



PUMA 300 *Series*



We makes your dreams come true.

CNC TURNING CENTER

PUMA 300 Series



The PUMA 300 Series is designed for heavy and interrupted cutting, holding long-term high accuracies, and superior surface finishes. High speed turret indexing and fast rapid traverse rates minimize time not in the cut. Proven manufacturing techniques and ultra rigid construction are combined with advanced technological features to produce a superior machine with exceptional values.

High Productivity

- Fast 4,500 rpm main spindle speed
- Powerful 26 kW spindle drive(P300C/LC)
- Fast 24 m/min rapid traverse
- Fast 0.15 sec turret indexing
- Large 102 mm bar capacity (P300C/LC)

High Reliability

- Perfect chip/coolant handling
- One-piece Meehanite cast iron bed
- Solid box way construction
- Fast turret under NC servo control
- Double anchor pretensioned ball screw

Get high productivity, reliability and accuracy for a wider range of applications from Doosan Infracore Turning Centers



PUMA 300 Series

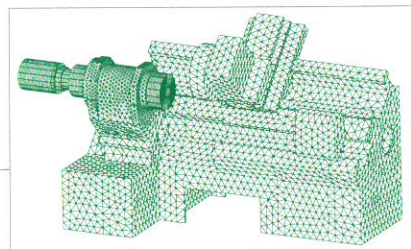
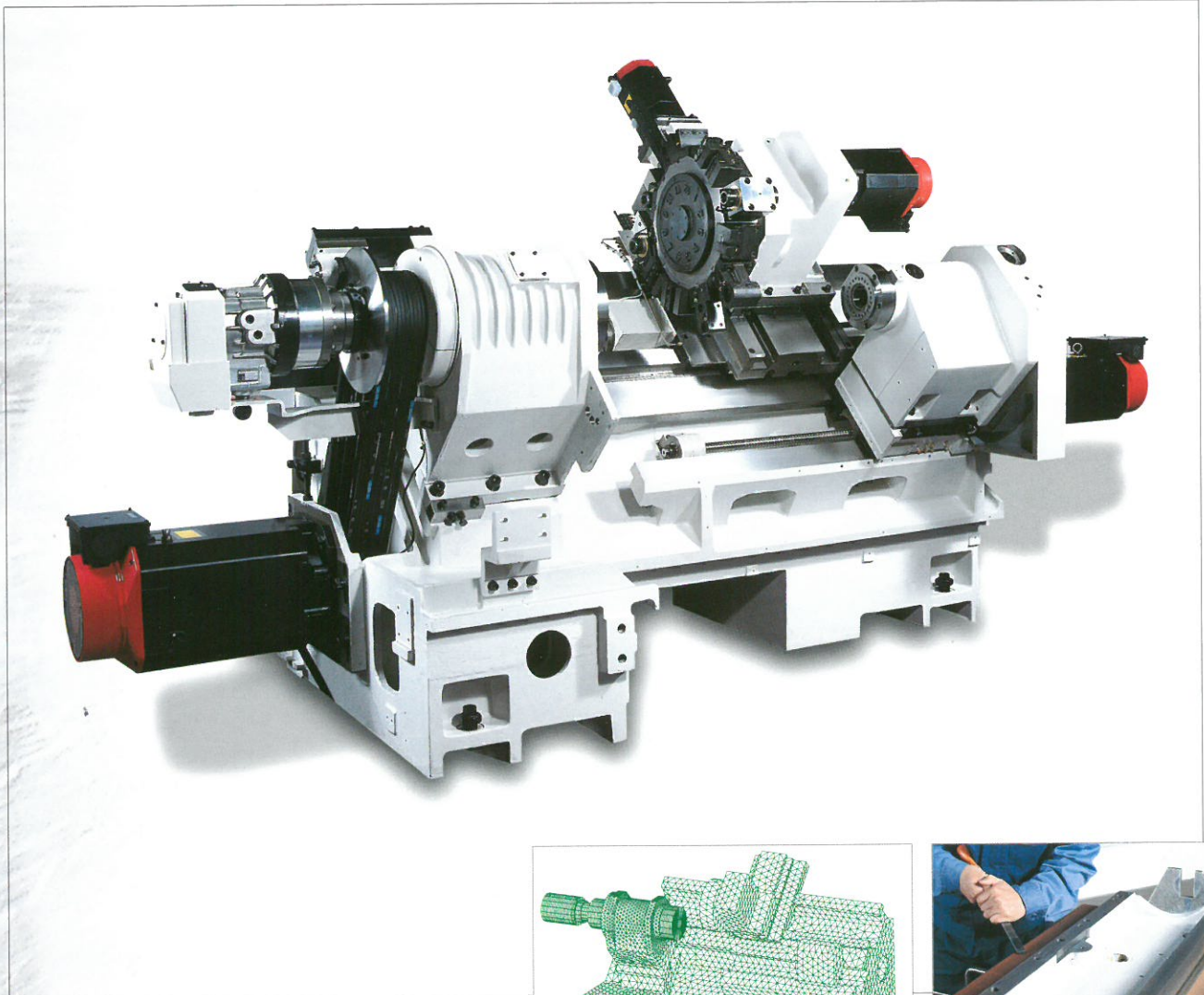
PUMA 300A/B/C PUMA 300LA/LB/LC
PUMA 300MA/MB/MC PUMA 300LMA/LMB/LMC
PUMA 300SA/SB/SC
PUMA 300MSA/MSB/MSC

M : Milling S : Sub-spindle L : Long bed

High Accuracy

- Quality-proven precision bearings & ball screws
- Fluoroplastic resin bonded & hand scraped guide ways
- $\pm 0.002\text{mm}$ repeatability

Doosan Infracore precision machine tools are internationally known for their durability, rigidity and high accuracy. Only well proven and time tested manufacturing techniques can produce machines of this quality.



FEM analysis used to design a stable body
(FEM : Finite Element Method)

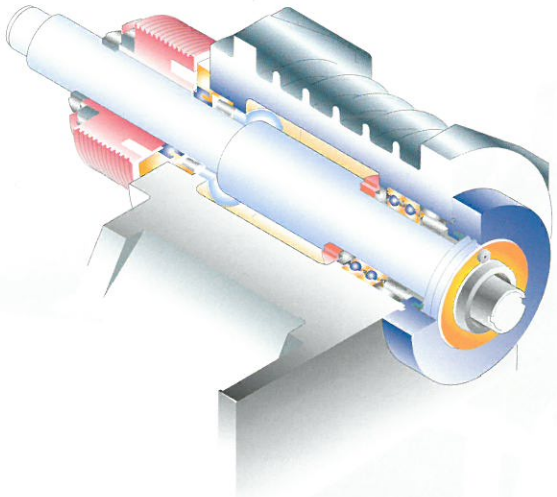


Scraping of surface

BED AND WAY CONSTRUCTION

The PUMA 300 series is a true 45 degree slant bed design. The bed is a one piece casting with both the saddle and tailstock guideways in the same plane to eliminate thermal distortion. The heavily ribbed torque tube design prevents twisting and deformation. Fine grain Meehanite processed cast iron is used because of its excellent dampening characteristics. This ensures high rigidity with no deformation during heavy cutting. The slant angle allows for easy loading , changing and inspection of tools.

