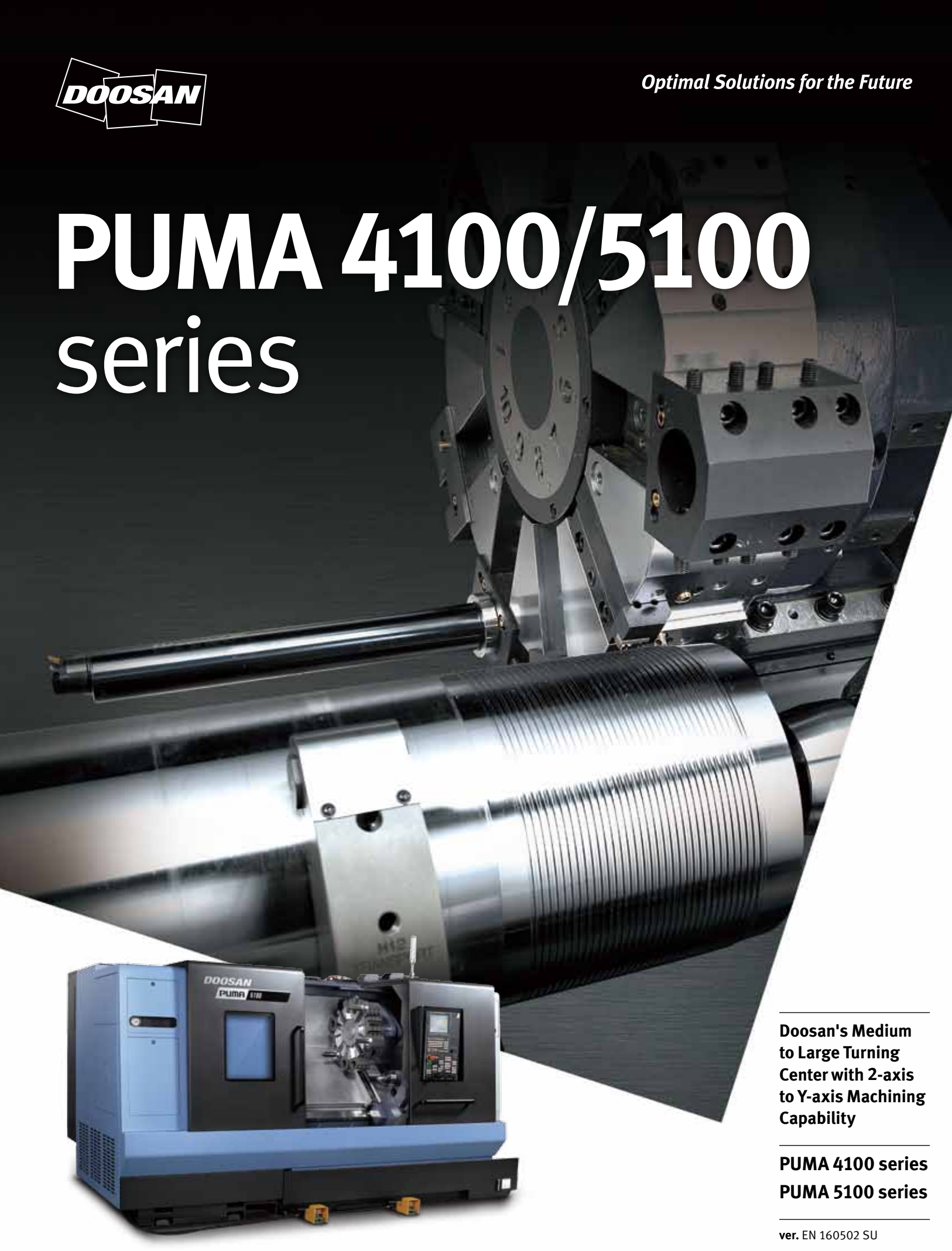
DOOSAN

Optimal Solutions for the Future

PUMA 4100/5100 series



Doosan's Medium to Large Turning Center with 2-axis to Y-axis Machining Capability

PUMA 4100 series

PUMA 5100 series

ver. EN 160502 SU

PUMA 4100/5100 series

PUMA 4100/5100 series are horizontal turning centers designed for machining medium to large size workpieces. It ensures powerful machining capability by using a 2 step gearbox and high torque motors together with a rigid box guideway structure. Also, it can process complex workpieces by using the optional Y axis function. In addition, the optional Doosan threading functions, especially for Oil/Gas industry parts, makes it the solution for a wide variety of applications.

Contents

Various Line-up

- For machining various medium to large size workpieces, the PUMA 4100/5100 series offers 25 models in the line-up. This consists of chuck sizes from 12” to 21” diameter with optional big bore spindle, 1m or 2m turning length and 2 axis to Y axis configurations.

Powerful machining capability

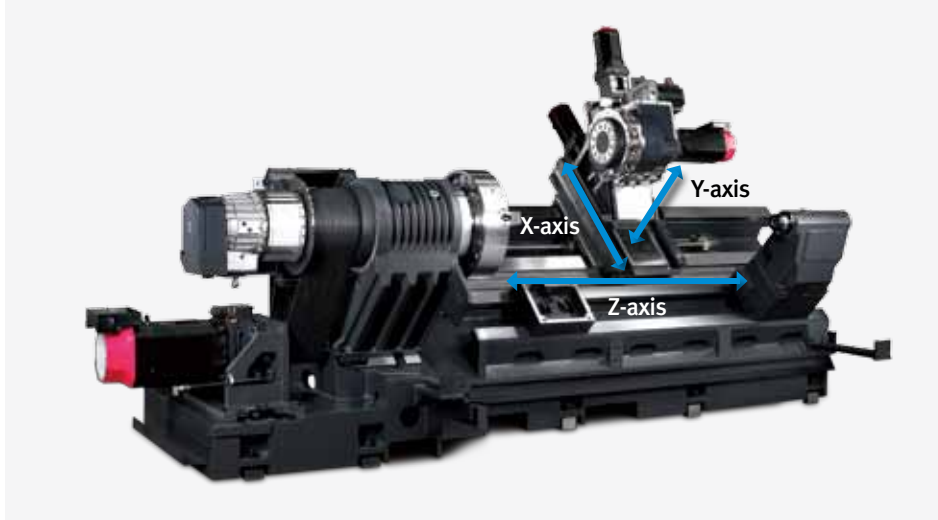
- PUMA 4100/5100 series have powerful machining capability with optimized cutting performance due to the 2 speed gearbox and high torque spindle motors, and stable box guideway structure.

Improve convenience

- PUMA 4100/5100 series can process complex parts in just one setup by applying the optional Y axis function. In addition, the newly designed operation panel and optional threading functions optimize the operators convenience.

Basic Structure

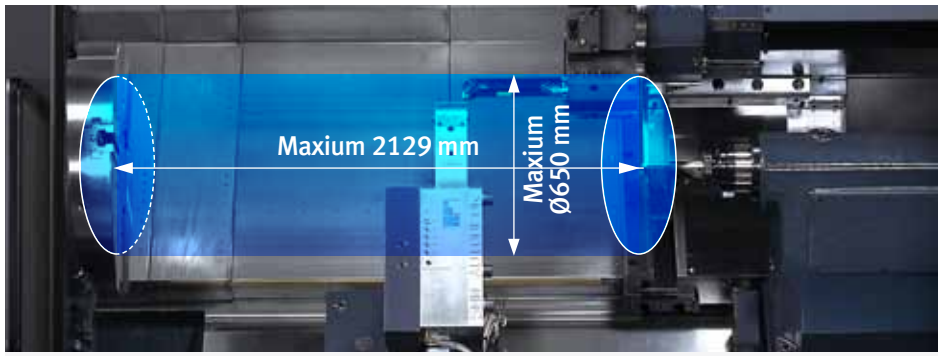
Machine capability ranges from 2 axis to Y axis, which allows large, complex parts to be completed in a single setup.



Model		Chuck size (inch)	1m (Std.)			2m (L)		
			2-axis	M	Y	2-axis	M	Y
PUMA 4100	A	12	O	O	-	O	O	-
	B	15	O	O	-	O	O	-
	C	21	O	-	-	O	-	-
PUMA 5100	A	15	O	O	-	O	O	O
	B	21	O	O	-	O	O	O
	C	Big Bore	O	-	-	O	-	O

Machining area

The largest work envelop in its class with maximum turning diameter of Ø650 mm and maximum turning length of 2m.



