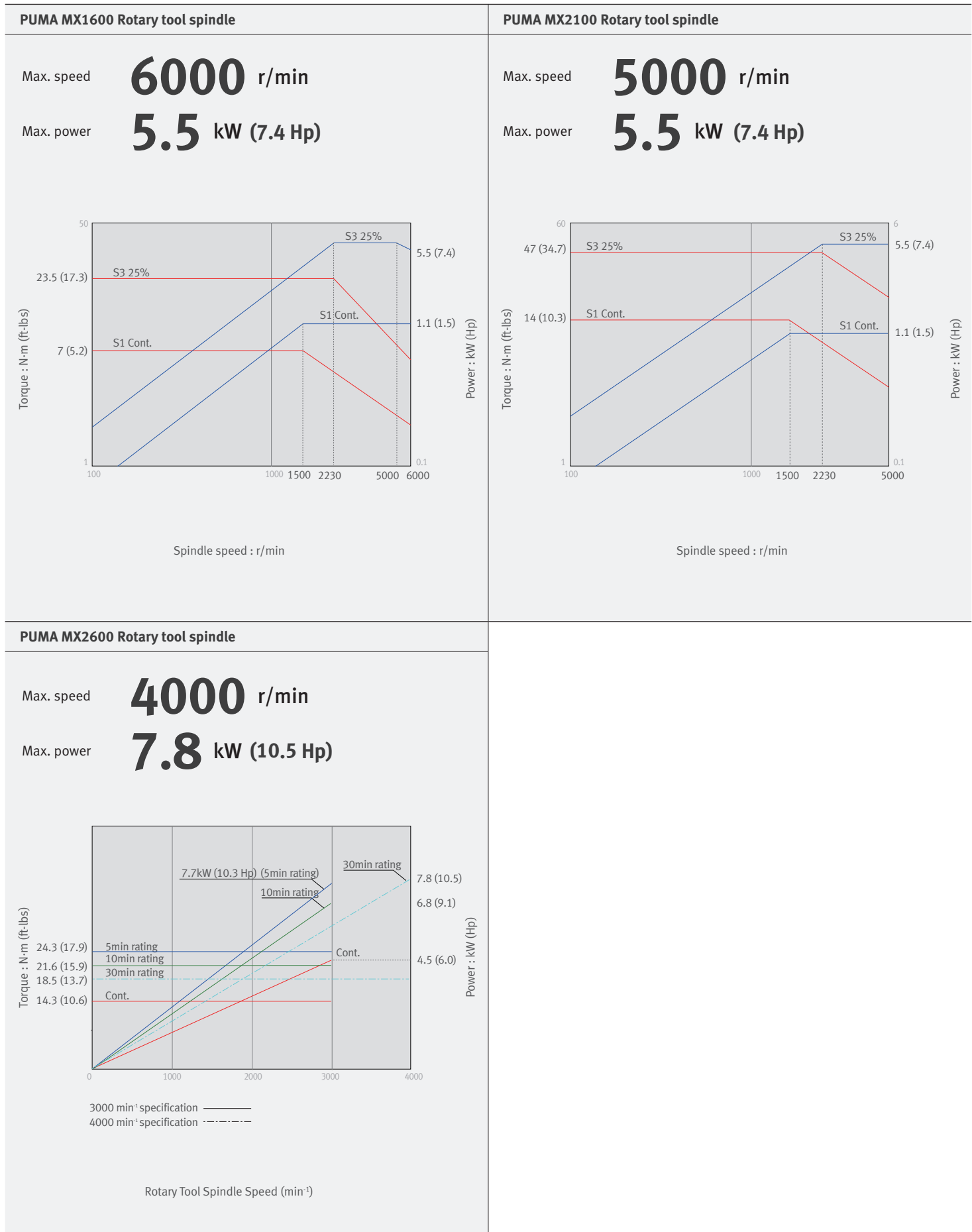
\* : PUMA MX1600T / ST

#### Case2) Lower turret to support long parts with tail center application **option**



Lower turret of PUMA MX series can be available as tailstock function by inserting tail center into tool holder to support light weighted long shaft cutting.

## Rotary Tool Spindle Power-Torque Diagram



## Automatic Tool Changer

### Servo driven ATC & Tool magazine

The tool magazine can be increased up to 80 tools(except PUMA MX1600/735 series). Tools are selected by a fixed address method that follows the shorter path.

#### Basic information

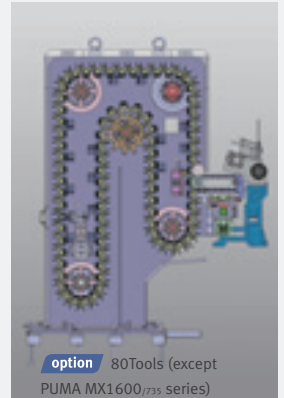
Basic Structure  
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Servo ATC and Servo tool magazine ensuring fast and reliable tool indexing.

#### Detailed Information

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Tool storage

# 40 tools

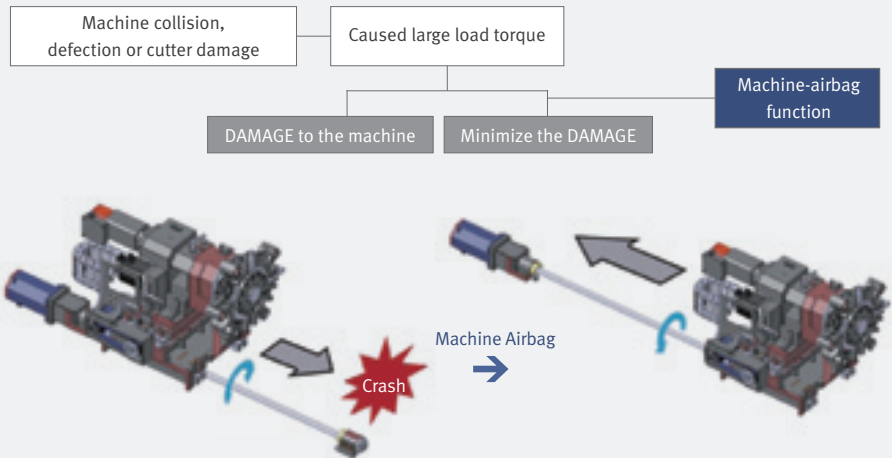
Model	Unit	PUMA MX1600	PUMA MX2100	PUMA MX2600
Max. tool length (from gauge line)	mm (inch)	200 (7.9)	300 (11.8)	400 (15.8)
Max. tool weight	kg (lb)	4 (8.8)	9 (19.8)	10 (22.0)
Max. tool diameter (continuous)	mm (inch)	70 (2.8)	90 (3.5)	90 (3.5)
Max. tool diameter (adjacent pots are empty)	mm (inch)	95 (3.7)	120 (4.7)	130 (5.1)
Max. tool moment	N-m (ft-lbs)	3.9 (2.9)	8.2 (6.1)	9.8 (7.2)

## Safety design to decrease collision-caused damage

### Machine Airbag Function

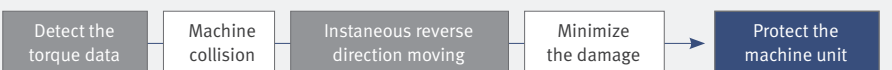
Machine airbag function minimizes damage in the event of a machine collision, defect or heavy load by detecting sudden axis load increase.

- It is available on the servo axis (X, Z, B, Y-AXIS).
- This function can not prevent collision but can minimize collision damage.



#### The principle of Machine-airbag Function

1. Higher torque load can be detected than setting vale if machine come into collision.
2. Servo Unit automatically move in the reverse direction instaneously.



## Various application and performance

PUM MX series is ideal for heavy and interrupted cutting and also your productivity by machining your part with fewer set-ups, shorter changeover and lead time.

## Improved productivity



### Simultaneous machining

Simultaneous machining can be executed by milling spindle and lower turret. This is effective for automated operation when using gantry loader or robot.



### Balance cutting

Both milling spindle and lower turret can do the balance cutting to save machining time and high accuracy when machining small diameter shaft.

## Powerful Machining

	<b>OD (Heavy duty cutting)</b>		
		Unit	PUMA MX2600
	Spindle speed	r/min	910
	Cutting speed	m/min (ipm)	200 (7874)
	Feedrate	m/rev	0.4
	Cutting depth	mm (inch)	10 (0.4)
	Material removal rate	cm <sup>3</sup> /min (inch <sup>3</sup> /min)	800 (315.0)
	<b>Face milling (Milling 1)</b>		
		Unit	PUMA MX2600
	Milling Spindle speed	r/min	1100
	Tool [6Z]	mm (inch)	Ø80 (3.2)
	Feedrate	m/rev	5 (0.2)
	Cutting depth	mm (inch)	1.0
	Material removal rate	cm <sup>3</sup> /min (inch <sup>3</sup> /min)	330 (129.9)
	<b>End milling (Milling 2)</b>		
		Unit	PUMA MX2600
	Milling Spindle speed	r/min	380
	Tool [6Z]	mm (inch)	Ø25 (1.0)
	Feedrate	m/rev	25 (1.0)
	Cutting depth	mm (inch)	0.5
	Material removal rate	cm <sup>3</sup> /min (inch <sup>3</sup> /min)	119 (46.9)
	<b>Drilling (Milling 3)</b>		
		Unit	PUMA MX2100
	Milling Spindle speed	r/min	2000
	Tool [U-drill]	mm (inch)	Ø40 (3.2) [6Z]
	Feedrate	m/rev	0.2
	Material removal rate	cm <sup>3</sup> /min (inch <sup>3</sup> /min)	503 (9.7)

- Workpiece material, KS (JIS) : SM45C (S45C), Carbon steel
- The cutting test results indicated above are obtained as an example through real test cutting.
- The results, indicated in this catalogue are provides as example. They may not be obtained due to differences in cutting conditions and environmental conditions during measurement.



## Standard / Optional Specifications

● Standard ○ Optional X Not applicable

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**Customer Support Service**

No.	Division	Applications	PUMA MX1600/735	PUMA MX1600	PUMA MX2100	PUMA MX2600
1	Tool shank	CAPTO C5	●	●	X	X
2		CAPTO C6	X	X	●	●
3		HSK-A63	X	X	○	○
4	Tool magazine	40 tools	●	●	●	●
5		80 tools	X	○	○	○
6	Left spindle	No chuck	○	○	○	○
7		Hydraulic chuck (6")	●	●	X	X
8		Hydraulic chuck (8")	X	X	●	X
9		Hydraulic chuck (10")	X	X	order base	●
10		Hardened&Ground hard jaw	○	○	○	○
11		Soft jaw	○	○	○	○
12		Dual pressure chucking	○	○	○	○
13		Chuck clamp confirmation	○	○	○	○
14		Chuck pressure check switch	○	○	○	○
15		Right spindle (S/ST model)	Hydraulic chuck (6")	●	●	X
16	Hydraulic chuck (8")		X	X	●	X
17	Hydraulic chuck (10")		X	X	order base	●
18	Hardened&Ground hard jaw		○	○	○	○
19	Soft jaw		○	○	○	○
20	Dual pressure chucking		○	○	○	○
21	Chuck clamp confirmation		○	○	○	○
22	Chuck pressure check switch		○	○	○	○
23	Work holding device	Lower turret for turning (8-station)	●	X	X	X
24		Lower turret for turning (12-station)	X	X	X	○
25		Lower turret for turn-milling (12-station)	X	X	● BMT55P	● BMT65P
26		Lower turret for turn-milling (16-station)	○ BMT45P	● BMT45P	X	X
27		Lower turret for turn-milling (24-station)	X	X	○ BMT55P	X
28		Tail center on lower turret	○	○	○	○
29		Inner shaft hyd. Supply for Steady rest or guide bush	○	○	X	X
30		Steady rest (SLU3.1)	○	○	○	○
31		Semi steady rest (Holder type)	X	X	○	○
32		Fixed type guide bush (Turn-Mill turret only)	○	○	X	X
33	Servo driven steady rest(Z movement)	Select one among SLU3.0 to SLU5.0	X	X	○ (only MX2100L/LS)	X
34		Select one among SLU3.1 to SLU5.0	X	X	X	○ (only MX2100L/LS)
35	Servo driven steady rest(X/Z movement)	Select one among SLU3.0 to SLU5.0	X	X	○ (only MX2100L/LS)	X
36		Select one among SLU3.1 to SLU5.0	X	X	X	○ (except T/ST model)

● Standard ○ Optional X Not applicable

No.	Division	Applications	PUMA MX1600/735	PUMA MX1600	PUMA MX2100	PUMA MX2600	
37	Coolant	T-T-C (Through Tool coolant for Milling spindle)	Pressure 1.0MPa(145 psi)/bag filter	●	●	●	●
38			Pressure 2.0MPa(290 psi)/cyclone bag filter	○	○	○	○
39			Pressure 7.0MPa(1015 psi)/dual bag filter	○	○	○	○
40			Pressure 7.0MPa(1015 psi)/paper filter	○	○	○	○
41			MQL(Minimum quantity lubrication) system	○	○	○	○
42		For Lower turret (T/ST model)	Pressure 0.45MPa(65.3 psi)/Tank screen filter	●	●	●	●
43			Pressure 0.7MPa(101.5 psi)/Tank screen filter	○	○	○	○
44			Pressure 1.0MPa(145 psi)/Tank screen filter	○	○	○	○
45		For flushing and others	Pressure 1.45MPa(210.3 psi)/Tank screen filter	○	○	○	○
46			Pressure 0.45MPa(65.3 psi)/Tank screen filter	●	●	●	●
47	Coolant chiller(temperature control)*		○	○	○	○	
48	Oil skimmer		○	○	○	○	
49	Coolant pressure switch		○	○	○	○	
50	Coolant level switch : Sensing level - Low		○	○	○	○	
51	Chip disposal	Chip conveyor (Right disposal)	Hinged belt type for steel	○	○	○	○
52			Magnetic scraper type for casting	○	○	○	○
53			Special conveyor	order made	order made	order made	order made
54		Chip bucket		○	○	○	○
55		Air blower (for Left or Right spindle chuck)		●	●	●	●
56		Chuck coolant (for Left or Right spindle chuck)		○	○	○	○
57	Through spindle coolant (Left or Right spindle)		○	○	○	○	
58	Through spindle air (Left or Right spindle)		○	○	○	○	
59	Coolant gun		○	○	○	○	
60	Mist collector (Interface only or Integrated)		○	○	○	○	
61	High accuracy	Thermal compensation of X1-axis for B-axis spindle		●	●	●	●
62		Linear scale feed back (X1-axis)		○	○	○	○
63		Linear scale feed back (Y-axis)		○	○	○	○
64		Linear scale feed back (Z1-axis)		○	○	○	○
65	Linear scale feed back (X2-axis of Lower turret in T/ST model)		○	○	○	○	
66	Measurement	Manual tool setter (Left/ Renishaw)		X	X	X	X
67		Auto tool setter (Left/ Renishaw)		○	○	○	○
68		Portable tool setter (Right/Renishaw)		X	X	X	X
69		Auto workpiece measurement (RMP60)		○	○	○	○
70	Automation	Parts unloader and conveyor		○	○	○	○
71		Workpiece ejector (for right spindle)		○	○	○	○
72		Bar feeder interface		○	○	○	○
73		Automatic front door (with safety device)		○	○	○	○
74	Others	Air gun		○	○	○	○
75		Automatic power off		○	○	○	○
76		Doosan tool monitoring system		●	●	●	●
77		Rotary type window wiper		○	○	○	○
78		Signal tower		●	●	●	●
79		Workpiece cutoff confirmation (Electrical type)		●	●	●	●
80	Quick change tooling(CAPTO) **		○	○	○	○	
81	Standard Accessories *****	FOUNDATION BOLT FOR ANCHORING		●	●	●	●
82	Customized Special Option***	PARTS UNLOADER AND CONVEYOR_GRIPPER TYPE ****		○	○	○	X
83		V STAND FOR SHAFT WORKPIECE		○	○	○	○
84		CHIP COVEYOR_DRUM FILTER TYPE		○	○	○	○
85		SHOWER COOLANT		○	○	○	○
86		AIR LIMIT SENSING ON CHUCK_PREPARATION		○	○	○	○
87		TOOL SETTER EXTENSION FOR SPECIAL CHUCK		○	○	○	○
88		MAIN/LEFT SPINDLE AIR CURTAIN		○	○	○	○
89		TOOL SETTER_NON-CONTACTING_NC4_RENISHAW		○	○	○	○
90		TOOL SETTER_NON-CONTACTING_BLUM		○	○	○	○
91		COOLANT FOR MILLING SPDL_MULTI PRESSURE		○	○	○	○
92		MQL SYSTEM		○	○	○	○
93		ANGULAR HEAD FOR MILLING SPINDLE_MANUAL		○	○	○	○

