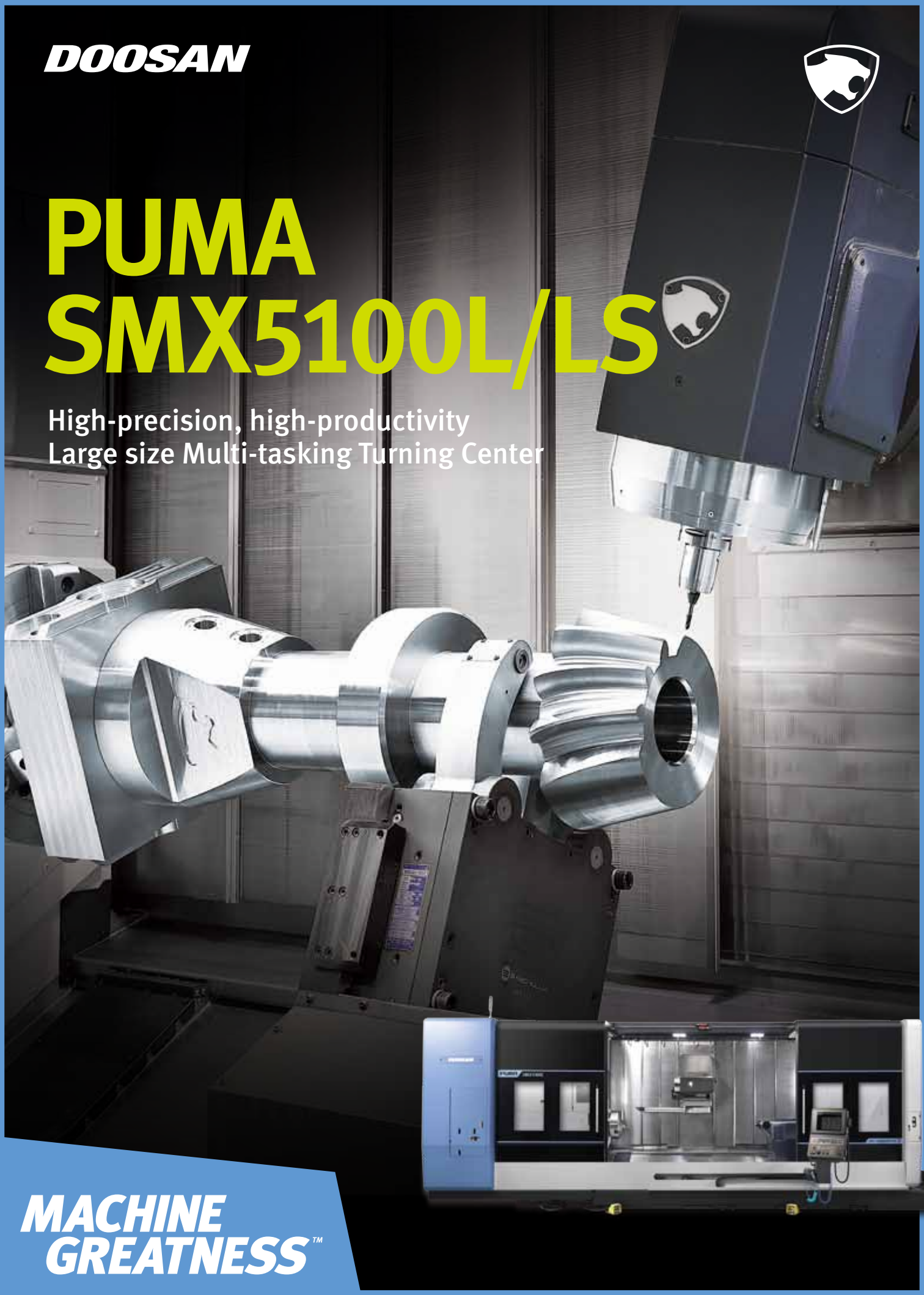
DOOSAN

PUMA SMX5100L/LS

High-precision, high-productivity
Large size Multi-tasking Turning Center



MACHINE GREATNESS™

Basic information

Basic Structure
Main Units
Machine
Performance
CUFOS

Detailed Information

Options
Diagrams
Specifications

Customer Support Service

PUMA SMX5100L/LS

PUMA SMX5100 series are 3M length large-sized multi-tasking turning centers with high power/torque spindle and wide machining area. It is optimized for complex turn-mill machining process of long, large-diameter workpieces such as oil-gas, aerospace, industrial machinery components.
PUMA SMX5100 series also provide excellent performance for high precision machining by minimizing thermal deformation and applying an accuracy control feature based on multiple thermal compensation functions. Ergonomic design considering operator convenience and efficient maintenance provides an optimal solution that meets the customer's needs.

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Higher Productivity through Powerful Multi-tasking Functions

Decreases the total processing time and number of machining operations by using a single setup and provides excellent high speed performance for component manufacturing processes which require accurate and complex machining.

- Complex machining capabilities of left spindle, right spindle, B-axis , milling spindle.
- Built-in spindle/High torque Big bore spindle can be selected according to customer's machining conditions
- High-rigidity machine construction using structural analysis design
- Maximized Y-axis machining area through orthogonal design structure

Enhanced Precision through High Accuracy Control Functions

Maintains excellent precision during long-term machining processes by minimizing the thermal deformation of the spindle and the feed axis, and maximises precision through the 0.0001° axis resolution control function.

- Minimized thermal deformation of the spindle and feed axis using oil cooler
- Adoption of Roller LM Guideways with high-rigidity and high precision
- Equipped with 0.0001° B-axis and C-axis accuracy control function

Easy and Convenient Operation through an Ergonomic Design

Features excellent maintenance as well as usability and convenience through customized functions.

- CUFOS CNC with CPS(Collision Protection System), Tool management and additional customized functions
- Wide door and easy spindle accessibility for convenient workpiece loading/unloading
- Side-to-side movable swiveling operation panel with adjustable height
- Convenient ATC operation panel

Basic Structure

Optimized orthogonal structure secures a wide working area, easy operation and stability for high precision machining

Robust Design

FEM (Finite Element Method) analysis results in superior machine stability. All guideways are sealed with a protective covers, preventing high temperature chips and coolant from contacting the guideways, thus maintaining unsurpassed long-term accuracy.

Feed Axis

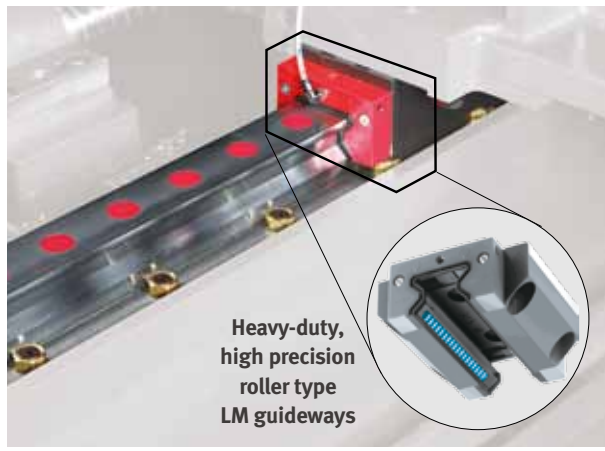
Best-in-its class X-axis travel 910mm and Y-axis travel 520mm provide high-production processing capability. In particular, since the X, Y and Z axes are linearly moved in an orthogonal status, high precision of machining itself is basically implemented.

Travel		
	PUMA SMX5100L/LB	PUMA SMX5100LS/LSB
X-axis	910(-30/+880) mm (35(-1.2/+34.6)inch)	
Y-axis	520(±260) mm (20.5(±10.2)inch)	
Z-axis	3215 mm (126.6inch)	
A-axis*	3100 mm (122.0inch)	
B-axis	240(±120)°	

* Tailstock/Right Spindle travel

High Precision Roller type LM Guideways

High precision roller type LM guideways minimizes non-cutting time through high rapid traverse rates.



Rapid traverse rate		
	PUMA SMX5100L/LB	PUMA SMX5100LS/LSB
X-axis	40 m/min (1574.8 ipm)	
Y-axis	40 m/min (1574.8 ipm)	
Z-axis	40 m/min (1574.8 ipm)	
A-axis*	-	14 m/min (551.2 ipm)
B-axis	30 r/min (1181.1 ipm)	

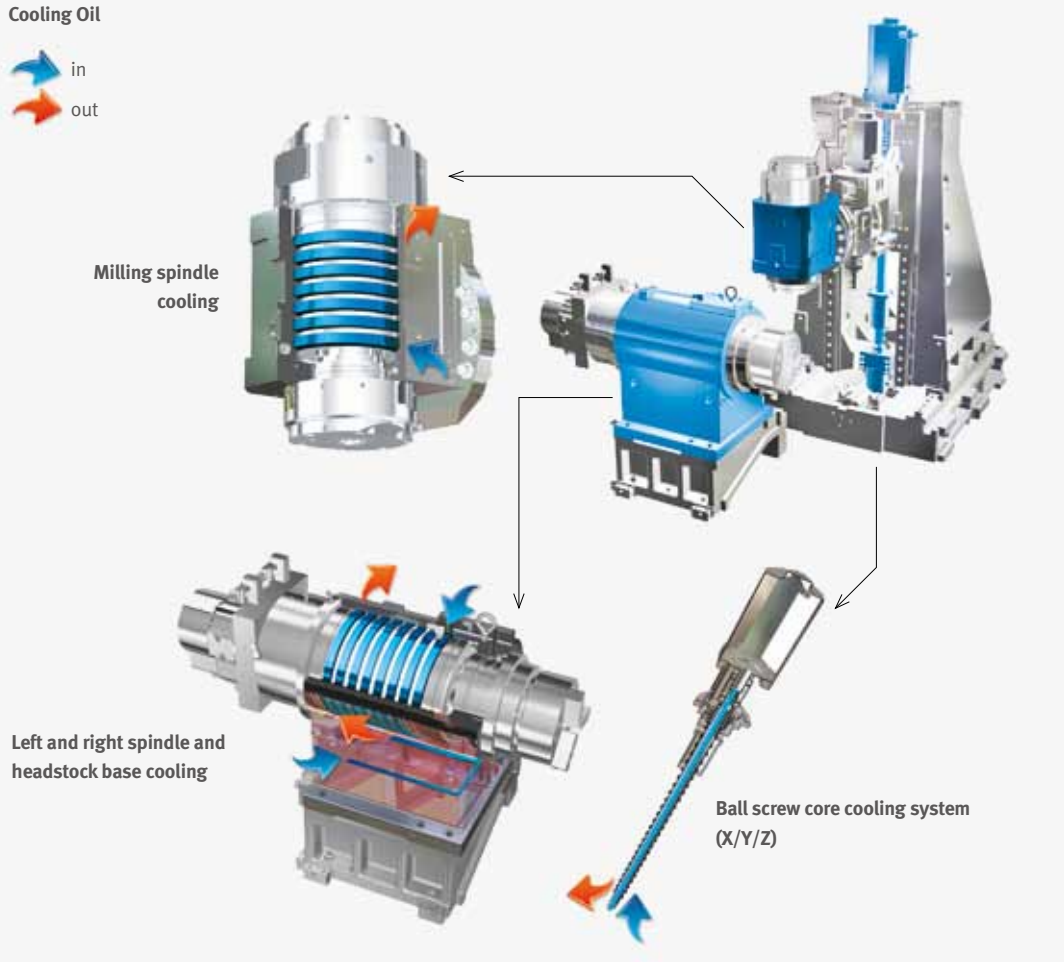
* Tailstock/Right Spindle travel

Basic Cooling Concept for Higher Accuracy in a Long time Machining

Structural preparation to minimize thermal error and ensure superior accuracy for a long time operation