Max. turning diameter

ø650 mm
(ø25.6 inch)

Max. turning length

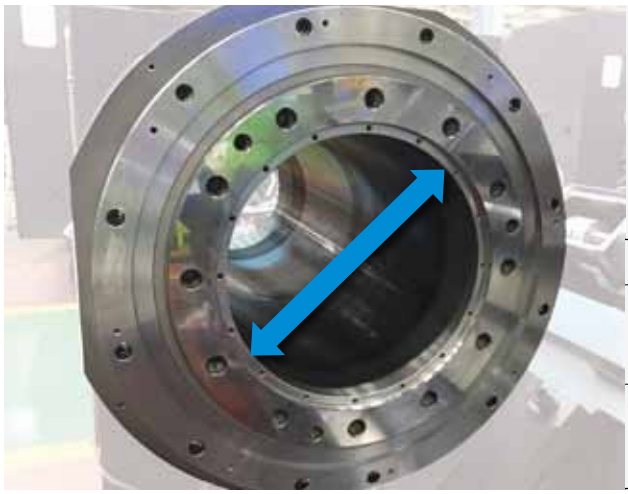
2129 mm
(83.8 inch)

Unit : mm (inch)

Function		Model	Max. turning diameter	Max. turning length
2-axis	2-axis	PUMA 4100A/B/C	550 (21.7)	1079 / 1043 / 1024 (42.5 / 41.1 / 40.3)
		PUMA 4100LA/LB/LC		2129 / 2093 / 2074 (83.8 / 82.4 / 81.7)
	M	PUMA 4100MA/MB/MC	560 (22.0)	1014 / 978 / 959 (39.9 / 38.5 / 37.8)
		PUMA 4100LMA/LMB/LMC		2064 / 2028 / 2009 (81.3 / 79.8 / 79.1)
PUMA 5100	2-axis	PUMA 5100A/B/C	650 (25.6)	992 (39.1)
		PUMA 5100LA/LB/LC		2042 (80.4)
	M	PUMA 5100MA/MB		951 (37.4)
		PUMA 5100LMA/LMB		2001 (78.8)
	M	PUMA 5100LYA/LYB/LYC	650 (25.6)	2050 / 2020 / 2020 (80.7 / 79.5 / 79.5)

Machining area

The machines are available with a variety of spindle through bore sizes to provide the ideal solution for customers pipe diameters.



Max. spindle through hole diameter

ø275 mm

(ø10.8 inch)

Unit : mm (inch)

Model		Max. spindle through hole diameter
PUMA 4100	A	102 (4.0)
	B	132 (5.2)
	C	181 (7.1)
PUMA 5100	A	132 (5.2)
	B	181 (7.1)
	C	275 (10.8)

Spindle

The gearbox design allows PUMA 4100/5100 spindle to have unparalleled power and torque, which boosts productivity with extreme heavy-duty cutting capability.

Max. spindle speed

1500 r/min

Max. spindle power (30min / Cont.)

45/37 kW

(60.3 / 49.6 Hp)

Max. spindle torque

4038 N·m

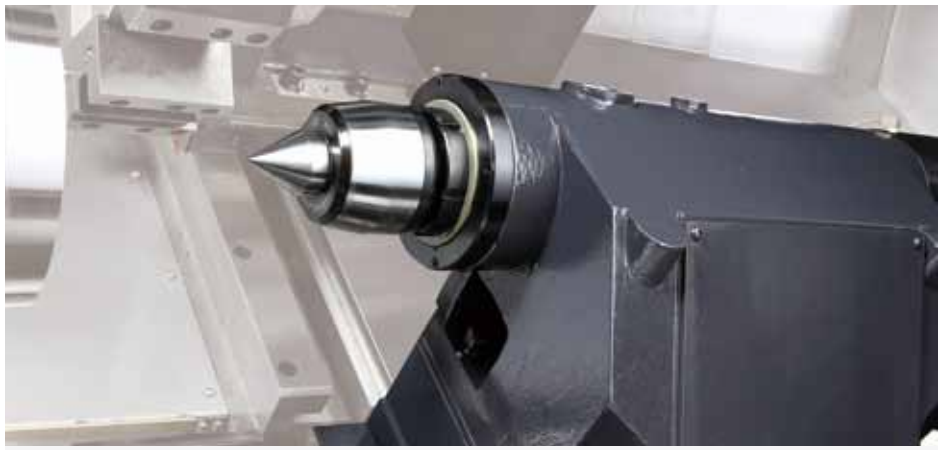
(2980.0 ft-lb)

PUMA 5100B

Model	Max. spindle speed r/min	Max. spindle power (30min / Cont.) kW (Hp)	Max. spindle torque N·m (ft-lb)
PUMA 4100A/LA	3000	35 (S3 25%) / 26 / 22 (46.9(S3 25%) / 34.9 / 29.5)	1584 (1169.0)
PUMA 4100B/LB	2000	35 (S3 25%) / 26 / 22 (46.9(S3 25%) / 34.9 / 29.5)	2379 (1755.7)
PUMA 4100C/LC	1500	37 / 30 (49.6 / 40.2)	3280 (2420.6)
PUMA 4100MA/LMA	3000	30 / 22 (40.2 / 29.5)	832 (614.0)
PUMA 4100MB/LMB	2000	30 / 22 (40.2 / 29.5)	1611 (1188.9)
PUMA 4100MC/LMC	1500	37 / 30 (49.6 / 40.2)	2432 (1794.8)
PUMA 5100A/LA	2000	37 / 30 (49.6 / 40.2)	3280 (2420.6)
PUMA 5100B/LB	1500	45 / 37 (60.3 / 49.6)	4038 (2980.0)
PUMA 5100C/LC	1000	45 / 37 (60.3 / 49.6)	4463 (3293.7)
PUMA 5100MA/LMA	2000	37 / 30 (49.6 / 40.2)	2432 (1794.8)
PUMA 5100MB/LMB	1500	45 / 37 (60.3 / 49.6)	2957 (2182.3)
PUMA 5100LYA	2000	37 / 30 (49.6 / 40.2)	2431 (1794.1)
PUMA 5100LYB	1500	45 / 37 (60.3 / 49.6)	2957 (2182.3)
PUMA 5100LYC	1000	45 / 37 (60.3 / 49.6)	3268 (2411.8)

Tailstock

High rigidity hydraulic tailstock is rigidly clamped to the bed slide way to provide stable support for long workpieces.



Tailstock travel

1000 mm / 2050 mm (39.4 / 80.7 inch)

Model	Tailstock travel	Quill diameter	Quill travel	Std.	Opt.
PUMA 4100/M, PUMA 5100/M	1000 (39.4)	120 (4.7)	120 (4.7)	Manual	Programmable
PUMA 4100L/LM, PUMA 5100L/LM	2050 (80.7)	120 (4.7)	120 (4.7)	Manual	Programmable
PUMA 5100LY	2050 (80.7)	120 (4.7)	140 (5.5)	Programmable	-

Turret

Turret rotation is controlled by servo motor for fast and reliable tool selection. Doosan's unique BMT85P turret design is used on M and Y specification models to boost heavy duty milling performance.

2-axis model

No. of tool stations

PUMA 4100A/LA

12ea (std.) / **10ea** option

PUMA 4100B/LB/C/LC
PUMA 5100 series

10ea (std.) / **12ea** option

M,Y Model

BMT75P

No. of tool stations

12ea

Cutting performance

Multi-functionality including end milling, face milling, drilling, tapping, etc. offers better machining performance while minimizing work setting.

O.D turning	
Cutting speed	210 m/min (8267.7 ipm)
Feedrate	0.55 mm/rev
Cutting depth	11.9 mm (0.5 inch)

ID turning (Rough cutting)	
Cutting speed	280 m/min (11023.6 ipm)
Feedrate	0.1 mm/rev
Cutting depth	3 mm (0.1 inch)
Tool length	4.0D

U-Drill (2-axis)	
Cutting Tool	80 mm (3.1 inch)
Spindle speed	750 r/min
Feedrate	0.2 mm/rev

Face milling	
Face mill dia.	63 mm (2.5 inch)
Cutting speed	176 m/min (6.9 ipm)
Feedrate	900 mm/min (35.4 ipm)
Cutting depth	6 mm (0.2 inch)

U-Drill (3-axis)	
Cutting Tool	25 mm (1.0 inch)
Spindle speed	2500 r/min
Feedrate	0.3 mm/rev

* This test result come from under condition
1) Material : Steel (SM45C)
2) Test Machine :PUMA 5100LMA
   - Main spindle motor : 37 / 30 kW (49.6 / 40.2 Hp)
   - Rotary tool motor : 11 / 5.5 kW (14.8 / 7.4 Hp)