\* When using oil-based coolant, fire prevention measures must be prepared. We recommend you to use Coolant chiller to do heat control of coolant pump. \*\* Lower turret Applicable

\*\*\* Additional option #1 : STEADY REST HOLDER\_ON TURRET is available for PUMA MX1600T/T 735/ST/ST 735, Additional option #2 : SUB/RIGHT SPINDLE AIR CURTAIN is available for PUMA MX1600S/S 735/ST/ST 735, PUMA MX2100S/ST/LS/LST, PUMA MX2600S/ST

\*\*\*\* PARTS UNLOADER AND CONVEYOR\_GRIPPER TYPE is not available for PUMA MX2600/T \*\*\*\*\* It is standard on all MX series

## External Dimensions

### Basic information

- Basic Structure
- Cutting
- Performance

### Detailed Information

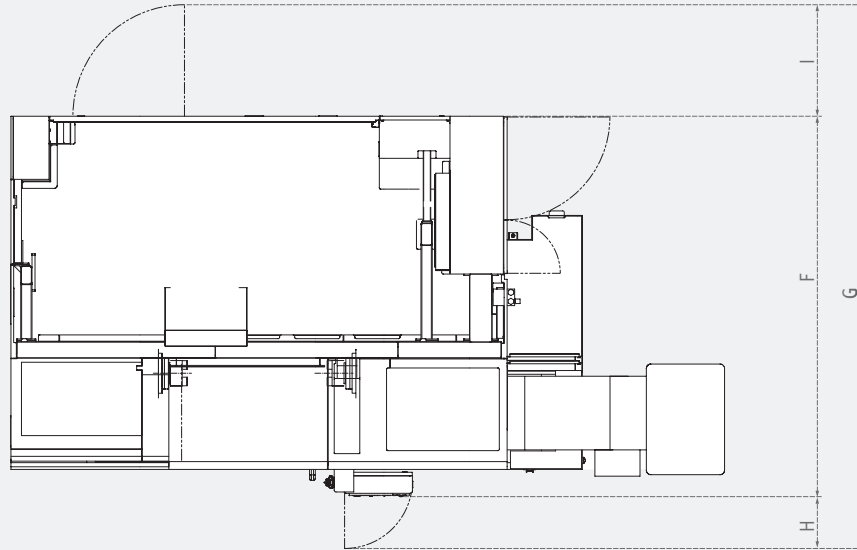
- Options
- Diagrams
- Specifications

### Customer Support Service

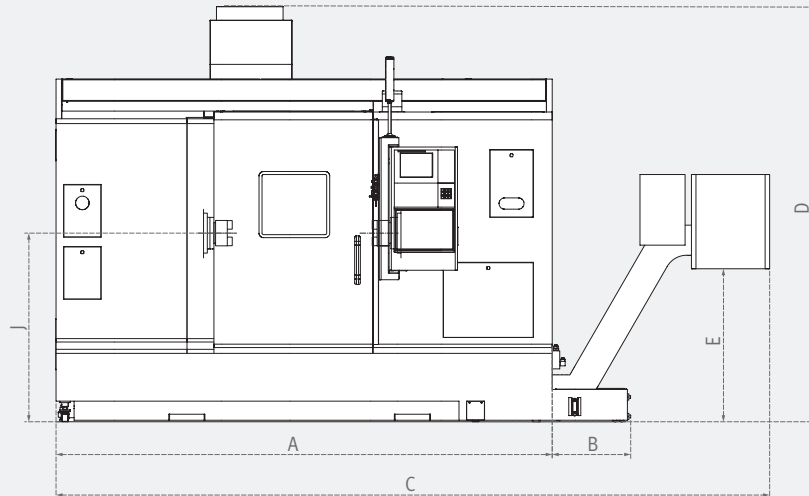
## PUMA MX1600 / MX2100 series (40 tools)

Unit : mm (inch)

Top View



Front view



	A	B	C	D	E	F	G	H	I	J
<b>PUMA MX1600<sub>735</sub> Series</b>	2900 (114.2)	400 (1.7)	4365 (171.9)	2774 (109.2)	1090 (42.9)	2681 (105.5)	3768 (148.3)	345 (13.6)	742 (29.2)	1265 (49.8)
<b>PUMA MX1600 series</b>	3300 (129.9)	522 (20.6)	4746 (186.9)	2764 (108.8)	1018 (40.1)	2531 (99.6)	3618 (142.4)			1255 (49.4)
<b>PUMA MX2100 series</b>	3890 (153.2)	957 (37.3)	5386 (212.1)	2805 (110.4)	1071 (42.2)	2525 (99.4)	3660 (144.1)	405 (15.9)	730 (28.7)	1245 (49.0)

PUMA MX series

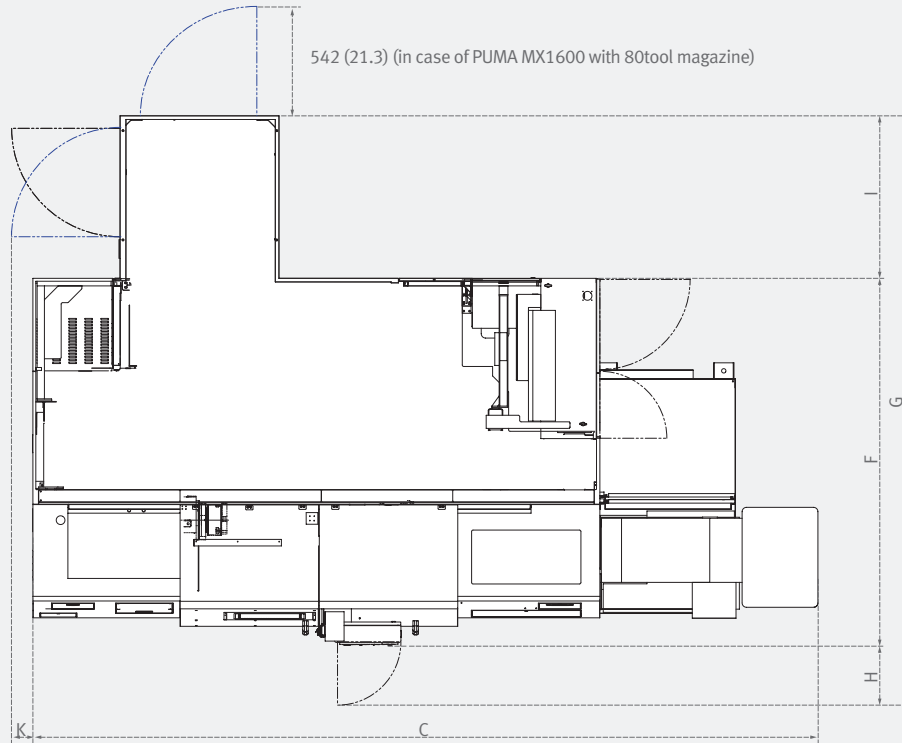
\* Some peripheral equipment can be placed in other places



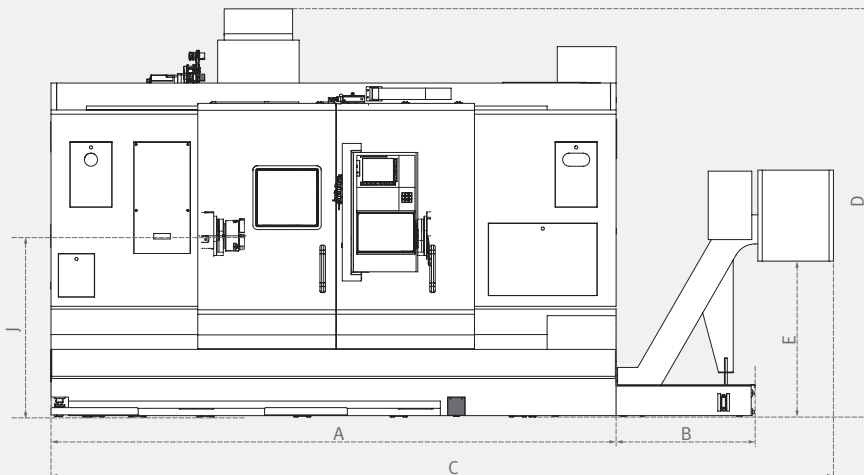
# PUMA MX1600 / MX2100 series (80 tools)

Unit : mm (inch)

Top View



Front view



	A	B	C	D	E	F	G	H	I	J	K
<b>PUMA MX1600 series</b>	3300 (129.9)	522 (20.6)	4765 (187.6)	2646 (104.2)*	1080 (42.5)	2521 (99.3)	4054 (159.6)	401 (15.8)	1132 (44.6)	1255 (49.4)	<b>562.6 (22.1)</b>
<b>PUMA MX2100 series</b>	3890 (153.1)	957 (37.7)	5386 (212.1)	2805 (110.4)	1071 (42.2)	2525 (99.4)	4045 (159.3)	405 (15.9)	1115 (43.9)	1245 (49.0)	146 (5.8)

\* Up to top of the 80 tool magazine

\* Some peripheral equipment can be placed in other places

## External Dimensions

### Basic information

- Basic Structure
- Cutting
- Performance

### Detailed Information

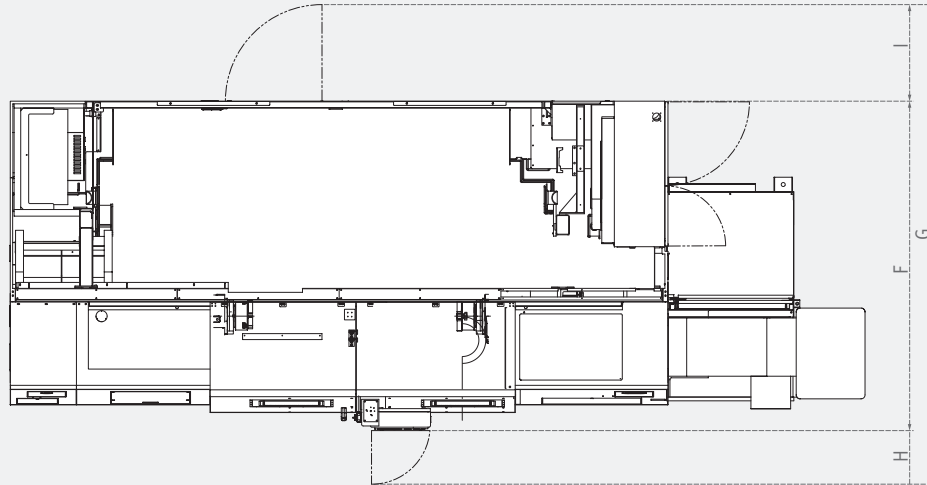
- Options
- Diagrams
- Specifications

### Customer Support Service

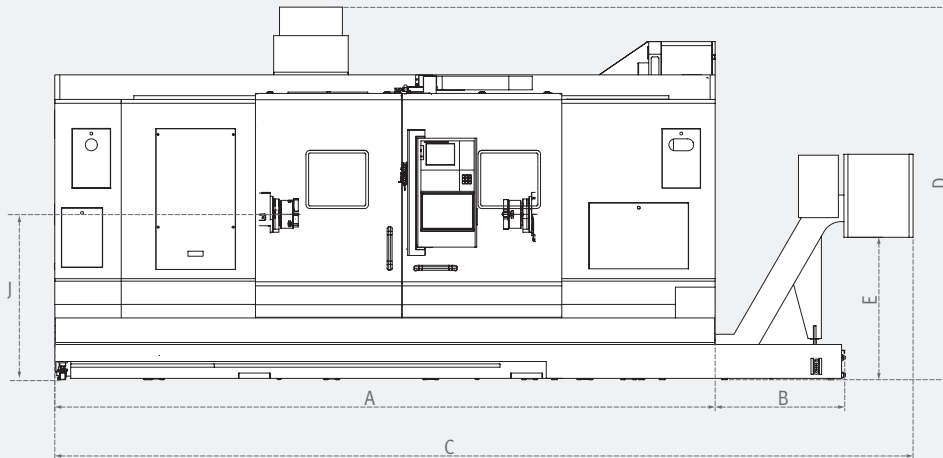
## PUMA MX2100L / MX2600 series (40 tools)

Unit : mm (inch)

Top View



Front view



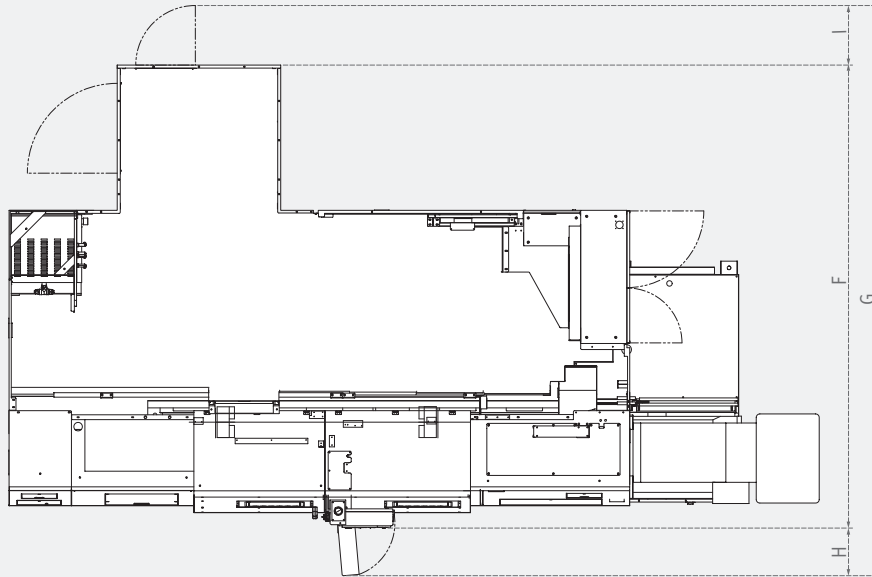
	A	B	C	D	E	F	G	H	I	J
<b>PUMA MX2100L series</b>	4969 (195.6)	975 (38.4)	6458 (254.3)	2805 (110.4)	1072 (42.2)	2490 (98.0)	3625 (142.7)	405 (15.9)	730 (28.7)	1245 (49.0)
<b>PUMA MX2600 series</b>	5125 (201.8)	945 (37.2)	6647 (261.7)	3011 (118.6)	1200 (47.2)	2682 (105.6)	3762 (148.1)	392 (15.4)	688 (27.1)	1265 (49.8)

