# PUMA V series

## PUMA V400/V550

High Performance Vertical Turning Center

Doosan Machine Tools

*Optimal Solutions for the Future*

# PUMA V series
## PUMA V400/V550

The vertical turning center is designed for long term accuracy, heavy duty cutting and to minimize floor space.
Its powerful spindle drives, meehanite casting and integral box guide way provide unsurpassed rigidity.

# New Standard for Unsurpassed High Productivity, High Speed and High Precision

# PUMA V400 series

## Main Spindle

The cartridge type spindle with A2#8 spindle nose assures high capability and easy of maintenance. Especially rigid coupled bearing assembly is to support heavy weight workpiece and reduces thermal growth in long run operation.

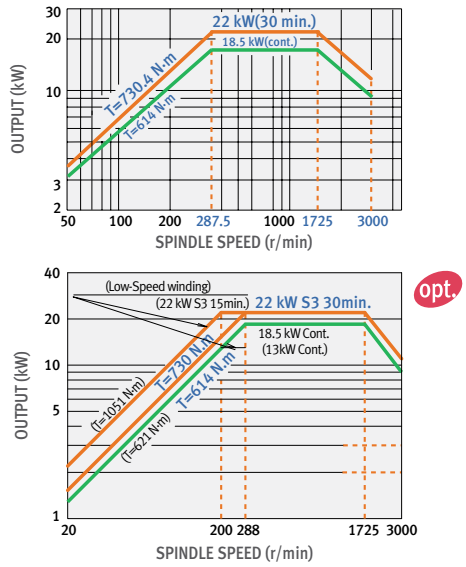
Max. spindle speed

**3000 r/min**

Motor (30 min)

**22 kW (29.5 Hp)**

### Main spindle power-torque diagram




PUMA V400/V400M

## Rigidity Bed and Wide Working Range

X-axis travel

**268 mm (10.55 inch)**

Z-axis travel

**488 mm (19.21 inch)**

Meehanite cast iron bed and integral box guideways provide the rigid foundation needed for superior precision, deep cutting and rugged dependability. The heavily-ribbed and exclusive bed design provides unsurpassed rigidity, enabling heavy cutting and assuring stability for exceptional accuracy and superior

### Machining range

A : Max. turning diameter

**496 (420) mm (19.53 (16.54) inch)**

B : Max. turning length

**461 (400) mm (18.15 (15.75) inch)**

( ) : on PUMA V400M

## Rapid Traverse

X-axis

**20 m/min (787.4 ipm)**

Z-axis

**20 m/min (787.4 ipm)**

## BMT Turret (PUMA V400M)

Index time (1-station swivel)

**0.15 s**

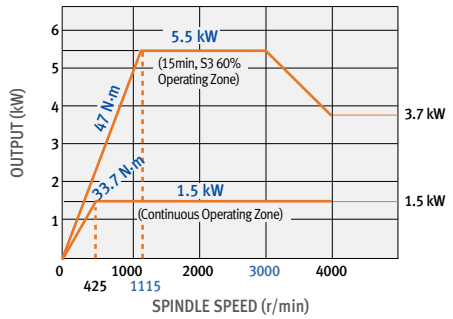
No. of tool station

**12 (12+12)*1 stations**
**8 (8+8)*1 stations (opt)**

*1 : PUMA V400-2SP

The large 12 station heavy duty turret features a large diameter Curvic coupling and heavy duty design with unsurpassed rigidity. Turret rotation, acceleration and deceleration are all controlled by a reliable high torque servo motor. Unclamp and rotation are virtually simultaneous. Its fast index response reduces the total cycle time

