Doosan Infracore
Machine Tools

PUMA 480

Powerful, Heavy Duty Turning Center

Massive yet responsive turning centers without compromise. The most powerful machines in their class.

PUMA 480 series mainly focus its capacity on heavy duty cutting,
wide range of cutting coverage along with rapid positioning and fast bi-directional turret-indexing.

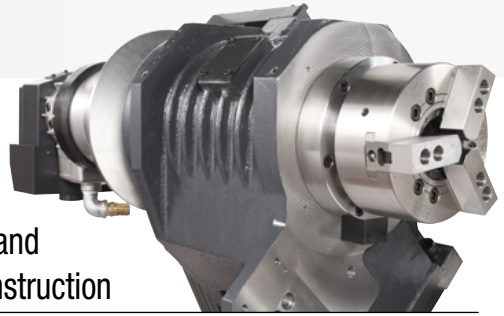
Powerful, Heavy Duty Turning Center

PUMA 480

Main Spindle

PUMA 480 series

	PUMA 480[L]	PUMA 480D[LD]
Max. spindle speed	1500 r/min	1000 r/min
Bar working dia.	165.5 mm (6.5 inch)	275 mm (10.8 inch)
Motor (30 min)	45 kW (60.3 Hp)	



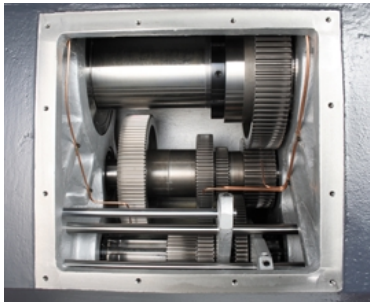
Headstock and Spindle Construction

The headstock casting is made of Meehanite and ribbed on the outside to increase the surface area for better heat dissipation. The headstock and main spindle are manu-factured in a temperature controlled environment then assembled and tested in our clean room. 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. All spindle bearings are permanently grease lubricated precision class P4.

Main Spindle Drive

The 45kW (60.3Hp) spindle motor provides power for heavy stock removal, greatly reducing the number of roughing passes required. The reliable digital AC spindle motor provides fast acceleration and is maintenance free. The preloaded spindle bearings are specifically calibrated to maintain the perfect balance of rigidity and speed. The geared headstock ensures optimal power throughout a wide speed range.

Isolated Gear Box (DI Gear Box)*

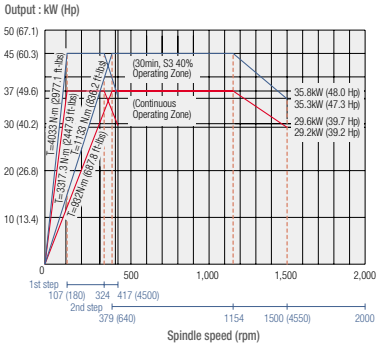


Power is delivered to the spindle through a two speed gearbox allowing high spindle speeds as well as powerful low end torque. The gearbox and spindle motor are isolated from the spindle, eliminating transfer of heat and vibration.

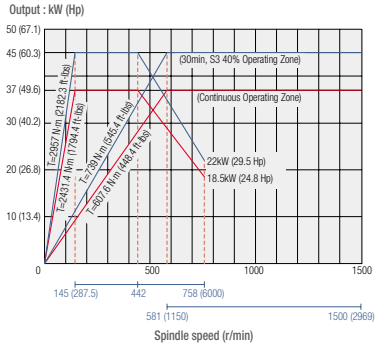
* : is standard on PUMA480[L]

Main spindle power-torque diagram

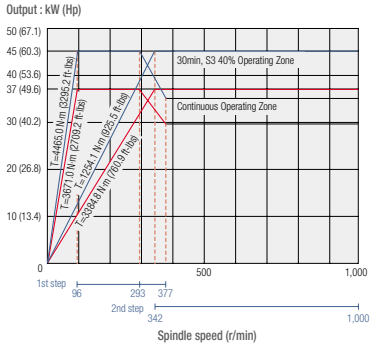
PUMA 480 [L/XL] (Max. 1500 r/min)



PUMA 480M [LM / XLM] (Max. 1500 r/min)

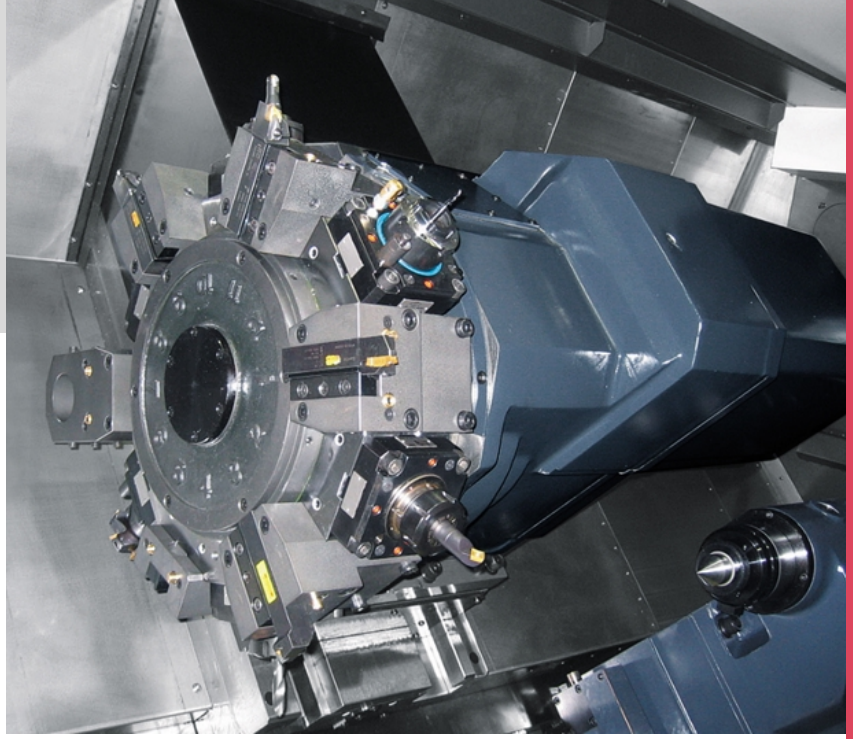


PUMA 480D (Max. 1000 r/min)