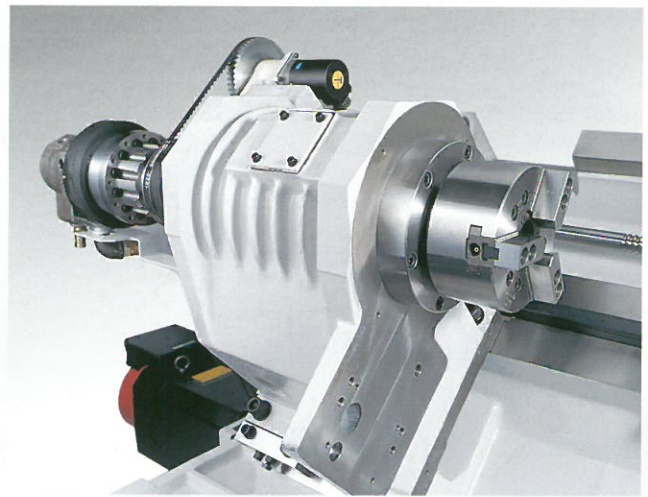
All guideways are wide wrap-around rectangular type for unsurpassed long-term rigidity and accuracy. The guideways are widely spaced to ensure stability and fully protected. Each guideway is induction hardened and precision ground. A fluoroplastic resin, Rulon® 142, is bonded to the mating way surfaces, for its wear and friction characteristics and then hand scraped for a perfect fit and center height.



• Main spindle drive

● MAIN SPINDLE DRIVE

The high-torque spindle motor provides power for heavy stock removal, greatly reducing the number of roughing passes required. For 3 axis milling models the motor is a spindle servo type controlling both the spindle in 2 axis mode and full contouring C-axis in the 3 axis mode. A dual pressure hydraulic spindle, can lock the spindle during heavy milling at a specific position or apply pressure to stabilize the spindle during contour milling.

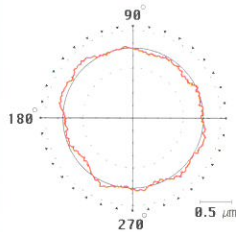


● HEADSTOCK AND SPINDLE CONSTRUCTION

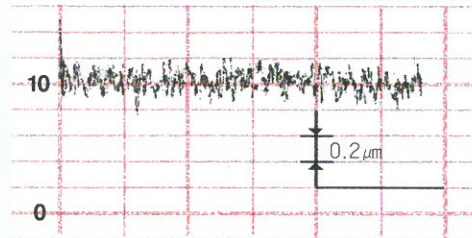
The headstock casting is made of Meehanite and ribbed on the outside to increase the surface area for better heat dissipation. The heavy duty cartridge type spindle is supported by a double row of cylindrical roller bearings in the front and rear, with duplex angular thrust bearings in between. The cylindrical roller bearings feature a large contact surface which ensures the highest rigidity for heavy loads and superior surface finishes.

■ Machining capacity · accuracy

- Material : Brass
- Cutting Speed : 300m/min
- Cutting Depth : 0.025mm
- Cutting Feed : 0.025mm/rev
- Tool : Diamond (Nose R0.1)

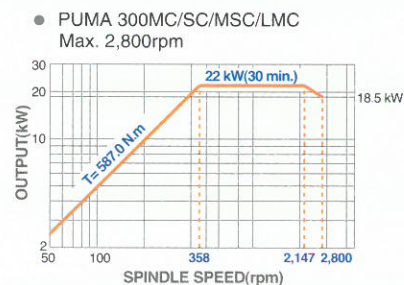
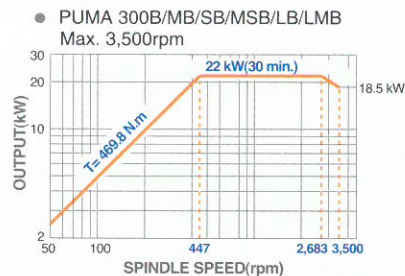
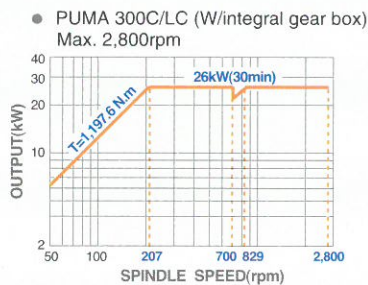
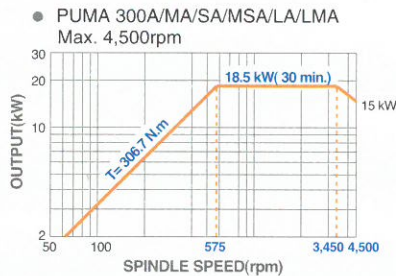


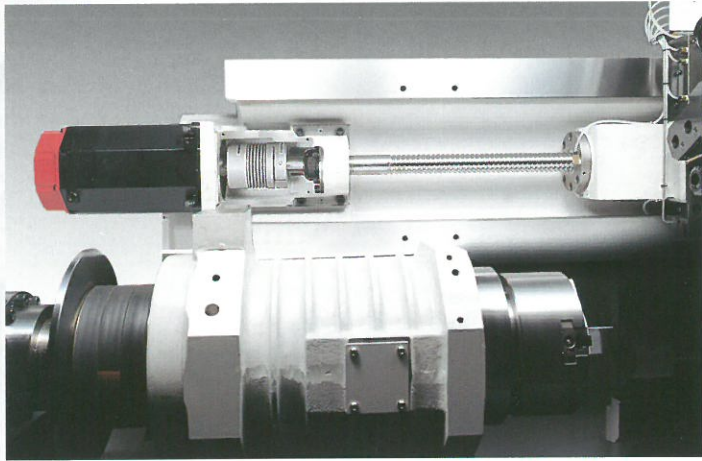
■ Roundness 0.60 μm



■ Roughness 0.29 μm (Ra)

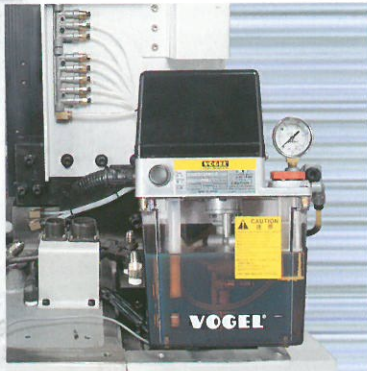
■ Main spindle power-torque diagram





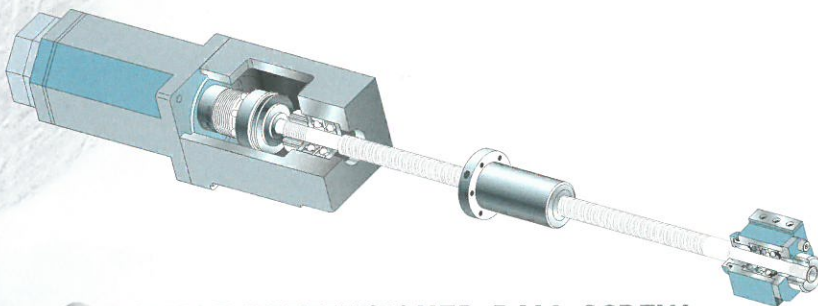
AXIS DRIVES

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



METERED WAY LUBRICATION

Automatic lubrication is provided to all guideways, ball screws and the tailstock quill. A maintenance free piston distributor delivers a precise quantity of oil to each lubrication point. The 1.9 l reservoir lasts up to 100 hours. A low level alarm prevents the machine from restarting without lubricant.



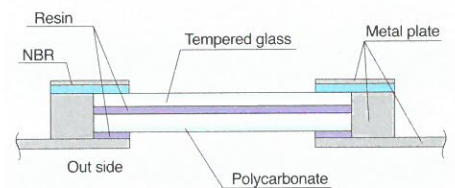
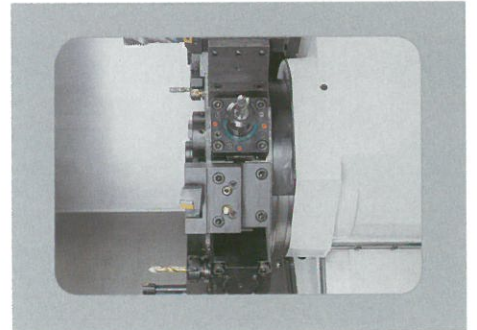
DOUBLE PRETENSIONED BALL SCREW

The X-axis features a double pretensioned ball screw, supported on each end by precision class P4 angular contact thrust bearings. Both axis' are driven by large diameter, high precision ball screws. Each ball screw has been carefully selected to achieve a combination of high accuracy, high rapid traverse rates and high feed thrust. All ball screws are fully supported on both ends.