\* Some peripheral equipment can be placed in other places

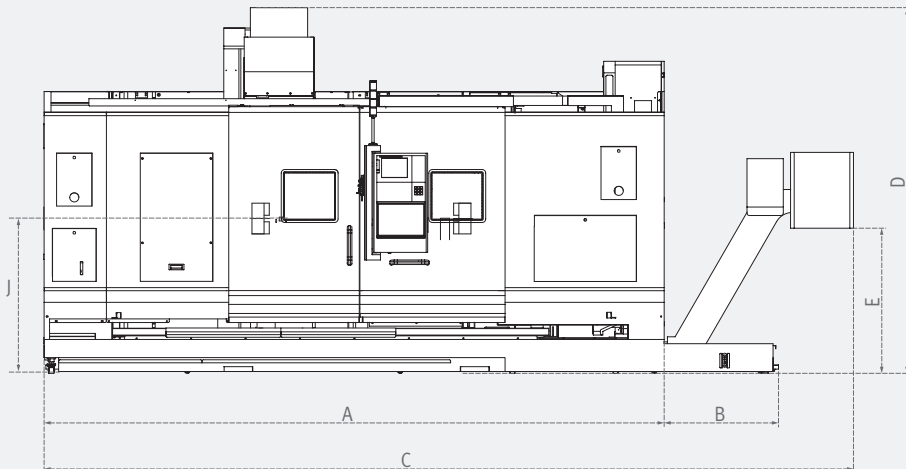
# PUMA MX2100L / MX2600 series (80 tools)

Unit : mm (inch)

Top View



Front view



	A	B	C	D	E	F	G	H	I	J
<b>PUMA MX2100L series</b>	4969 (195.6)	975 (38.4)	6458 (254.3)	2965 (116.3)*	1072 (42.2)	3742 (147.3)	4689 (185.6)	405 (15.9)	542 (21.3)	1245 (49.0)
<b>PUMA MX2600 series</b>	5125 (201.8)	945 (37.2)	6690 (263.4)	3025 (119.1)	1200 (47.2)	3825 (150.6)	4710 (185.4)	393 (15.5)	492 (19.4)	1265 (49.8)

\* Up to top of the 80 tool magazine

\* Some peripheral equipment can be placed in other places

# Tooling System

## Basic information

- Basic Structure
- Cutting
- Performance

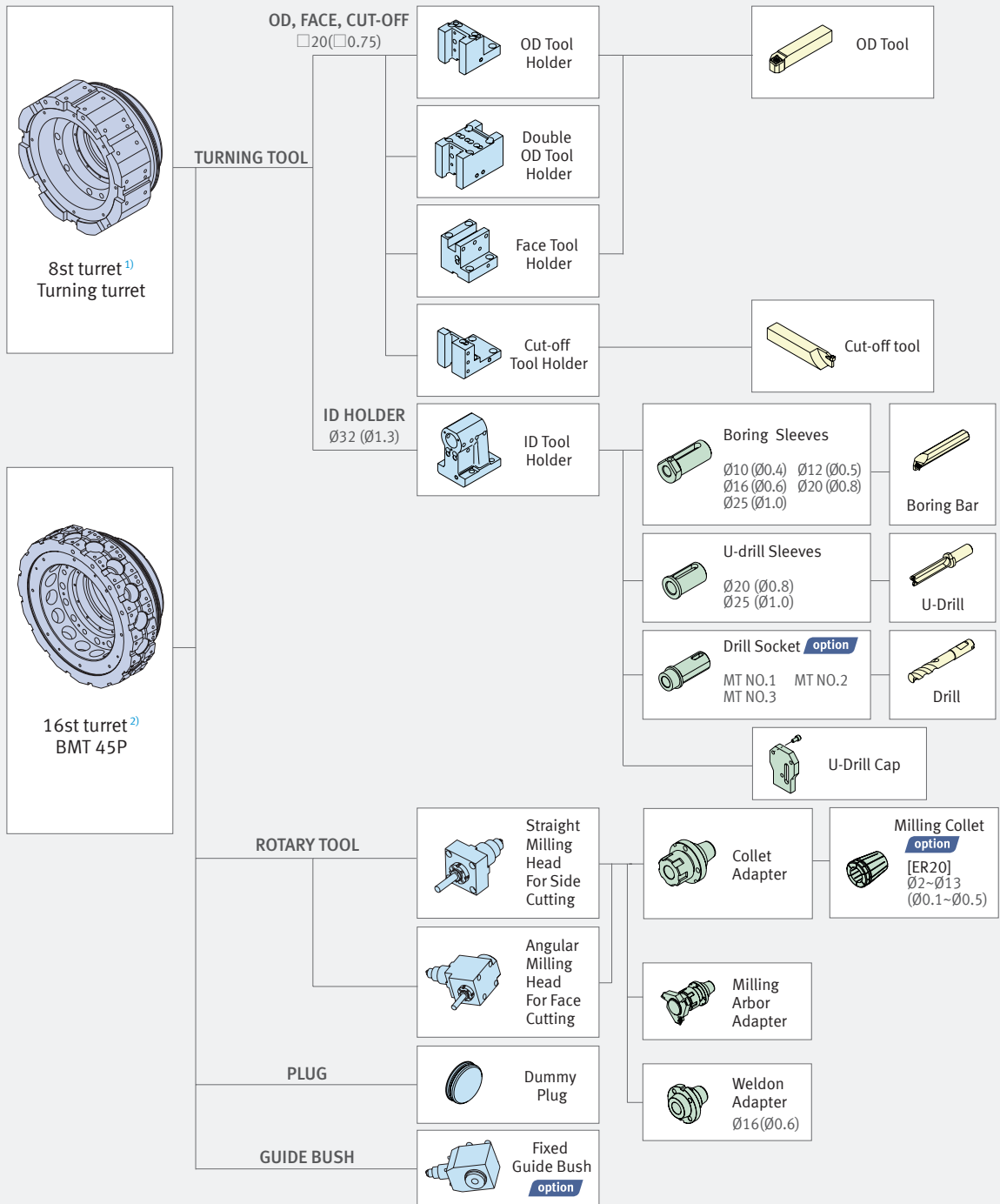
## Detailed Information

- Options
- Diagrams
- Specifications

## Customer Support Service

## Lower turret of PUMA MX1600/735 and MX1600 series (T/ST model)

Unit : mm (inch)



<sup>1)</sup> Standard for T/ST model of MX1600/735

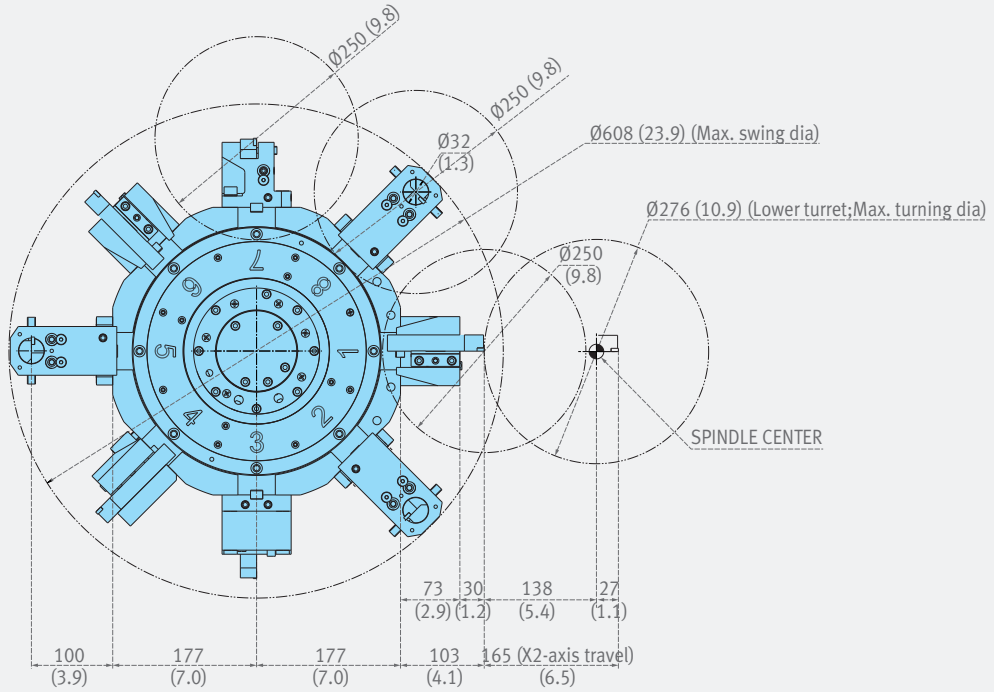
<sup>2)</sup> Standard for T/ST model of MX1600 and Option for T/ST model of MX1600/735

## Tool Interference Diagram of Lower Turret

### For Turning (8 Stations)

Unit : mm (inch)

PUMA MX1600T/735, PUMA MX1600ST/735

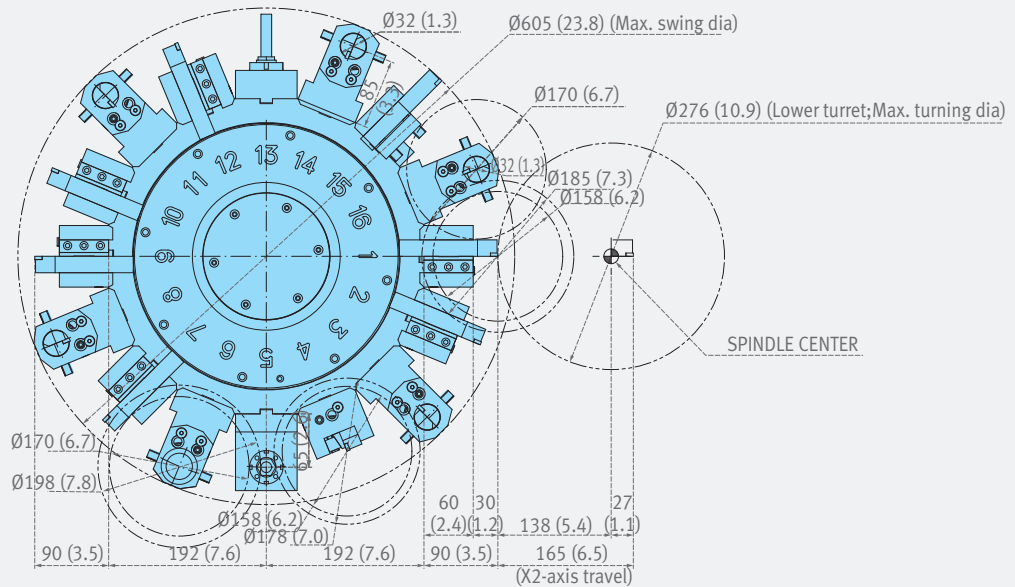


### For Turn-Milling (16 Stations, BMT45P)

Unit : mm (inch)

PUMA MX1600T/ST

PUMA MX1600T/735 **option**, PUMA MX1600ST/735 **option**



# Tooling System

## Basic information

- Basic Structure
- Cutting
- Performance

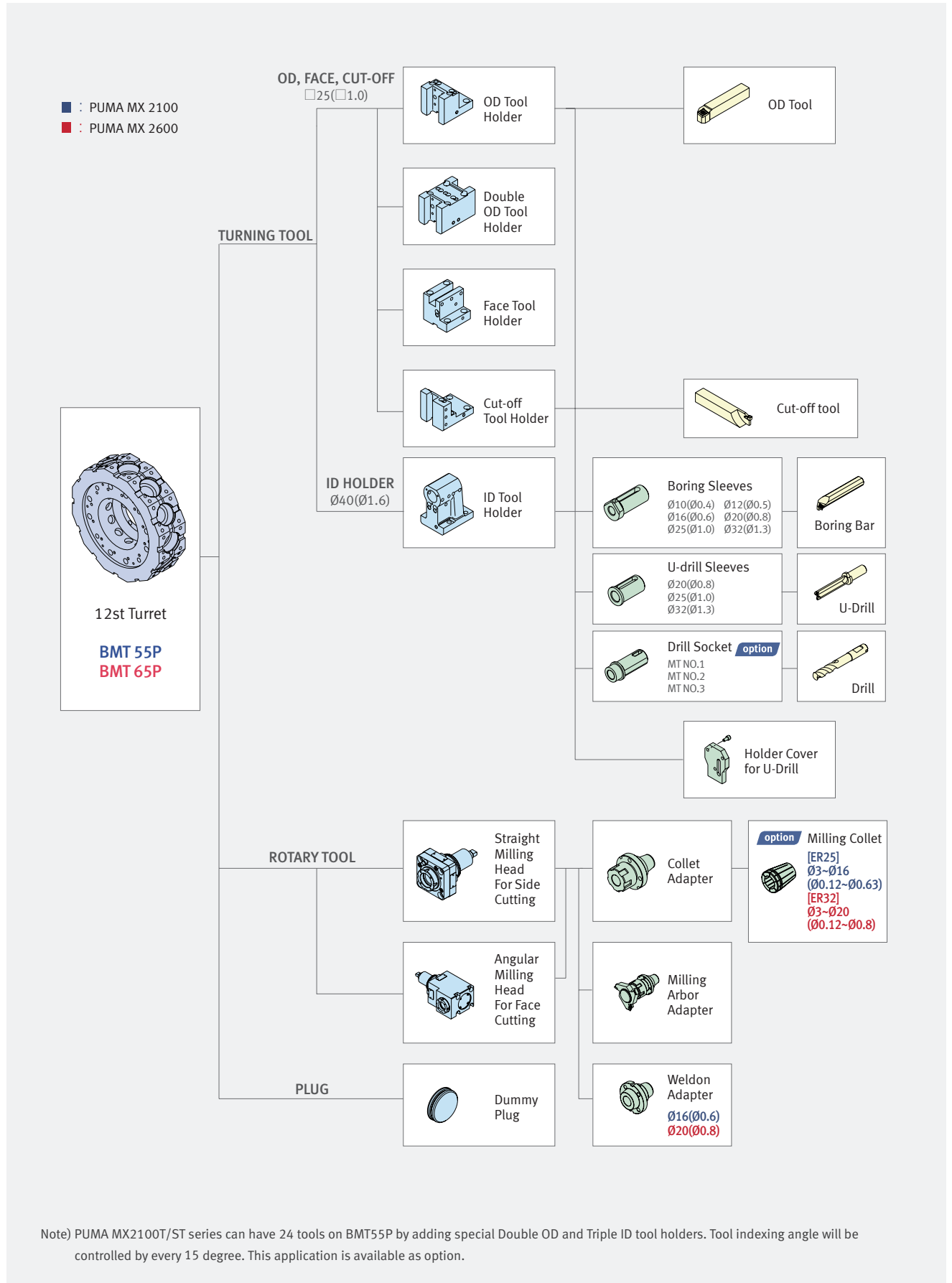
## Detailed Information

- Options
- Diagrams
- Specifications

## Customer Support Service

## Lower turret of PUMA MX2100/2600 series (T/ST model)

Unit : mm (inch)

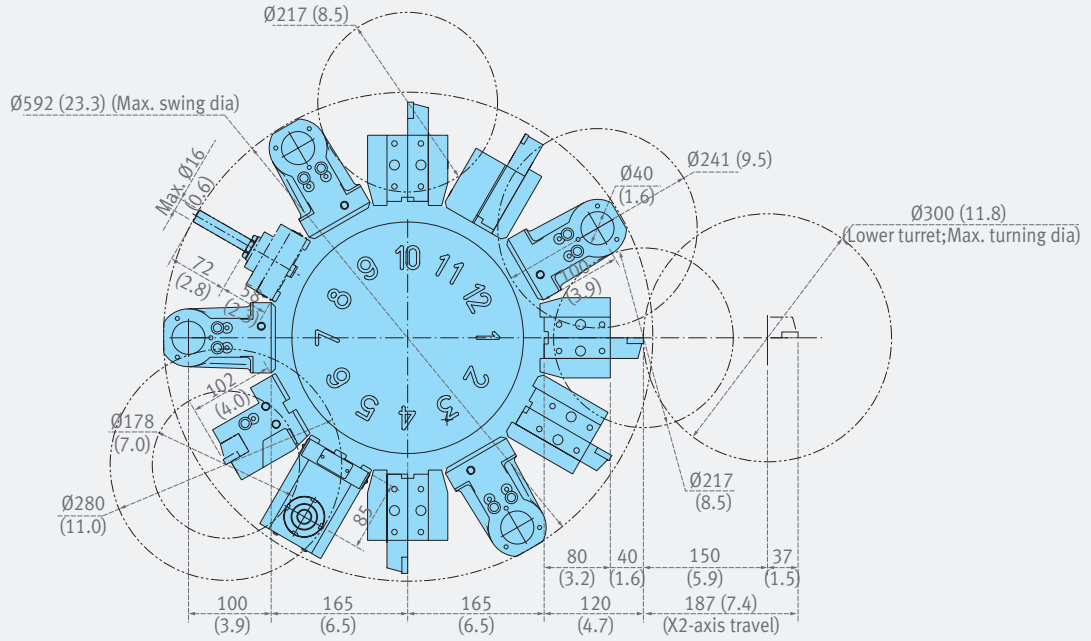


## Tool Interference Diagram of Lower Turret

### For Turn-Milling (12 Stations, BMT55P)

Unit : mm (inch)