Minimization of Thermal Deformation by Oil Cooling

Spindle and ball screw core cooling system minimizes thermal deformation during long machining processes and enhances high accuracy performance.



Roundness, Surface Roughness

By performing systematic test procedures of individual machine elements and detailed analysis of results, the SMX5100 series achieves a high level of precision and reliability that fulfills customer satisfaction.

Turning (O.D. machining)

Roughness

0.39μm

Material	Aluminium
Tool	OD tool (SANDVIK)
Spindle speed	1000 r/min
Feedrate	0.1 mm/rev

Roundness

1.25μm

Material	Aluminium
Tool	OD tool (SANDVIK)
Spindle speed	1500 r/min
Feedrate	0.1 mm/rev

Milling (X-Y plane)

Roundness

5μm

Material	Aluminium
Tool	Endmill Ø10 mm(TAEGUTEC)
Spindle speed	12000 r/min
Feedrate	300 mm/min

* This test is performed under Doosan Machine Tool's test environment.

Spindle

Built-in spindle and High-torque big-bore spindle can be selected depending on the machining conditions between high-precision 5-axis contouring and heavy-duty machining for different-to-cut materials

Perfect combination of rotating spindles

Both left and right spindle are capable of high accuracy C-axis control and perform various machining functions like turning, milling and synchronized cutting using single set-up with milling spindle.

Model	Spindle	Standard Chuck (inch)	Spindle speed (r/min)	Power kW (Hp)	Torque N·m (ft-lbs)	Condition
PUMA SMX5100L/LS	Left spindle	15	2400	37/30 (49.6/40.2)	1643 (1212.5)	30min/cont.
PUMA SMX5100LB/LSB		21	1500		4200 (3099.6)	
PUMA SMX5100LS	Right spindle	15	2400		1643 (1212.5)	
PUMA SMX5100LSB		21	1500		4200 (3099.6)	

Model	Spindle	Standard Chuck (inch)	Spindle speed (r/min)	Power kW (Hp)	Torque N·m (ft-lbs)	Condition
PUMA SMX5100L/LS	Milling spindle	CAPTO C8	10000	37/30/25 (49.6/40.2/33.5)	302 (222.9)	2.5min/ 30min/ cont.
PUMA SMX5100LB/LSB						

Machining All Angles (C & B-axis)

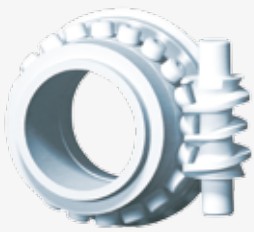
Machining operation is mainly done by Left and Milling spindle. C-axis of left spindle and B-axis of milling spindle with Y-axis control realize multi-tasking turning center that can drill, tap and end mill in any angle and also deliver the ability to cut precise angles and contouring(5-axis simultaneous controlled specification is option).

C-axis positioning control

To enhance C-axis positioning accuracy of left spindle, the position compensation sensor has been adopted. Left and Right spindle can have C-axis positioning control of every 0.0001° in 360°.

B-axis positioning control Precise continuous index

B-axis index of swiveling every 0.0001° position in ±120° performs not only horizontal front face machining but also complex angular machining.



Swivel and indexing of B-axis is driven by servo motor and roller gear cam, ensuring sufficient rigidity for powerful cutting as well as for high-precision position control

Dual pressure braking

Depends on cutting condition, braking index of B-axis can be controlled.

Emergency braking function

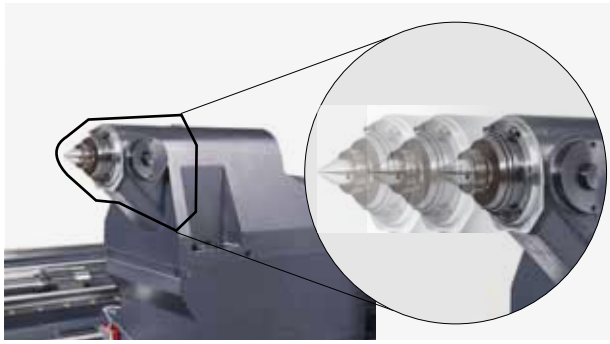
In case of abnormal operation stops such as power supply interruption, the braking function protects operators and workpieces.

Tailstock

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

Servo driven tailstock

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. This provides production efficiency by reducing the operator's set-up time and non-cutting time during machining.



Model	Tail stock travel mm (inch)	Max. quill thrust force kN (lbs)	Tail stock center
PUMA SMX5100L	3100 (122.0)	15 (3374.4)	MT#5 (Built-in type Dead Center)
PUMA SMX5100LB	3100 (122.0)	20	

ATC Automatic Tool Changer

Servo ATC and Servo tool magazine ensuring fast and reliable tool indexing

Servo driven ATC & Tool magazine

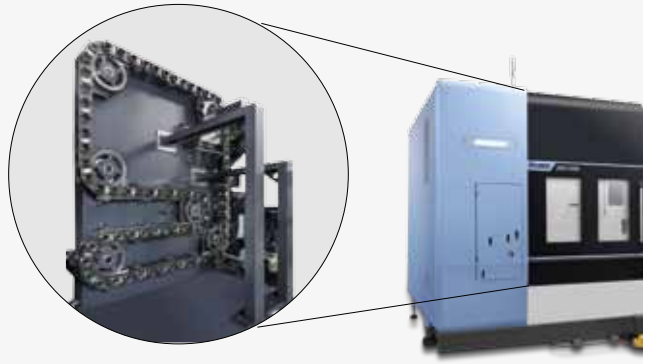
The tool magazine can be increased up to 120 tools and tools are selected by a fixed address method that search for the shortest path.

Tool storage

40 tools

option 80 / 120 tools*

The photo is tool magazine of 80 tools



Max. tool length (from gauge line)	600 mm (23.6 inch)
Max. tool weight	30 kg (66.1 lb)
Max. tool moment	29.4 N.m (21.7 ft-lbs)
Max. tool diameter (continuous)	Ø135 mm (5.3 inch)
Max. tool diameter (adjacent pots are empty)	Ø260 mm (10.2 inch)

ATC Operation Panel

The status of ATC and the tool magazine unit are identified visually by using a graphic touch panel display and touch operation. The touch screen also operates the ATC, the tool magazine and the tool pot carrier individually.

Enlarged touch screen panel is available as an option

10.4inch

ATC-Magazine Infomation Display

The operation status of ATC-magazine, which is difficult to check from outside, can be displayed at a glance on 10.4” big screen

Convenient Touch operation

Available buttons are activated according to the current and next operation steps. Complex manual operations are replaced in a simple way.

Tool magazine inside monitoring

Real tool magazine status can be monitored by CCTV installed in the magazine room.

Additional Tool Magazine

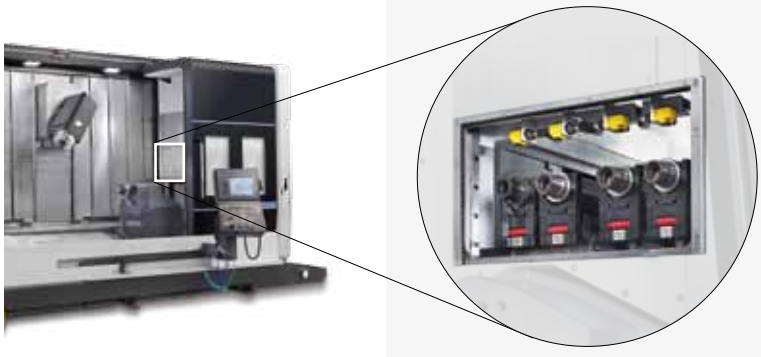
Optional LBB(Long boring bar) magazine and long tool magazine can make easy and efficient ID turning/milling of long pipes, tubes and shafts.

PUMA SMX5100L/LS can accommodate workpieces as long as 3050mm and process long tubes such as Isolation Valves/pipe lines(Oil/Gas) and landing gear axle(Aerospace) requiring the center bore machining. Additional(Optional) Long Boring Bar/Long tool magazine can reduce machining processes/cycle time and improve machining capability.