Turret

PUMA 480 series



Index time (1-station swivel)

0.25 s

No. of tool station

10 stations PUMA 480[L / XL]

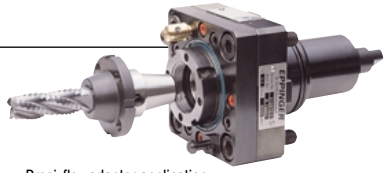
12 stations PUMA 480M [LM / XLM]

Fast Turret Indexing

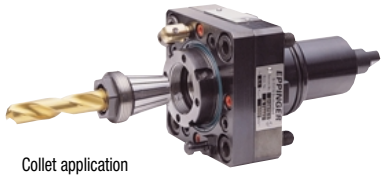
The large 12 and 10 station heavy duty turret features a large diameter Curvic coupling and hydraulic clamp force. The heavy duty design provides unsurpassed rigidity for heavy stock removal, fine surface finishes, long boring bar overhang ratios, and extended tool life. Turret rotation, deceleration and clamp are all controlled by a reliable high torque-hydraulic index motor. Unclamp and rotation are virtually simultaneous. Turret indexing is non-stop bi-directional, with a 0.25 second next station index time. Turning tools are securely attached to the turret by wedge clamps.

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.



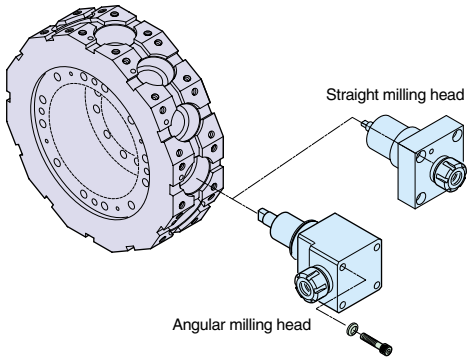
Preci-flex adapter application



Collet application

BMT Milling Turret

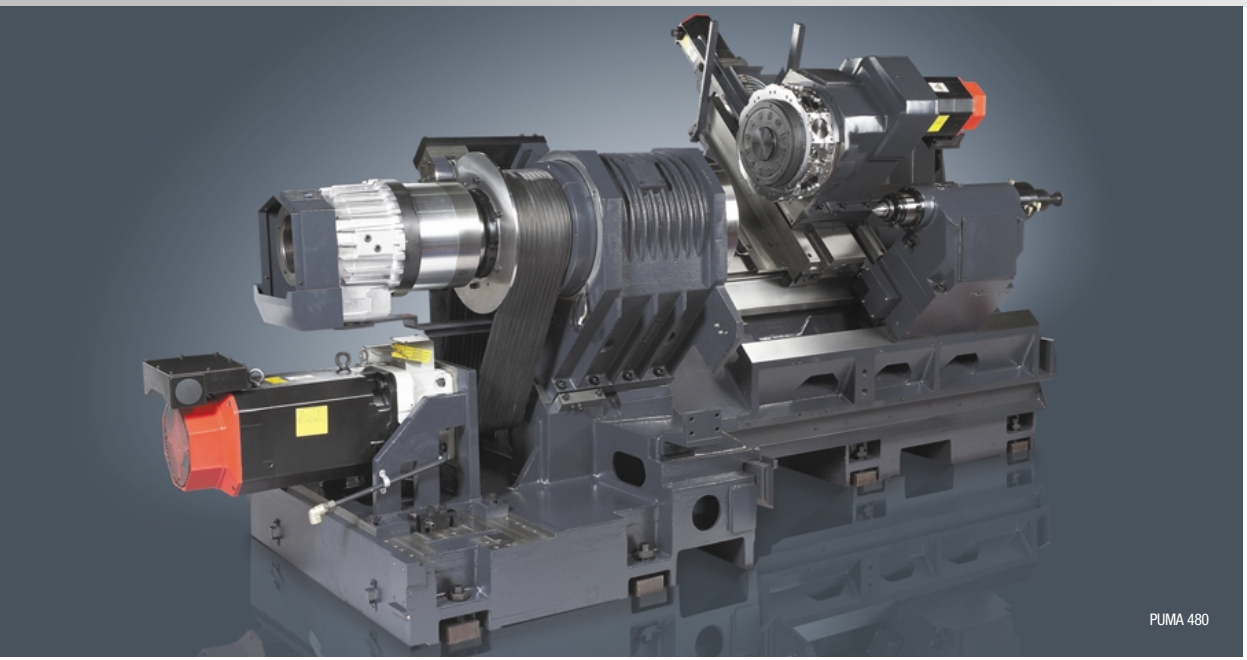
The large 12 station heavy duty turret features a large Curvic coupling diameter. This heavy duty design provides unsurpassed rigidity for heavy stock removal, fine surface finishes, and extended tool life. Indexing repeatability is ±0.0055 degrees. Turret indexing is non-stop bi-directional. An extremely reliable high-torque hydraulic motor provides for quick turret indexing. 32mm square tool holders are mounted directly to the turret. The boring bar capacity is 60mm. The turret features a flexible design, allowing for left or right handed, ID or OD tool placement.



Bed and Way Construction

PUMA 480 series

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.



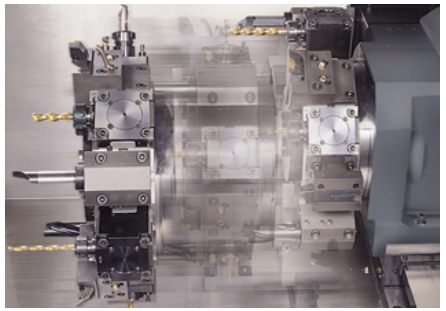
PUMA 480

The PUMA 480 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 un-surpassed long-term rigidity and accuracy. The guideways are widely spaced to ensure stability and fully protected. Each guide-way is induction hardened and precision ground. A fluroplastic resin, Rulon£ó 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. Optional long bed enables extra-long shaft machining.