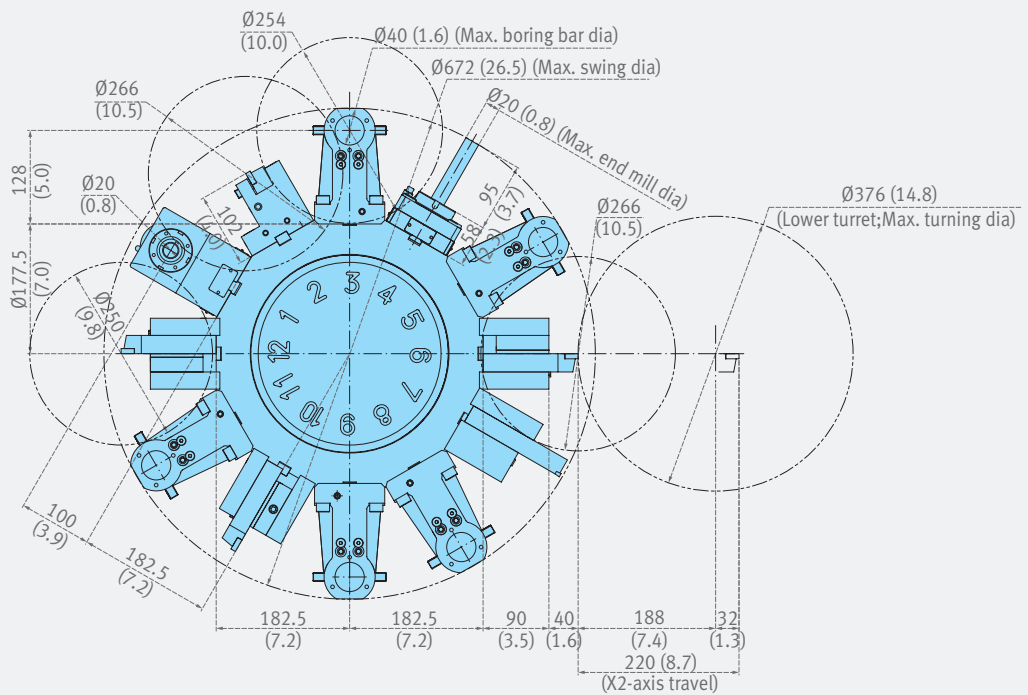
PUMA MX2100T/LT/ST/LST



### For Turn-Milling (12 Stations, BMT65P)

Unit : mm (inch)

PUMA MX2600T/ST



Basic information

- Basic Structure
- Cutting
- Performance

Detailed Information

- Options
- Diagrams
- Specifications

Customer Support Service

Milling Spindle of PUMA MX1600/2100/2600 series

Unit : mm (inch)



The adapters, in long and short version, make it possible to extend the total length.

Coromant Capto



PUMA MX1600: CAPTO C5

PUMA MX2100/2600: CAPTO C6

Multi-function type, suitable for both rotary and fixed tool cutting in milling and lathe



Special tools and engineered products



Blanks to be shaped according to your needs



Rotating Tools

- CoroMill milling cutters with Coromant Capto coupling
- CoroMill milling cutters and adapters
- CoroMill modular cutting heads and a variety of shanks
- Endmills, short hole drills and taps with a large number of adapter
- Indexable insert drills with Coromant Capto coupling
- Indexable insert drills and adapters
- Boring tools with Coromant Capto coupling

Turning Tools

**External machining**

- 45° Coromant Capto cutting units for turning
- 90° Coromant Capto cutting units for turning, threading parting and grooving
- Standard shank tools and adapters for turning, threading parting and grooving
- Coromant Capto cutting units for turning, threading

**Internal machining**

- Modular tooling system 570-cutting heads for turning, threading, parting and grooving and boring bars in different designs
- Boring bars and adapters

**Mini-turret**

- Three tools in one: one position in the magazine containing three standard shank tools.

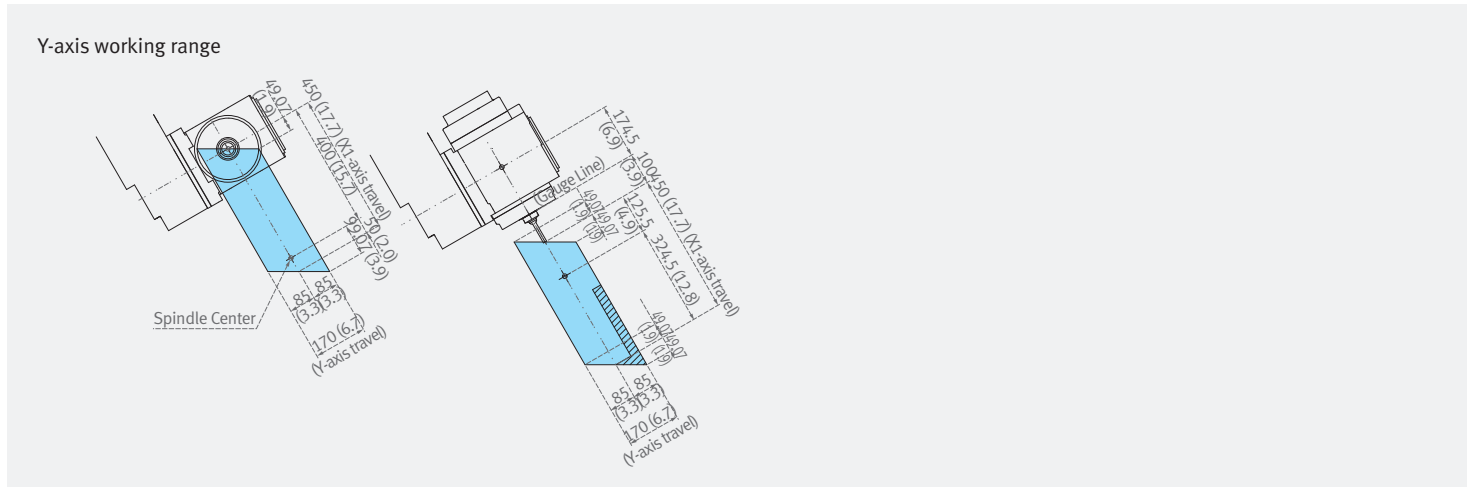
• All holders are not supplied. It is only reference for you.



## Working Range of B-axis and Y-axis

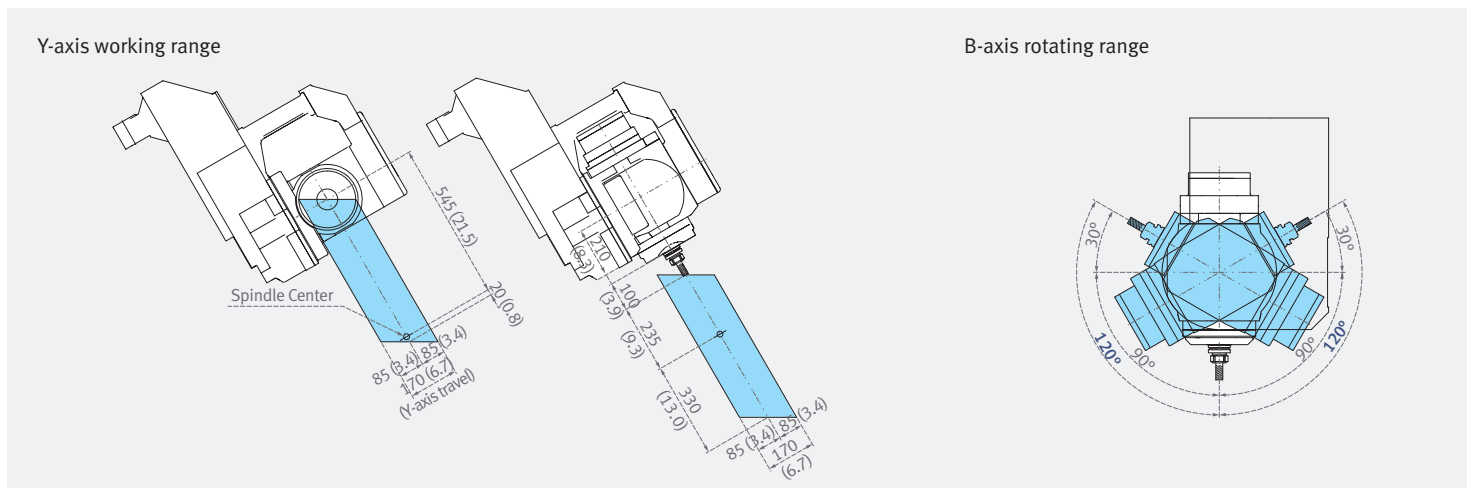
### PUMA MX1600/735 series, PUMA MX1600 series

Unit : mm (inch)



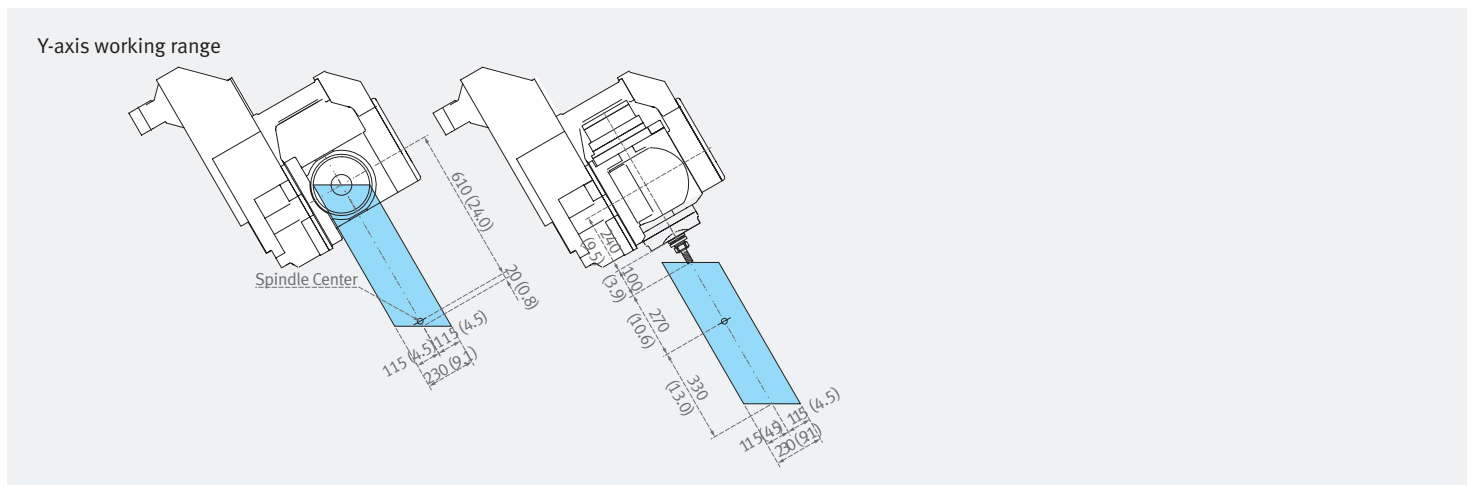
### PUMA MX2100 series

Unit : mm (inch)



### PUMA MX2600 series

Unit : mm (inch)



# Working Range

## Basic information

- Basic Structure
- Cutting
- Performance

## Detailed Information

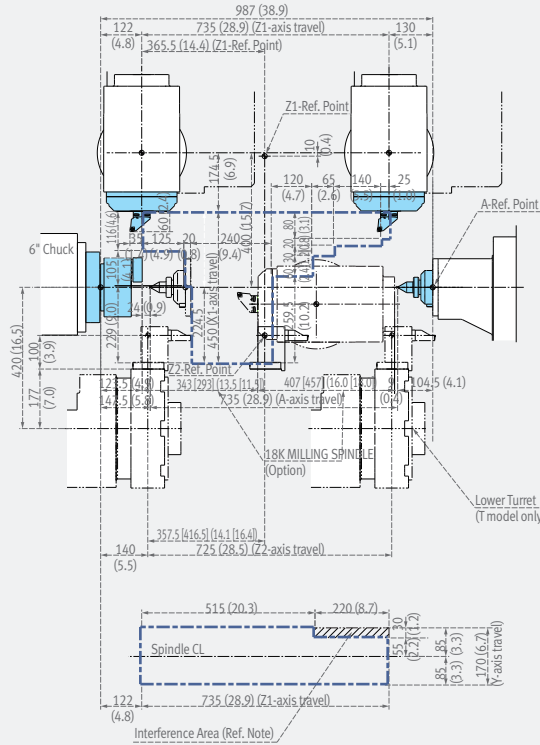
- Options
- Diagrams
- Specifications

## Customer Support Service

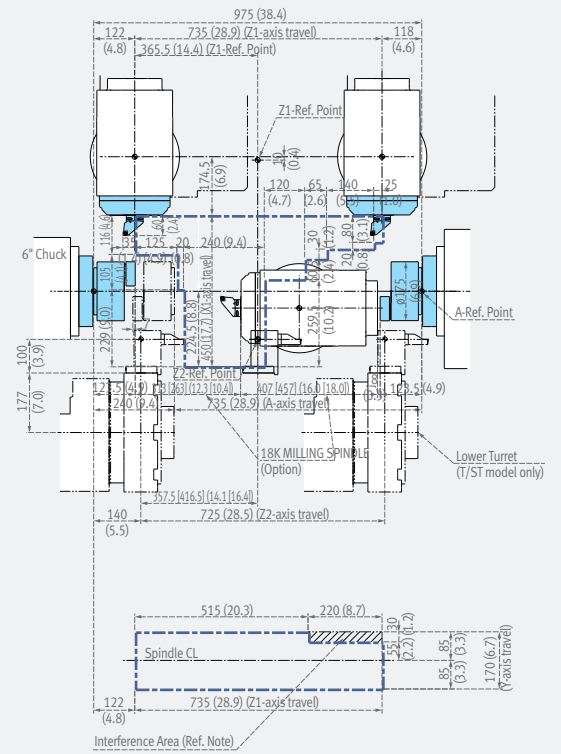
### PUMA MX1600/735 series

Unit : mm (inch)

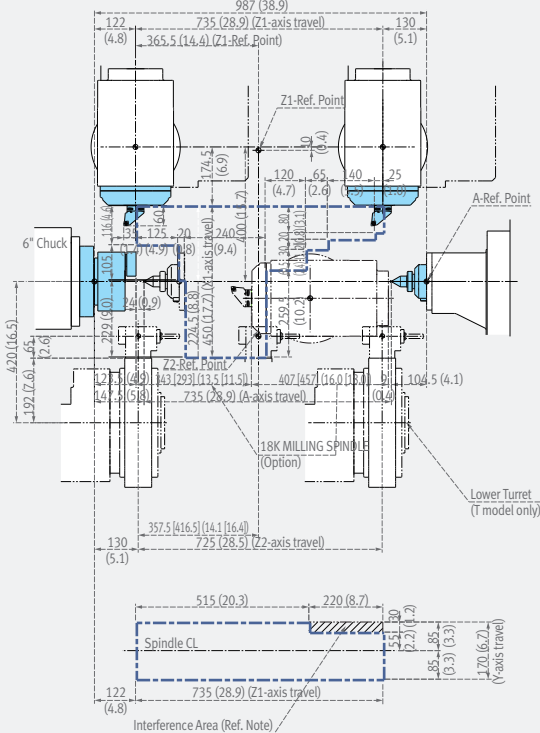
**PUMA MX1600/735, PUMA MX1600T/735**  
(Lower turret for turning with 8 stations)