OPERATOR'S PANEL

The operator's panel is mounted on the right hand side and angled 20 degrees for easy viewing and accessibility during set-up and operation. The layout and location of the panel is ergonomically designed to be efficient and convenient for the operator.



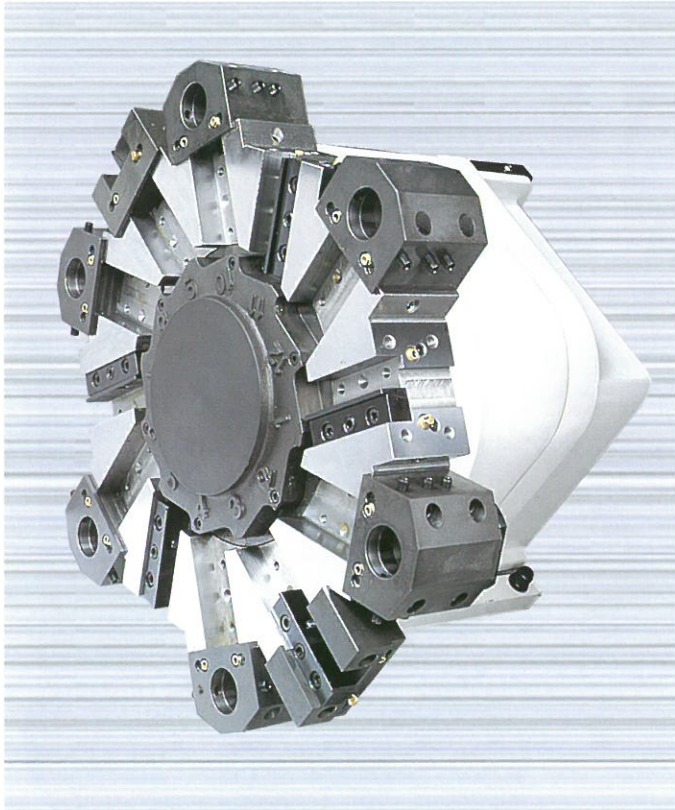
DOUBLE-PANELED SAFETY WINDOW

The operator safety can be enhanced through the front door with its shock absorbing laminated glass and double panel construction. The windows without grating also provide a clear view of the machine inside.

Maximize your total production output.

FAST TURRET INDEXING

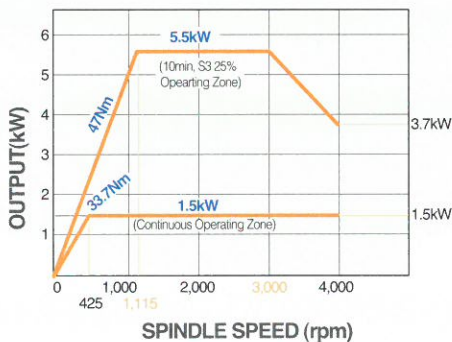
The large 12/10 station heavy duty turret features a large 230mm diameter Curvic coupling and 78 kgf of hydraulic clamp force. The heavy duty design provides unsurpassed rigidity for heavy stock removal, fine surface finishes, long boring bar overhang ratios, and extended tool life. Turret rotation, acceleration and deceleration are all controlled by a reliable high torque servo motor. Unclamp and rotation are virtually simultaneous. Turret indexing is non-stop-bi-directional, with a 0.15 second next station index time. Turning tools are securely attached to the turret by wedge clamps.



- Servo-Driven Turret
 - 30% Faster index time
- Non-Lift Index Turret(3 pieces coupling)
 - Preventing coolant & chip from penetrating
 - No oil seals applied
- No external coolant coupling

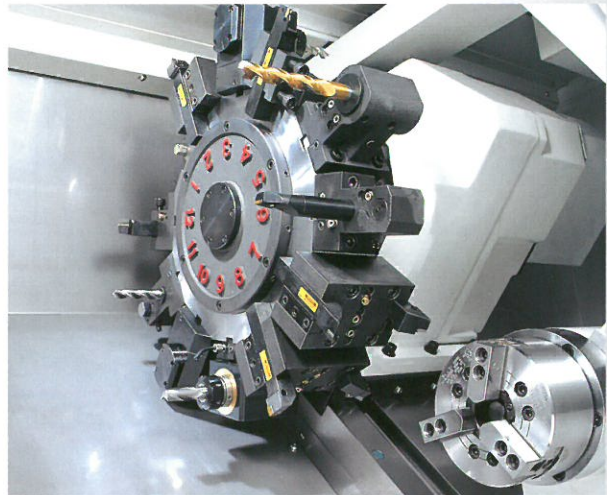
Milling spindle power-torque diagram

- PUMA 300M/MS (4,000rpm)

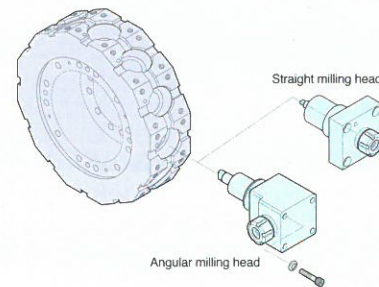


BMT MILLING TURRET

The more rigid, accurate & reliable BMT turret allows tools to be arranged to clear a 230 mm chuck. New BMT holders fixed firmly by 4 screws, boast of a strict tolerance & rigid construction. Especially rotating tool holders can be mounted in all 12 stations. Turret rotation, acceleration and deceleration are all controlled by the same high torque servo motor as the standard turret. Turret indexing is bi-directional, with a 0.15 sec next station index time.



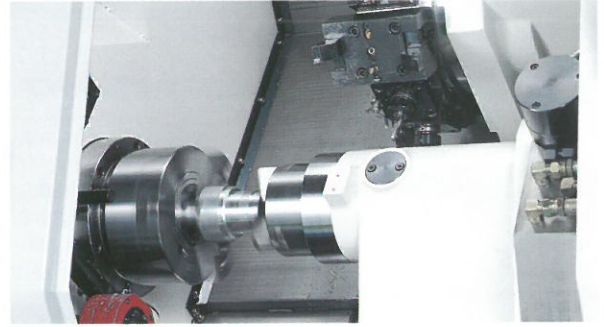
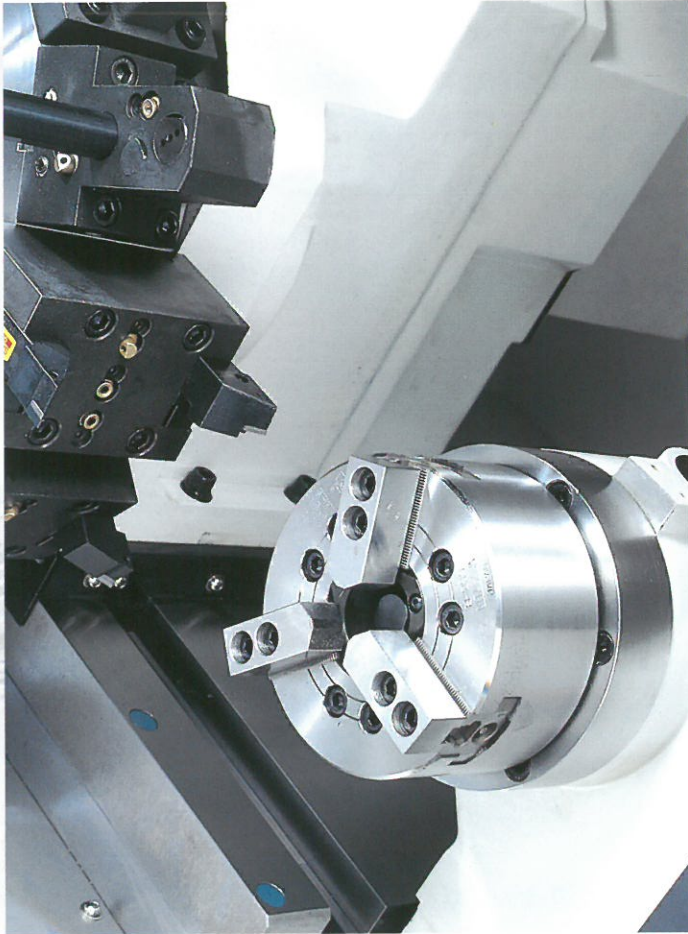
Radial BMT