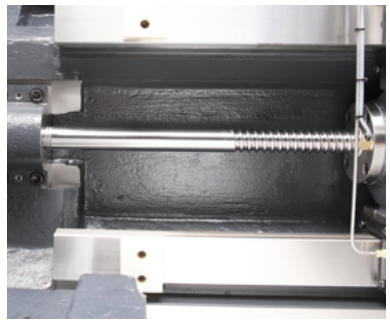
Rapid Traverse

X-axis 16 m/min
(629.9 ipm)

Z-axis 20 [18] m/min
(787.4 [708.7] ipm)



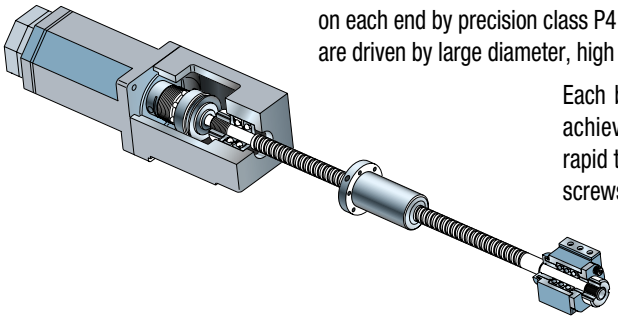
Scraping of Slideway



Outstanding rigidity for high feedrates

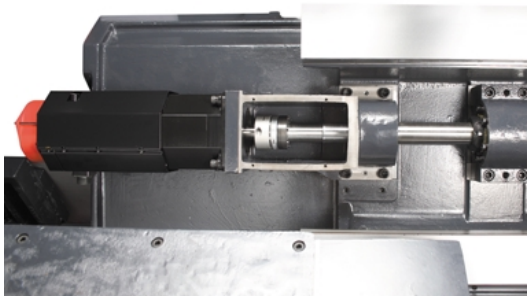
Axis Drive Construction and Tail Stock

Double Pretensioned Ball Screw



Both the X and Z axes features a double pretensioned ball screw, supported on each end by precision class P4 angular contact thrust bearings. Both axes 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.

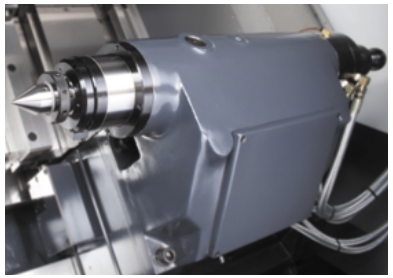


Axis Drives

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.

Programmable Tailstock opt.

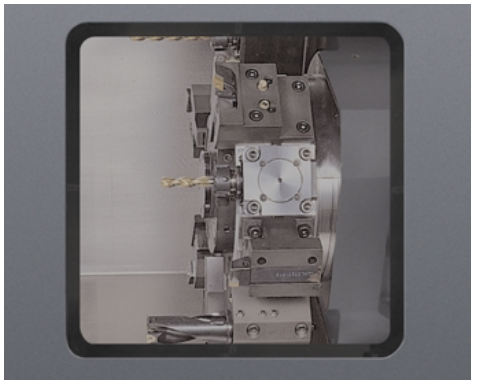
The programmable tailstock body is mounted on the same guideway surface as the headstock. The heavy casting, large 120mm (4.7 inch) diameter quill, and precision Morse Taper #6 live center provide outstanding rigidity. The 120mm (4.7 inch) quill stroke is activated by either the program or foot switch. Auto lubrication is provided to the quill and guideways.

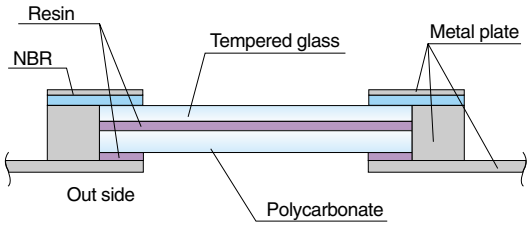


Safety Design for Human

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.





Operator's Panel

The operator control panel is mounted on an adjustable pendant 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. Comprehensive alarm diag-nostics are provided for the machine, control and programming errors.

Eco-Friendly Design

Collection of Waste Lubrication Oil

Less waste lubrication oil extends the life time of the coolant water and cut down the grime and offensive smell of the machine inside.

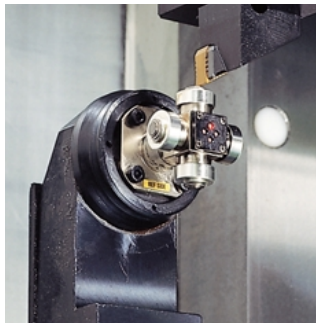
No Coolant Leakage

Rigorously designed, manufactured and tested machine covers do not permit coolant leakage in any condition. The factory always keeps our environment clean.

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 1.8 L (0.5 galon) reservoir lasts up to 80 hours. A low level alarm prevents the machine from restarting without lubricant.

Tool Pre-Setter opt.



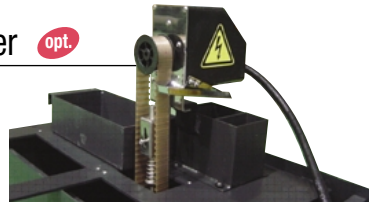
The automatic tool setter reduces set-up time by minimizing the need for skim cuts, measurements and entering tool offsets. The tool setting arm is moved by an electric motor and can be controlled through the program.