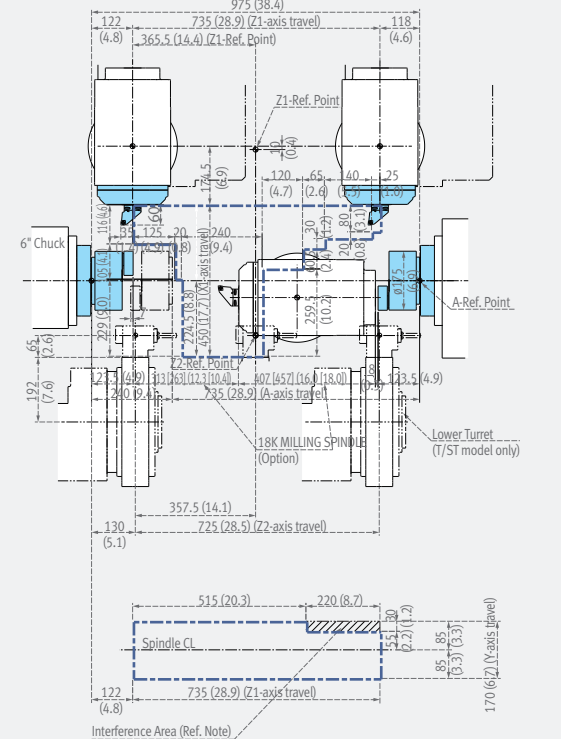
**PUMA MX1600S/735, PUMA MX1600ST/735**  
(Lower turret for turning with 8 stations)



**PUMA MX1600T/735**  
(Lower turret for turn-milling with 16 stations)

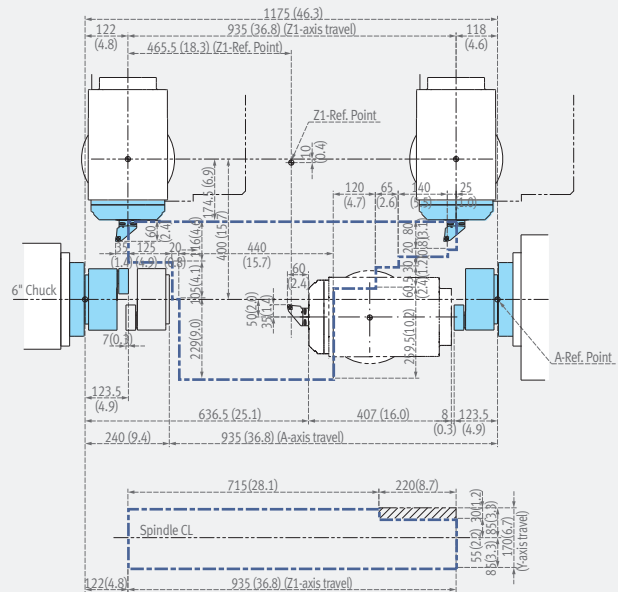
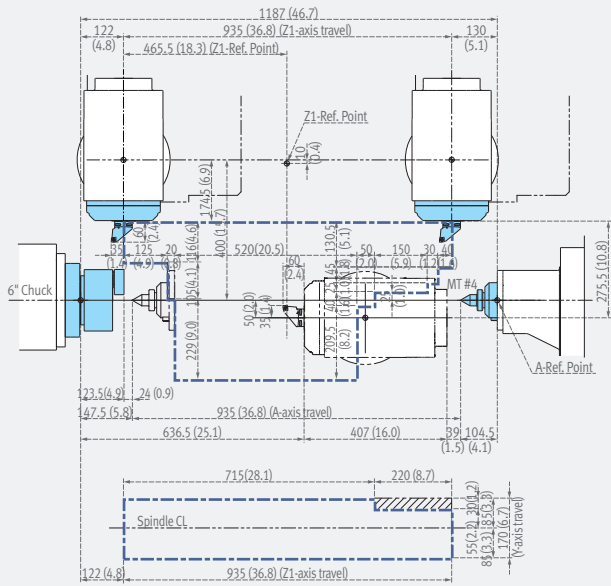


**PUMA MX1600ST/735**  
(Lower turret for turn-milling with 16 stations)



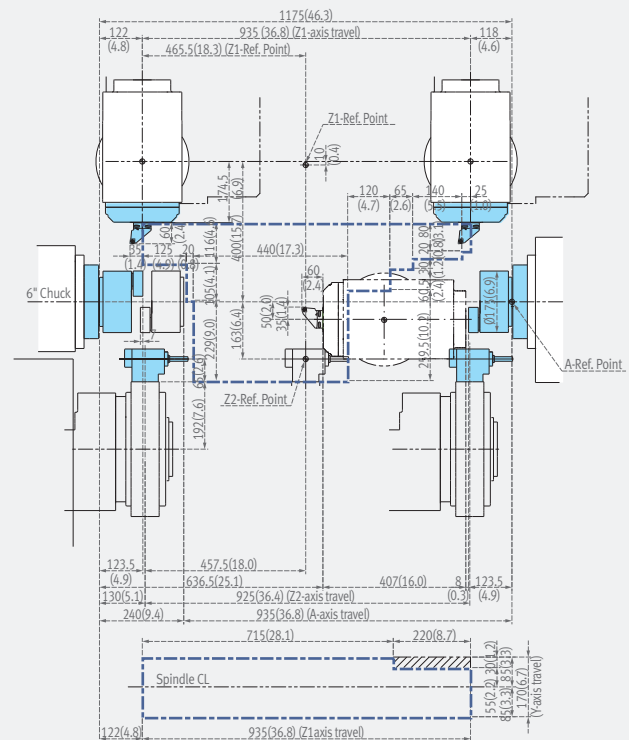
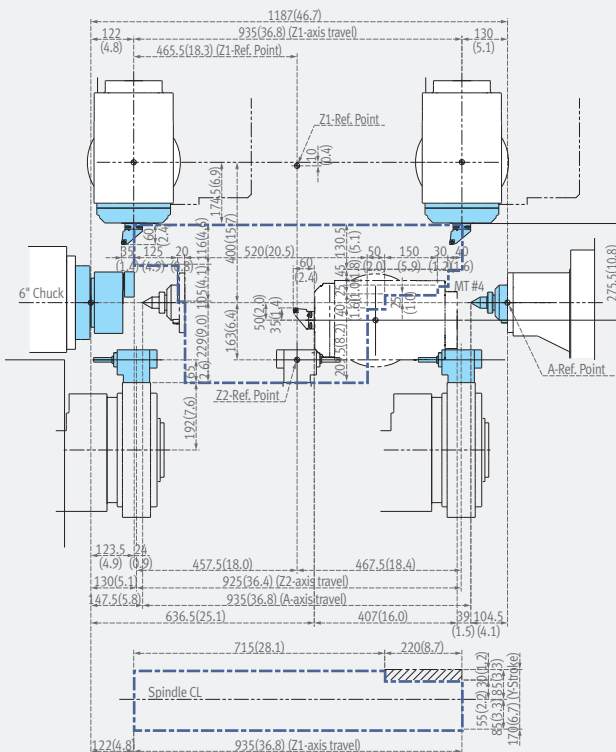
PUMA MX1600

PUMA MX1600S



PUMA MX1600T

PUMA MX1600ST



## Working Range

### Basic information

- Basic Structure
- Cutting
- Performance

### Detailed Information

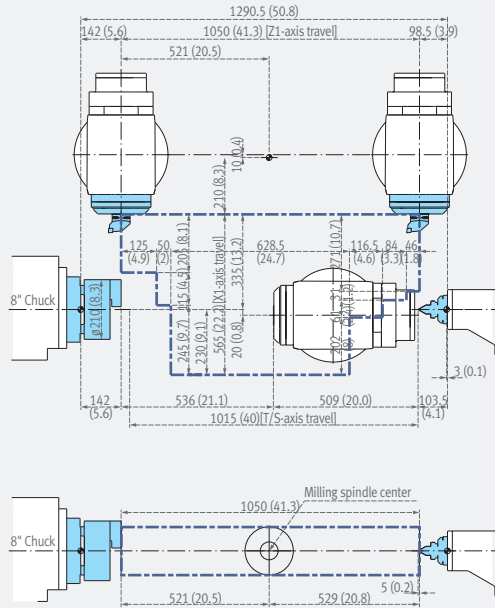
- Options
- Diagrams
- Specifications

### Customer Support Service

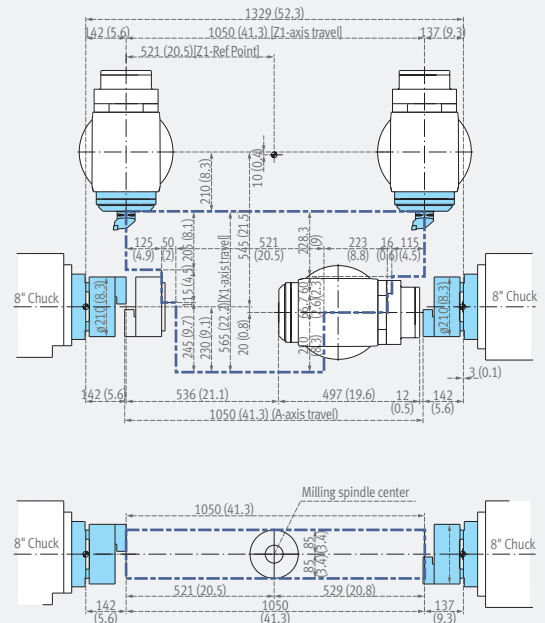
## PUMA MX2100 series

Unit : mm (inch)

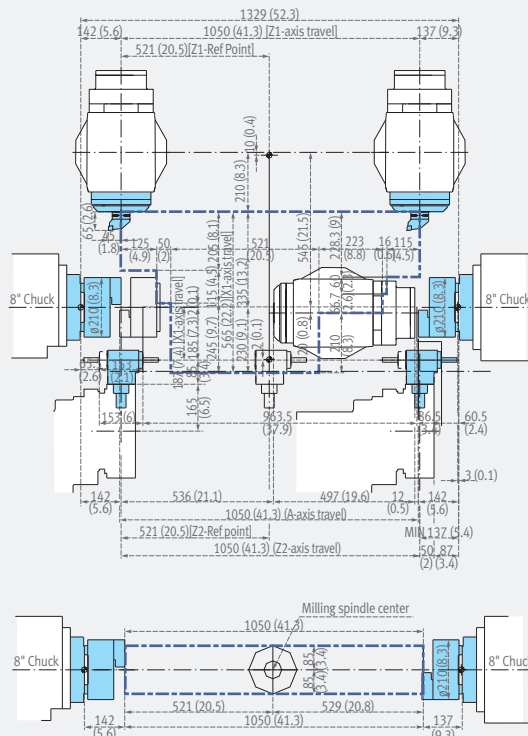
PUMA MX2100



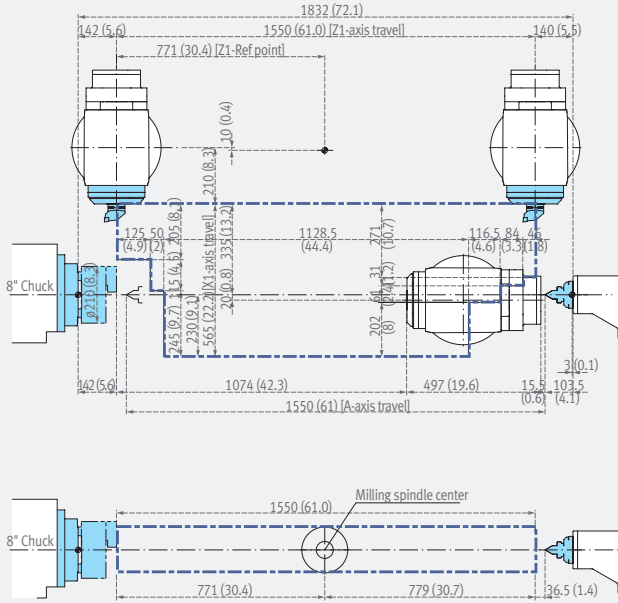
PUMA MX2100S



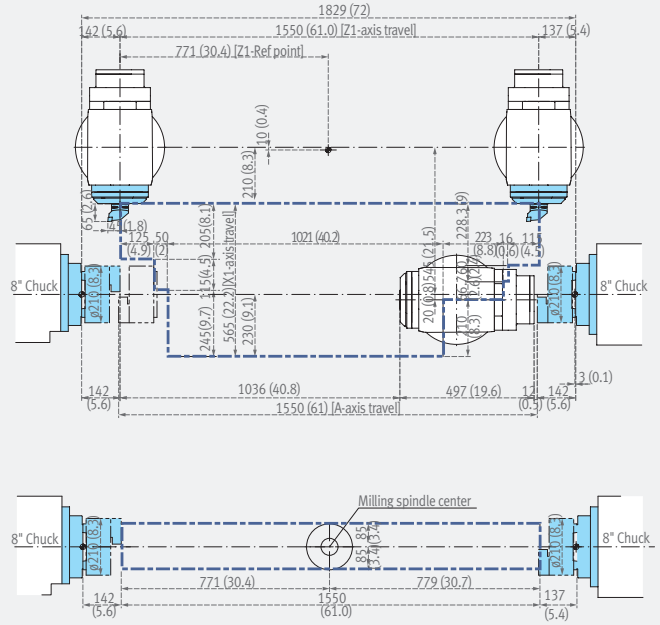
PUMA MX2100ST



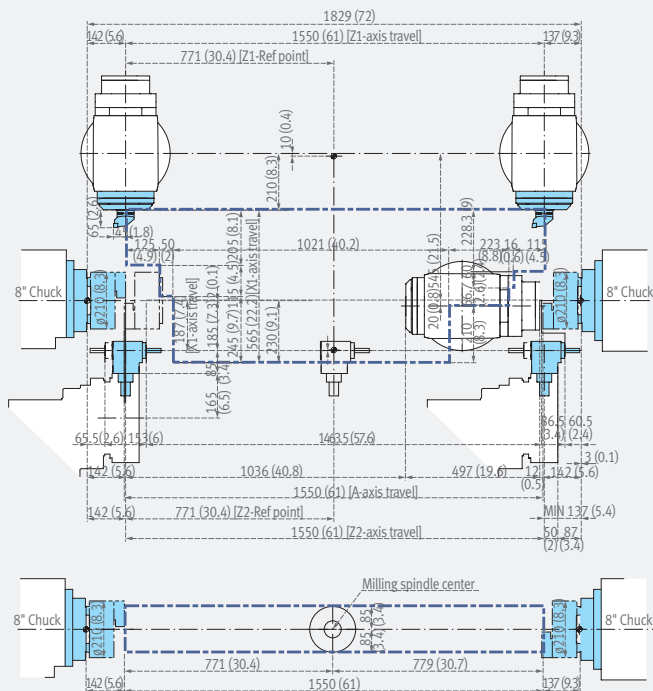
PUMA MX2100L



PUMA MX2100LS



PUMA MX2100LST



## Working Range

### Basic information

- Basic Structure
- Cutting
- Performance

### Detailed Information

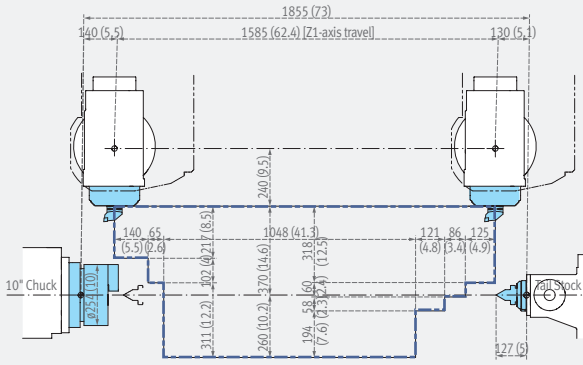
- Options
- Diagrams
- Specifications

### Customer Support Service

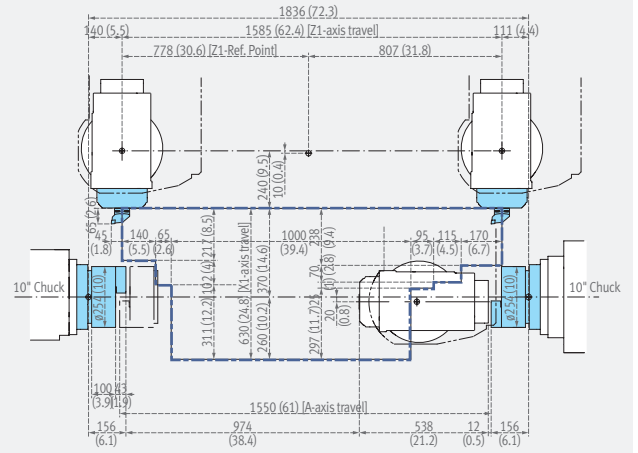
## PUMA MX2600 series

Unit : mm (inch)