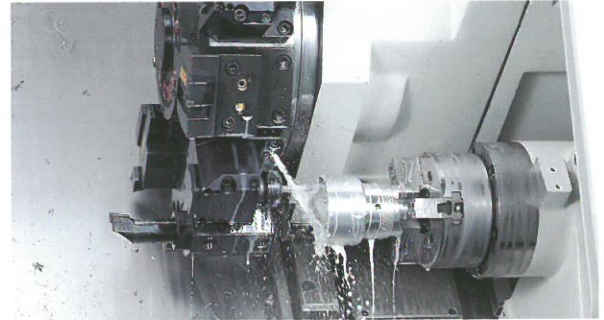
PRECI-FLEX READY ROTARY TOOLS



Preci-Flex ready rotary tool holders are available on the milling versions. Preci-Flex is a tooling system utilizes the existing ER collet taper in the rotary holders. The spindle face is precision ground relative to the taper and there are four drilled and tapped holders in this face. The Preci-Flex adapters locate on both the taper and the spindle face for maximum rigidity.



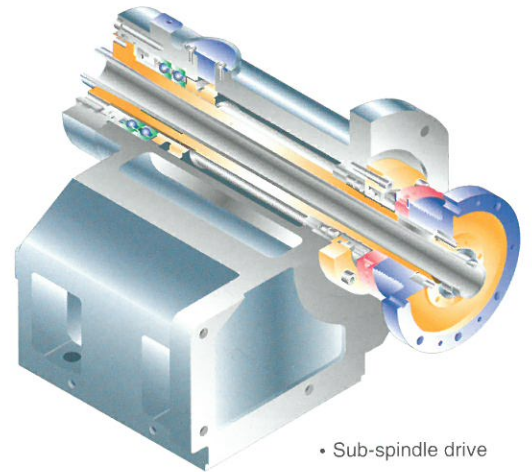
■ Synchronizing



■ Rigid Tapping

● SUB-SPINDLE (PUMA 300S, 300MS)

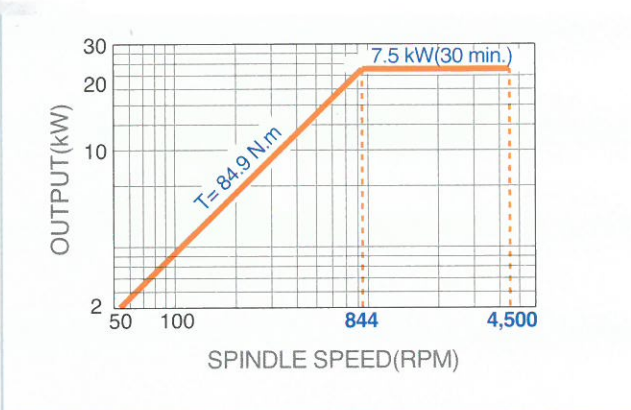
The sub-spindle with 5 degree index allows for machining on the rear side of the work piece. The sub-spindle body is accurately positioned by the B-axis ball screw and servo motor. "On the fly" parts transfer can be performed by synchronizing the speeds of the main spindle and sub-spindle. The 4,500 RPM sub-spindle is equipped with a powerful 7.5 kW motor. The bar capacity through the cylinder and drawtube is 44mm. Chucks up to 6" in diameter can be actuated.



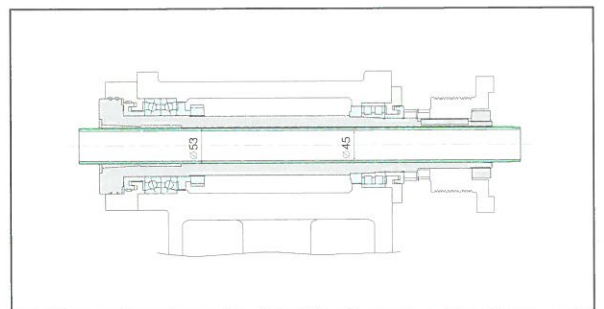
• Sub-spindle drive

■ Sub-spindle power-torque diagram

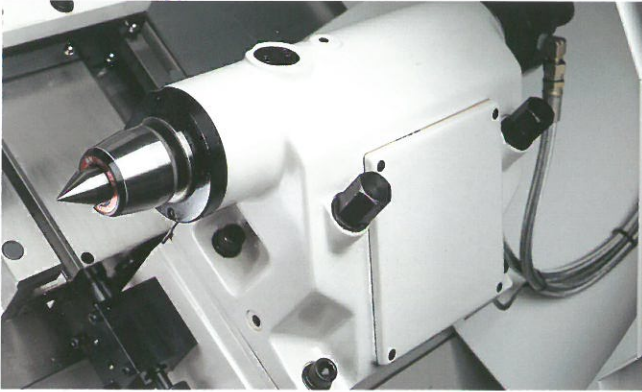
- PUMA 300S/MS (4,500rpm)



● PUMA 300S/MS SUB-SPINDLE Cross Section

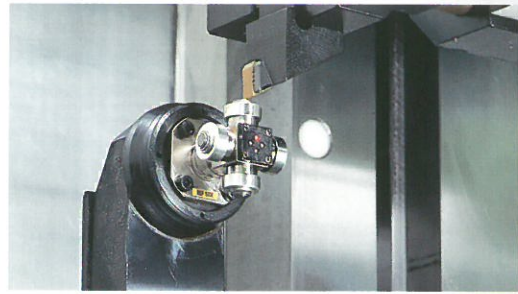


● TOW ALONG TAILSTOCK



Widely spaced guideways and heavy-duty design of the tailstock body ensure ample rigidity. The tailstock body is positioned by a drive bar, which engages with the carriage. The drive bar movement and hydraulic body clamping are manual (std.) or programmable (opt.)

● AUTOMATIC TOOL SETTER(Opt.)



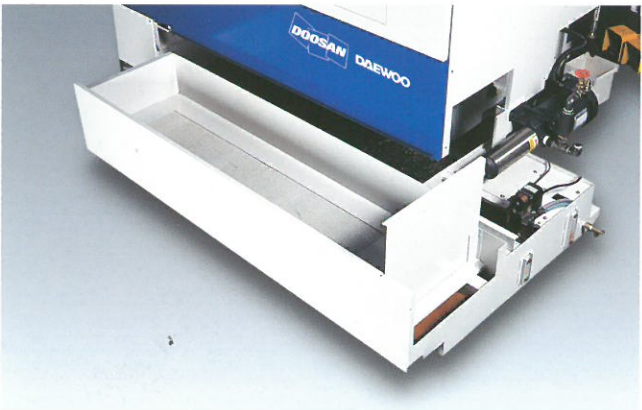
The automatic tool setter reduces set-up time by minimizing the need for skim cuts, measurements and entering tool offsets. The toolsetting arm is moved by a hydraulic actuator and can be controlled through the program.

● PARTS CATCHER(Opt.)