Equipment

Hydraulic Power Unit

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

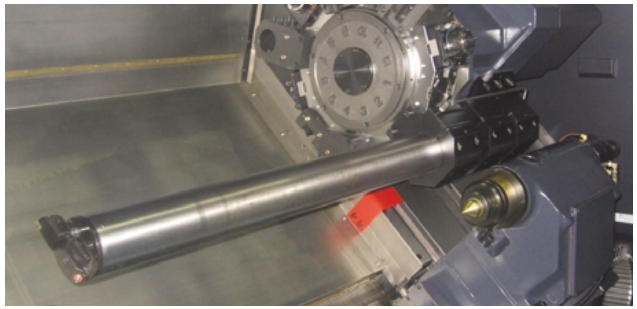
Oil Skimmer opt.



Electric Torque Limiters

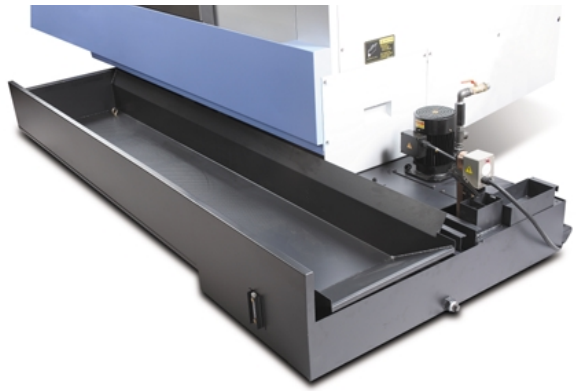
Each axis ball screw is protected by electric torque limiters to minimize damage in the event of a crash. Upon impact, the limiter immediately stops the machine.

Long boring bar opt.



Coolant System

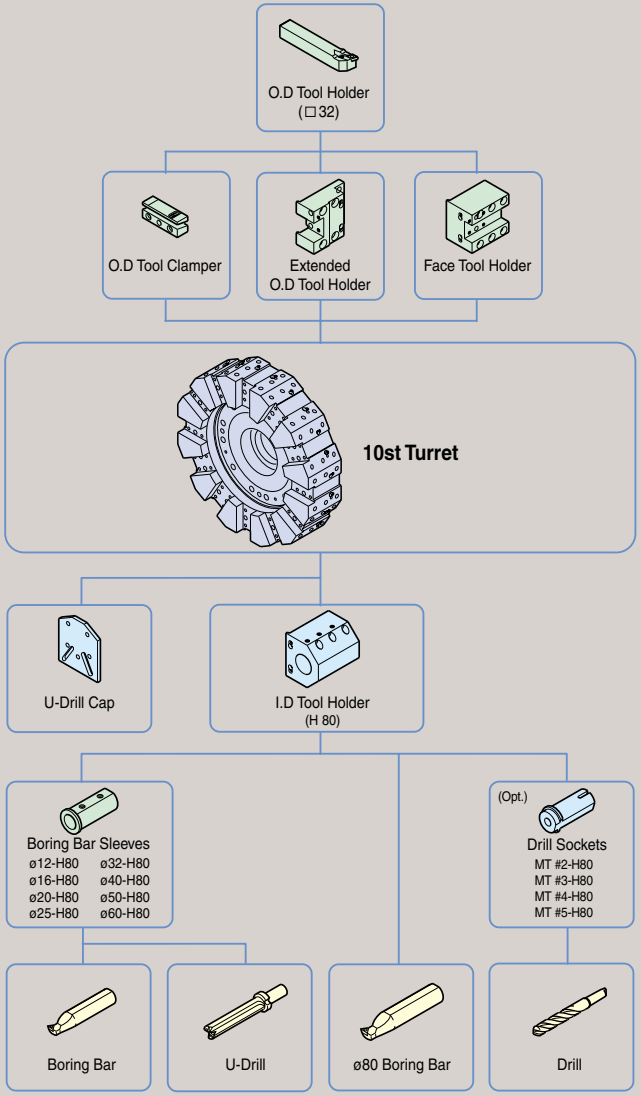
The high pressure flushes chips out of drilled holes, reduces the need for peck drill cycles, meets the requirements of most insert drill manufactures and significantly increases tool life.



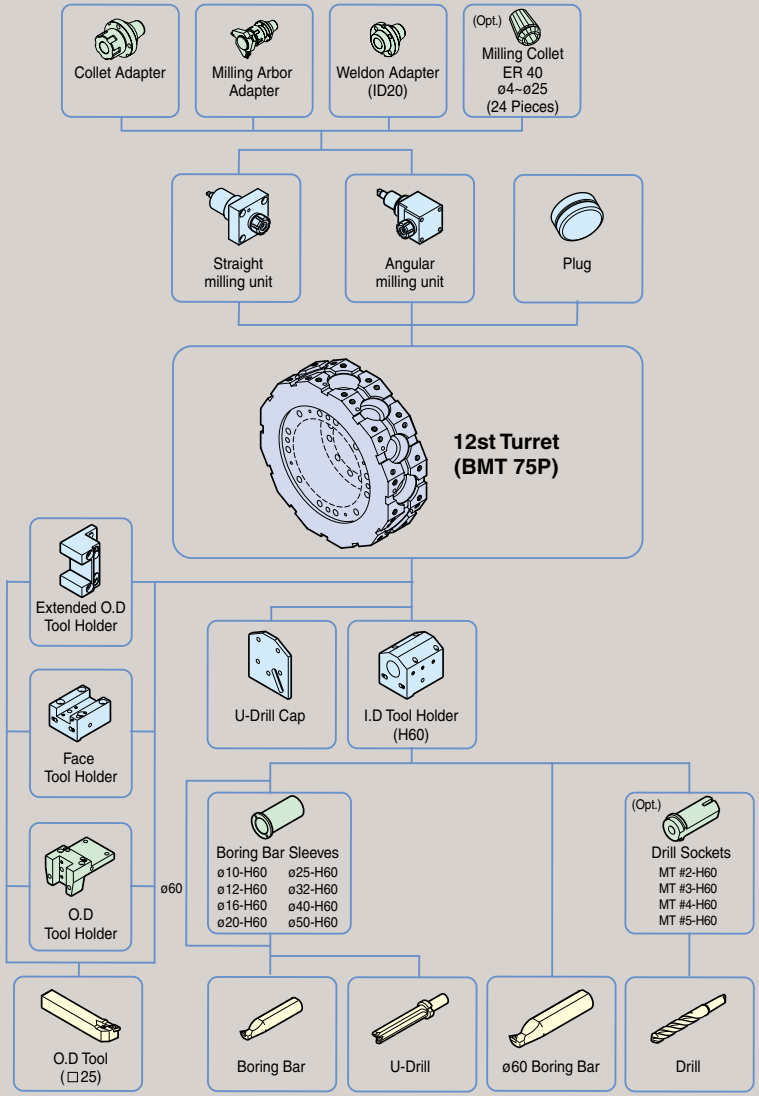
Tooling System

Unit : mm (inch)