Automatic LBB Changer Package option

Package name	Composition
Package A1 (❶+❷+❹) drastically reduce LBB set-up time and optimized package for heavy-duty machining on hard materials	Auto Head tool ATC(C4) + LBB(Auto Head tool change type) + 3-LBB stocker
Package A2 (❶+❷+❸+❹)	Package A + LBB(Manual tool change type) 1EA
Package A3 (❶+❷+❸+❸+❹)	Package A + LBB(Manual tool change type) 2EA
Package B1 (❸+❹) drastically reduce LBB set-up time and high productivity package	LBB(Manual tool change type) + 3-LBB stocker
Package B2 (❸+❸+❹)	Package B + LBB(Manual tool change type) 1EA
Package B3 (❸+❸+❸+❹)	Package B + LBB(Manual tool change type) 2EA

Tools magazine for Long boring bar option



Max. Tool size
Ø80 x L1120 mm
(Ø3.1 x L 44.1 inch)

Max. Weight
70 kg
(154.3 lb)

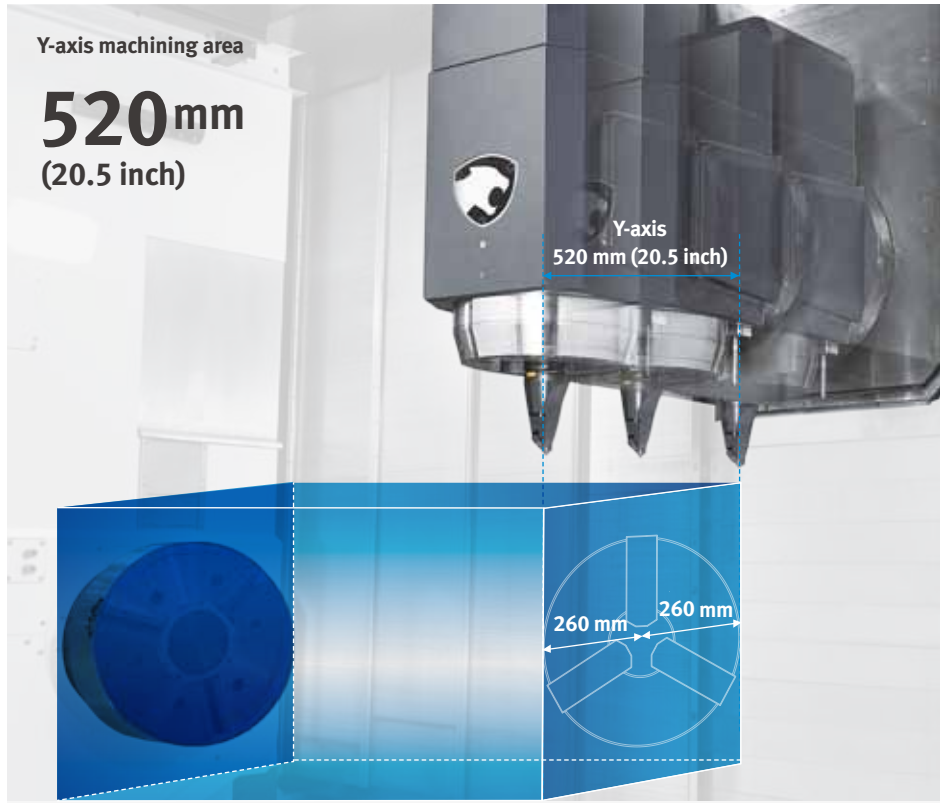
Tool storage
4 tools

Machining Area

Expands machining capacity using an orthogonal structure and enables machining of large size workpieces through the extended turning diameter.

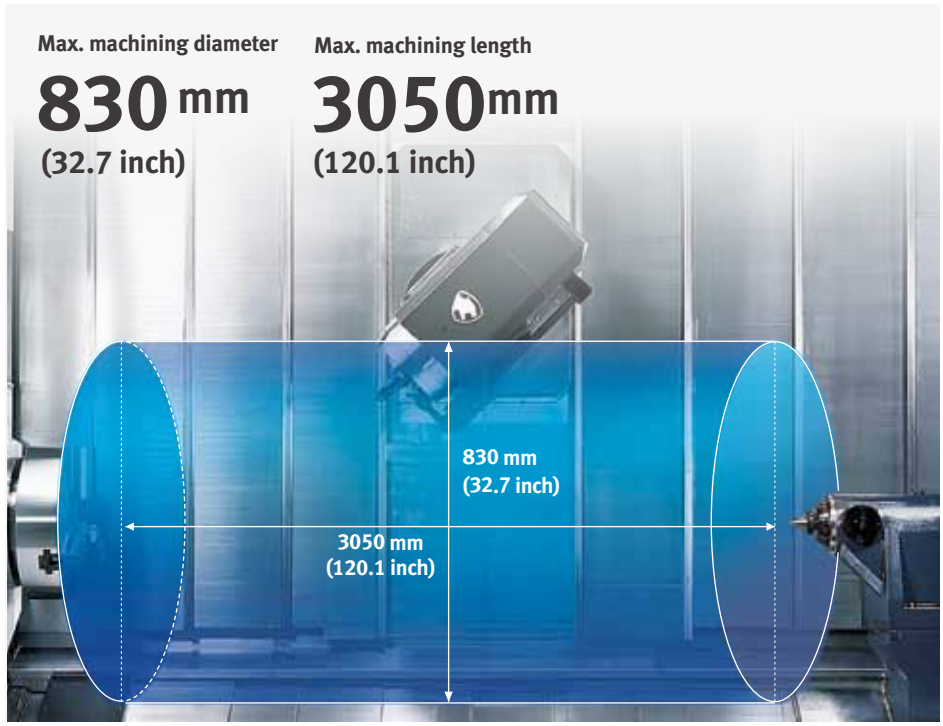
Maximized Y-axis Machining Area Using Orthogonal Structure Design

Maximized Y-axis machining area because of orthogonal structure design allows the machining of a wide range of workpieces.



Extended Machining Area

The extended machining area allows machining of large diameter and Max. 3M long length workpieces.



Cutting Performance

Powerful machining capability in various operation such as turning, milling, drilling, tapping and other multitasking performance ensuring more higher machining efficiency.

Powerful Machining

O.D. cutting (PUMA SMX3100)

Spindle speed r/min	Cutting speed m/min (ipm)	Feedrate mm/rev (ipr)	Radial cutting depth mm (inch)	Material removal rate cm^3/min ($inch^3$/min)
253	210 (8267.7)	0.55 (0.0 ipr)	8.5 (0.3)	1405 (85.7)

U-drill (milling)

Tool mm (inch)	Milling spindle speed r/min	Feedrate mm/min (ipm)	Material removal rate cm^3/min ($inch^3$/min)
Ø80 (Ø3.1)	796	200 (7.9)	600 (36.6)

Face milling

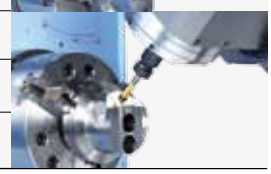
Tool mm (inch)	Milling spindle speed r/min	Radial cutting depth mm (inch)	Feedrate mm/min (ipm)	Material removal rate cm^3/min ($inch^3$/min)
Ø100 (Ø3.9)	637	7 (0.3)	1114 (43.9)	602 (36.7)

End milling

Tool mm (inch)	Milling spindle speed r/min	Radial cutting depth mm (inch)	Feedrate mm/min (ipm)	Material removal rate cm^3/min ($inch^3$/min)
Ø32 (Ø1.3)	597	32 (1.3)	350 (13.8)	358 (21.8)

Tapping

Tool mm (inch)	Milling spindle speed r/min	Feedrate mm/min (ipm)
M36 x P4.0 (M1.4 x P0.2)	221	4.0 (0.2)



* 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.

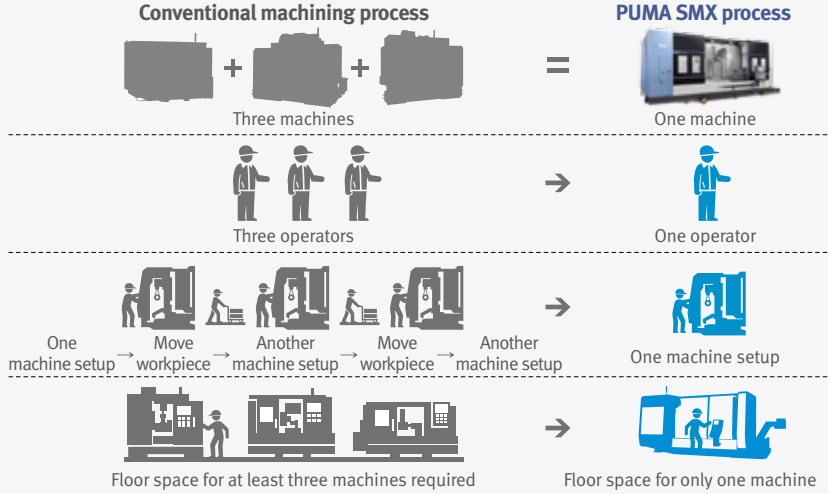
Higher Productivity by Multi-tasking Performance

Faster machining time compared to working with many conventional machines provides superior productivity and machining capability.

Reduced production lead time by

75 %

Reduced time and operator requirements and enhanced accuracy!



Ergonomic Design

Maximizes user's convenience by employing ergonomic design concept

Ease of Machine Setup through Ergonomic Design

By laying out the operation panel and tool magazine in a user-friendly way, tooling and workpiece setup become easier for the operator.

1.
Wide door opening width
Easy crane work when loading/unloading workpieces

2.
Easy operator's access to spindle
Fast and comfortable work set-up

3.
Operation panel with side-to-side movement, swivel action and adjustable height

Swivel angel adjustment : 100°
Height adjustment : 190 mm (7.5 inch)
Longitudinal movable : 2615 mm (103.0 inch)

4.
Extended front window

Enables the operator to easily monitor the machining operation using the large front window

5.
Front-focused maintenance

Intensive device arrangement such as oil supply, gages to facilitate daily maintenance

CUFOS for PUMA SMX ser.

Customized User-friendly Flexible Operation Solutions

CUFOS is a PC based control system created by Doosan Machine Tools. Equipped with intuitive user-friendly functions such as a smart phone screen and easy customization, CUFOS helps to improve operational efficiency and performance for the user.

• Features of CUFOS

19 inch Touch Screen

- **Program memory : 2GB (40GB option)**

  App-based Interface like smart phone, tablet PC

EASY PROGRAMMING

- **Conversational Programming**
- **Sketch Cycle : Gear Skiving, Gear Hobbing, Polygon Turning (continuously being added...)**
- **SSD Data Server : Program file sharing/ managing (CF card/USB/External PC)**

EASY SET-UP/OPERATION

- Tool Management for SMX
- CPS(Collision Protection System)
- Manual Viewer
- Video Viewer

EASY MAINTENANCE

- Status Monitor
- Alarm Guidance
- Maintenance Manager
- Easy connection with external S/W(creating additional App.)