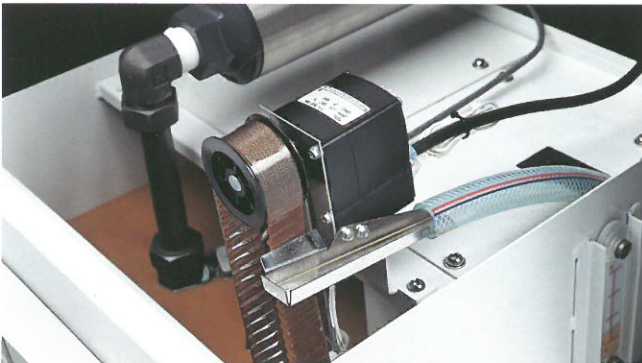
An optional parts catcher is available for unattended operation with a barfeeder. A part conveyor is also available for more advanced applications.

● COOLANT SYSTEM



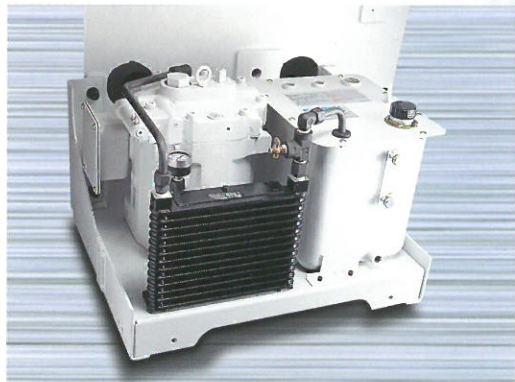
The large capacity coolant tank and chip pan are separated from the machine bed to prevent heat transfer and ease cleaning. A low level coolant alarm is included for unattended operation.

● OIL SKIMMER(Opt.)



A belt oil skimmer picks up and removes waste oil from the coolant tank that is easily drained.

● HYDRAULIC POWER UNIT

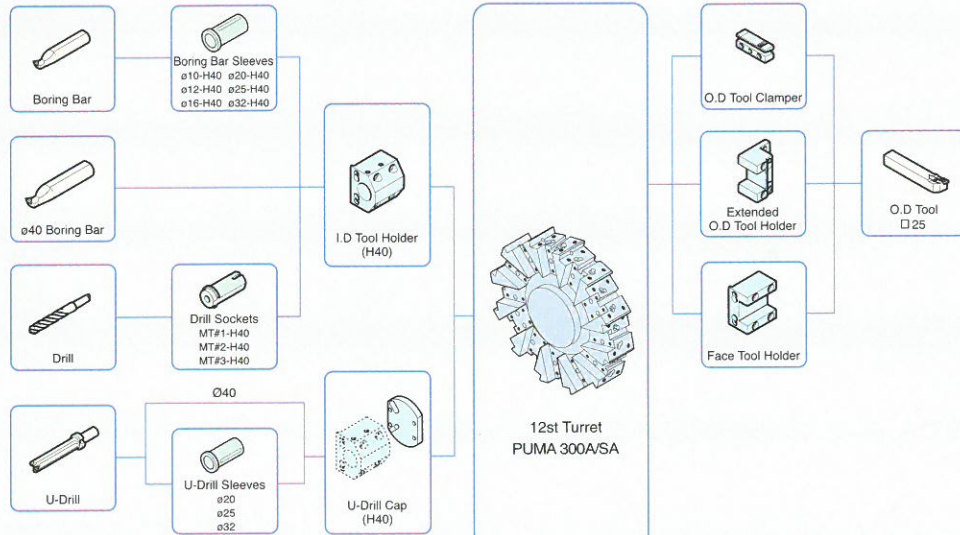


The temperature of the hydraulic oil is regulated by a cooling system.