PUMA 480[L/XL]



PUMA 480M[LM/XLM]

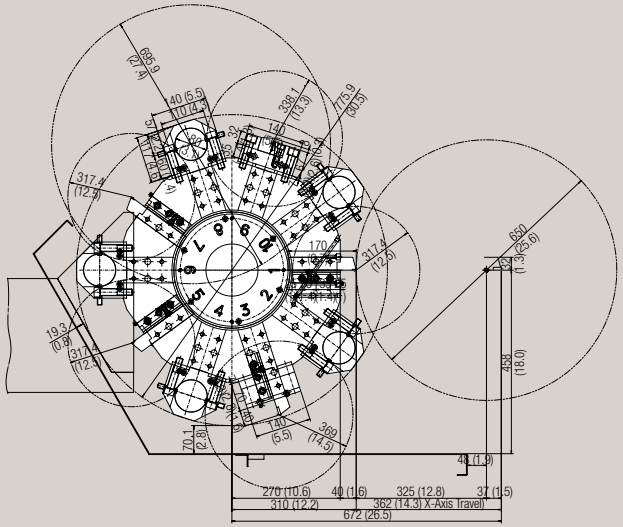


Tool Interference Diagram

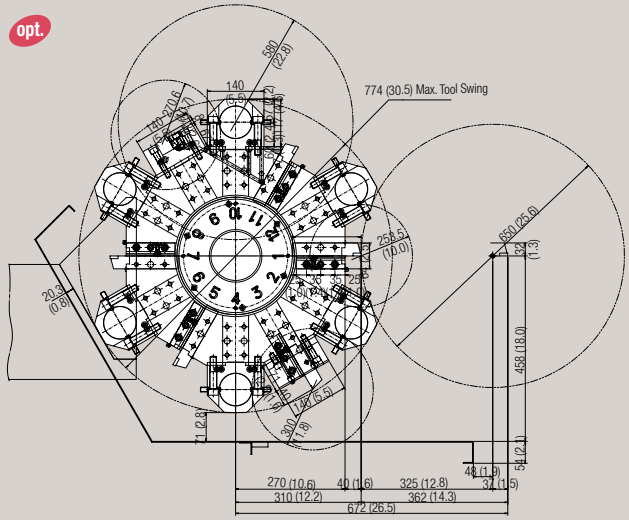
Unit : mm (inch)

PUMA 480[L/XL]

10 station std.

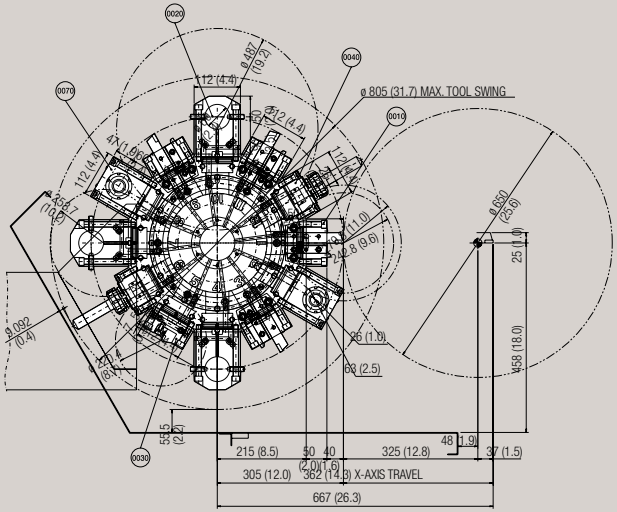


12 station opt.



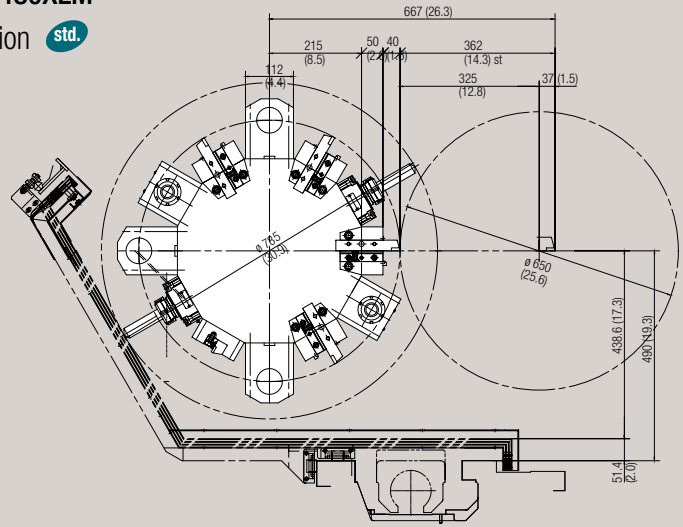
PUMA 480M[LM]

12 station std.



PUMA 480XLM

12 station std.