* 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 △ Contact DOOSAN X N/A

No.	Description	Features			PUMA 4100 series						PUMA 5100 series							
					A	B	C	MA	MB	MC	A	B	C	MA	MB	LYA	LYB	LYC
1	CHUCK	None			○	○	○	○	○	○	○	○	●	○	○	○	○	●
2		12 Inch			●	X	X	●	X	X	X	X	X	X	X	X	X	X
3		15 Inch			X	●	X	X	●	X	●	X	X	●	X	●	X	X
4		18 Inch			X	○	X	X	○	X	○	X	X	○	X	X	X	X
5		21 Inch			X	X	●	X	X	●	X	●	X	X	●	X	●	X
6		24 Inch			X	X	X	X	X	X	X	○	X	X	○	X	○	X
7		Special Chuck			△	△	△	△	△	△	△	△	△	△	△	△	△	△
8	JAW	Soft Jaws			●	●	●	●	●	●	●	●	○	●	●	●	●	○
9		Hardened & ground hard jaws			○	○	○	○	○	○	○	○	○	○	○	○	○	○
10	CHUCKING OPTION	Single pressure chucking			●	●	●	●	●	●	●	●	○	●	●	●	●	○
11		Dual pressure chucking			○	○	○	○	○	○	○	○	○	○	○	○	○	○
12		Chuck clamp confirmation			○	○	○	○	○	○	○	○	○	○	○	○	○	○
13	STEADY REST*	Specification	Manual	Ø25 ~ Ø200	○	○	○	○	○	○	X	X	X	X	X	X	X	X
14				Ø35 ~ Ø330	X	X	X	X	X	X	○	○	○	○	○	○	○	○
15				Ø50 ~ Ø260	○	○	○	○	○	○	○	○	○	○	○	○	○	○
16			Hydraulic or Pramm-able	Ø16 ~ Ø152 (SLU-3)	○	○	○	○	○	○	X	X	X	X	X	X	X	X
17				Ø20 ~ Ø165 (SLU-3)	○	○	○	○	○	○	X	X	X	X	X	X	X	X
18				Ø35 ~ Ø245 (SLU-4)	○	○	○	○	○	○	○	○	○	○	○	○	○	○
19				Ø45 ~ Ø310 (SLU-5)	X	X	X	X	X	X	○	○	○	○	○	○	○	○
20	TAILSTOCK	Manual type			●	●	●	●	●	●	●	●	●	●	●	X	X	X
21		Programmable type			○	○	○	○	○	○	○	○	○	○	○	●	●	●
22		Live center			●	●	●	●	●	●	●	●	●	●	●	●	●	●
23		Built-in dead center			○	○	○	○	○	○	○	○	○	○	○	○	○	○
24	COOLANT PUMP	1.5 BAR			●	●	●	●	●	●	●	●	●	●	●	X	X	X
25		4.5 BAR			○	○	○	○	○	○	○	○	○	○	○	●	●	●
26		7/10/14.5/20/70 BAR			○	○	○	○	○	○	○	○	○	○	○	○	○	○
27	COOLANT OPTIONS	Oil skimmer			○	○	○	○	○	○	○	○	○	○	○	○	○	○
28		Coolant chiller			○	○	○	○	○	○	○	○	○	○	○	○	○	○
29		Coolant pressure switch			○	○	○	○	○	○	○	○	○	○	○	○	○	○
30		Coolant level switch			○	○	○	○	○	○	○	○	○	○	○	○	○	○
31		Coolant gun			○	○	○	○	○	○	○	○	○	○	○	○	○	○
32	CHIP DISPOSAL	Chip conveyor (Right side)			○	○	○	○	○	○	○	○	○	○	○	○	○	○
33		Chip bucket			○	○	○	○	○	○	○	○	○	○	○	○	○	○
34		Air blower for chuck			○	○	○	○	○	○	○	○	○	○	○	○	○	○
35		Mist collector interface (Duct only)			○	○	○	○	○	○	○	○	○	○	○	○	○	○
36		Integrated mist collector			○	○	○	○	○	○	○	○	○	○	○	○	○	○
37	MEASURE-MENT & AUTOMA-TION	Tool setter	Manual		○	○	○	○	○	○	○	○	○	○	○	○	○	○
38			Automatic		○	○	○	○	○	○	○	○	○	○	○	○	○	○
39		Auto door			○	○	○	○	○	○	○	○	○	○	○	○	○	○
40	OTHERS	Doosan Tool load monitoring system			●	●	●	●	●	●	●	●	●	●	●	●	●	●
41		Signal tower			○	○	○	○	○	○	○	○	○	○	○	○	○	○
42		Air gun			○	○	○	○	○	○	○	○	○	○	○	○	○	○
43		Automatic power off			○	○	○	○	○	○	○	○	○	○	○	○	○	○

* Please contact DOOSAN to select detailed steady rest specifications

Peripheral equipments

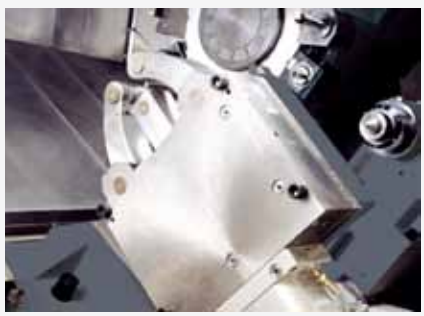
Long boring bar option

The long boring bar option allows you to easily machine deep holes to minimize cycle time. Please consult with Doosan specialist for details.

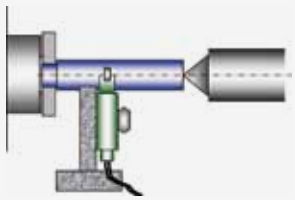
Twin chucking option

For more stable pipe threading process, twin chucking option(manual or pneumatic) is available. Please consult with Doosan specialist for details.

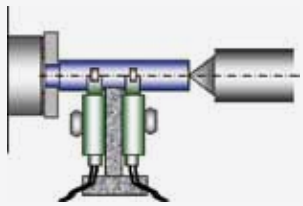
Steady rest option



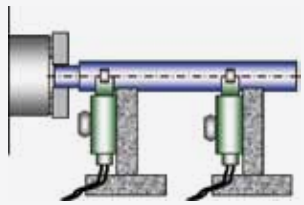
SINGLE



DOUBLE



TWIN



For turning a part with extensive length, various types of hydraulic steady rests(Single, Double or Twin type) are available.

Chip conveyor (Right side) option

Hinged belt

Magnetic scraper

Chip conveyor type	Material	Description
Hinged belt	Steel	Hinged belt chip conveyor, which is most commonly used for steel work(for cleaning chips longer than 30mm), is available as an option.
Magnetic scraper	Cast Iron	Magnetic scraper type chip conveyor, which is ideal for diecasting work(for cleaning small chips), is available as an option.

Coolant tank

Doosan's ergonomic roller coolant tank design, allows users to easily replace and refill coolant. Roller on the coolant tank allows users to simply take out and put it back in the machine like a drawer unit.

FANUC

Fanuc CNC is tuned ideally to PUMA 4100 / 5100 series, in order to maximize productivity.

User-friendly operation panel

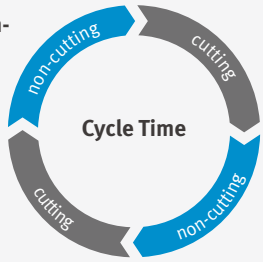
The newly designed operation panel groups all of the common buttons together to enhance operator's convenience. Also, 'QWERTY' keypad is applied as standard to improve convenience of users who are accustomed to PC keyboards.

- 10.4" Display
- SB & PCMCIA card (Std.)
- Qwerty type keyboard
- Easy to put button switch for attached option
- Ergonomic new design

Easy Operation Package

Increase Productivity

Reduced non-cutting time by 10%



Minimizes non-cutting time to further improve productivity.

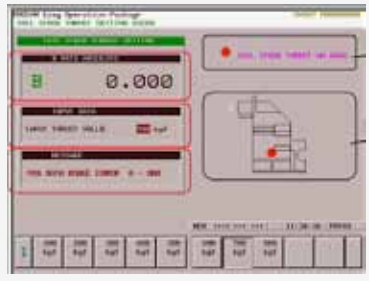
Operation rate

Function allows users to easily keep track of machine operating hours and the number of completed parts.

Tool load monitoring

This function detects overload on tools, caused by wear and damage, and triggers an alarm to minimize damage.

Tail stock thrust force setting option



This function allows users to easily setup tailstock thrust force on the screen.

Stable threading performance

All PUMA 4100 / 5100 series (2-Axis* to Y-Axis) are capable of threading work.