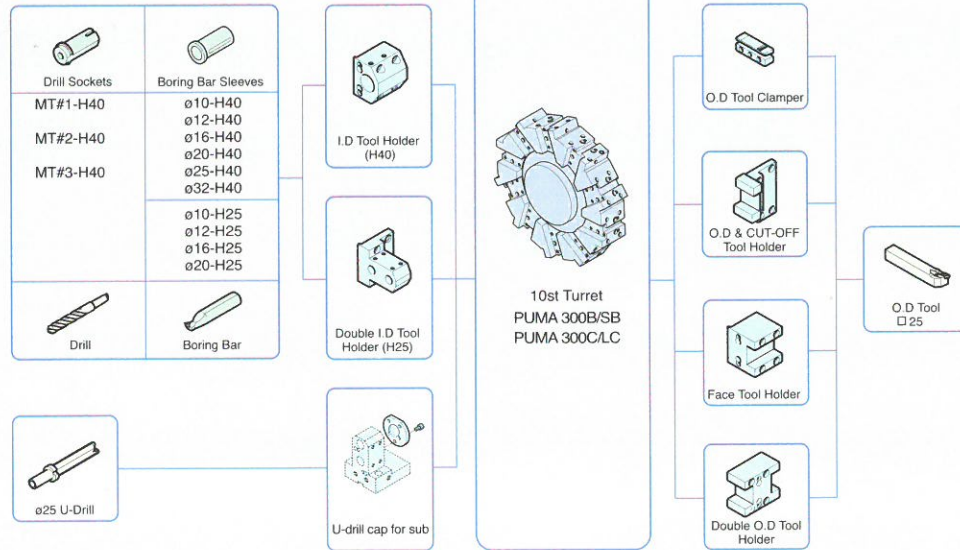
Tooling System

unit : mm

PUMA 300

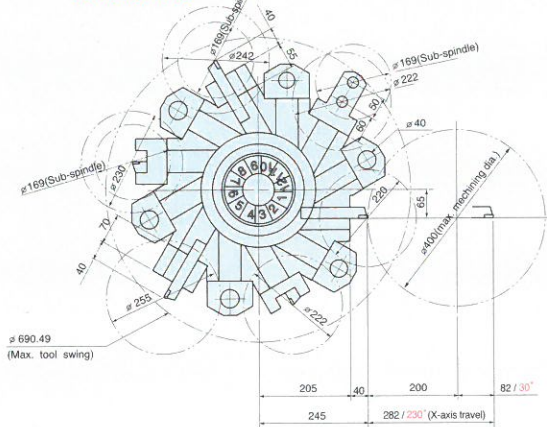


PUMA 300S

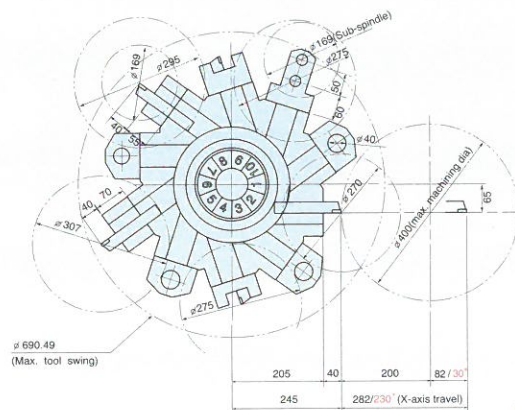


Tool Interference Diagram

PUMA 300A/SA/LA
 12-Station turret



PUMA 300B/SB/LB/C/SC/LC
 10-Station turret



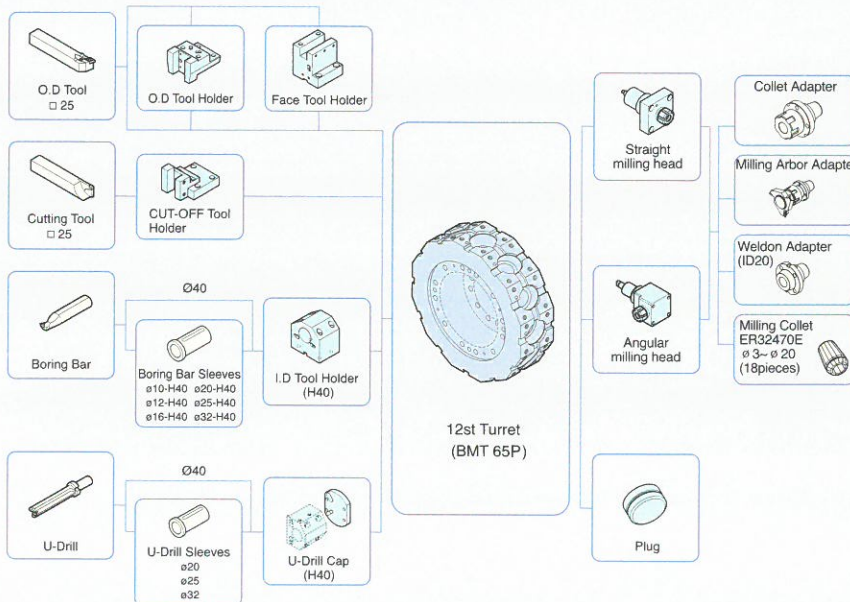
unit : mm

* : PUMA 300SA/SB

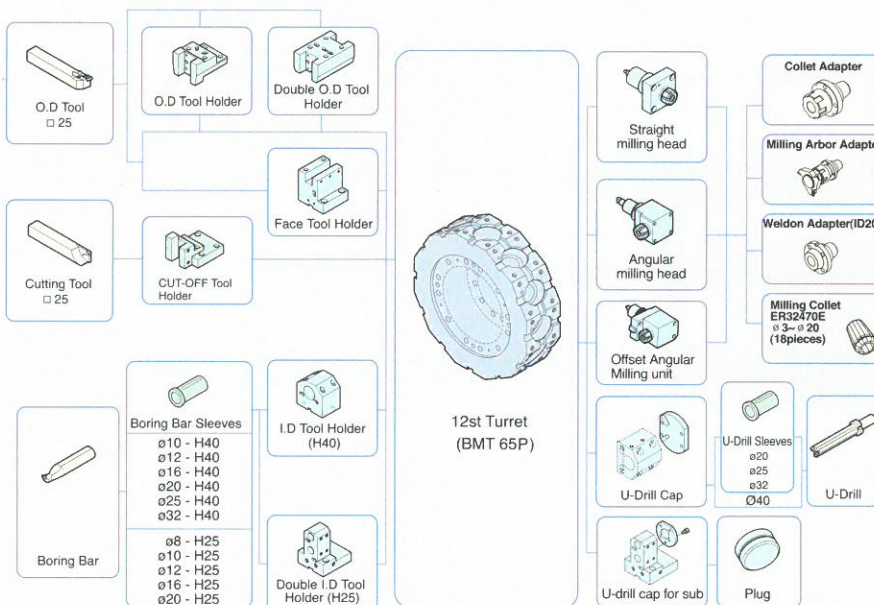
Tooling System

PUMA 300M

unit : mm



PUMA 300MS



Note) Above tooling system is our recommendation. Depending on export condition, the standard tooling packed with the machine can be different.

Tool Interference Diagram

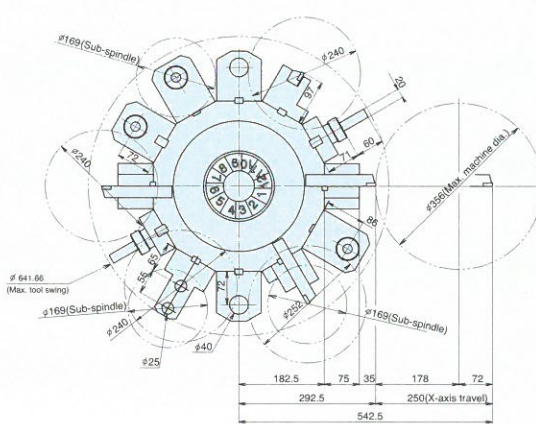
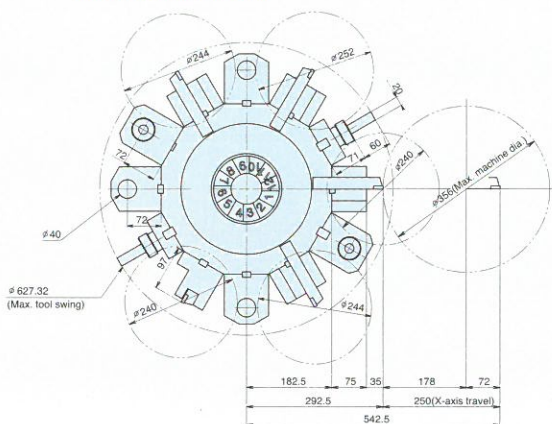
PUMA 300MA/LMA/MB/LMB/MC/LMC

12- Station turret (BMT65P)

PUMA 300MSA/MSB/MSC

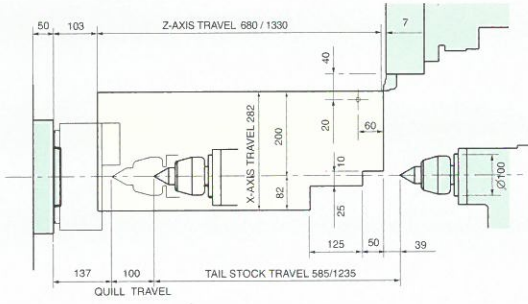
12- Station turret (BMT65P)