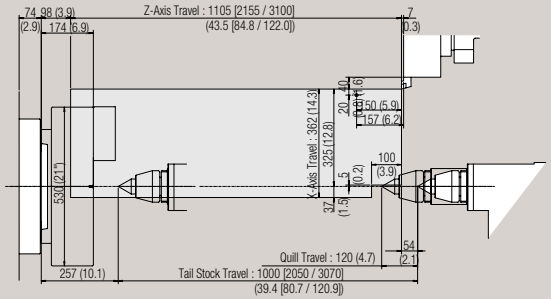


Working Range

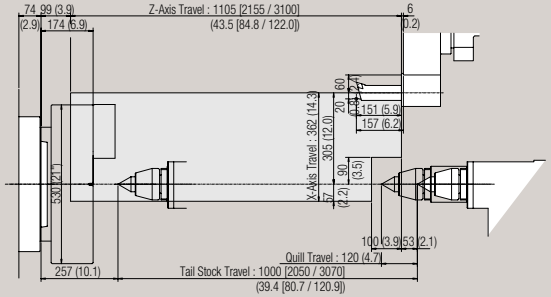
Unit : mm (inch)

PUMA 480[L/XL]

OD Tool Holder

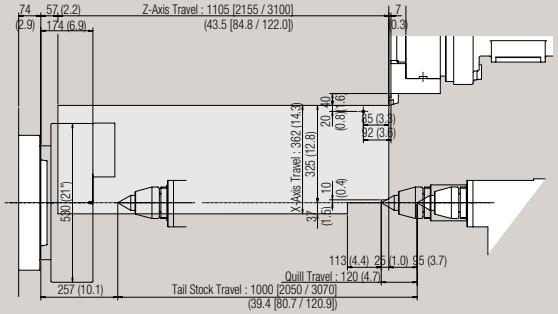


ID Tool holder

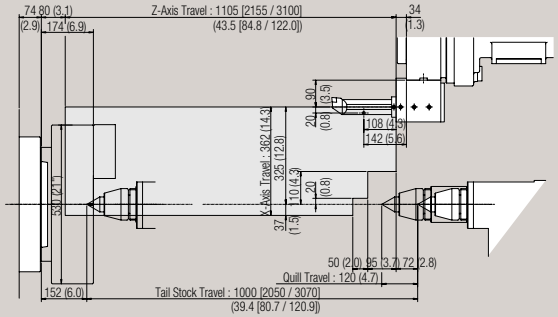


PUMA 480M[LM/XLM]

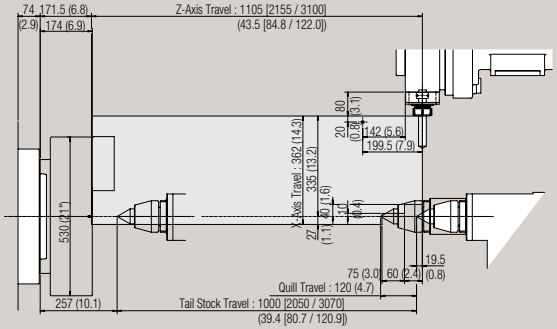
OD Tool Holder



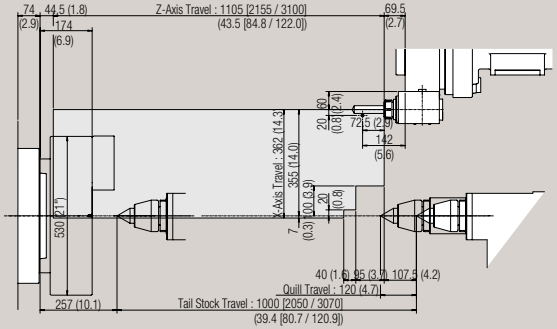
ID Tool holder



Straight milling unit



Angular milling unit

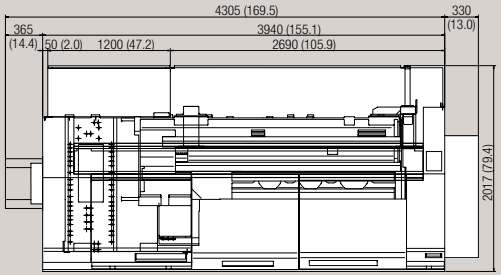


External Dimensions

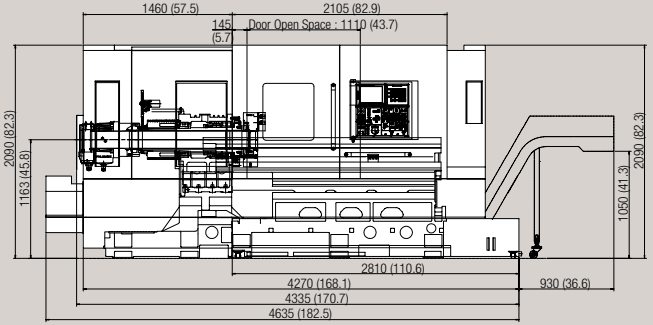
Unit : mm (inch)

PUMA 480[M]

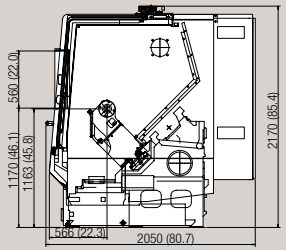
Top View



Front View

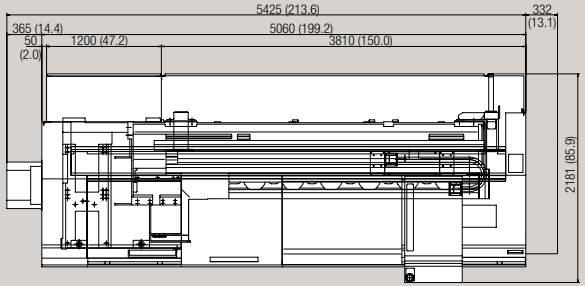


Side View

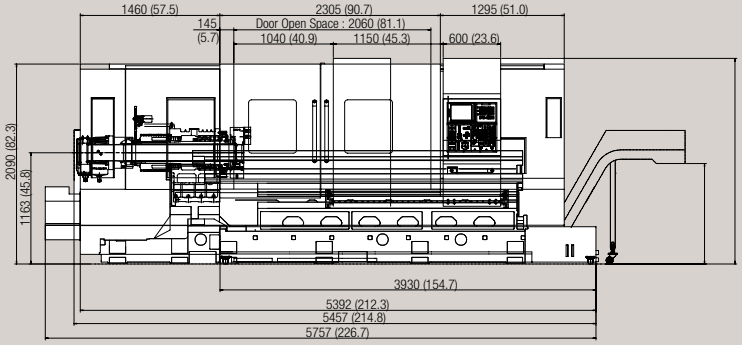


PUMA 480L[LM]