### Rotary tool spindle power-torque diagram



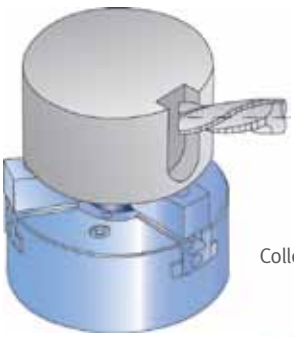

PUMA V400M BMT65P rotary spindle

### PUMA V400M Radial BMT Turret

PUMA V400M : BMT65P

## Rotary Tool Head

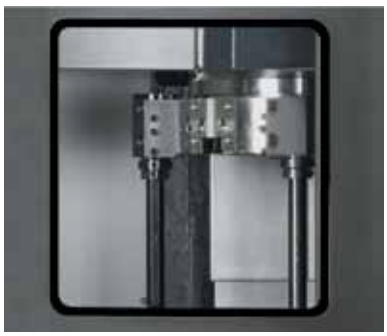
The new rotary tool head confirms the high rigidity and accuracy by simultaneous dual contact between the rotary tool head face and tool holding insert (called Preci-flex adapter) flange face as well as tool head pocket taper

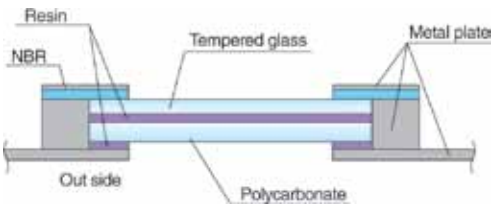


Preci-flex adapter application

Collet application

## Double-Paneled Safety Window

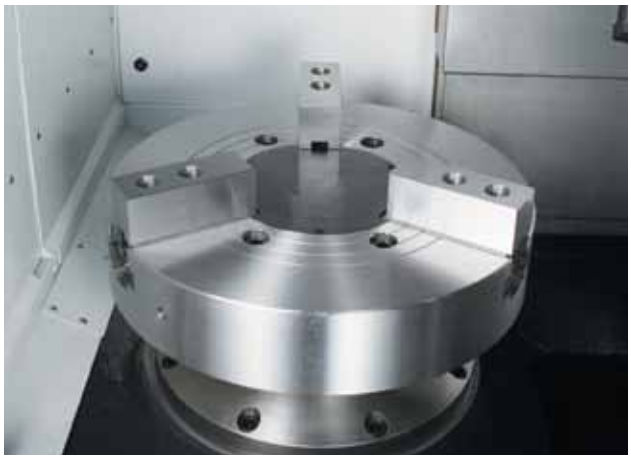




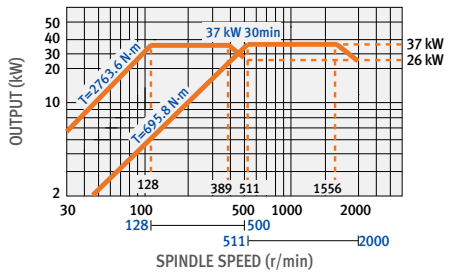

The operator safety can be enhanced through the front door with its shock absorbing laminated glass and double panel construction. The windows without grating also provide a clear view of the machine inside.

# PUMA V550 series

## Main Spindle



### Main spindle power-torque diagram




Max. spindle speed

**2000 r/min**

Motor (30 min)

**37 kW (49.6 Hp)**

The cartridge-type precision spindle is assembled in a temperature controlled clean room. Four rows of high precision roller bearings and two rows of angular contact thrust bearings support the A2#11 American standard type spindle nose. The entire assembly is per-manently grease lubricated, which eliminates routine maintenance and reduces thermal growth. Twin spindle model(PUMA V550-2SP) have an independent direct drive system for each spindle. This permits either synchronous or asynchronous operation to double your productivity, or to machine complete components from each unit.