Sketch cycle

Easy and Quick, but Powerful programming for complex machining

Sketch cycle is easy-to-use conversational programming software that make a support to code complex shapes and machining processes such as gear skiving, hobbing and polygon turning.

Advangages

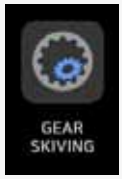
- Easy to use even for beginners with conversational programming by advising workpiece shapes, tool information and machining conditions
- Expensive CAM software is not required
- Reduce coding time by up to 70% while minimizing trial and errors
- Enable to utilize the recent high productivity processing program such as gear skiving

Create a machining program

[Use to an individual machining program]

or
[Insert programming codes into the whole program]

* Please contact to DOOSAN on further information

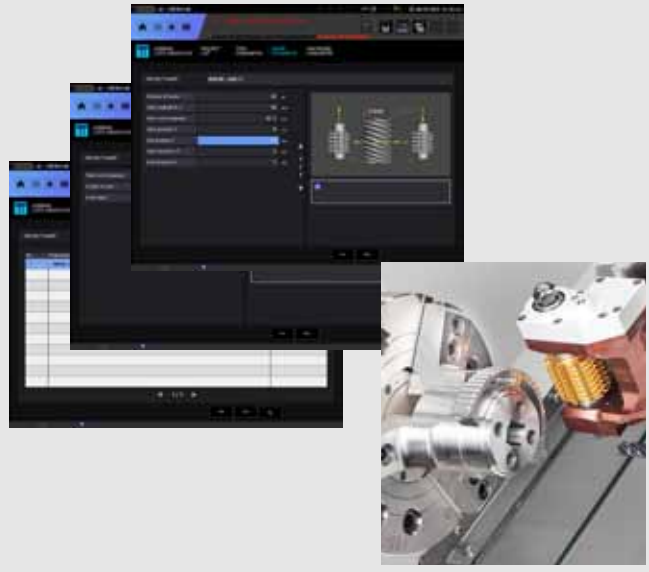


Gear skiving

Gear skiving is carried out in 5 axis machines for more flexible and productive gear machining. The complete component can be finished in one machine, which shorten production time and reduce handling and logistics cost.

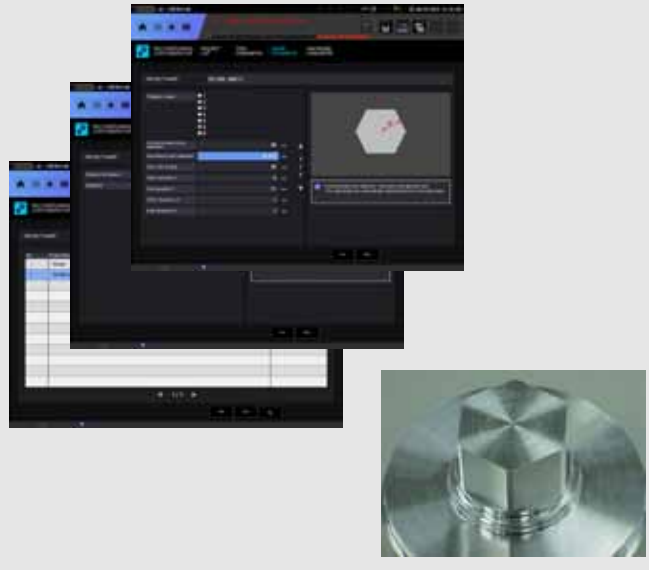
Gear hobbing

Gear hobbing make it easy to proceed gear machining with general turning centers. Gear machining programs can be created by the simple conversational programming so program coding and set-up time can be saved dramatically.



Polygon turning

Polygon turning is a machining process which allows non-circular forms(polygons) to be machine turned without interrupting the rotation of workpieces. It allows rapid production and clean machining of advanced geometries.



EasySet-up & Operation

Tool management, Collision Protection between machine unit/ workpiece/tooling and various user guidance provide higher productivity and user-convenience

Tool management

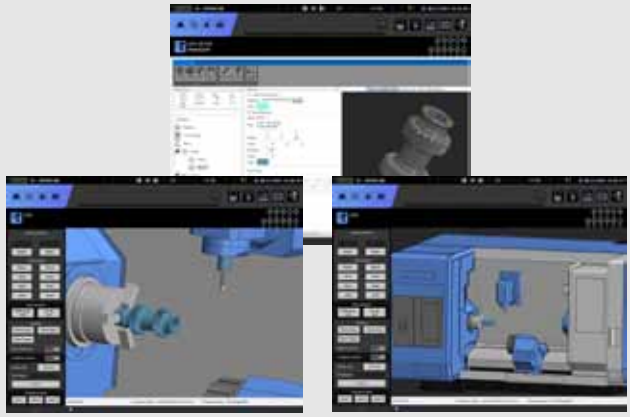
Doosan EOP (Easy Operation Package) tool management

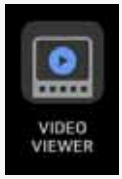
Includes a summary monitoring screen and gives the operator easy access to Doosan's own tool management system which provides comprehensive real time data on each tool, such as remaining tool life and status of tool groups.

CPS (Collision Protection System)

A function to prevent real-time collision in manual mode between the tool and equipment / machine elements inside the working area.

Use the Setup Manager with the CPS app to build up the machine model, and add tool, workpiece and workholding equipment details.





Video viewer

Video transfer and viewer functions make clearer communication possible between operators and helpful for training new workers, complex job arrangement

*** Video format : .wmv, .avi, .mpg, .mpeg, .mp2, mp3, .wav, .mov, .mp4 (same as Window media open files)**

Easy Maintenance

Keeping a machine in best condition through Status Monitoring, Alarm Guidance and Maintenance manager functions

Status Monitoring

Monitoring various information such as spindle, milling spindle, feed axis, cycle time, program/tool no. on one screen

Alarm Guidance

Presenting an operator alarm's causes and troubleshooting guides and sending an email when the alarm last for a long time

Maintenance manager

Monitors the status of machine and control elements, and confirms the alarm condition and maintenance schedule for preventative maintenance.

Standard / Optional Specifications

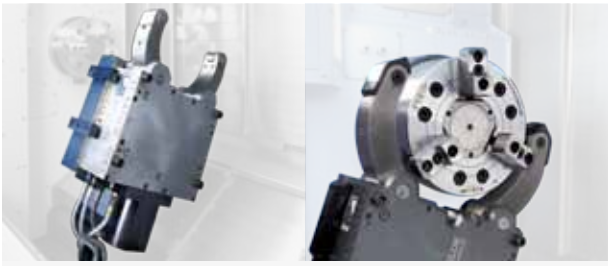
● Standard ○ Optional X Not applicable

NO.	Division	Option		PUMA SMX5100L	PUMA SMX5100LB	PUMA SMX5100LS	PUMA SMX5100LSB
1	Tool shank	CAPTO C8		●	●	●	●
2		HSK 100T		○	○	○	○
3		10.4" operation touch panel		●	●	●	●
4	Tool magazine	40 tools		●	●	●	●
5		80 tools		○	○	○	○
6		120 tools		○	○	○	○
7	Additional Tool Magazine	Long tool magazine_4ea		○	○	○	○
8		Automatic LBB Changer Package A1 or A2 or A3		○	○	○	○
9		Automatic LBB Changer Package B1 or B2 or B3		○	○	○	○
11	Work holding device	Left spindle	Hydraulic chuck 15"	●	X	●	X
12			Hydraulic chuck 18"	○	X	○	X
13			Hydraulic chuck 21"	X	●	X	●
14			Hydraulic chuck 24"	X	○	X	○
15		Right spindle	Hydraulic chuck 15"	X	X	●	X
16			Hydraulic chuck 18"	X	X	○	X
17			Hydraulic chuck 21"	X	X	X	●
18			Hydraulic chuck 24"	X	X	X	○
19		Dual pressure chucking (high pressure/high pressure)		○	○	○	○
20		Chuck clamp & Unclamp		●	●	●	●
21		Servo driven steady rest*	SLU5.1 (Ø85 ~ Ø350)	○	○	○	○
22			K5.1 (Ø100 ~ Ø410)	○	○	○	○
23			K6.0 (Ø135 ~ Ø460)	○	○	○	○
24			K6.1 (Ø215 ~ Ø510)	○	○	○	○
25			RX6.1 (Ø250~Ø685)	○	○	○	○
26	Coolant	T-T-C (Milling spindle)	Pressure 1.0MPa (145 psi)/Tank screen filter	●	●	●	●
27			Pressure 3.0MPa (435 psi)/Cyclone filter	○	○	○	○
28			Pressure 7.0MPa (1015 psi) / Cyclone filter	○	○	○	○
29		Oil skimmer		○	○	○	○
30		Coolant pressure switch (Standard for milling spindle)		●	●	●	●
31		Coolant level switch : Sensing level - Low		○	○	○	○
32	Chip disposal	Chip conveyor (Right disposal)	Hinged Belt type	○	○	○	○
33			Magnetic Scraper type	○	○	○	○
34			Drum filter with Hinge scraper type	○	○	○	○
35		Chip bucket		○	○	○	○
36		Air blower (for Left or Right spindle chuck)		●	●	●	●
37		Chuck coolant (for Left or Right spindle chuck)		○	○	○	○
38		Through spindle air (for Left or Right spindle)		○	○	○	○
39		Through spindle coolant (Left or Right)		○	○	○	○
40		Through spindle air & Air blower (for Milling spindle)		○	○	○	○
41		Shower coolant(1.1kW, 165 liter/min)		○	○	○	○
42		Coolant gun		○	○	○	○
43		Air gun		○	○	○	○
44		Mist collector		○	○	○	○
45	High accuracy	Thermal compensation		●	●	●	●
46		Ball screw core cooling (X/Y/Z-axis)		●	●	●	●
47		Oil cooling flow detector(for spindle, ball screw)		○	○	○	○
48		Coolant chiller (temperature control)		○	○	○	○
49		Linear scale (X-axis)		○	○	○	○
50		Linear scale (Y-axis)		○	○	○	○
51		Linear scale (Z-axis)		○	○	○	○
52	Measurement	Auto tool setter (Linear, Touch probe)		○	○	○	○
53		Auto Tool setter (NC4. Laser)		○	○	○	○
54		Auto workpiece measurement (RMP60)		○	○	○	○
55		Intelligent Kinematic Compensation for Multi-tasking (Software customized by Doosan)		●	●	●	●
56		Intelligent Kinematic Compensation for Multi-tasking (Datum Ball)		○	○	○	○
57	Automation	Robot interface		○	○	○	○
58		Automatic front door (with safety device)		○	○	○	○
58	Others	U-axis_DANDREA TA-C160		○	○	○	○
59		Air Limit sensing		○	○	○	○
60		Auto power off		○	○	○	○
61		Portable MPG		○	○	○	○
62		Rotay type window wiper		○	○	○	○
63	Standard Accessories	FOUNDATION BOLT FOR ANCHORING		●	●	●	●
64		Signal tower		●	●	●	●
65		Doosan tool monitoring system		●	●	●	●
66		Foot switch_sigle		●	●	●	●

* Please contact DOOSAN to select detailed steady rest specifications.