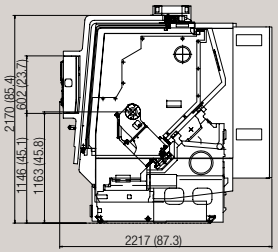
Top View



Front View



Side View

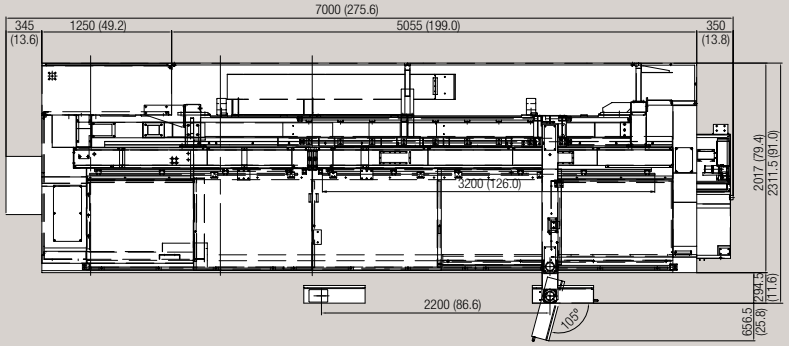


External Dimensions

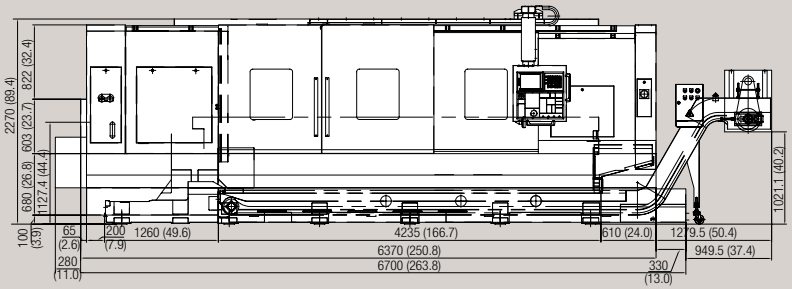
Unit : mm (inch)

PUMA 480XL[XLM]

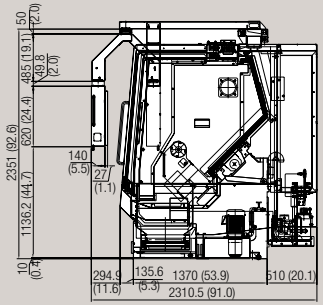
Top View



Front View



Side View



Machine Specifications

	Description		Unit	PUMA 480[L]	PUMA 480M[LM]	PUMA 480XL	PUMA 480XLM	PUMA 480D[LD]
Capacity	Swing over bed		mm (inch)	900 (35.4)				
	Swing over saddle		mm (inch)	720 (28.3)				
	Recom. turning diameter		mm (inch)	380 (15.0)				
	Max. turning diameter		mm (inch)	650 (25.6)				
	Max. turning length		mm (inch)	992 [2042] (39.1 [80.4])	951 [2001] (37.4 [78.8])	3065 (120.7)		992 [2042] (39.1 [80.4])
	Bar working diameter		mm (inch)	165.5 (6.5)	165.5 (6.5)			*
Carriage	Travel distance	X-axis	mm (inch)	362 [57+305] (14.3 [2.2+12.0])	362 [37+325] (14.3 [1.5+12.8])	362 [37+305] (14.3 [1.5+12.0])	362 [37+325] (14.3 [1.5+12.8])	362 [57+305] (14.3 [2.2+12.0])
		Z-axis	mm (inch)	1105 [2155] (43.5 [84.8])		3100 (122.0)		1105 [2155] (43.5 [84.8])
Main Spindle	Spindle speed		r/min	1500				1000
	Spindle nose		ASA	A1 #15				A2 #20
	Spindle bearing diameter (Front)		mm (inch)	240 (9.4)				460 (18.1)
	Spindle through hole		mm (inch)	181 (7.1)				275 (10.8)
	Cs spindle index angle		deg	-	360 (in 0.001)	-	360 (in 0.001)	-
Tool Post	No. of tool station		st	10	12	10	12	10
	OD tool height		mm (inch)	32 x 32 (1.3 x 1.3)	25 x 25 (1.0 x 1.0)	32 x 32 (1.3 x 1.3)	25 x 25 (1.0 x 1.0)	32 x 32 (1.3 x 1.3)
	Boring bar diameter		mm (inch)	ø 80 (3.1)	ø 60 (2.4)	ø 80 (3.1)	ø 60 (2.4)	ø 80 (3.1)
	Indexing time (1st swivel)		s	ø 0.25				
	Rotary tool spindle speed		r/min	-	3000	-	3000	-
Feedrate	Rapid traverse	X-axis	m/min (ipm)	16 (630)				
		Z-axis	m/min (ipm)	20 [18] (787.4 [708.7])		10 (303.7)		20 [18] (787.4 [708.7])
	Max. cutting feedrate	X-axis	mm/rev (ipr)	500 (19.7)				
		Z-axis	mm/rev (ipr)	500 (19.7)				
Tail Stock	Quill diameter		mm (inch)	120 (4.7)				
	Quill bore taper		MT#	MT#6				
	Quill travel		mm (inch)	120 (4.7)				
Motors	Main spindle motor (30min)		kW (Hp)	45 (60.3)				
	Servo motor	X-axis	kW (Hp)	4.0 (5.4)				
		Z-axis	kW (Hp)	7.0 [6.0] (9.4 [8.0])		6.0 (8.0)		7.0 [6.0] (9.4 [8.0])
	Rotary tool spindle motor		kW (Hp)	-	11	-	11	-
	Coolant pump		kW (Hp)	0.4 (0.5)				
Tank Capacity	Coolant tank capacity (rated capacity)		kVA	53.1	58.1	53.1	58.1	53.1
Machine Size	Machine height		mm (inch)	2170 [2270] (85.4 [89.4])		2411 (94.9)		2170 [2270] (85.4 [89.4])
	Machine dimension	length	mm (inch)	4335 [5452] (170.7 [214.6])	4615 [5732] (181.7 [225.7])	6980 (274.8)		4335 [5452] (170.7 [214.6])
		width	mm (inch)	2050 [2217] (80.7 [87.3])		2340 (92.1)		2050 [2217] (80.7 [87.3])
	Machine weight		kg (lb)	8600 [10600] (18959.5 [23368.7])	8900 [10900] (19620.9 [24030.0])	12500 (27557.4)		9100 [11100] (20061.8 [24470.9])