## Rigidity Bed and Wide Working Range

X-axis travel

**390 (490)*1 mm**

**(15.35 (19.29) inch)**

Z-axis travel

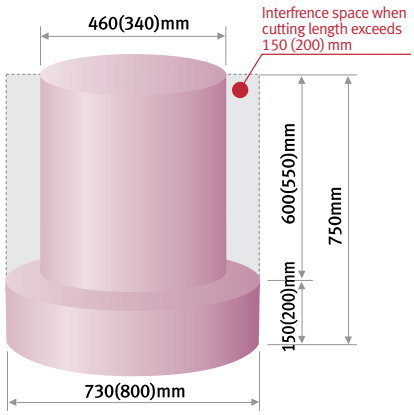
**780 mm**

**(30.71 inch)**

*1 : PUMAV550M

The one piece bed and box type column castings are rigid and heavily ribbed. Meehanite cast iron. These castings remain stable even under the heaviest cutting conditions. Fine grained Meehanite cast iron is used for its excellent vibration absorbing characteristics. The cross slide body is fully supported by the saddle in all positions and there is no table overhang.

### Workpiece space and interference space




( ) : PUMA V550M

## Rapid Traverse

X-axis

**20 m/min (787.4 ipm)**

* only PUMA V550M : 12 m/min (472.4 ipm)

Z-axis

**16 m/min (629.9 ipm)**

## BMT Turret (PUMA V550M)

Index time
(1-station swivel)

**0.15 s**

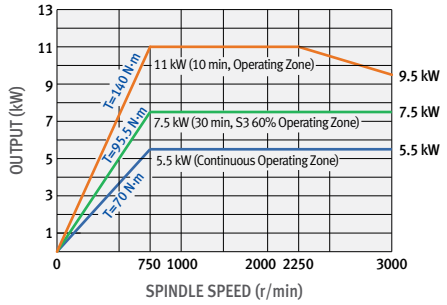
No. of tool station

**8 (8+8)*1 stations**

*1 : PUMA V550-2SP : 8+8

The large 8 station heavy duty turret features a large diameter Curvic coupling and heavy duty design with unsurpassed rigidity. Turret rotation, acceleration and deceleration are all controlled by a reliable high torque servo motor. Unclamp and rotation are virtually simultaneous. Its fast index response reduces the total cycle time required to machine parts.

### Rotary tool spindle power-torque diagram




PUMA V550M BMT75P rotary spindle

### PUMA V550M Radial BMT Turret

The turret features BMT75P style tooling in which the toolholders are mounted directiy to the turret's periphery using 4 large bolts. This type of mounting system allows a extremely high degree of rigidity.

Index time (1-station swivel)