Servo driven Steady rest option

This equipment supports long workpieces during the machining process. Linear positioning of the steady rest is achieved by servo motor and ball screw and can be positioned during cycle.



Steady rest parking function

When you don't want to use steady rest, you can make it parked under left chuck.

Size	Type	Parking function
K5.1 (Ø100 ~ Ø410)	Single, Double, Twin	w/ 15" Chuck
K6.0 (Ø135 ~ Ø460)	Single, Double	w/ 15" Chuck
K6.1 (Ø215 ~ Ø510)	Single, Double	w/ 15", 18" Chuck
RX6.1 (Ø250 ~ Ø685)	Single	w/ 21" Chuck

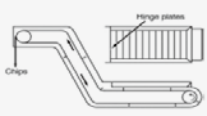
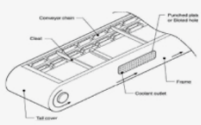
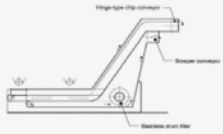
SINGLE

DOUBLE

TWIN

Chip Conveyor (Right side exit) option

The conveyor provides a superior chip removal system and is designed with a stable structure for easy maintenance and reduced leakage. By selecting the correct type of conveyor, the efficiency of the machine working area is increased.

Name	**Hinge Belt**	**Magnetic Scraper**	**Drum filter +Hinge scraper** (Double type)
Application	For steel	For castings	For steel, castings, nonferrous metal
Features	- General - Appropriate for a heavy material chip of more than 30 mm in length	- Easy maintenance - Eject the chip by scraping and raising the chip with the scraper	- Appropriate for both a long and a short chip - Filtering coolant
Shape			

U-axis option

D'Andrea TA-C160(Ø320mm), ID/OD/taper turning in random angles and various surface shapes is possible, while maintaining higher productivity and precise roundness

‹U-axis turning sample›

Tool Setter (Automatic) option

Auto linear motion type tool setter for tool measurement and tool wear detection

Gear skiving solutions

We propose a dramatic improvement in productivity with gear skiving solutions such as power skiving, invo-milling, and hobbing, which allow high-precision external / internal gear machining with a single setting.

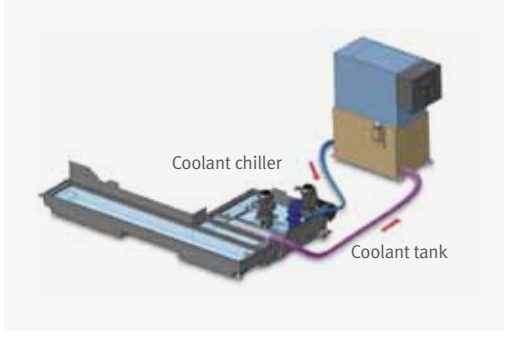
* Please contact to DOOSAN on further information.

Linear scale option

We propose linear scale when you want to achieve high accuracy of simultaneous 5-axis machining, long term machining and higher feed precision.

Coolant Chiller (Recommendation) option

A coolant chiller minimizes the thermal deformation by controlling the temperature of the return coolant to the machine, thus improving the accuracy.



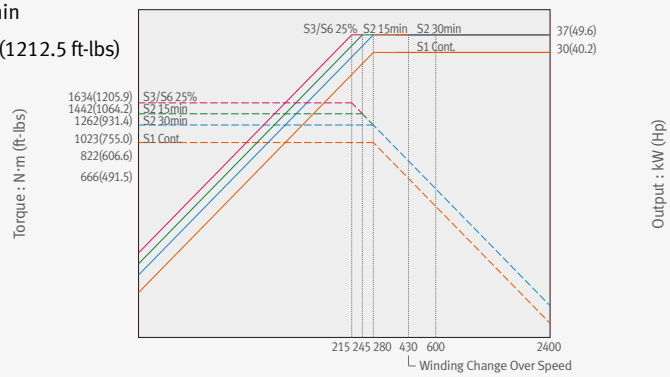
Spindle Power – Torque Diagram

PUMA SMX5100L / LS / LB / LSB

Both turning and milling spindles have powerful heavy-duty built-in type motors to maximize productivity.

Left spindle (PUMA SMX5100L, LS) / Right spindle (PUMA SMX5100LS)

Max. spindle power : 37kW (49.6 Hp)
Max. spindle speed : 2400 r/min
Max. spindle torque : 1643 N·m (1212.5 ft-lbs)

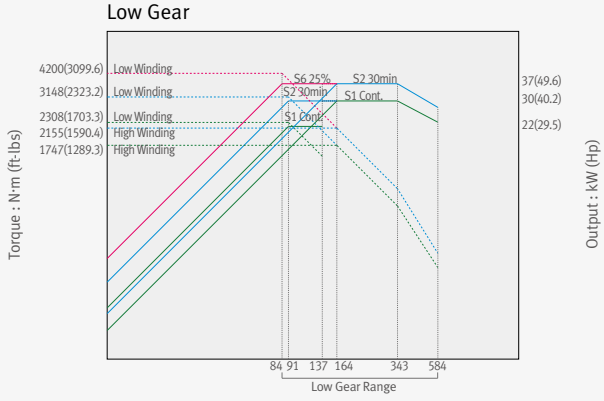


Spindle speed : r/min

Left spindle (PUMA SMX5100LB, LSB) / Right spindle (PUMA SMX5100LSB)

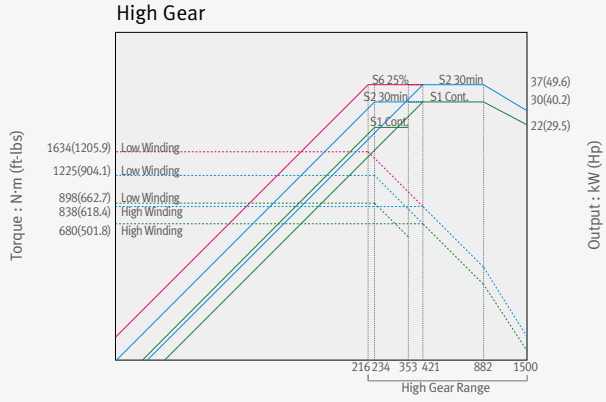
Max. spindle power : 37kW (49.6 Hp) Max. spindle speed : 1500 r/min Max. spindle torque : 4200 N·m (3099.6 ft-lbs)

Low Gear



Spindle speed : r/min

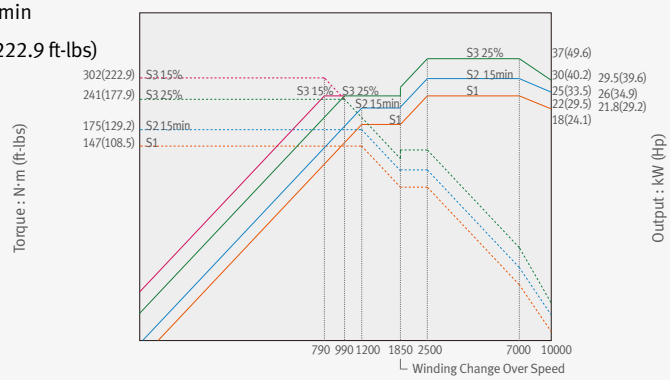
High Gear



Spindle speed : r/min

Milling spindle

Max. spindle power : 37kW (49.6 Hp)
Max. spindle speed : 10000 r/min
Max. spindle torque : 302 N·m (222.9 ft-lbs)