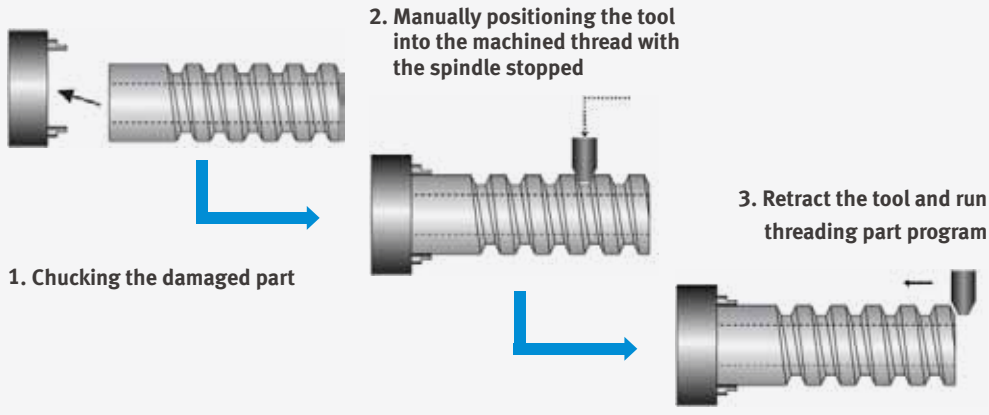
* In order to re-machine threads or perform arbitrary speed threading on a 2-Axis machine, additional optional devices have to be selected.

Threading repair function

This function allows users to repair thread even when original program is not available and this is a standard Fanuc NC function.

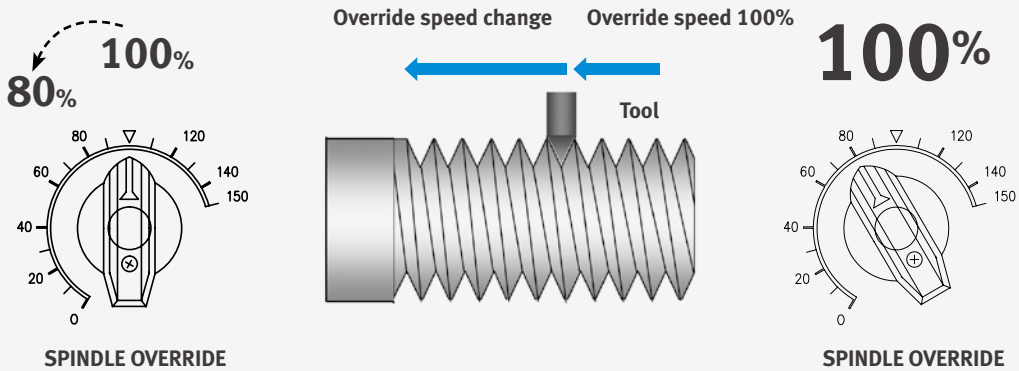
Re-machining function option

This function allows users to re-machine damaged threads by using the existing program.



Arbitrary speed threading option

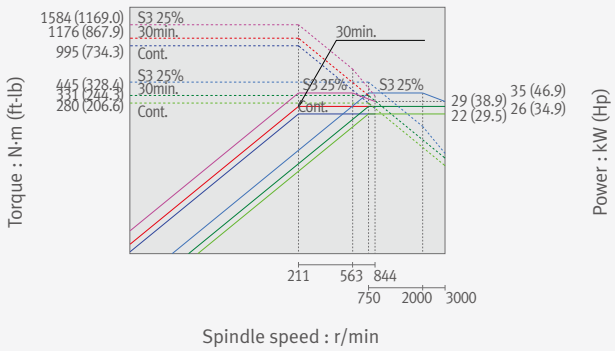
This function allows users to control spindle speed in order to set it at an ideal machining condition to keep the best thread quality.