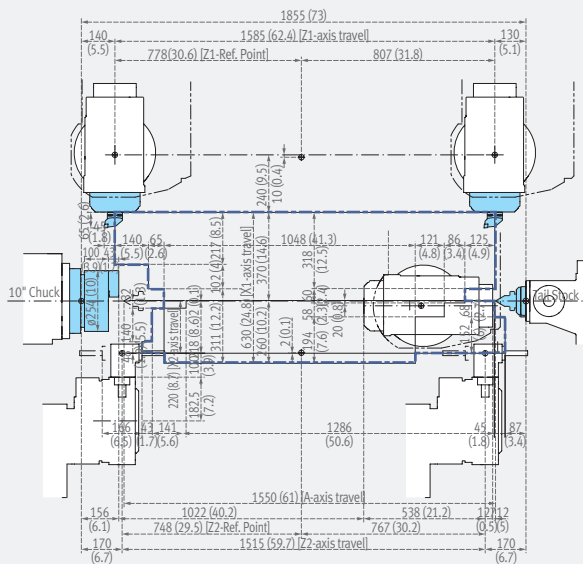
PUMA MX2600



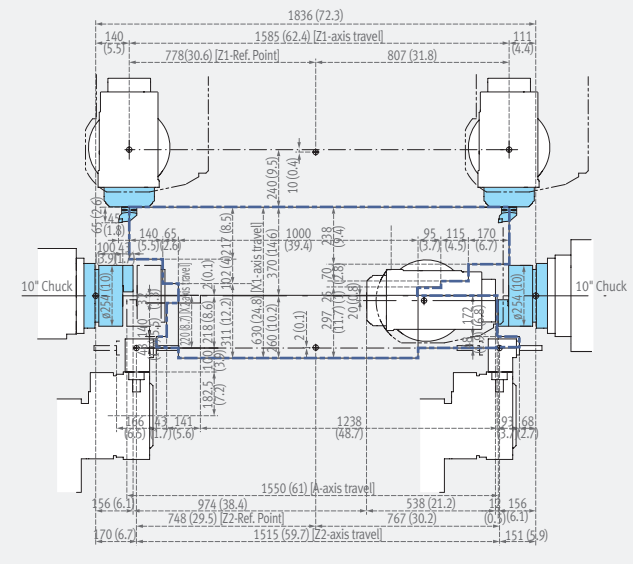
PUMA MX2600S



PUMA MX2600T



PUMA MX2600ST

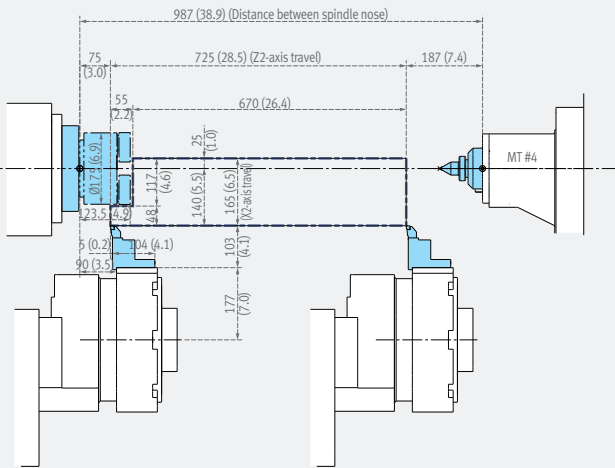


## Working Range of Lower Turret (For Turning, 8 stations)

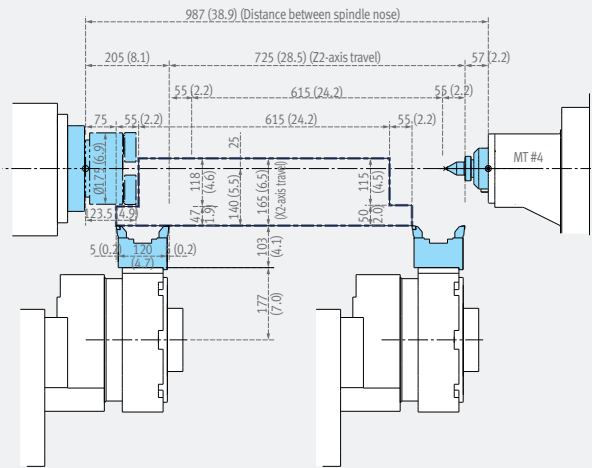
### PUMA MX1600T/735

Unit : mm (inch)

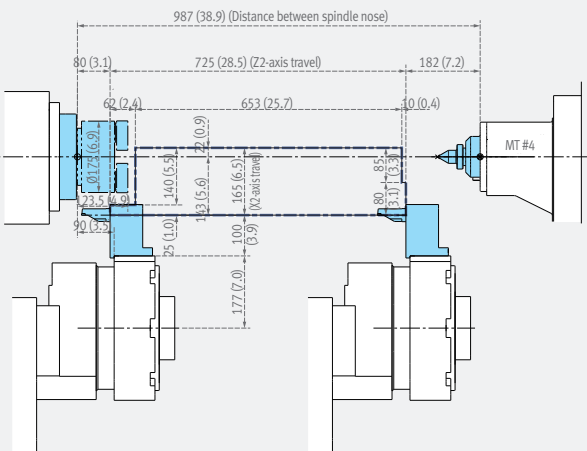
Single OD Holder



Double OD Holder



ID Holder



# Working Range of Lower Turret (For Turning, 8 stations)

Basic information

- Basic Structure
- Cutting
- Performance

## PUMA MX1600ST/735

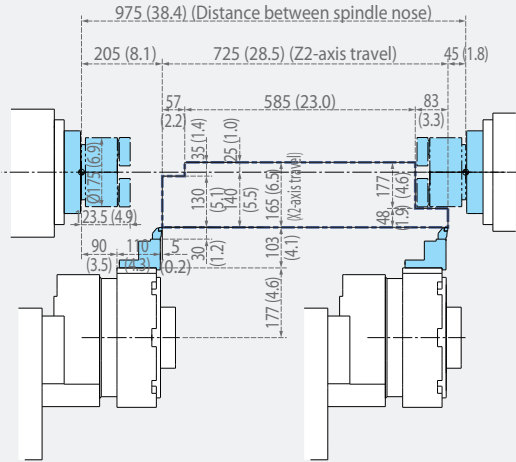
Unit : mm (inch)

Detailed Information

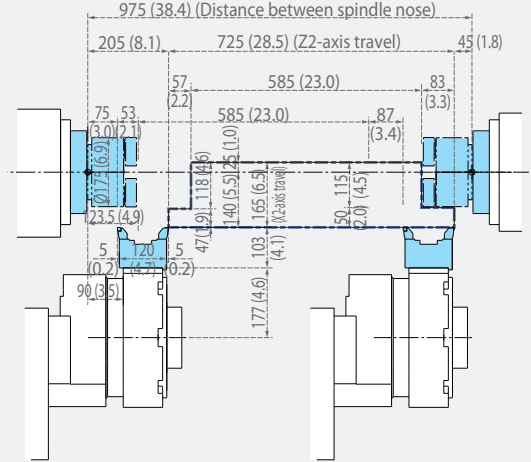
- Options
- Diagrams
- Specifications

Customer Support Service

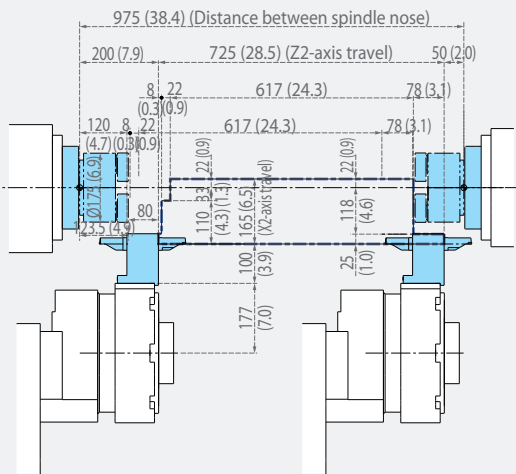
Single OD holder



Double OD holder



ID holder



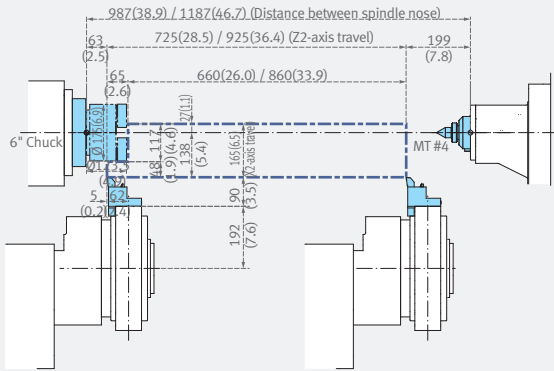


# Working Range of Lower Turret (For Turn-Milling, 16 stations, BMT45P)

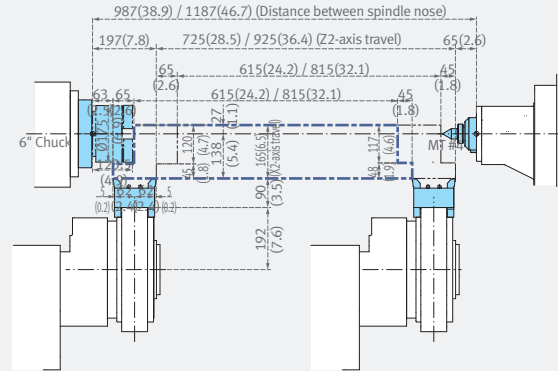
## PUMA MX1600T<sub>735</sub> / MX1600T

Unit : mm (inch)

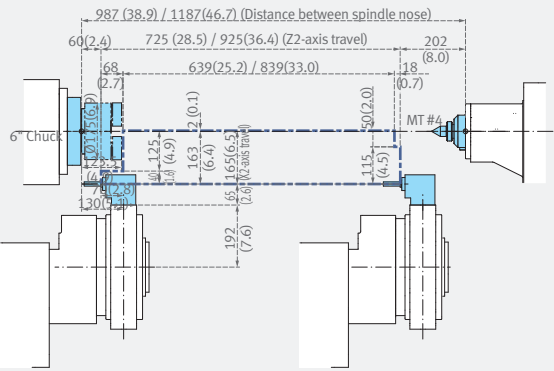
Single OD Tool holder



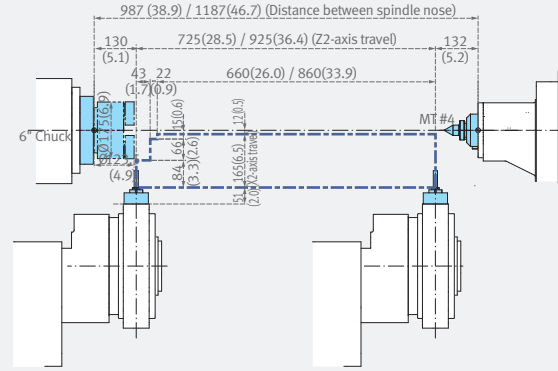
Double OD Tool holder



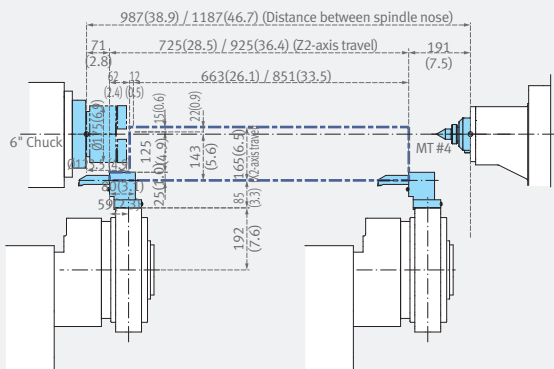
Angular milling head



Straight milling head



ID Tool holder



## Working Range of Lower Turret (For Turn-Milling, 16 stations, BMT45P)

Basic information

- Basic Structure
- Cutting
- Performance

### PUMA MX1600ST<sub>735</sub> / MX1600ST

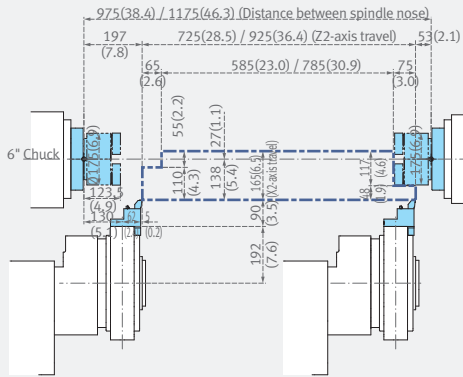
Unit : mm (inch)

Detailed Information

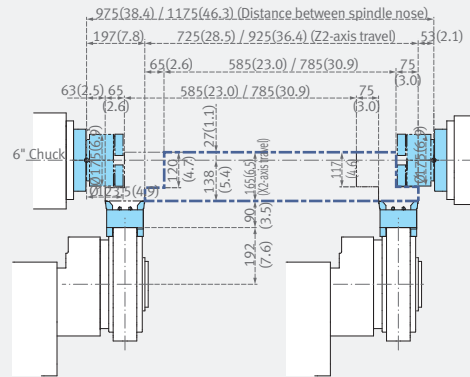
- Options
- Diagrams
- Specifications

Customer Support Service

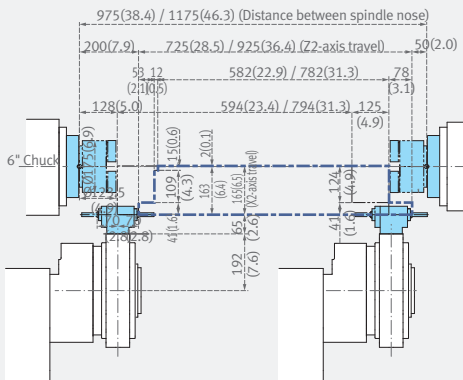
Single OD Tool holder



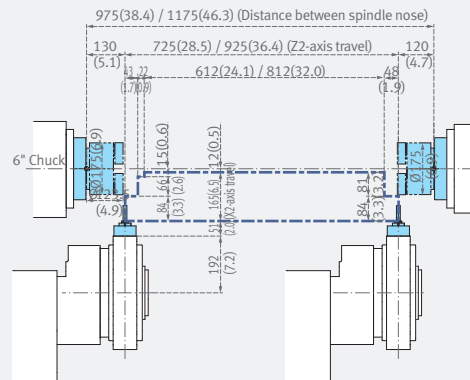
Double OD Tool holder



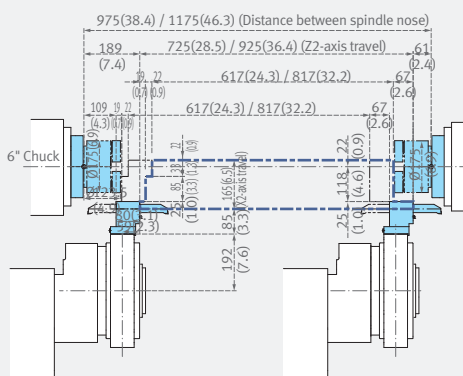
Angular milling head



Straight milling head



ID Tool holder

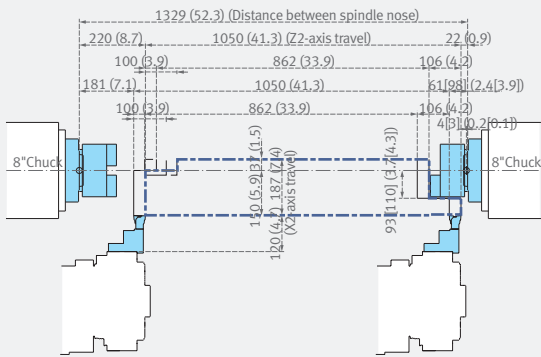


# Working Range of Lower Turret (For Turn-Milling, 12 stations, BMT55P)

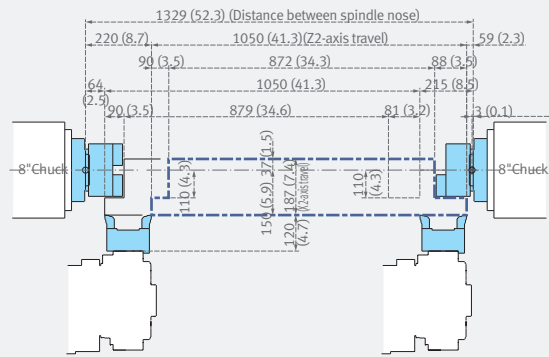
## PUMA MX2100ST

Unit : mm (inch)