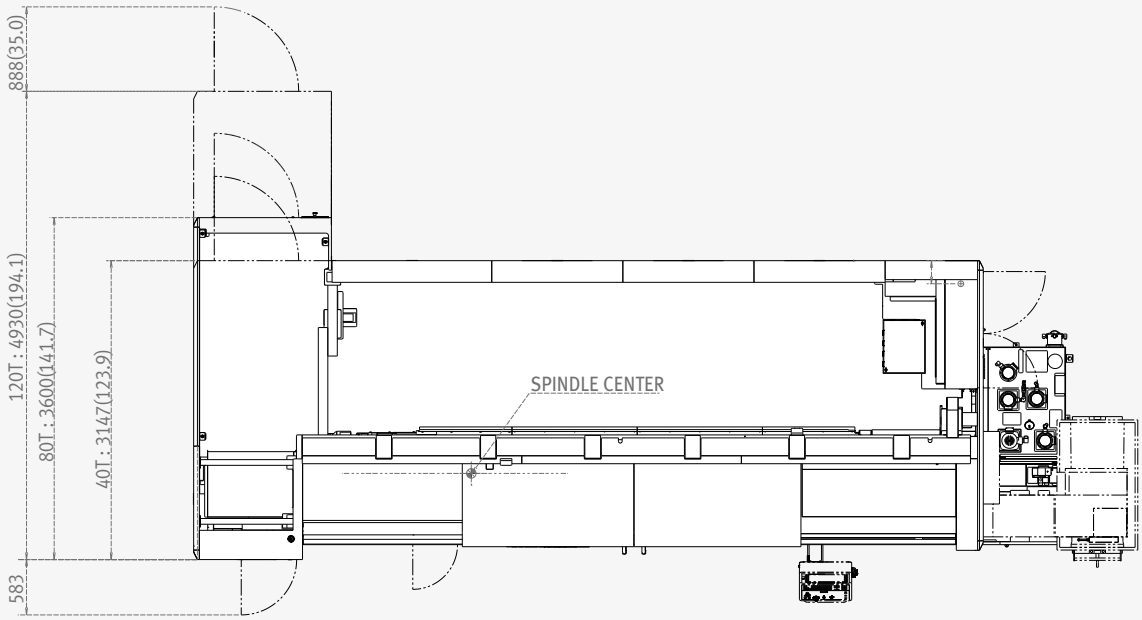
Spindle speed : r/min

External Dimensions

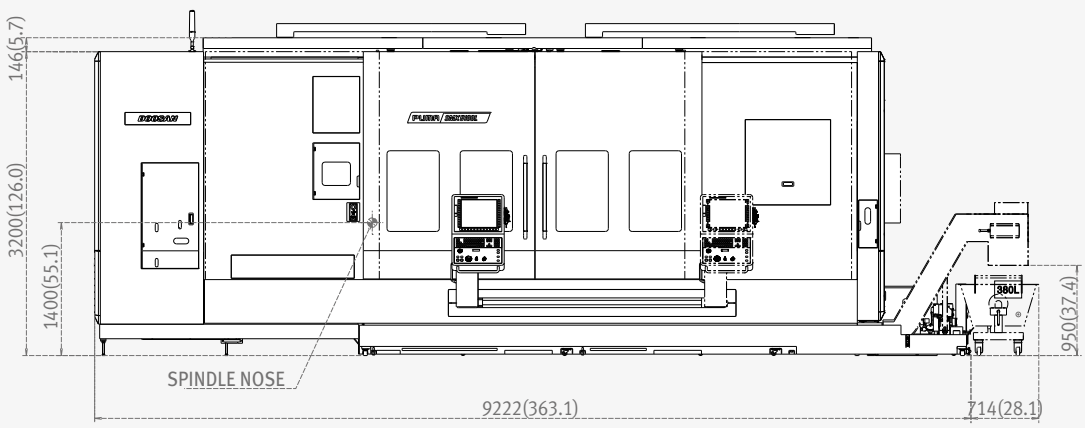
PUMA SMX5100L / LS

Unit : mm (inch)

Top view



Front view



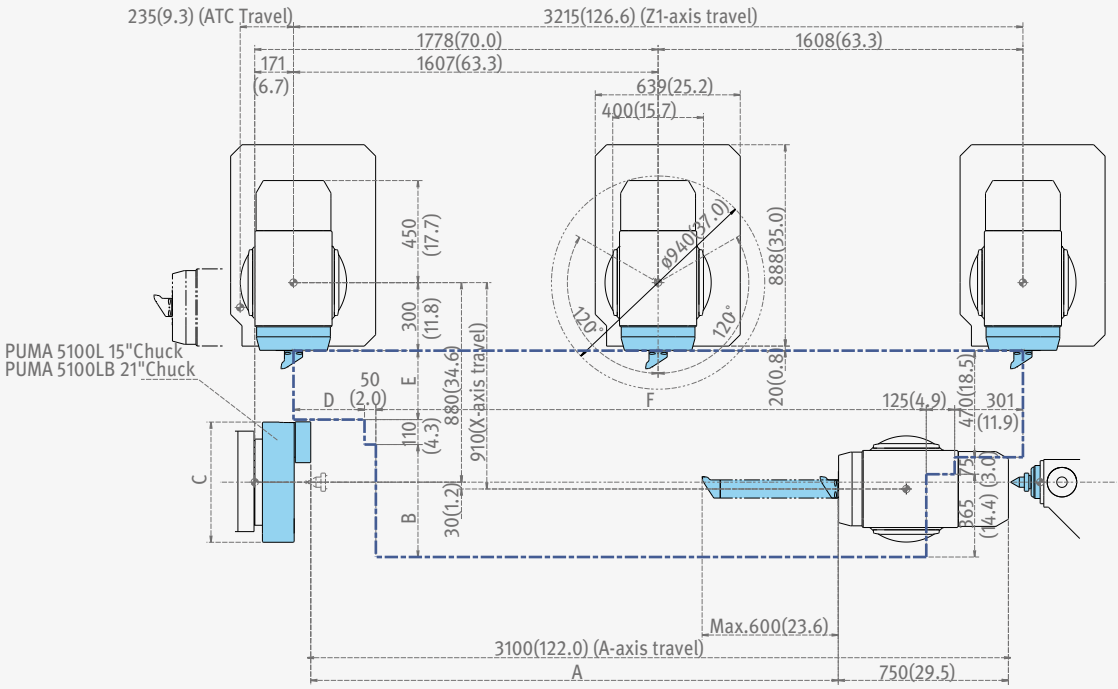
*Some peripherals can be placed in different locations.

Working Range

PUMA SMX5100L/LB

Entire range

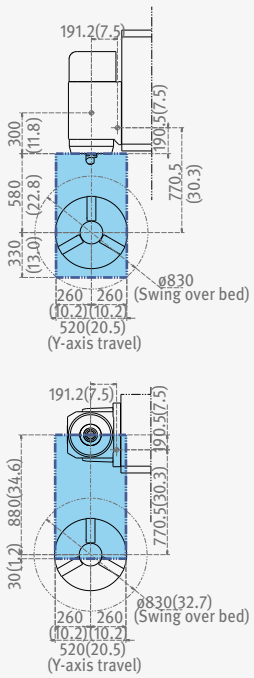
Unit : mm (inch)



Model	A	B	C	D	E	F
PUMA SMX5100L	2352(92.6)	424(16.7)	381(15.0)	285(11.2)	376(14.8)	2454(96.6)
PUMA SMX5100LB	2352(92.6)	496(19.5)	530(20.9)	313(12.3)	304(12.0)	2426(95.5)

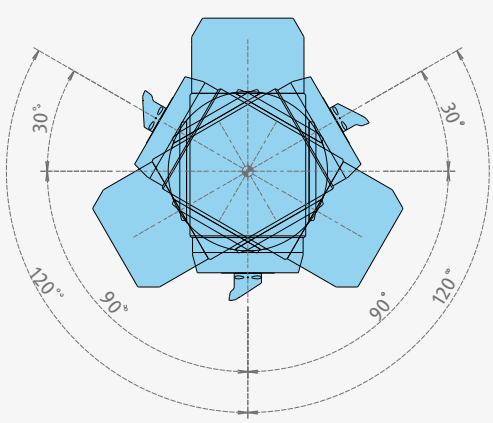
Y-axis working rage

Unit : mm (inch)



B-axis rotating range

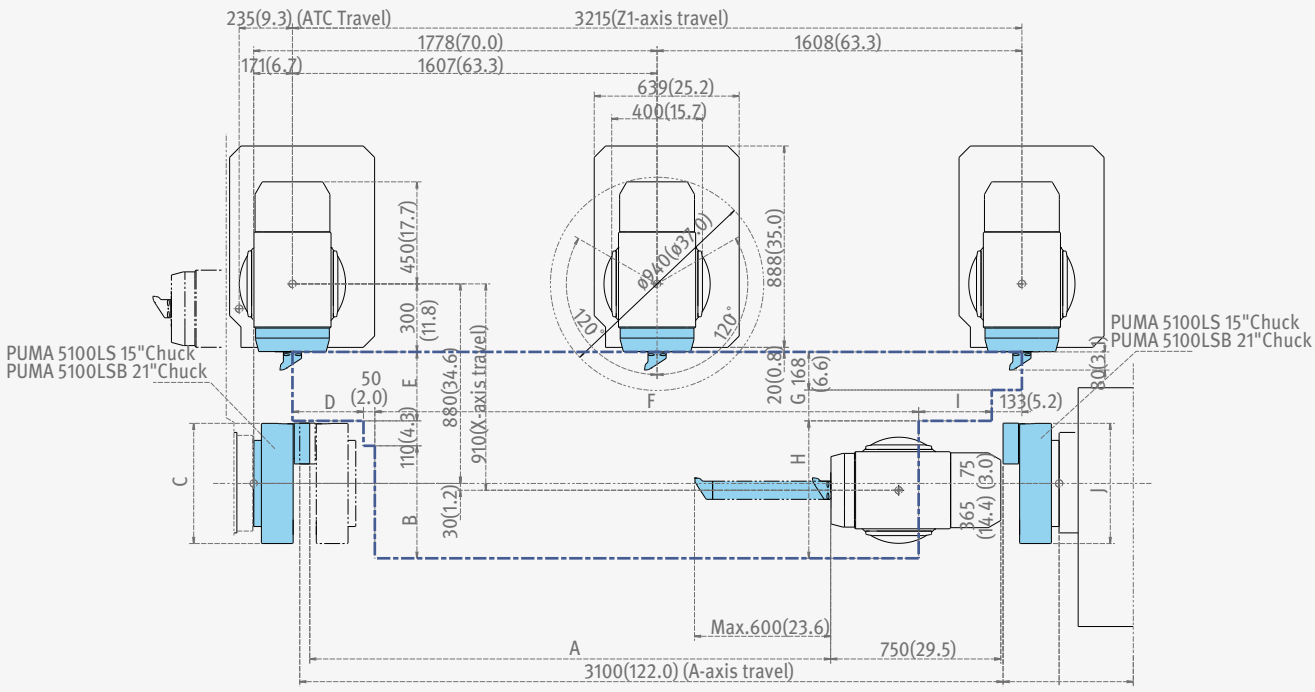
Unit : mm (inch)



PUMA SMX5100LS/LSB

Entire range

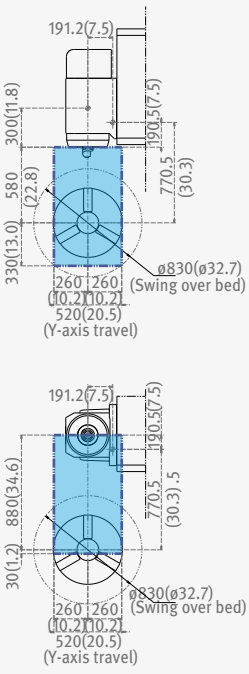
Unit : mm (inch)