Power-Torque Diagram

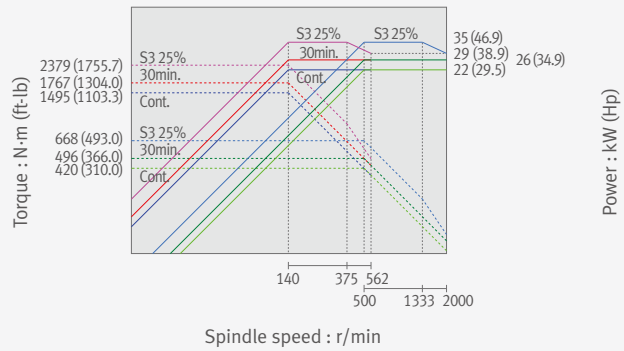
PUMA 4100A/LA

Max. spindle speed : 3000 r/min



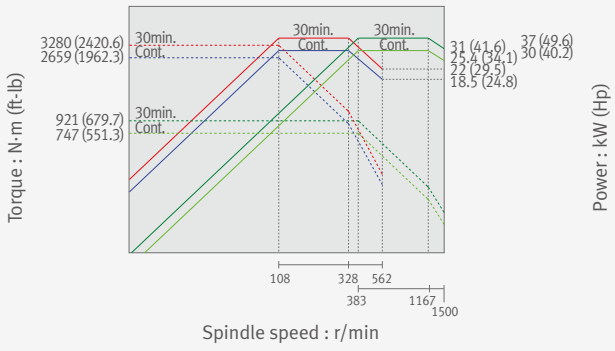
PUMA 4100B/LB

Max. spindle speed : 2000 r/min



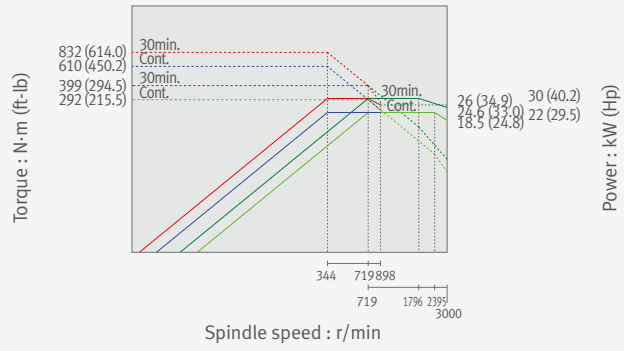
PUMA 4100C/LC

Max. spindle speed : 1500 r/min



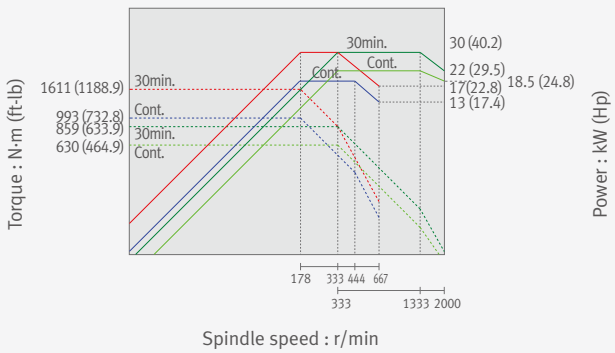
PUMA 4100MA/LMA

Max. spindle speed : 3000 r/min



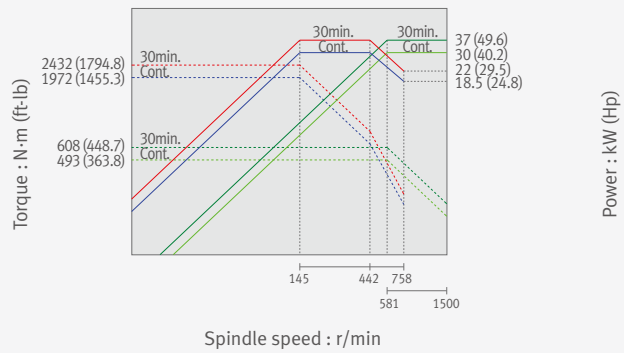
PUMA 4100MB/LMB

Max. spindle speed : 2000 r/min



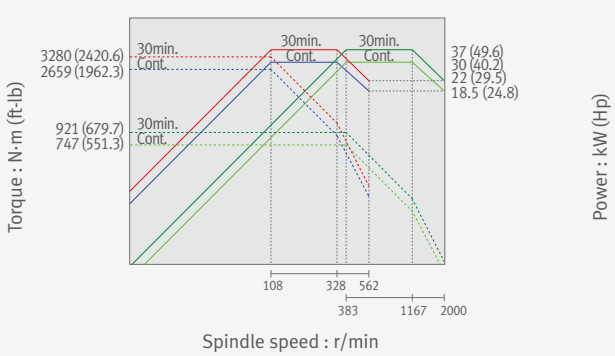
PUMA 4100MC/LMC

Max. spindle speed : 1500 r/min



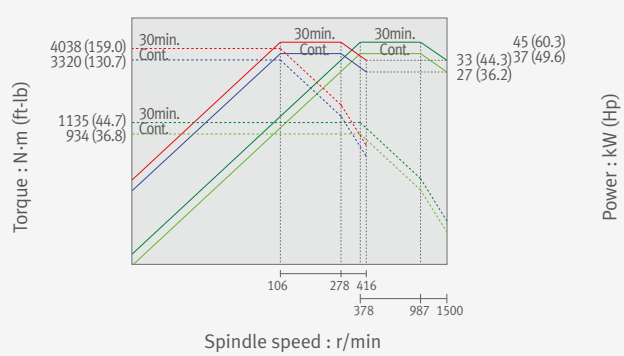
PUMA 5100A/LA

Max. spindle speed : 2000 r/min



PUMA 5100B/LB

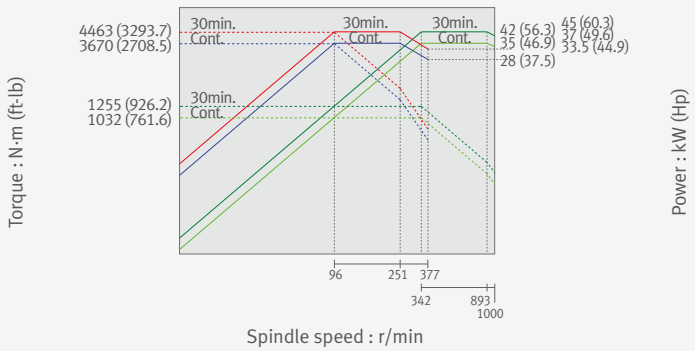
Max. spindle speed : 1500 r/min



Power-Torque Diagram

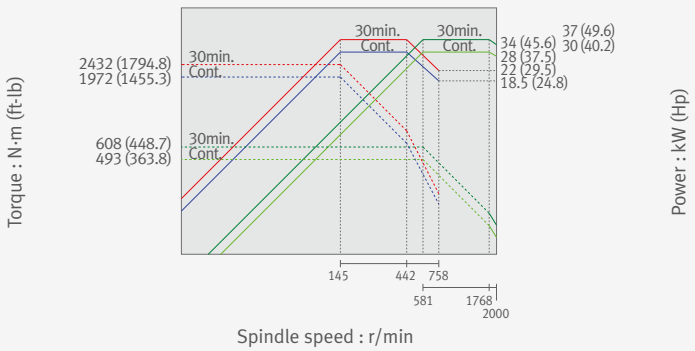
PUMA 5100C/LC

Max. spindle speed : 1000 r/min



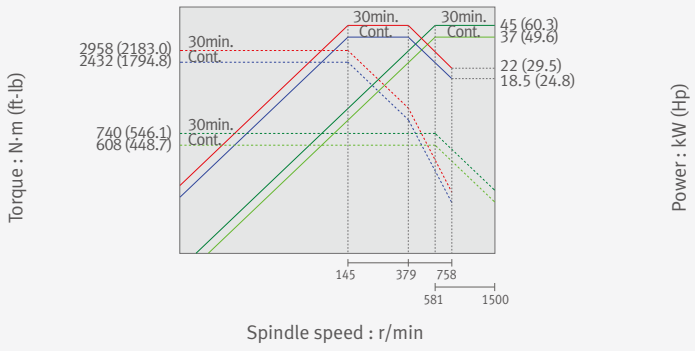
PUMA 5100MA/LMA

Max. spindle speed : 2000 r/min



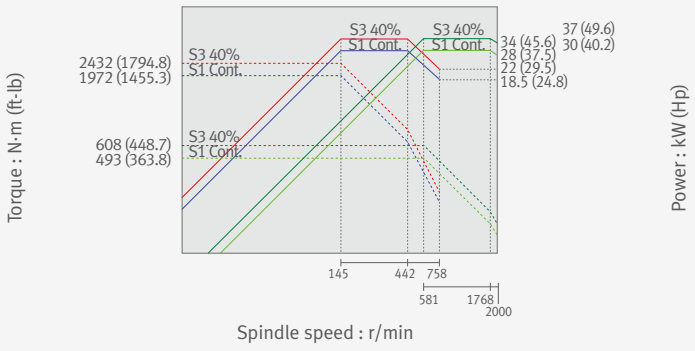
PUMA 5100MB/LMB

Max. spindle speed : 1500 r/min



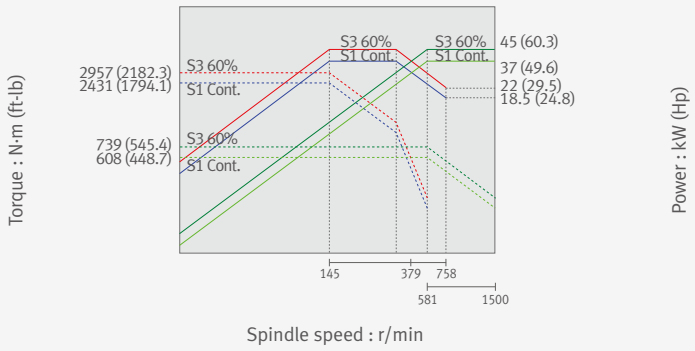
PUMA 5100LYA

Max. spindle speed : 2000 r/min



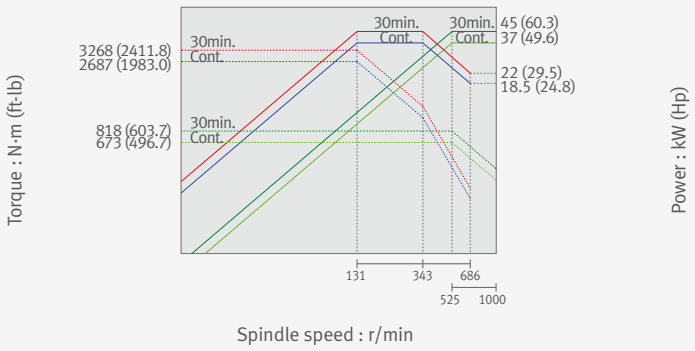
PUMA 5100LYB

Max. spindle speed : 1500 r/min



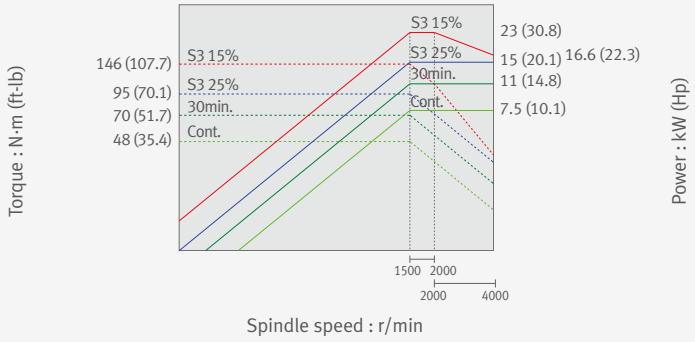
PUMA 5100LYC

Max. spindle speed : 1000 r/min



Rotary tool

Max. rotary tool speed : 4000 r/min

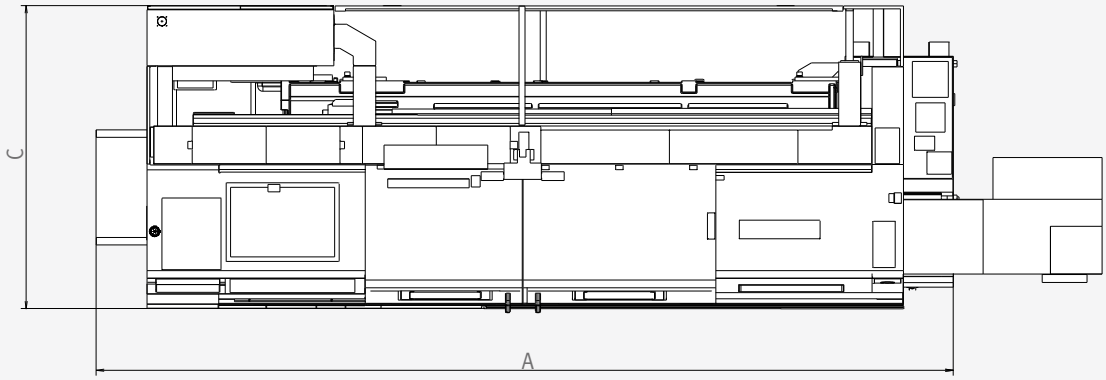


External Dimensions

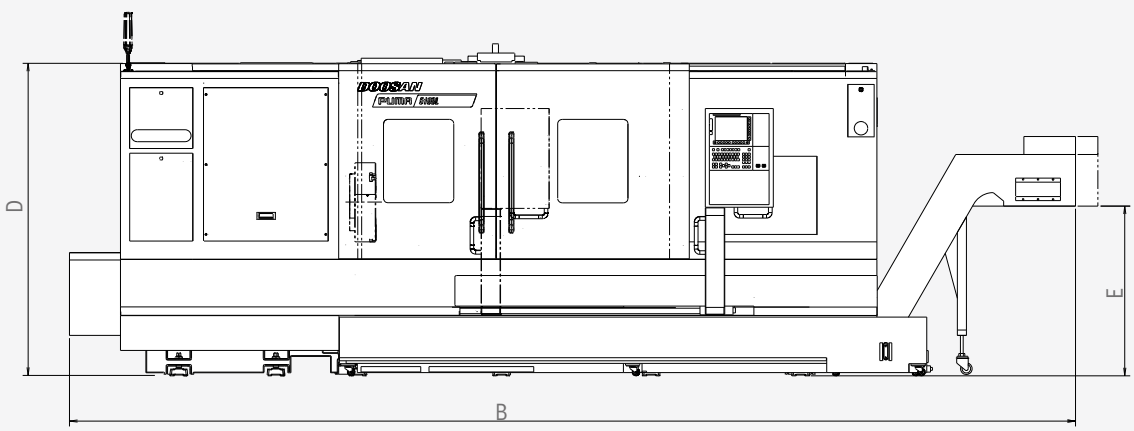
PUMA 4100 / 5100 series

Unit : mm (inch)