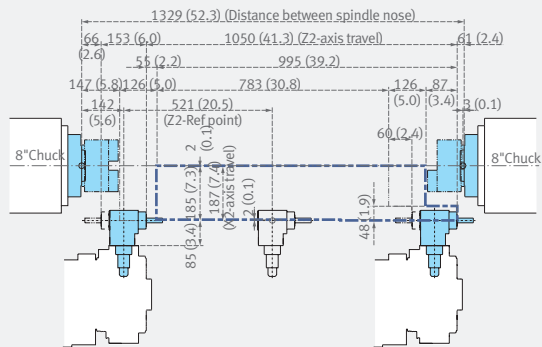
Single OD Tool holder



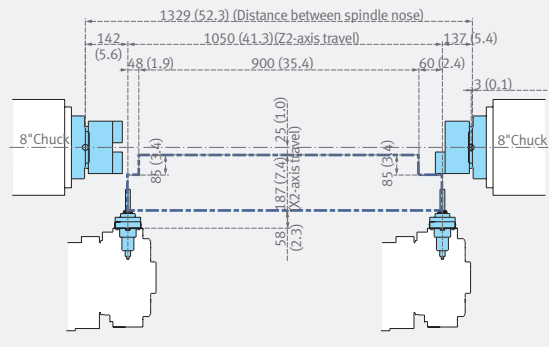
Double OD Tool holder



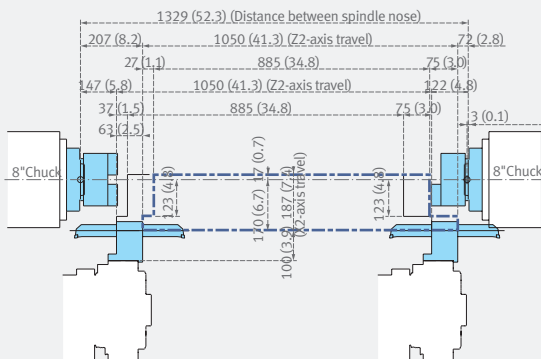
Angular milling head



Straight milling head



ID Tool holder



# Working Range of Lower Turret (For Turn-Milling, 12 stations, BMT55P)

Basic information

- Basic Structure
- Cutting
- Performance

## PUMA MX2100LST

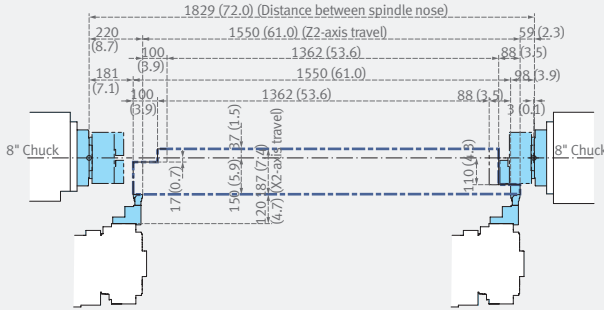
Unit : mm (inch)

Detailed Information

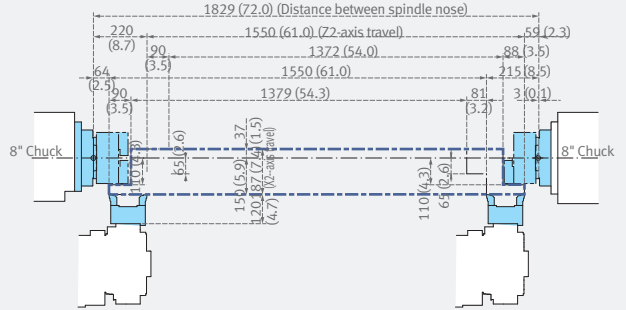
- Options
- Diagrams
- Specifications

Customer Support Service

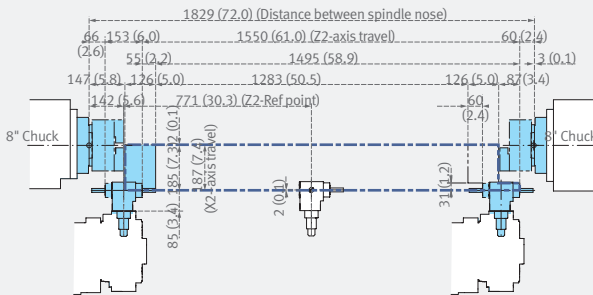
Single OD Tool holder



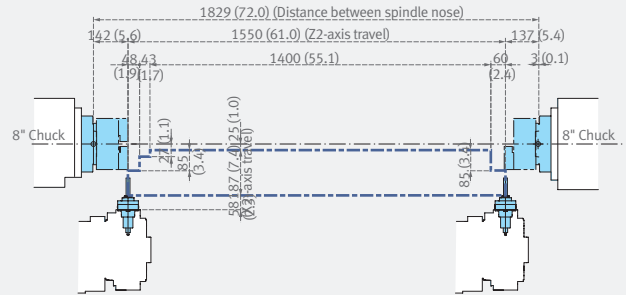
Double OD Tool holder



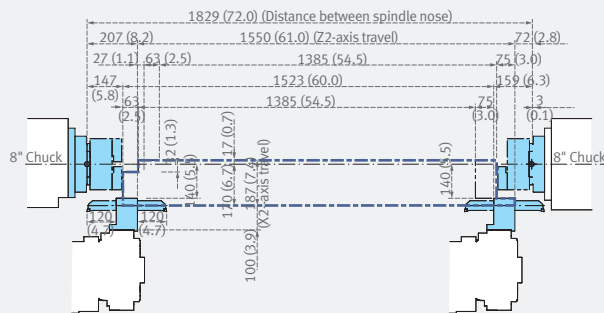
Angular milling head



Straight milling head



ID Tool holder

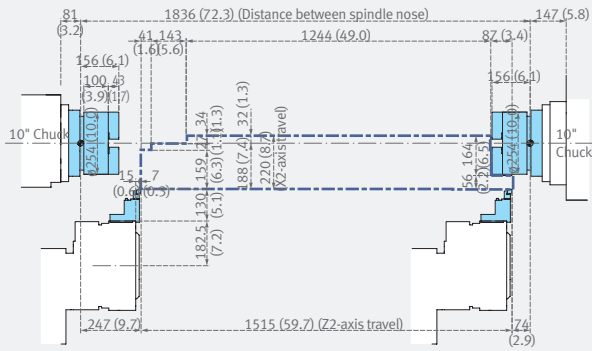


# Working Range of Lower Turret (For Turn-Milling, 12 stations, BMT65P)

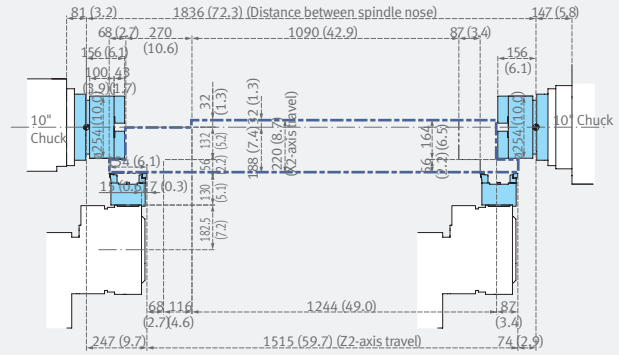
## PUMA MX2600ST

Unit : mm (inch)

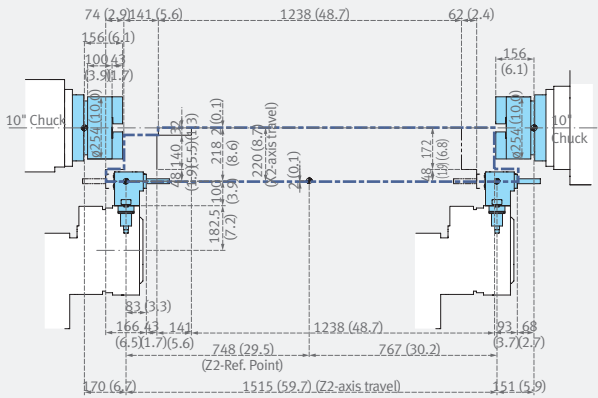
Single OD Tool holder



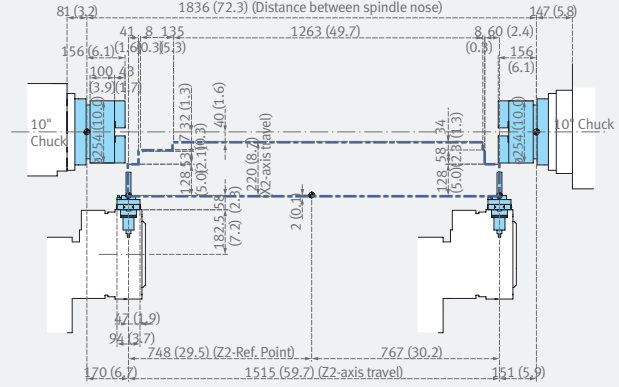
Double OD Tool holder



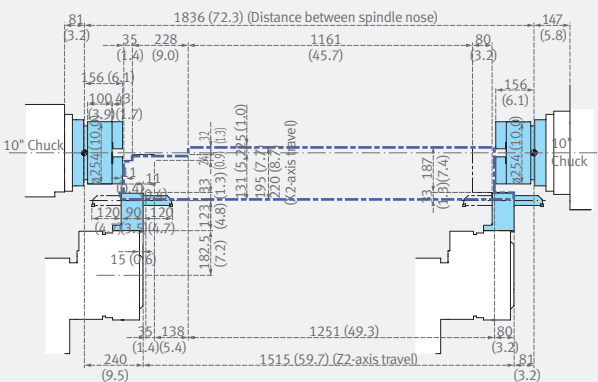
Angular milling head



Straight milling head



Boring Bar holder



## Basic information

Basic Structure  
Cutting  
Performance

## Detailed Information

Options  
Diagrams  
Specifications

## Customer Support Service



Description		Unit	MX1600 <sup>T735</sup> / MX1600	MX1600S <sup>T735</sup> / MX1600S	MX1600T <sup>T735</sup> / MX1600T	MX1600ST <sup>T735</sup> / MX1600ST	
Capacity	Swing over bed	mm (inch)	680 (26.8)				
	Recom. Turning diameter	mm (inch)	170 (6.7)				
	Max. Machining diameter	mm (inch)	330 (13.0)				
	Max. Turning length	mm (inch)	700 / 900 (27.6 / 35.4)				
	Chuck size	inch	6				
	Bar working diameter	mm (inch)	51 (2.0)				
Travels	Travel distance	X1-axis	450 (17.7)				
		Z1-axis	735 / 935 (28.9 / 36.8)				
		Y-axis	170 (±85) (6.7 (±3.3))				
		X2-axis	-	-	165 (6.5)		
		Z2-axis	-	-	725 / 925 (28.5 / 36.4)		
		A-axis	-	735/935 (28.9 / 36.8)	-	735/935 (28.9 / 36.8)	
Feedrate	Rapid Traverse Rate	X1-axis	36 (1417.3)				
		Z1-axis	36 (1417.3)				
		Y-axis	26 (1023.6)				
		X2-axis	-	-	24 (944.9)		
		Z2-axis	-	-	36 (1417.3)		
		A-axis	-	30 (1181.1)	-	30 (1181.1)	
Left spindle	Max. Spindle speed	r/min	6000				
	Spindle nose	ASA	A2-5				
	Spindle bearing diameter (Front)	mm (inch)	100 (3.9)				
	Spindle through hole	mm (inch)	62 (2.4)				
	Min. spindle Indexing angle(C-axis)	deg.	0.0001				
Right spindle	Max. Spindle speed	r/min	-	6000	-	6000	
	Spindle nose	ASA	-	A2-5	-	A2-5	
	Spindle bearing diameter (Front)	mm (inch)	-	100 (3.9)	-	100 (3.9)	
	Spindle through hole	mm (inch)	-	62 (2.4)	-	62 (2.4)	
	Min. spindle Indexing angle(C-axis)	deg.	-	0.001	-	0.001	
Milling spindle	Max. spindle speed	r/min	12000 (18000)*				
	Min. spindle Indexing angle(B-axis)	deg.	0.001				
Automatic Tool Changer	Tool storage capa. (Max.)	ea	40 / 40 {80}*				
	Tool changer arm		SWING ARM				
	Tool selection		FIXED ADDRESS				
	Max. tool diameter	Continuous	mm (inch)	70 (2.8)			
		Without Adjacent Tools	mm (inch)	95 (3.7)			
	Max. tool length	mm (inch)	200 (7.9)				
	Max. tool weight	kg (lb)	4 (8.8)				
	Max. tool moment	N·m (ft·lbs)	3.9 (2.9)				
Tool change time (T-T)	s	2.1					
Lower Turret	No. of tool stations	ea	-	-	8{16, BMT45P}* / 16, BMT45P		
	OD tool size	mm (inch)	-	-	20 x 20 (0.8 x 0.8)		
	Max. boring bar size	mm (inch)	-	-	32 (1.3)		
	Turret Indexing time(1 station swivel)	s	-	-	0.2 / 0.35		
	Max. Rotary tool speed	r/min	-	-	{6000}* / 6000		
Servo driven Tailstock	Quill diameter	mm (inch)	-	-	-	-	
	Quill bore taper	MT	Built-in dead #4	-	Built-in dead #4	-	
	Quill travel	mm (inch)	735/935 (28.9/36.8)	-	735/935 (28.9/36.8)	-	
Motors	Left spindle motor power	kW (Hp)	15 / 11 (20.1 / 14.8)				
	Right spindle motor power	kW (Hp)	-	15 / 11 (20.1 / 14.8)	-	15 / 11 (20.1 / 14.8)	
	Milling spindle motor power	kW (Hp)	9/7.5/3.7 (12.1/10.1/4.7)				
	Coolant pump motor power	kW (Hp)	2.5(3.4)				
Power source	Electric power supply (rated capacity)	kVA	43.35	55.28	50.77	64.42	
Machine Dimensions	Height	mm (inch)	2780 / 2760 (109.4 / 108.7)				
	Length	mm (inch)	3300 / 3800 (129.9 / 149.6)				
	Width	mm (inch)	2686 / 2530 (105.7 / 99.6)				
	Weight	kg (lb)	10800 / 11100 (23809.9 / 24470.9)	11100 / 11400 (24470.9 / 25132.3)	11000 / 11300 (24250.8 / 24911.9)	11300 / 11600 (24911.9 / 25573.2)	