Model	A	B	C	D	E	F	G	H	I	J
PUMA SMX5100L	2352(92.6)	424(16.7)	381(15.0)	285(11.2)	376(14.8)	2453(96.6)	208(8.2)	534(21.0)	294(11.6)	381(15.0)
PUMA SMX5100LB	2296(90.4)	496(19.5)	530(20.9)	313(12.3)	304(12.0)	2397(94.4)	136(5.4)	606(23.9)	322(12.7)	530(20.9)

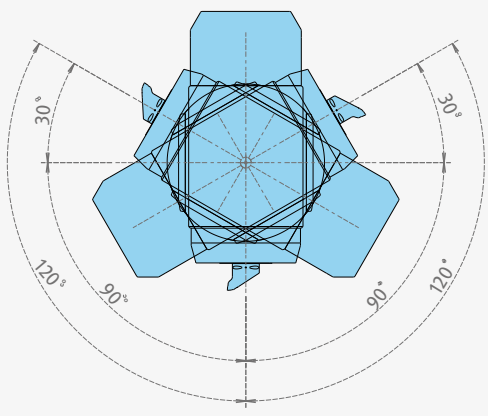
Y-axis working rage

Unit : mm (inch)



B-axis rotating range

Unit : mm (inch)



Machine Specifications

PUMA SMX 5100L / LS

Item			Unit	PUMA SMX5100L	PUMA SMX5100LB	PUMA SMX5100LS	PUMA SMX5100LSB
Capacity	Swing over bed		mm (inch)	830(32.7)	830(32.7)	830(32.7)	830(32.7)
	Recom. turning diameter		mm (inch)	380(15.0)	380(15.0)	380(15.0)	380(15.0)
	Max. turning diameter		mm (inch)	830(32.7)	830(32.7)	830(32.7)	830(32.7)
	Max. turning length		mm (inch)	3050(120.1)	3050(120.1)	3050(120.1)	3050(120.1)
	Chuck size	Left spindle	inch	15	21	15	21
		Right spindle	inch	15	21	15	21
	Max. material weight	Flange (include chuck)	kg (lb)	840 (1851.9)	1700 (3747.8)	840 (1851.9)	1700 (3747.8)
		Shaft (include chuck)	kg (lb)	1400 (3086.4)	2600 (5731.9)	-	-
	Bar working diameter		mm (inch)	102(224.9)	165.5(364.9)	102(224.9)	165.5(364.9)
Travels	Travel distance	X-axis	mm (inch)	910(35.8) (-30/+880) (-1.2/+34.6)	910(35.8) (-30/+880) (-1.2/+34.6)	910(35.8) (-30/+880) (-1.2/+34.6)	910(35.8) (-30/+880) (-1.2/+34.6)
		Y-axis	mm (inch)	520(±260) (20.5(±10.2))	520(±260) (20.5(±10.2))	520(±260) (20.5(±10.2))	520(±260) (20.5(±10.2))
		Z-axis	mm (inch)	3215(126.6)	3215(126.6)	3215(126.6)	3215(126.6)
		A-axis	mm (inch)	3100(122.0)	3100(122.0)	3100(122.0)	3100(122.0)
		B-axis	deg	240	240	240	240
		C1-axis	deg	360	360	360	360
		C2-axis	deg	-	-	360	360
	Rapid traverse rate	X-axis	m/min (ipm)	40(1574.8)	40(1574.8)	40(1574.8)	40(1574.8)
		Y-axis	m/min (ipm)	40(1574.8)	40(1574.8)	40(1574.8)	40(1574.8)
		Z-axis	m/min (ipm)	40(1574.8)	40(1574.8)	40(1574.8)	40(1574.8)
		A-axis	m/min (ipm)	-	-	14(551.2)	14(551.2)
		B-axis	r/min	30	30	30	30
		C1-axis	r/min	need consultation	20	need consultation	20
		C2-axis	r/min	-	-	need consultation	20
Left spindle	Max. spindle speed		r/min	2400	1500	2400	1500
	Spindle motor power (30min/cont.)		kW (Hp)	37/30 (49.6/40.2)	37/30 (49.6/40.2)	37/30 (49.6/40.2)	37/30 (49.6/40.2)
	Spindle nose		ASA	A2-11	A2-15	A2-11	A2-15
	Spindle bearing diameter (Front)		mm (inch)	180(7.1)	240(9.4)	180(7.1)	240(9.4)
	Spindle through hole		mm (inch)	120(4.7)	185(7.3)	120(4.7)	185(7.3)
	Min. spindle indexing angle (C1-axis)		deg	0.0001	0.0001	0.0001	0.001
Right spindle	Max. spindle speed		r/min	-	-	2400	1500
	Spindle motor power (30min/cont.)		kW (Hp)	-	-	37/30 (49.6/40.2)	37/30 (49.6/40.2)
	Spindle nose		ASA	-	-	A2-11	A2-15
	Spindle bearing diameter (Front)		mm (inch)	-	-	180(7.1)	240(9.4)
	Spindle through hole		mm (inch)	-	-	120(4.7)	185(7.3)
	Min. spindle indexing angle (C2-axis)		deg	-	-	0.0001	0.001
Milling spindle	Max. spindle speed		r/min	10000	10000	10000	10000
	Milling spindle motor power (2.5min/30min/Cont.)		kW	37/30/25 (49.6/40.2/33.5)	37/30/25 (49.6/40.2/33.5)	37/30/25 (49.6/40.2/33.5)	37/30/25 (49.6/40.2/33.5)
	Min. spindle indexing angle (B-axis)		deg.	0.0001	0.0001	0.0001	0.0001
Automatic Tool Changer	No. of tool stations		ea	40 {80,120}	40 {80,120}	40 {80,120}	40 {80,120}
	Tool shank			CAPTO C8	CAPTO C8	CAPTO C8	CAPTO C8
	Max. tool	Diameter continous	mm (inch)	135(5.3)	135(5.3)	135(5.3)	135(5.3)
		Diameter without adjacent tools	mm (inch)	260(10.2)	260(10.2)	260(10.2)	260(10.2)
	Max. tool length		mm (inch)	600(23.6)	600(23.6)	600(23.6)	600(23.6)
	Max. tool weight		kg (lb)	30(66.1)	30(66.1)	30(66.1)	30(66.1)
	Max. tool moment		N·m (ft-lbs)	29.4(21.7)	29.4(21.7)	29.4(21.7)	29.4(21.7)
	Tool change time (T-T-T)	Tool-to-Tool	s	2.4	2.4	2.4	2.4
		Chip-to-Chip	s	13.2	13.2	13.2	13.2
Long tool Magazine	Max. tool storage capacity		ea	4	4	4	4
	Max. tool size		mm (inch)	Ø80 x 1120 (Ø3.1 x 44.1)	Ø80 x 1120 (Ø3.1 x 44.1)	Ø80 x 1120 (Ø3.1 x 44.1)	Ø80 x 1120 (Ø3.1 x 44.1)
	Max. tool weight		kg (lb)	70(154.3)	70(154.3)	70(154.3)	70(154.3)
Automatic LBB(Long Boring Bar) Changer	Max. tool storage capacity		ea	3	3	-	-
	Max. tool size		mm	Ø100 x 1000 (Ø3.9 x 39.4)	Ø100 x 1000 (Ø3.9 x 39.4)	-	-
	Max. tool weight (Boring bar holder)		kg (lb)	140(308.6)	140(308.6)	-	-
	Auto Head tool change (for Long Boring Bar Type)	Max. tool storage capacity	ea	10	10	-	-
		Head tool type		CAPTO C4	CAPTO C4	-	-
		Max. tool size	mm (inch)	75(3.0)	75(3.0)	-	-
		Max. tool weight	kg	1	1	-	-
Tail Stock	Quill bore taper		MT	#5	#5	-	-
	Tail stock travel		mm (inch)	3100(122.0)	3100(122.0)	-	-
Powersource	Electric power supply (rated capacity)		kVA	95.7	98.6	118.5	121.7
Machine Dimensions	Height		mm (inch)	3346(131.7)	3346(131.7)	3346(131.7)	3346(131.7)
	Length		mm (inch)	9222(363.1)	9222(363.1)	9522(374.9)	9522(374.9)
	Width		mm (inch)	3597(141.6)	3597(141.6)	3597(141.6)	3597(141.6)
	Weight		kg (lb)	31000 (68342.3)	33000 (72751.5)	32200 (70987.8)	35900 (79144.8)
Control	NC system			CUFOS(Fanuc base)			

* { } : Optimal

NC Unit Specification

CUFOS

● Standard ○ Optional X Not applicable

No.	Item		Spec.	PUMA SMX 5100L/LB	PUMA SMX 5100LS/LSB	PUMA SMX 5100L/LB	PUMA SMX 5100LS/LSB
				Fanuc 31i		Fanuc 31i-5	
1	Controlled axis	Controlled axes		6 (X, Z, C, B, Y, A)	7 (X1, Z1, C1, B, Y, A, C2)	6 (X, Z, C, B, Y, A)	7 (X1, Z1 ,C1, B, Y, A, C2)
2		Simultaneously controlled axes		4 axes	4 axes	5 axes	5 axes
3		Synchronous/Composite control		X	●	X	●
4		Inch/metric conversion		●	●	●	●
5		Stored stroke check 1		●	●	●	●
6		Unexpected disturbance torque detection function		●	●	●	●
7	Operation	DNC operation with memory card		●	●	●	●
8		Tool retract and recover		○	○	○	○
9		Dry run		●	●	●	●
10		Single block		●	●	●	●
11		Handle interruption		○	○	○	○
12		Incremental feed	x1,x10,x100	●	●	●	●
13		Manual handle retrace		○	○	○	○
14		Active block cancel		○	○	○	○
15	Interpolation functions	Nano interpolation		●	●	●	●
16		Linear interpolation		●	●	●	●
17		Circular interpolation	G02	●	●	●	●
18		Polar coordinate interpolation		●	●	●	●
19		Cylindrical interpolation		●	●	●	●
20		Helical interpolation		●	●	●	●
21		Thread cutting, synchronous cutting		●	●	●	●
22		Multi threading		●	●	●	●
23		Thread cutting retract		●	●	●	●
24		Continuous threading		●	●	●	●
25		Variable lead thread cutting		○	○	○	○
26		Circular thread cutting		○	○	○	○
27		Polygon machining with two spindles		●	●	●	●
28		High-speed skip	Input signal is 8 points.	○	○	○	○
29		3rd/4th reference position return		●	●	●	●
30		Balanced cutting	Only for more than 2 path control	X	X	X	X
31	Feed function	Override cancel		●	●	●	●
32	Program input	Absolute/incremental programming	Combined use in the same block	●	●	●	●
33		Diameter/Radius programming	X-axis	●	●	●	●
34		Dynamic switching of diameter/radius specification		○	○	●	●
35		Automatic coordinate system setting		●	●	●	●
36		Workpiece coordinate system	G52 - G59	●	●	●	●
37		Workpiece coordinate system preset		○	○	○	○
38		Addition of workpiece coordinate system	48 pairs	○	○	○	○
39		Addition of workpiece coordinate system	300 pairs	○	○	○	○
40		Direct drawing dimension programming		●	●	●	●
41		G code system	A	●	●	●	●
42		G code system	B/C	●	●	●	●
43		Chamfering/Corner R		●	●	●	●
44		Custom macro		●	●	●	●
45		Addition of custom macro common variables	#100 - #199, #500 - #999	●	●	●	●
46		Interruption type custom macro		○	○	○	○
47		Canned cycle		●	●	●	●
48		Automatic corner override		○	○	○	○
49		3-dimensional coordinate system conversion		●	●	●	●
50		Macro executor		●	●	●	●
51		Macro executor + C language executor		X	X	X	X
52		Coordinate system shift		●	●	●	●
53		Direct input of coordinate system shift		●	●	●	●
54		Real time custom macro		○	○	○	○