**0.25 s**

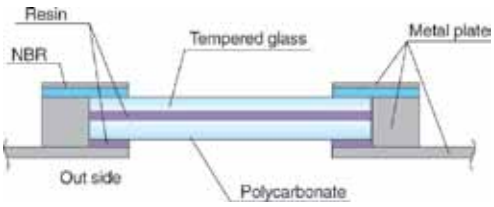
No. of tool station

**12 stations**

## 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.

## Double-Paneled Safety Window

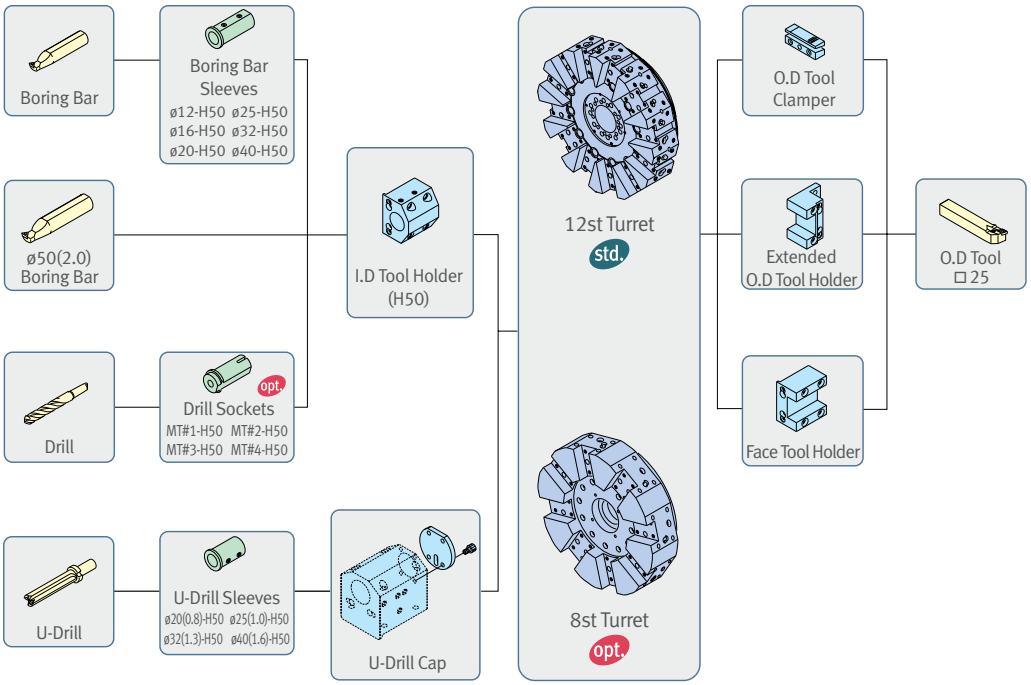



The operator safety can be enhanced through the front door with its shock absorbing laminated glass and double panel construction. The windows without grating also provide a clear view of the machine inside.

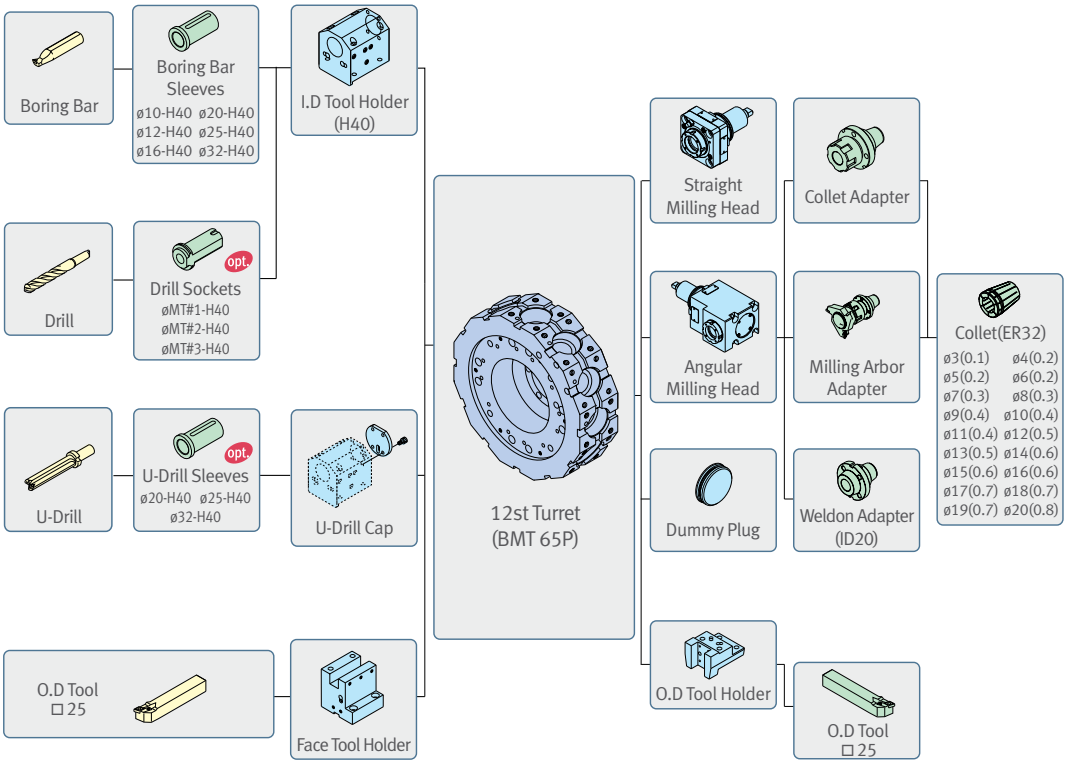
# Tooling System

Unit: mm (inch)