Top view



Front view



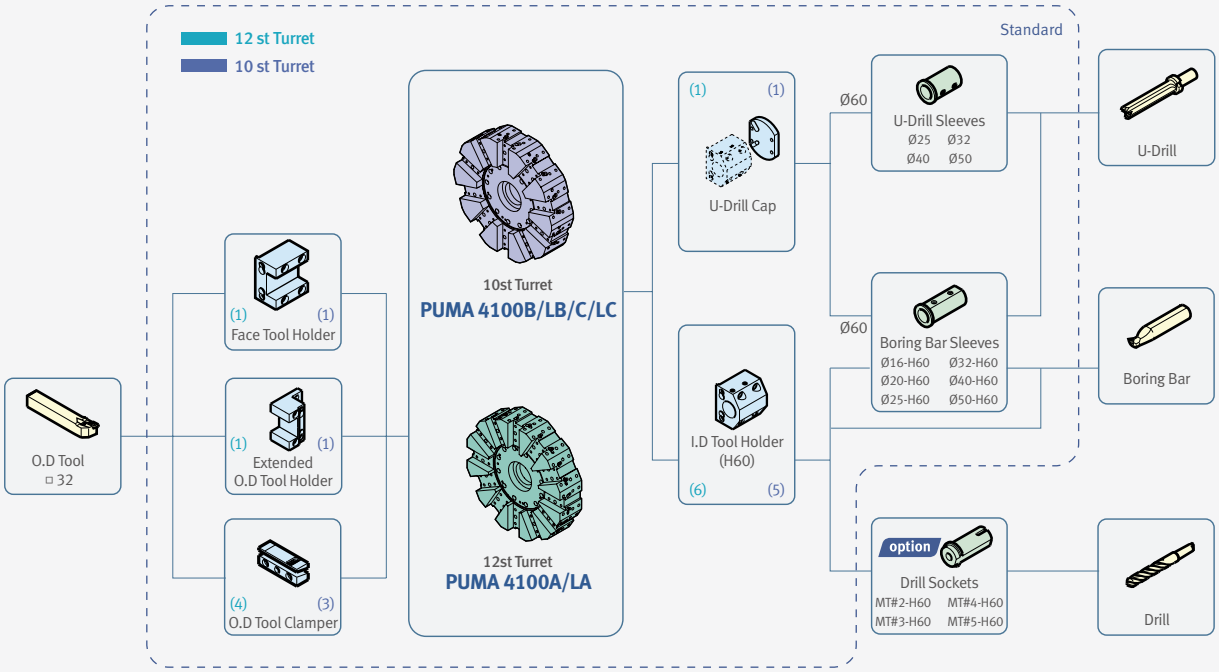
Model	A (Length)	B (Length with chip conveyor)	C (Width)	D (Height)	E (Height of ground to chip outlet)
PUMA 4100/5100	4654 (183.2)	5549 (218.5)	2056 (80.9)	2194 (86.4)	1053 (41.5)
PUMA 4100L/5100L	5774 (227.3)	6669 (262.6)	2275 (89.6)	2222 (87.5)	1053 (41.5)
PUMA 4100M/5100M	4685 (184.4)	5580 (219.7)	2275 (89.6)	2222 (87.5)	1053 (41.5)
PUMA 4100LM/5100LM	5774 (227.3)	6669 (262.6)	2275 (89.6)	2222 (87.5)	1053 (41.5)
PUMA 5100LY	5980 (235.4)	6890 (271.3)	2522 (99.3)	2885 (113.6)	1050 (41.3)

* 500 mm of a space is required to the right of the machine in order to install and remove chip conveyor.

Tooling System

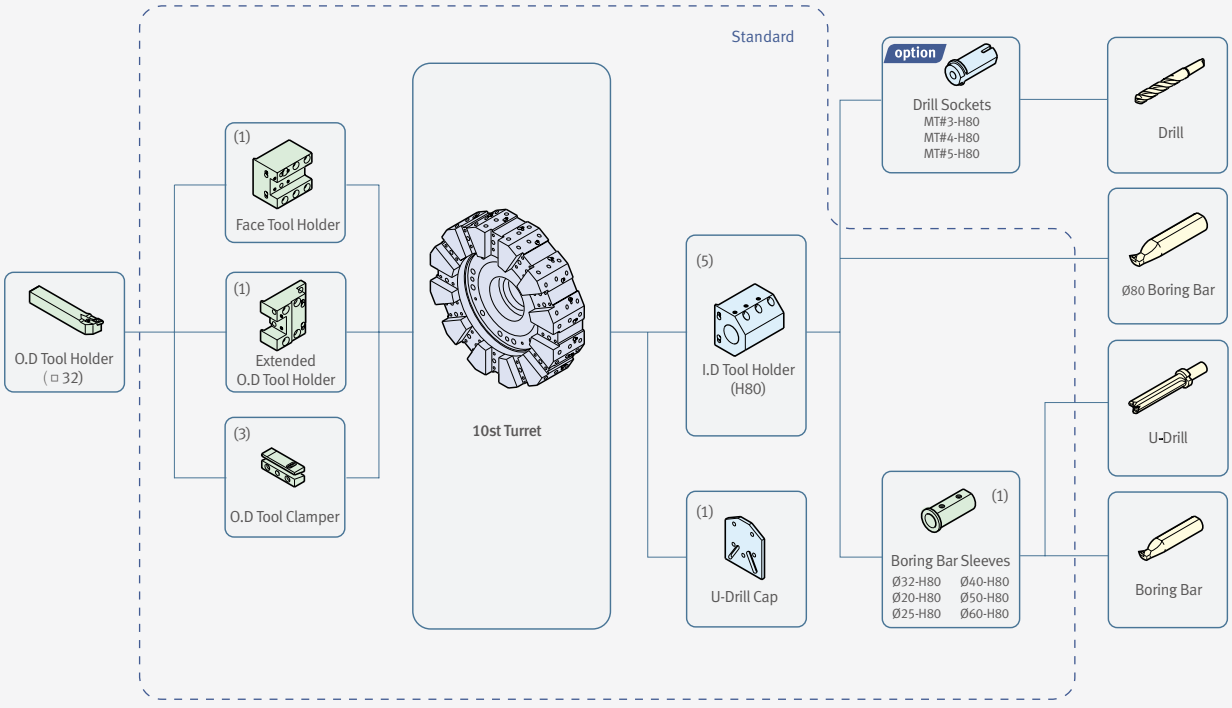
PUMA 4100

Unit : mm (inch)



PUMA 5100

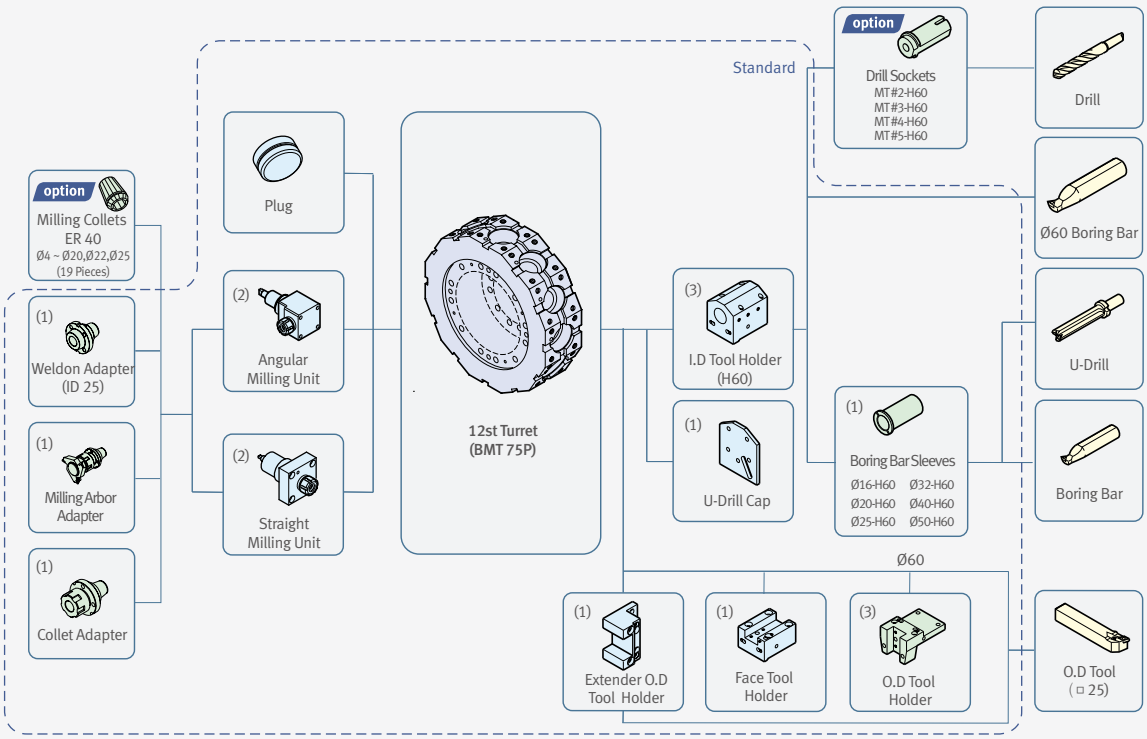
Unit : mm (inch)