NC Unit Specification

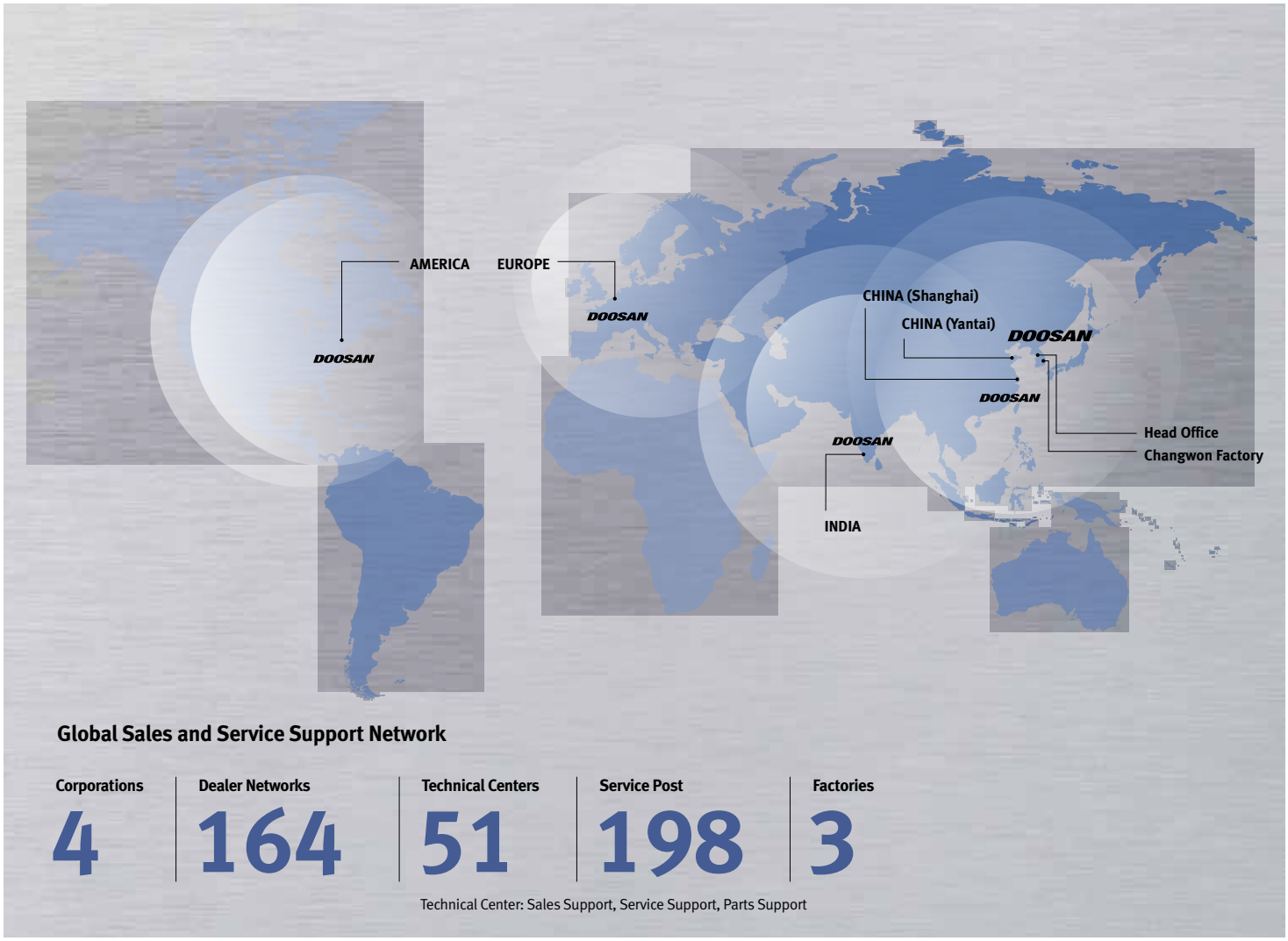
● Standard ○ Optional X Not applicable

No.	Item		Spec.	PUMA SMX 5100L/LB	PUMA SMX 5100LS/LSB	PUMA SMX 5100L/LB	PUMA SMX 5100LS/LSB
				Fanuc 31i		Fanuc 31i-5	
55	Operation Guidance Function	Pattern data input		○	○	○	○
56		Easy Operation package		●	●	●	●
57	Auxiliary/ Spindle speed function	Constant surface speed control		●	●	●	●
58		Spindle override	0 - 150%	●	●	●	●
59		Spindle orientation		●	●	●	●
60		Spindle synchronous control		X	●	X	●
61		Rigid tap		●	●	●	●
62		Arbitrary speed threading		○	○	○	○
63	Tool function / Tool compensation	Tool offset pairs	400-pairs	●	●	●	●
64		Tool offset pairs	499-pairs	○	○	○	○
65		Tool offset pairs	999-pairs	○	○	○	○
66		Tool offset		●	●	●	●
67		Tool center point control		X	X	X	X
68		Smooth TCP		X	X	●	●
69		Y-axis offset		●	●	●	●
70		Tool radius/Tool nose radius compensation		●	●	●	●
71		Tool geometry/wear compensation		●	●	●	●
72		Automatic tool offset		●	●	●	●
73		Direct input of offset value measured B		●	●	●	●
74		Tool life management		●	●	●	●
75	Accuracy compensation function	Backlash compensation for each rapid traverse and cutting feed		●	●	●	●
76		Stored pitch error compensation		●	●	●	●
77	Editing operation	Part program storage size & Number of registerable programs	1280M(512KB)_1000 programs	●	●	●	●
78			2560M(1MB)_1000 programs	○	○	○	○
79			5120M(2MB)_1000 programs	○	○	○	○
80			10240M(4MB)_1000 programs	○	○	○	○
81			20480M(8MB)_1000 programs	○	○	○	○
82			2560M(1MB)_2000 programs	○	○	○	○
83			5120M(2MB)_4000 programs	○	○	○	○
84			10240M(4MB)_4000 programs	○	○	○	○
85			20480M(8MB)_4000 programs	○	○	○	○
86		Program protect		●	●	●	●
87		Password function		●	●	●	●
88		Playback		○	○	○	○
89		Memory card program edit & operation	Max 63 programs	●	●	●	●
90	Data input / output	data server		○	○	○	○
91		External data input		●	●	●	●
92		Memory card input/output		●	●	●	●
93		USB memory input/output		●	●	●	●
94		Automatic data backup		●	●	●	●
95	Interface function	Embedded Ethernet		●	●	●	●
96		Fast Ethernet		○	○	○	○
97	Robot Interface	Robot interface with PMC I/O module		○	○	○	○
98		Robot interface with PROFIBUS-DP		○	○	○	○
99	CUFOS	Display Unit	19" Color LCD Screen, 2 Point-touch	●	●	●	●
100		Main RAM Memory	4GB	●	●	●	●
101		Storage Memory	SSD 32GB	●	●	●	●
102			SSD 64GB	○	○	○	○
103			SSD 128GB	○	○	○	○
104		Doosan Tool Management for SMX		○	○	○	○
105		Collison Protection System	When this item is selected, The size of RAM and SSD are automatically expanded to 8GB and 64GB, respectively.	○	○	○	○
106		SSD Data server Application	2GB	●	●	●	●
107			20GB	○	○	○	○
108			40GB	○	○	○	○
109		Manager's Message Notification application		●	●	●	●
110		FTP Server service		●	●	●	●
111		Smart key access control application		○	○	○	○
112		Memo Application		●	●	●	●
113		Machine status Monitor application		●	●	●	●
114		Alarm guidance application		●	●	●	●
115		Manual viewer Application		●	●	●	●
116		Calendar Application		●	●	●	●
117		Browser Application		●	●	●	●
118		Maintenace Manager Application		●	●	●	●
119		Data Logger Application		●	●	●	●
120		Servo viewer Application		●	●	●	●

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	Service Post	Factories
4	164	51	198	3

Technical Center: Sales Support, Service Support, Parts Support

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 SMX5100L/LS

Description	단위	PUMA SMX5100L	PUMA SMX5100LB	PUMA SMX5100LS	PUMA SMX5100LSB
Chuck (Left spindle)	inch	15{18}	21{24}	15{18}	21{24}
Chuck (Right spindle)	inch	-	-	15{18}	21{24}
Max. turning diameter	mm (inch)	830 (32.7)			
Max. turning length	mm (inch)	3050 (120.1)			
Max.Spindle speed	r/min	2400	1500	2400	1500
Motor power	kW (Hp)	37/30 (49.6 / 40.2)			

*{ } Option

Doosan Machine Tools

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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 or 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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