## PUMA V400 / V400-2SP

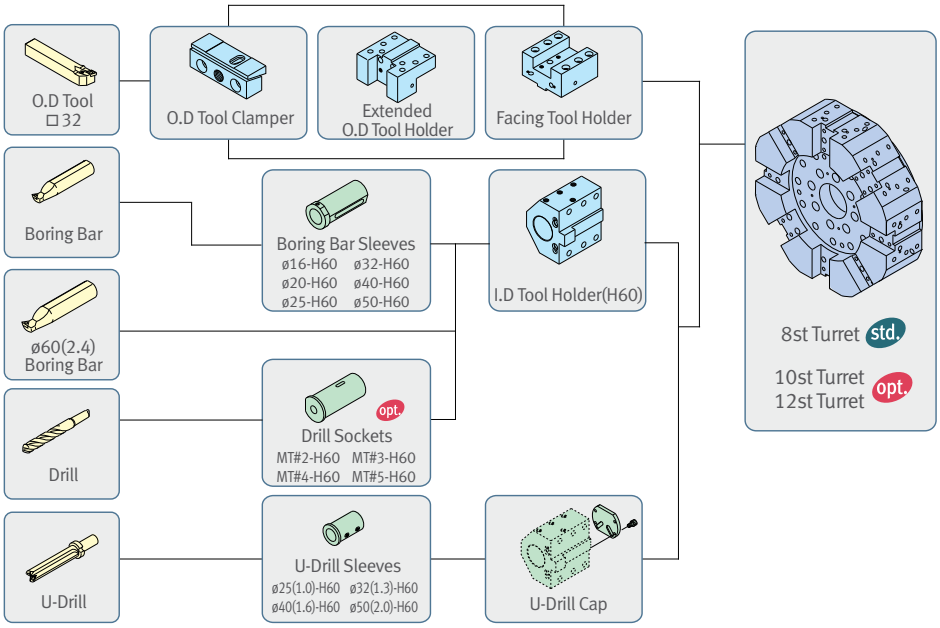



## PUMA V400M

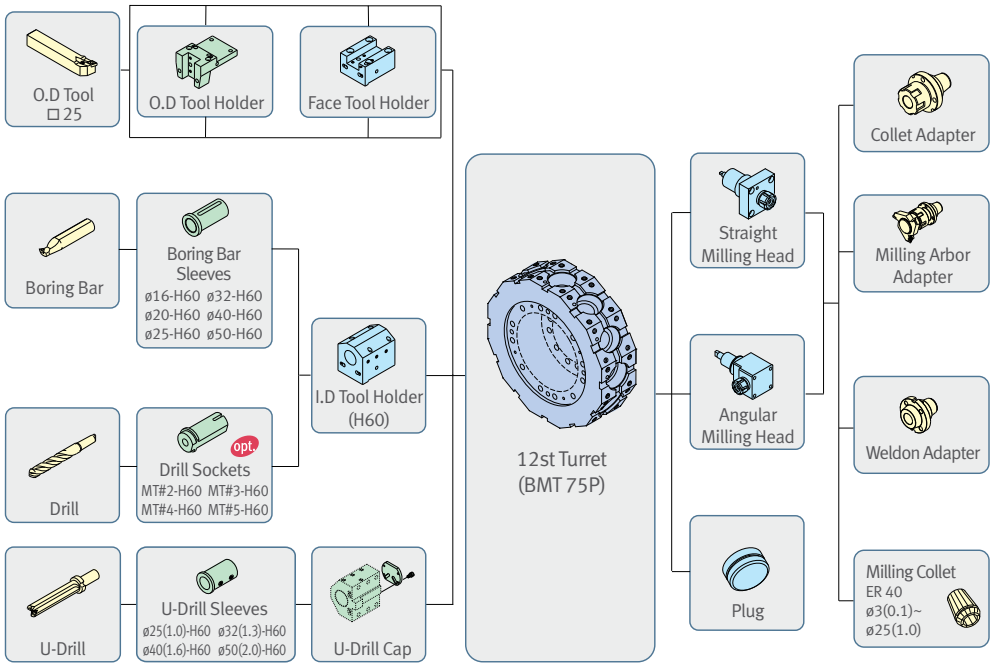


Unit: mm (inch)

## PUMA V550 / V550-2SP




## PUMA V550M



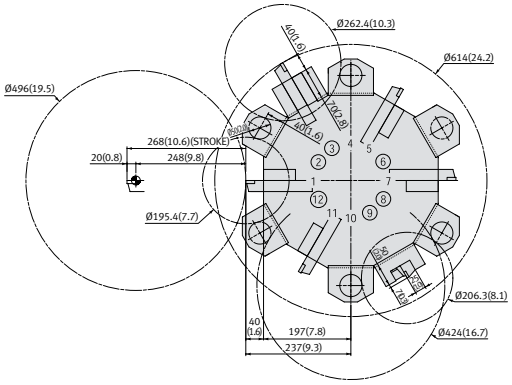

Note) Above tooling system is our recommendation.