- Design and specifications are subject to change without notice.
- Doosan is not responsible for difference between the information in the catalogue and the actual machine.

* : Max. bar working diameter can be set by the workpiece chucking system used

Standard Feature

- Coolant supply equipment
- Foot switch
- Full enclosure chip and coolant shield
- Hand tool kit, including small hand tool for operations
- Hydraulic chuck & actuating cylinder *
- Hydraulic power unit
- Levelling bolts & plates
- Live center
- Lubrication equipment
- Soft jaws *
- Standard tooling kit (tool holders& boring sleeves)
- Work light

* : Hyd. Chuck and cylinder, Soft jaws are not standard items of PUMA 480D / LD

Optional Feature

- 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
- Bar feeder interface
- Chip bucket
- Chip conveyor
- Controller : Fanuc 31i-A
- Dual chucking pressure
- Hardened & ground jaws
- Hydraulic steady rest
- Manual steady rest
- Oil skimmer
- Pressure switch for chucking pressure check
- Programmable tail stock
- Proximity switches for chuck clamp detection
- Proximity switches for quill position detection
- Signal tower (yellow, red, green)
- Special chucks
- Tailstock quill for dead center (MT #5)
- Tool monitoring system
- Tool pre-setter (hydraulic type)

NC Unit Specifications Fanuc 32i-A

	Item	Spec.	Fanuc 32i-A
Controls	Controlled axes		X, Z, C (!)
	Simultaneously controlled axes	Std. 2 axes	3 axes (!)
Axis Functions	Backlash compensation	0~±9999 pulses	○
	Cs contouring control		○(!)
	Follow-up / Chamfering on / off		○
	HRV2 control		○
	Least input increment	0.001mm / 0.0001"	○
	Stored stroke check1	Overtravel control	○
Operation	Automatic operation (memory) / Buffer register		○
	Handle incremental feed	X1, X10, X100	○
	Search function	Sequence NO. / Program NO.	○
Interpolation	1st reference position return	Manual, G28	○
	2nd reference position return	G30	○
	Reference position return check	G27	○
	Circular interpolation	G02	○
	Continuous thread cutting		○
	Dwell	G04	○
	Linear interpolation	G01	○
	Multiple threading / Thread cutting retract		○
	Polar coordinate interpolation		○(!)
	Thread cutting / Synchronous cutting		○
Feed Functions	Feed per minute / Feed per revolution		○
	Feedrate override	0 - 200 % (10% unit)	○
	Jog feed override	0 - 2000 mm/min	○
	Rapid traverse override	F0 / 25 / 100 %	○
	Tangential speed constant control		○
Axuiliary & Spindle Functions	Spindle orientation		○
	Constantant surface speed control	G96, G97	○
	M-function	M3 digits	○
	Multi-spindle control		○(!)
	Rigid tapping		○
	Spindle speed override	0~150%	○
Programming Functions	Absolute / Incremental programming		○
	Canned cycle for drilling / Turning		○
	Custom macro		○
	Decimal point programming/pocket calculator type decimal point programming		○
	Direct drawing dimension programming		○
	eZ Guide i	Conversational programming	○

	Item	Spec.	Fanuc 32i-A
Programming Functions	Maximum program dimension	±9 digits	○
	Multi repetitive canned cycle	G70~G76	○
	Multi repetitive canned cycle 2		○
	Optional block skip (without hardware)	Total 9 (Only NC function)	○
	Sequence number	N8 digits	○
	Programmable data input	G10	○
	Sub program call	10 folds nested	10
	Work coordinate system selection	G52~G59	○
Tool Functions	Auto tool offset		○
	Tool monitoring system		Opt.
	Direct input of tool offset value measured B		○
	Tool geometry / wear compensation	Geometry & wear data	○
	Tool life management		○
	Tool nose radius compensation		○
	T-code function	T2+2 digits	○
	Tool offset	G43, G44, G49	○
	Tool offset pairs	±6 digits	64
	Tool offset value counter input		○
Editing Op. Functions	Background editting		○
	Expanded part program editting	Copy, Move, Change of NC program	○
	No. of Registered programs		500ea
	Part program editing / Program protect		○
	Part program storage length*1		640m
Setting & Display	Display of spindle speed and T-code at all screen		○
	Help function	Alarm & Operation display	○
	Self diagnostic function		○
	Servo setting screen / Spindle setting screen		○
	Status display / Lock function		○
	Tool path graphic display		Opt.(!)
Data Input & Output	External key input / External data input		○
	External work number search		○
	I/O interface	RS-232C	○
	Memory card input and output		○
	Reader puncher control	CH1 interface	○
Other Functions	Ethernet function	Embedded ethernet function	○
	MDI / DISPLAY unit		10.4" color TFT LCD
	PMC system		○

○ : Standard OPT : Option (!) : only M type

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

PUMA 480

Powerful, Heavy Duty Turning Center

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