unit : mm

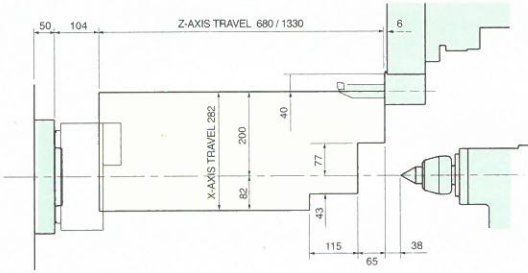


PUMA 300/300L

OD Tool Holder

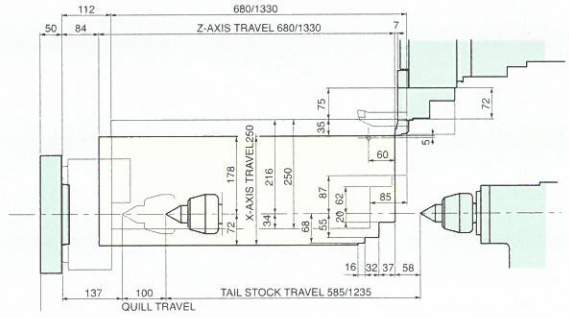


ID Tool Holder

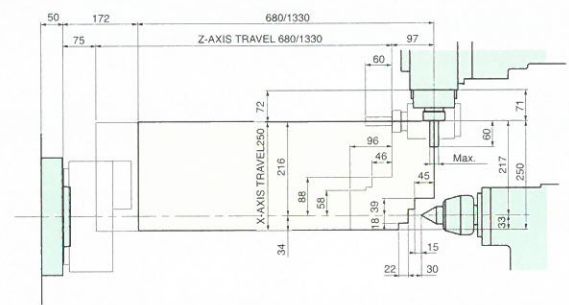


PUMA 300W/300LM

OD / ID Tool Holder

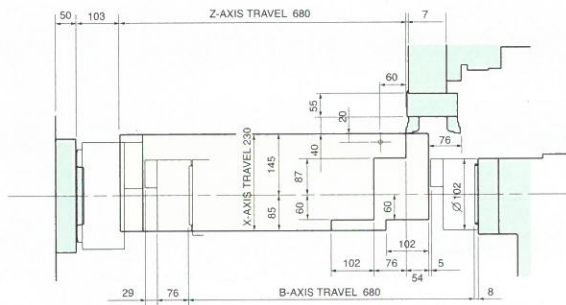


Drill / End Mill Unit

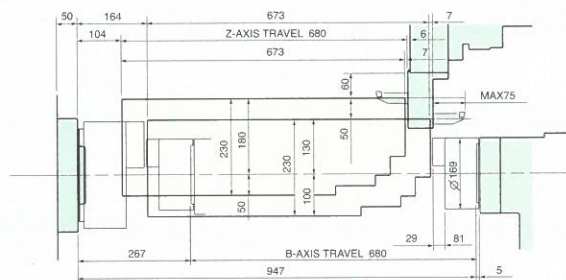


PUMA 300S

Double OD Tool Holder

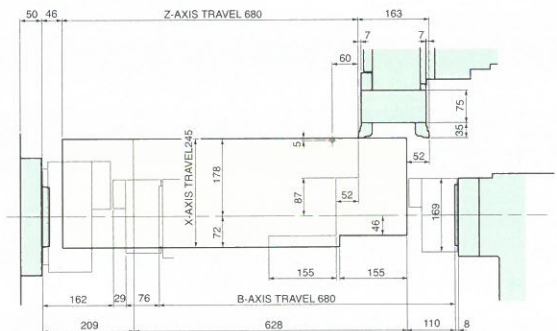


Double ID Tool Holder

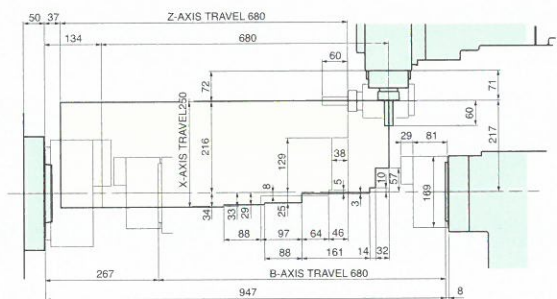


PUMA 300MS

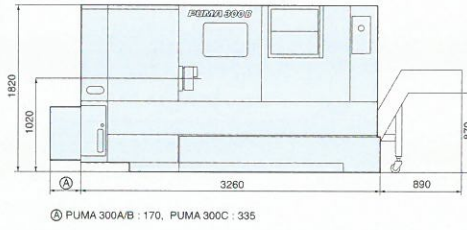
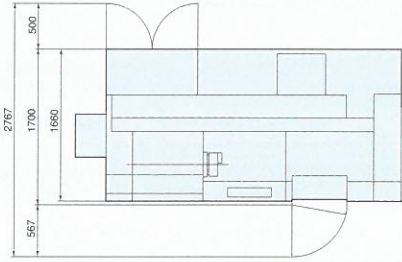
Double OD Tool Holder



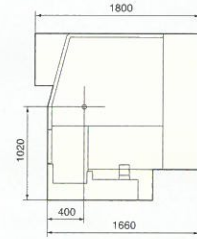
Drill / End Mill Unit



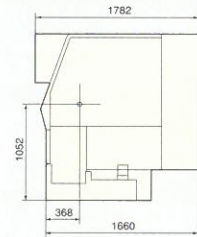
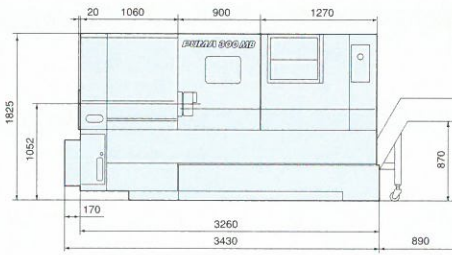
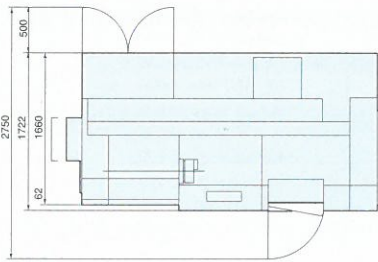
PUMA300A/B/C



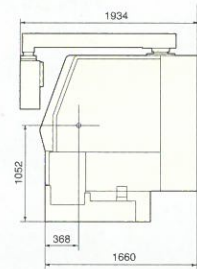
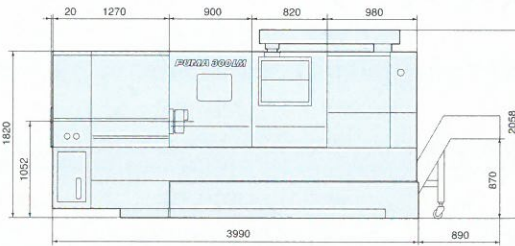
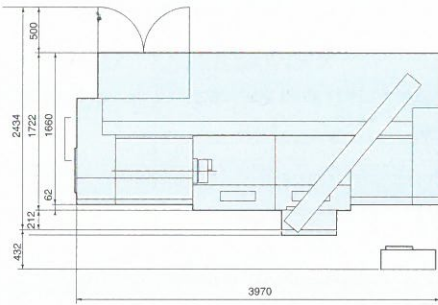
Ⓒ PUMA 300A/B : 170, PUMA 300C : 335



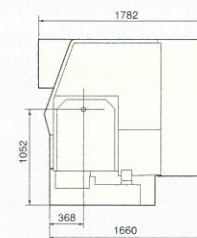
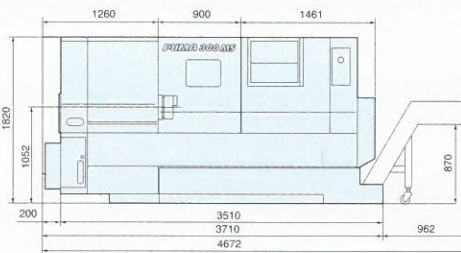
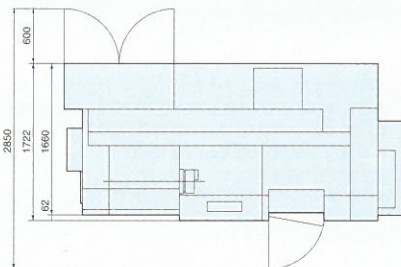
PUMA300M



PUMA300L/300LM



PUMA300S/300MS



Machine Specifications

Item			P 300A/B/C [P 300LA/LB/LC]	P 300MA/MB/MC [P 300LMA/LMB/LMC]	P 300SA/SB/SC	P 300MSA/MSB/MSC
Capacity	Swing over bed	mm	570	590	570	590
	Swing over saddle	mm	370	450	370	450
	Recom. turning diameter	mm	210 / 255 / 305	210 / 255 / 305	210 / 255 / 305	210 / 255 / 305
	Max. turning diameter	mm	400	355	400	355
	Max. turning length	mm	660 / 648 / 630 [1,310 / 1,298 / 1,280]	595 / 583 / 565 [1,245 / 1,233 / 1,215]	660 / 648 / 630	595 / 583 / 565
	Bar working diameter	mm	51 / 76 / 102	51 / 76 / 102	51 / 76 / 102	51 / 76 / 102
Travel	X-axis	mm	282 (82+200)	250 (72+178)	230 (30+200)	250 (72+178)
	Z-axis	mm	680 [1,330]	680 [1,330]	680	680
Main Spindle	Spindle speed	rpm	4,500 / 3,500 / 2,800	4,500 / 3,500 / 2,800	4,500 / 3,500 / 2,800	4,500 / 3,500 / 2,800
	Spindle nose	ASA	A2#6 / A2#8 / A2#11	A2#6 / A2#8 / A2#11	A2#6 / A2#8 / A2#11	A2#6 / A2#8 / A2#11
	Spindle bearing diameter (Front)	mm	100 / 130 / 160	100 / 130 / 160	100 / 130 / 160	100 / 130 / 160
	Spindle bore diameter	mm	62 / 90 / 115	62 / 90 / 115	62 / 90 / 115	62 / 90 / 115
	Cs spindle index angle	deg	-	360 (0.001)	-	360 (0.001)
Sub-Spindle	Spindle speed	rpm	-	-	4,500	4,500
	Spindle bearing diameter (Front)	mm	-	-	90	90
	Spindle bore diameter	mm	-	-	53	53
	Sub-spindle index angle	deg	-	-	5 (72 pos.)	5 (72 pos.)
Tool Post	No. of tool stations	st.	12 / 10 / 10	12 (BMT 65P)	12 / 10 / 10	12 (BMT 65P)
	OD tool size	mm	25	25	25	25
	Boring bar diameter	mm	40	40	40 (sub 25)	40 (sub 25)
	Indexing time (1st. swivel)	sec	0.15	0.15	0.15	0.15
	Rotary tool spindle speed	rpm	-	4,000	-	4,000
Feedrates	Rapid traverse	m/min	X: 20, Z: 24	X: 20, Z: 24	X: 20, Z: 24, B: 20	X: 20, Z: 24, B: 20
	Cutting feedrate(X,Z)	mm/rev	500	500	500	500
Tailstock	Quill diameter	mm	100	100	-	-
	Quill travel	mm	100	100	-	-
Motor	Main spindle motor(30 min)	kW	18.5 / 22 / 26	18.5 / 22 / 22	18.5 / 22 / 22	18.5 / 22 / 22
	Sub-spindle motor(30 min)	kW	-	-	7.5	7.5
	Rotary tool spindle motor(15 min)	kW	-	5.5	-	5.5
	Feed motor	kW	X: 3.0, Z:4.0	X: 3.0, Z: 4.0	X: 3.0, Z: 4.0, B: 3.0	X:3.0, Z: 4.0, B: 3.0
Power source	Electric power supply(Rated capacity)	kVA	33.4 / 37.8 / 44.5	36.1 / 40.6 / 40.6	41.7 / 46.2 / 46.2	44 / 48.4 / 48.4
Machine size	Machine height	mm	1,825 [2,065]	1,825 [2,065]	1,825	1,825
	Machine dimensions Length	mm	3,500 / 3,500 / 3,665 [4,075]	3,500 [4,075]	3,855	3,855
	Width	mm	1,800 [1,934]	1,800 [1,934]	1,800	1,800
	Machine weight	kg	5,620 / 5,620 / 5,740 [6,580 / 6,580 / 6,680]	5,740 [6,700]	5,740	5,860