Tooling System

PUMA 4100M/LM, PUMA 5100M/LM/LY

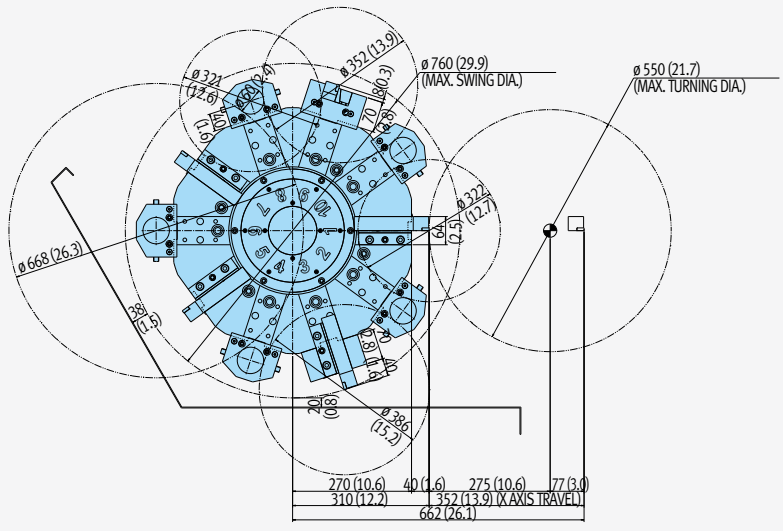
Unit : mm (inch)



Tool Interference Diagram

PUMA 4100 (10 station)

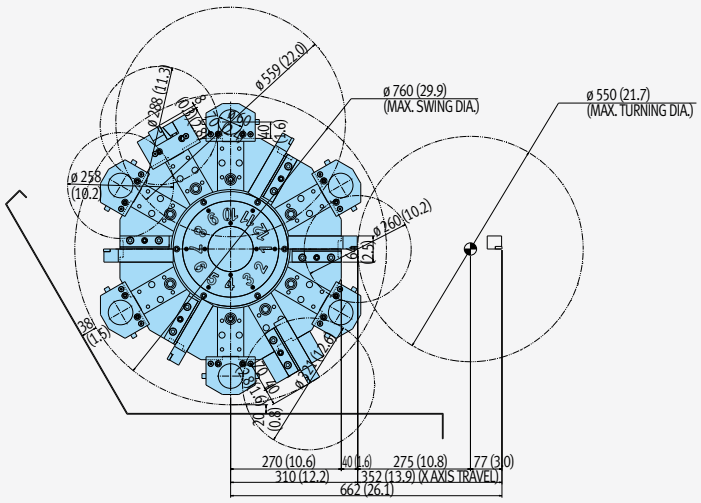
Unit : mm (inch)



Tool Interference Diagram

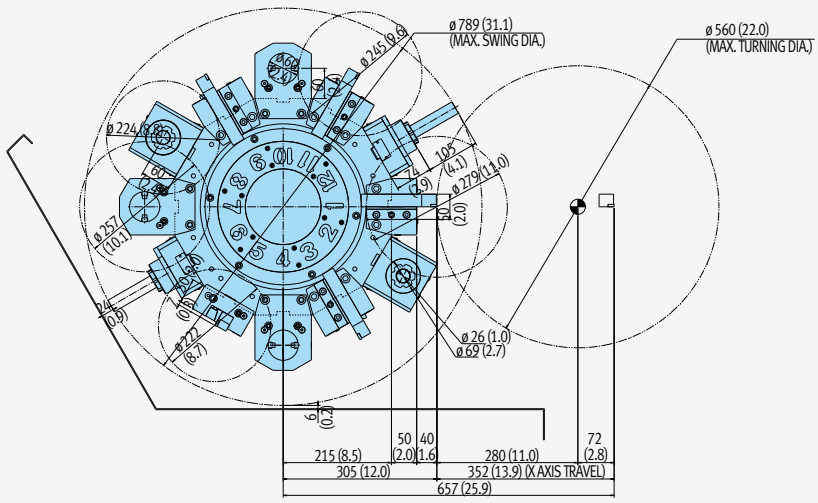
PUMA 4100 (12 station)

Unit : mm (inch)



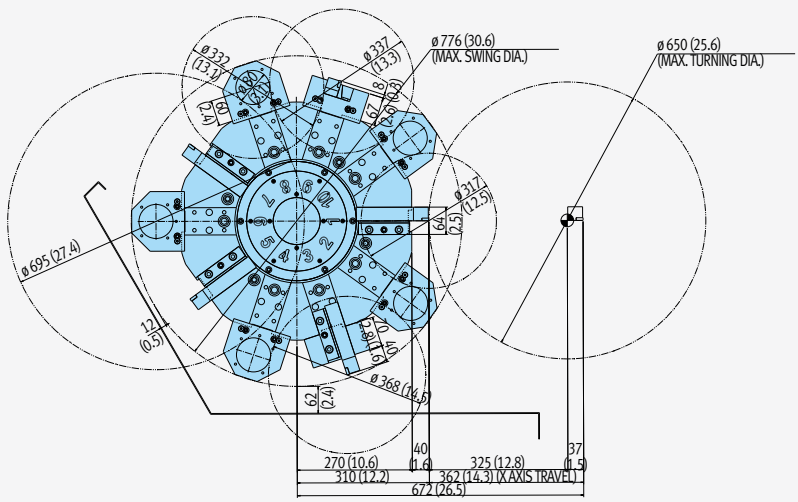
PUMA 4100M (12 station)

Unit : mm (inch)



PUMA 5100 (10 station)

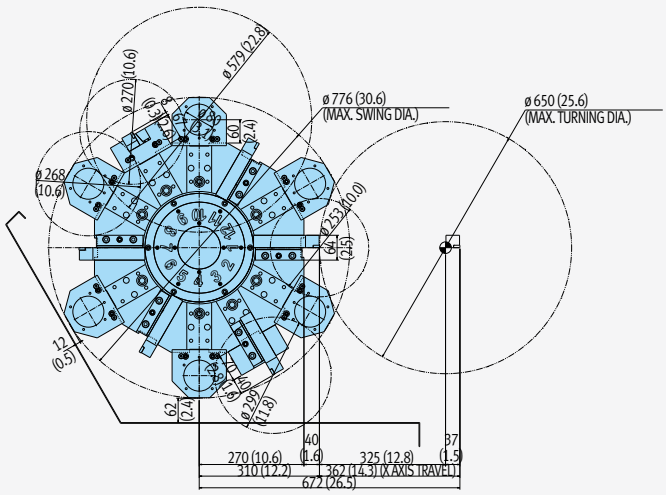
Unit : mm (inch)



Tool Interference Diagram

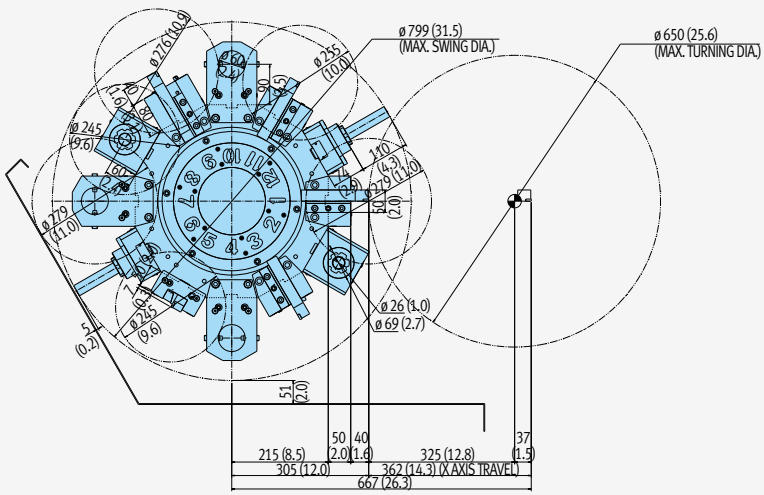
PUMA 5100 (12station)