# PUMA MX2100 series



Description		Unit	PUMA MX2100[L]	PUMA MX2100S[LS]	PUMA MX2100T[LT]	PUMA MX2100ST[LST]	PUMA MX2600T	PUMA MX2600ST	
Capacity	Swing over bed	mm (inch)	750 (29.5)				1000 (39.4)		
	Recom. Turning diameter	mm (inch)	210 (8.3)				255 (10.0)		
	Max. Machining diameter	mm (inch)	540 (21.3)				760 (29.9)		
	Max. Turning length	mm (inch)	1020 [1520] (40.2 [59.8])				1540 (60.6)		
	Chuck size	inch	8				10		
	Bar working diameter	mm (inch)	65 (2.6)				76(3.0)		
Travels	Travel distance	X1-axis	565 (22.2)				630 (24.8)		
		Z1-axis	1050 [1550] (41.3 [61.0])				1585 (62.4)		
		Y-axis	170 (±85) (6.7 (±3.3))				230(±115) (9.1(±4.5))		
		X2-axis	-	-	187 (7.4)		220 (8.7)		
		Z2-axis	-	-	1050 [1550] (41.3 [61.0])		1515 (59.6)		
		A-axis	-	1050 [1550] (41.3 [61.0])	-	1050 [1550] (41.3 [61.0])		-	1550 (61.0)
Feedrate	Rapid Traverse Rate	X1-axis	36 (1417.3)						
		Z1-axis	36 (1417.3)						
		Y-axis	26 (1023.6)						
		X2-axis	-	-	24 (944.9)			-	-
		Z2-axis	-	-	36 (1417.3)			-	-
		A-axis	-	30 (1181.1)	-	30 (1181.1)		-	30 (1181.1)
Left spindle	Max. 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	mm (inch)	76 (3.0)				86 (3.4)		
	Min. spindle Indexing angle(C-axis)	deg.	0.001						
Right spindle	Max. Spindle speed	r/min	-	5000	-	5000	-	4000	
	Spindle nose	ASA	-	A2-6	-	A2-6	-	A2-8	
	Spindle bearing diameter (Front)	mm (inch)	-	110 (4.3)	-	110 (4.3)	-	130 (5.1)	
	Spindle through hole	mm (inch)	-	76 (3.0)	-	76 (3.0)	-	86 (3.4)	
	Min. spindle Indexing angle(C-axis)	deg.	-	0.001	-	0.001	-	0.001	
Milling spindle	Max. spindle speed	r/min	12000						
	Min. spindle Indexing angle(B-axis)	deg.	0.001						
Automatic Tool Changer	Tool storage capa. (Max.)	ea	40 {80}*						
	Tool changer arm		SWING ARM						
	Tool selection		FIXED ADDRESS						
	Tool shank		CAPTO C6 {HSK A63}*						
	Max. tool diameter	Continous	mm (inch)	90 (3.5)					
		Without Adjacent Tools	mm (inch)	120 (4.7)				130 (5.1)	
	Max. tool length	mm (inch)	300 (661.4)				400 (881.8)		
	Max. tool weight	kg (lb)	9				10		
	Max. tool moment	N-m (ft-lbs)	8.2 (6.1)				9.8 (7.2)		
Tool change time (T-T)	s	2.0							
Lower Turret	No. of tool stations	ea	-	-	12, BMT55P		12, BMT65P		
	OD tool size	mm (inch)	-	-	25 x 25 (1.0 x 1.0)				
	Max. boring bar size	mm (inch)	-	-	40 (1.6)				
	Turret Indexing time(1 station swivel)	s	-	-	0.2				
	Max. Rotary tool speed	r/min	-	-	5000		4000		
Servo driven Tailstock	Quill bore taper	MT	Built-in dead #4	-	Built-in dead #4	-	Built-in dead #5	-	
	Quill travel	mm (inch)	1050 [1550] (41.3 [61.0])	-	1050 [1550] (41.3 [61.0])	-	1550 (61.0)	-	
Motors	Left spindle motor power	kW (Hp)	22 / 18.5 (29.5 / 24.8)				26 / 22 (34.9 / 29.5)		
	Right spindle motor power	kW (Hp)	-	22 / 18.5 (29.5 / 24.8)	-	22 / 18.5 (29.5 / 24.8)	-	26 / 22 (34.9 / 29.5)	
	Milling spindle motor power	kW (Hp)	18.5 / 15 / 11 (24.8 / 20.1 / 14.8)				22/18.5/15 (29.5/24.8/20.1)		
	Coolant pump motor power	kW (Hp)	2.5 (3.4)						
Power source	Electric power supply (rated capacity)	kVA	50 [53]	56.7 [75]	50 [53]	88 [89.8]	70	100	
Machine Dimensions	Height	mm (inch)	2805 (110.4)				3011 (118.6)		
	Length	mm (inch)	4850 [5945] (190.9 [234.1])				6070 (239.0)		
	Width	mm (inch)	2525 [2490] (99.4 [98.0])				2682 (105.6)		
	Weight	kg (lb)	11500 [12800] (25352.8 [28218.8])	11800 [13800] (26014.2 [30423.3])	11700 [13700] (25793.7 [30202.9])	12000 [14000] (26455.1 [30864.3])	14900 (32848.4)	15500 (34171.1)	

- The specifications and information above-mentioned may be changed without prior notice.
- For more details, please contact Doosan.

\*{ } : Option

Basic information

Basic Structure  
Cutting  
Performance

Detailed Information

Options  
Diagrams  
Specifications

Customer Support Service



NO.	Division	Item	Spec.	PUMA MX1600 / 2100(T) / (MX2600T)	PUMA MX1600 / 2100S(ST) / (MX2600ST)	PUMA MX1600 / 2100(T) / (MX2600T)	PUMA MX1600 / 2100S(ST) / (MX2600ST)
				Fanuc 31i	Fanuc 31i	Fanuc 31i-5	Fanuc 31i-5
1	Controlled axis	Controlled axes		6{8}: X1, Z1, C1, Y, B, A, {X2, Z2}	7{9}: X1, Z1, C1, Y, B, C2, A, {X2, Z2}	6{8}: X1, Z1, C1, Y, B, A, {X2, Z2}	7{9}: X1, Z1, C1, Y, B, C2, A, {X2, Z2}
2		Simultaneously controlled axes		4 axes	4 axes	5 axes	5 axes
3		Synchronous/Composite control	C1 & C2 Synchro Control	X {●}	●	X {●}	●
4		HRV2 control		●	●	●	●
5		Inch/metric conversion		●	●	●	●
6		Stored stroke check 1		●	●	●	●
7		Interference check for rotary area		●	●	●	●
8		Unexpected disturbance torque detection function		●	●	●	●
9	Operation	DNC operation with memory card		●	●	●	●
10		Tool retract and recover		○	○	○	○
11		Dry run		●	●	●	●
12		Single block		●	●	●	●
13		Handle interruption		○	○	○	○
14		Incremental feed	x1,x10,x100	●	●	●	●
15		Manual handle retrace		○	○	○	○
16		Active block cancel		○	○	○	○
17	Interpolation functions	Nano interpolation		●	●	●	●
18		Linear interpolation		●	●	●	●
19		Circular interpolation	G02	●	●	●	●
20		Polar coordinate interpolation		●	●	●	●
21		Cylindrical interpolation		●	●	●	●
22		Helical interpolation		●	●	●	●
23		Thread cutting, synchronous cutting		●	●	●	●
24		Multi threading		●	●	●	●
25		Thread cutting retract		●	●	●	●
26		Continuous threading		●	●	●	●
27		Variable lead thread cutting		○	○	○	○
28		Circular thread cutting		○	○	○	○
29		Polygon machining with two spindles		●	●	●	●
30		High-speed skip	Input signal is 8 points.	○	○	○	○
31		3rd/4th reference position return		●	●	●	●
32	Balanced cutting	Only for more than 2 path control	X{●}	X{●}	X{●}	X{●}	
33	Feed function	Override cancel		●	●	●	●
34		AI contour control I (40blocks)		●	●	○	○
35		AI contour control II (200blocks)		○	○	●	●
36		High-speed processing (600blocks)		X	X	●	●
37		Rapid traverse block overlap		●	●	●	●
38	Program input	Optional block skip	1 piece	●	●	●	●
39		Absolute/incremental programming		●	●	●	●
40		Diameter/Radius programming	X-axis	●	●	●	●
41		Dynamic switching of diameter/radius specification		○	○	●	●
42		Automatic coordinate system setting		●	●	●	●
43		Workpiece coordinate system	G52 - G59	●	●	●	●
44		Workpiece coordinate system preset		○	○	○	○
45		Addition of workpiece coordinate system	48 pairs	○	○	○	○
46		Addition of workpiece coordinate system	300 pairs	○	○	○	○
47		Direct drawing dimension programming		●	●	●	●
48		G code system	A	●	●	●	●
49	G code system	B/C	●	●	●	●	



● Standard ○ Optional X Not applicable

NO.	Division	Item	Spec.	PUMA MX1600 / 2100(T) / {MX2600T}	PUMA MX1600 / 2100S(ST) / {MX2600ST}	PUMA MX1600 / 2100(T) / {MX2600T}	PUMA MX1600 / 2100S(ST) / {MX2600ST}
				Fanuc 31i	Fanuc 31i	Fanuc 31i-5	Fanuc 31i-5
50	Program input	Chamfering/Corner R		●	●	●	●
51		Custom macro		●	●	●	●
52		Addition of custom macro common variables	#100 - #199, #500 - #999	●	●	●	●
53		Interruption type custom macro		○	○	○	○
54		Canned cycle		●	●	●	●
55		Multiple repetitive cycles	G70~G76	●	●	●	●
56		Multiple repetitive cycles II	Pocket profile	●	●	●	●
57		Canned cycle for drilling		●	●	●	●
58		Automatic corner override		○	○	○	○
59		3-dimensional coordinate system conversion		●	●	●	●
60		Coordinate system shift		●	●	●	●
61		Direct input of coordinate system shift		●	●	●	●
62		Real time custom macro		○	○	○	○
63		Pattern data input		○	○	○	○
64	Operation Guidance Function	EZ Guidei (Conversational Programming Solution)		●	●	●	●
65		EZ Operation package		●	●	●	●
66	Auxiliary/Spindle speed function	Constant surface speed control		●	●	●	●
67		Spindle override	0 - 150%	●	●	●	●
68		Spindle orientation		●	●	●	●
69		Spindle synchronous control		X	●	X	●
70		Rigid tap		●	●	●	●
71	Arbitrary speed threading		○	○	○	○	
72	Tool function / Tool compensation	Tool offset pairs	400-pairs	X	X	X	X
73			499-pairs	●	●	●	●
74			999-pairs	○	○	○	○
75		Tool offset		●	●	●	●
77		Smooth TCP		X	X	●	●
78		Y-axis offset		●	●	●	●
79		Tool radius/Tool nose radius compensation		●	●	●	●
80		Tool geometry/wear compensation		●	●	●	●
81		Automatic tool offset	G36/G37	●	●	●	●
82		Direct input of offset value measured B		●	●	●	●
83	Tool life management		●	●	●	●	
84	Accuracy compensation function	Backlash compensation for each rapid traverse and cutting feed		●	●	●	●
85		Stored pitch error compensation		●	●	●	●
86	Editing operation	Part program storage size & Number of registerable programs	1280M(512KB)_1000 programs	●	●	●	●
87			2560M(1MB)_1000 programs	○	○	○	○
88			5120M(2MB)_1000 programs	○	○	○	○
89			10240M(4MB)_1000 programs	○	○	○	○
90			20480M(8MB)_1000 programs	○	○	○	○
91			5120M(2MB)_4000 programs	○	○	○	○
92			10240M(4MB)_4000 programs	○	○	○	○
93			20480M(8MB)_4000 programs	○	○	○	○
94	Program protect		●	●	●	●	
95	Password function		●	●	●	●	
96	Playback		○	○	○	○	
97	Memory card program edit & operation	Max 63 programs	●	●	●	●	
98	Data input / output	Fast data server		○	○	○	○
99		External data input		●	●	●	●
100		Memory card input/output		●	●	●	●
101		USB memory input/output		●	●	●	●
102		Automatic data backup		●	●	●	●
103	Interface function	Embedded Ethernet		●	●	●	●
104		Fast Ethernet		○	○	○	○
105	Others	Display unit	15" color LCD	●	●	●	●
106	Robot interface	Robot interface with PMC I/O module		○	○	○	○
107		Robot interface with PROFIBUS-DP		○	○	○	○

# Responding to Customers Anytime, Anywhere

## Doosan Machine Tools' Global Network, Responding to Customer's Needs nearby, Anytime, Anywhere

Doosan machine tools provides a system-based professional support service before and after the machine tool sale by responding quickly and efficiently to customers' demands.

By supplying spare parts, product training, field service and technical support, we can provide top class support to our customers around the world.



### Global Sales and Service Support Network

Corporations	Dealer Networks	Technical Centers Technical Center: Sales Support, Service Support, Parts Support	Service Post	Factories
4	167	51	200	3

# Doosan Machine Tools Customer Support Service

We help customers to achieve success by providing a variety of professional services from pre-sales consultancy to post-sales support.



## Supplying Parts

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



## Field Services

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



## Technical Support

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



## Training

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



## Major Specifications

### PUMA MX series



Description		Unit	PUMA MX1600 <sup>735</sup> series	PUMA MX1600 series	PUMA MX2100/L series	PUMA MX2600T/ST series
Capacity	Chuck(Left/Right)	mm (inch)	6		8	10
	Max. turning dia.	mm (inch)	330(13.0)		540(21.3)	760(29.9)
	Max. turning length	mm (inch)	700 (27.6)	900 (35.4)	1020/1520 (40.2/59.8)	1540 (60.6)
	Bar working dia.	mm (inch)	51(2.0)		65(2.6)	76(3.0)
Left Spindle	Max. spindle speed	r/min	6000		5000	4000
	Max. spindle power	kW(Hp)	15/11 (20.1/14.8)		22/18.5 (29.5/24.8)	26/22 (34.9/29.5)
Servo driven Tailstock (except S/ST model)	Quill type	-	Built-in dead, MT#4			Built-in dead, MT#5
	Max. thrust force	kN(lbs)	3.5(786.8)		7.0(1573.6)	10.0(22480)
Right Spindle (on S/ST model)	Max. spindle speed	r/min	6000		5000	4000
	Max. spindle power	kW(Hp)	15/11 (20.1/14.8)		22/18.5 (29.5/24.8)	26/22 (34.9/29.5)
Milling Spindle	B-axis	deg.	240(±120)			
	Max. spindle speed	r/min	12000{18000}		12000	
	Max. spindle power	kW(Hp)	9/7.5/3.7 (12.1/10.1/4.7)		18.5/15/11 (24.8/20.1/14.8)	22/18.5/15 (29.5/24.8/20.1)
	Tool shank	-	Capto C5		Capto C6{HSK A63}	
ATC&Tool magazine	Tool storage	ea	40	40{80}		
	Tool changer	-	Swing arm			
Lower turret (on T/ST model)	For turning(Tool stations)	ea	8	-	-	{12}
	For turn-milling (Tool stations)	ea	{16, BMT45P}	16, BMT45P	12, BMT55P	12, BMT65P
	Max. rotary tool speed	r/min	{6000}	6000	5000	4000

{ } Option

## Doosan Machine Tools

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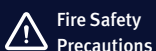
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\* For more details, please contact Doosan Machine Tools.

\* The specifications and information above-mentioned may be changed without prior notice.

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**Fire Safety  
Precautions**

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

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