Depenading on export condition, the standard tooling packed with the machine can be different.

# Tool Interference Diagram

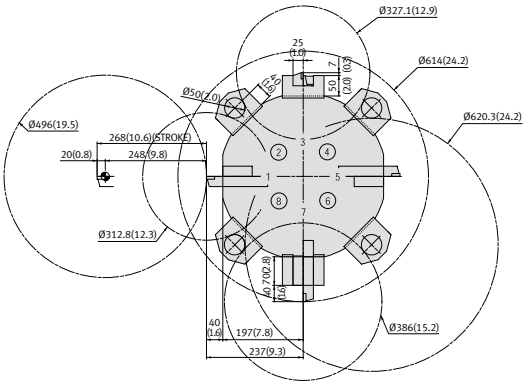
Unit: mm (inch)

## PUMA V400/V400-2SP

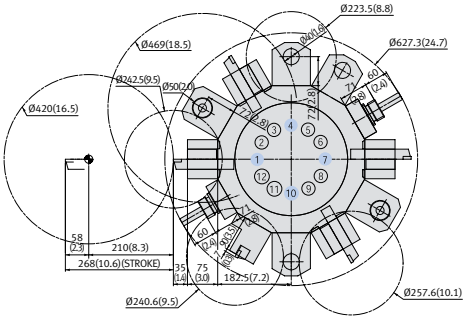
(1) PUMA V400 : 12 stations



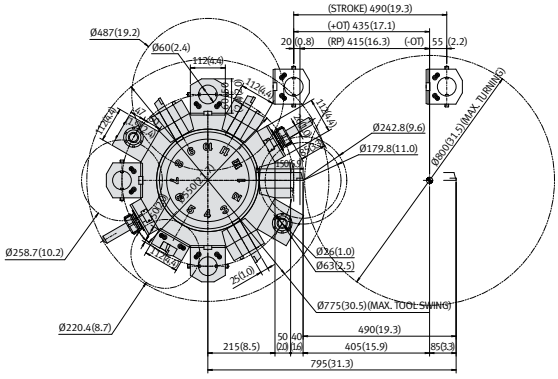

(2) PUMA V400 : 8 stations opt.