Standard Features

- Coolant supply equipment
- Foot switch
- Fanuc 21i-TB controller (for PUMA 300/L/M/LM)
- Fanuc 18i-TB controller(for PUMA 300S/MS)
- Front door interlock switch
- Full enclosure chip and coolant shield
- Hand tool kit, including small hand tool for operations
- Hydraulic chuck & actuating cylinder
- Hydraulic power unit
- Leveling jack screw & plates
- Live tail center
- Lubrication equipment
- Manuals
- Safety precaution name plates
- Soft jaws (total 5 sets)
- Standard tooling kit (tool holders & boring sleeves)
- Work light

Optional Features

- Additional tool holders & sleeves
- Air blast for chuck jaw cleaning
- Air gun
- Automatic door with safety device
- Automatic measuring system in process touch probe
- Automatic power off
- Automatic Steady rest (hydraulic type)
- Automatic work loading & unloading equipment
- Bar feeder interface
- Chip conveyor & chip bucket
- Collet chucks
- Coolant flushing
- Dual chucking pressure
- Hardened & ground jaws
- Oil skimmer
- Parts catcher & Parts conveyor
- Pressure switch for chucking pressure check
- Programmable tailstock
- Proximity switches for chuck clamp detection
- Proximity switch for tail stock quill position detection
- Signal tower (yellow, red, green)
- Special chucks
- Tail stock quill for dead center (MT#4)
- Tool monitoring system
- Tool pre-setter(Hydraulic type)

· [] : Long Bed Type-PUMA 300LA/LB/LC, PUMA 300 LMA/LMB

· Design and specifications are subject to change without notice.

· We do not responsible for difference between the information in the catalogue and the actual machine.

NC Unit Specifications

	Item	Spec	F21i-TB	F18i-TB
Controls	Controlled axes		X,Z,C(!)	X,Z,C(!!!),B(!,!!!)
	Simultaneously controlled axes	Std. 2 axes	3 axes(!)	3 axes(!,!!!)
Axis functions	Backlash compensation	0~ ± 9999 pulses	○	○
	Cs contouring control		○ (!)	○ (!!!)
	Follow-up / Chamfering on/off		○	○
	HRV control		○	○
	Increment system 1/10	0.0001mm / 0.00001"	○	Opt.
	Least input increment	0.001mm / 0.0001"	○	○
	Stored stroke check1	Overtravel control	○	○
Operation	Automatic operation(memory) / Buffer register		○	○
	Manual handle feed rate	X1, X10, X100	○	○
	Search function	Sequence NO. / Program NO.	○	○
Interpolation	1st, 2nd reference position check / return	G27/G28, - / G30	○	○
	Circular interpolation	G02, G03	○	○
	Continuous thread cutting		○	○
	Dwell	G04	○	○
	Linear interpolation	G01	○	○
	Multiple threading /Thread cutting retract		○	○
	Polar coordinate interpolation	G12.1, G13.1	○ (!)	○ (!!!)
	Thread cutting / Synchronous cutting		○	○
Feed functions	Feed per minute / Feed per revolution	G98 / G99	○	○
	Feedrate override	0 - 200 %(10% unit)	○	○
	Jog feed override	0 - 2000 mm/min	○	○
	Rapid traverse override	F0/ 50 / 100 %	○	○
	Tangential speed constant control		○	○
Axiliary & Spindle functions	1st Spindle orientation		○	○
	3rd spindle serial output		-	○ (!!!)
	Constant surface speed control	G96, G97	○	○
	M-function	M3 digit	○	○
	Multi-spindle control		○ (!)	○ (!,!!!)
	Rigid tapping		○	○
	Spindle speed override	0~150%	○	○
	Spindle synchronous control		-	○ (!,!!!)
Sub spindle orientation		-	○ (!,!!!)	
Programming functions	Absolute / Incremental programming		○	○
	Canned cycle for drilling	G80 series	○	○
	Chamfering / corner R		○	○
	Custom macro B		○	○
	Decimal point programming/pocket calculator type decimal point programming		○	○
	Direct drawing dimension programming		○	○
	eZ Guide i	Conversational programming	○	○
	Maximum program dimension	± 99999.999mm/(± 9999.9999 inch)	○	○
	Multi repetitive canned cycle	G70~G76	○	○
	Multi repetitive canned cycle 2		○	○
	Program number / Sequence number	O4 digits / N5 digits	○	○
	Programmable data input	G10	○	Opt.
	Sub program call	Nested holds4	4	4
	Tape format for FANUC series 10/11		○	-
	Tape format for FANUC series 15		-	○
Work coordinate system selection	G52, G53, G54~G59	○	○	
Auto tool offset		○	○	
Tool functions	Tool monitoring system		Opt.	Opt.
	Direct input of tool offset value measured B		○	○
	Tool geometry / wear compensation	Geometry & wear data	○	○
	Tool life management		Opt.	○
	Tool nose radius compensation	G40~G42	○	○
	Tool number command(T-code function)	T2+2 digits	○	○
	Tool offset pairs		64	32
	Tool offset value counter input		○	○
	Background editing		○	○
Editing op. functions	Expanded part program editing	Copy, Move, Change of NC program	○	○
	No. of Registered programs		200EA	125EA
	Part program editing / Program protect		○	○
	Part program storage length*1		80m	160m
	Display of spindle speed and T-code at all screen		○	○
Setting & display	Help function	Alarm&Operation display	○	○
	Self diagnostic function		○	○
	Servo setting screen / Spindle setting screen		○	○
	Tool path graphic display		Opt.(!)	○ (!,!!!)
	I/O interface	RS-232C	○	○
Data input & output	Memory card input and output		○	○
	Reader puncher control	CH1 interface	○	○
	Ethernet function	Embedded ethernet function	Opt.	○
Other functions	MDI / DISPLAY unit		10.4" color LCD	10.4" color LCD
	PMC system		○	○

○ : Std, Opt.: Option, (!) : only M type, (!!): only S type, (!!!): only MS type

*1 : Standard Part program length is different on export condition. On the addition of optional functions, its length can be reduced.

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