Unit : mm (inch)



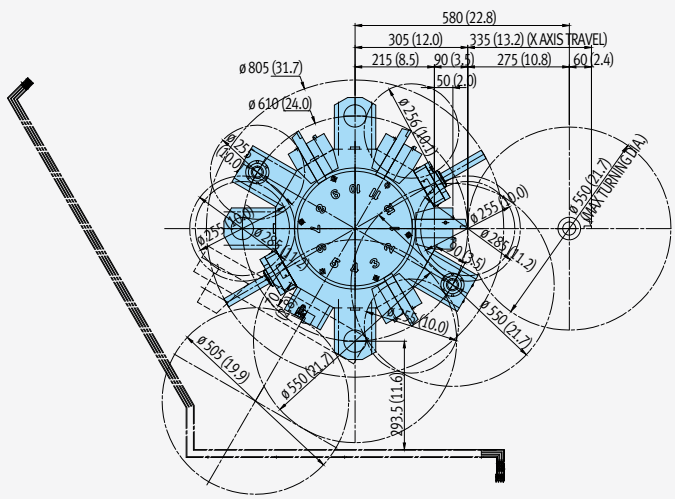
PUMA 5100M (12 station)

Unit : mm (inch)



PUMA 5100LY (12 station)

Unit : mm (inch)

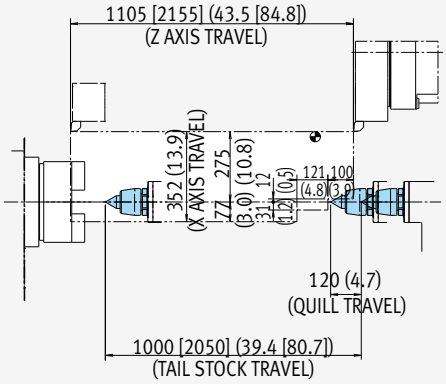


Working Range Diagram

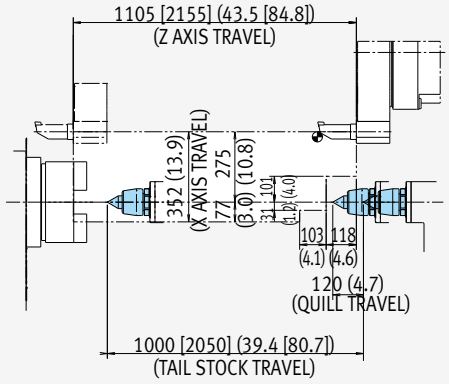
PUMA 4100[L]

Unit : mm (inch)

OD Tool Holder



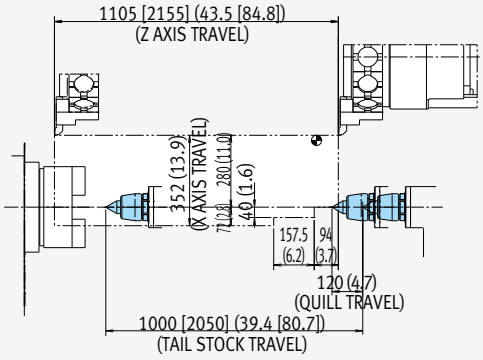
ID Tool holder



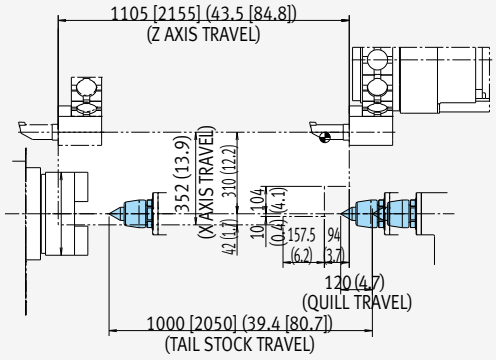
PUMA 4100M[LM]

Unit : mm (inch)

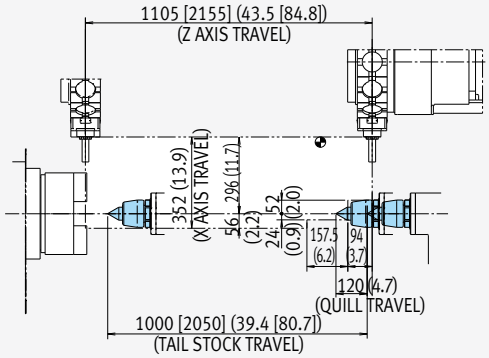
OD Tool Holder



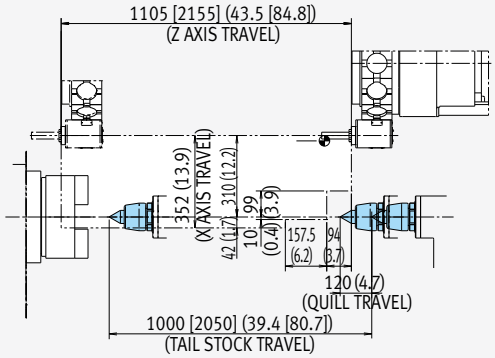
ID Tool Holder



Straight Milling Unit



Angular Milling Unit

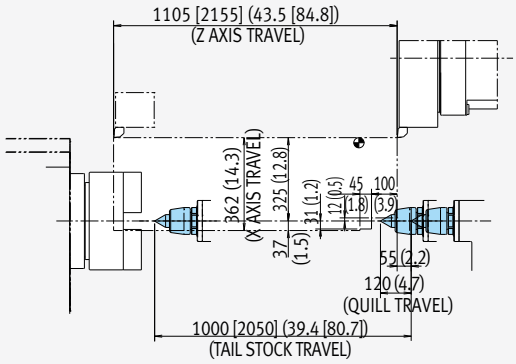


Working Range Diagram

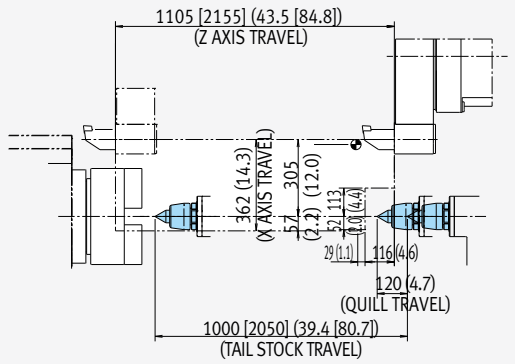
PUMA 5100[L]

Unit : mm (inch)

OD Tool Holder



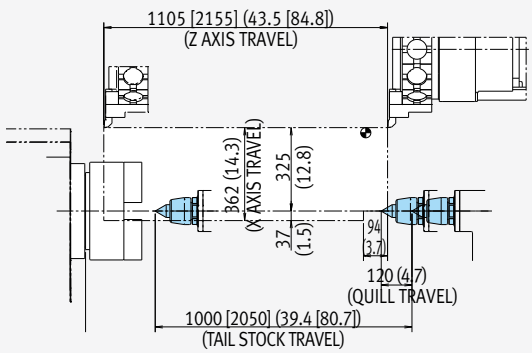
ID Tool holder



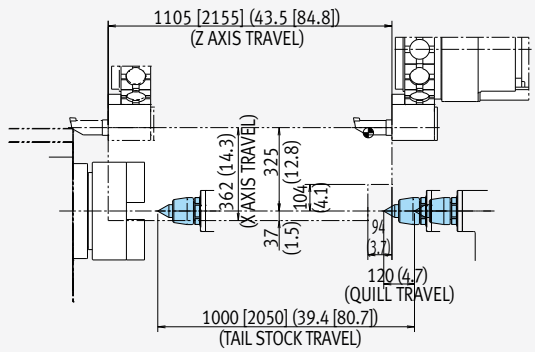
PUMA 5100M[LM]

Unit : mm (inch)

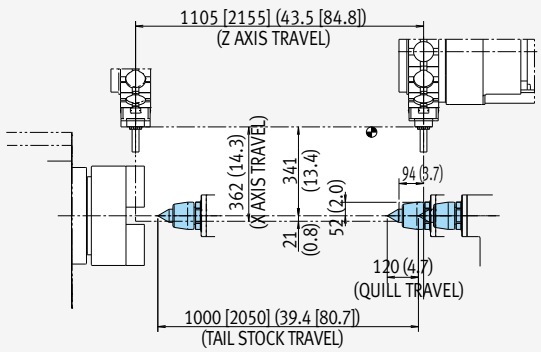
OD Tool Holder



ID Tool Holder



Straight Milling Unit



Angular Milling Unit