## PUMA V400M

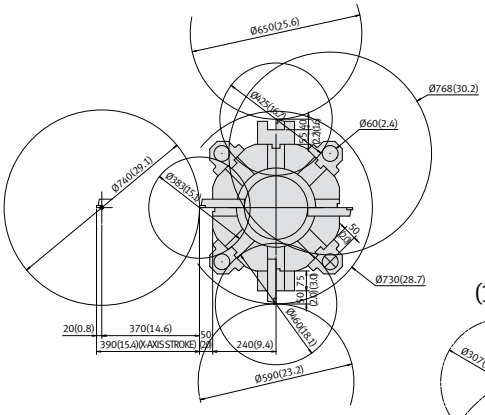



## PUMA V550M

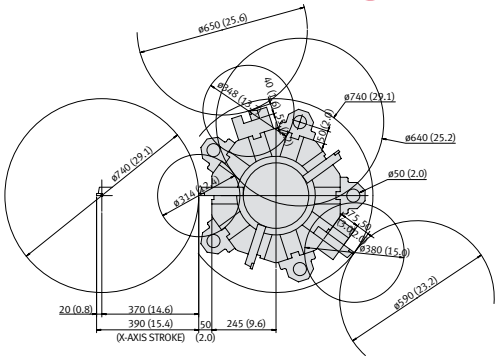



## PUMA V550/V550-2SP

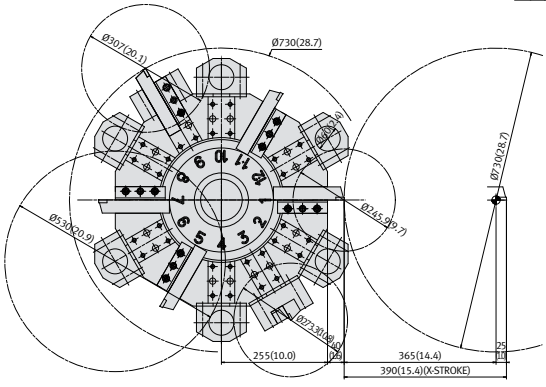
(1) PUMA V550 : 8 stations




(2) PUMA V550 : 10 stations opt.




(3) PUMA V550 : 12 stations opt.

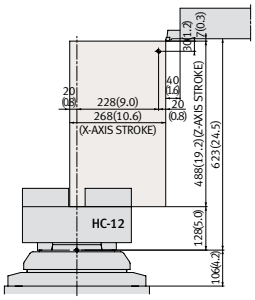


# Working Ranges

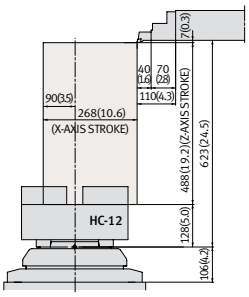
Unit: mm (inch)

## PUMA V400/V400-2SP

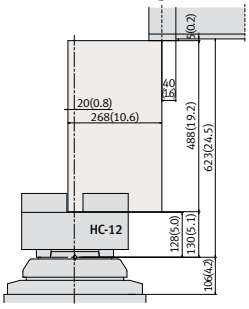
OD tool holder range




Extended OD tool holder range

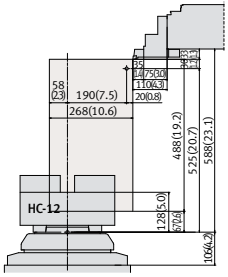



ID tool holder range

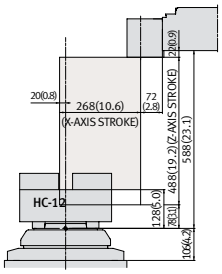



## PUMA V400M

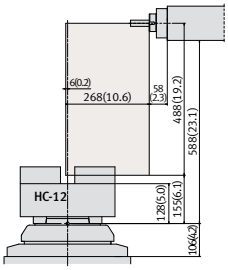
OD tool holder range



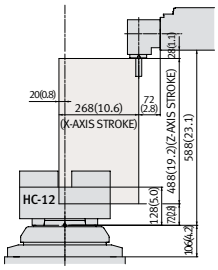

ID tool holder range




Straight milling unit

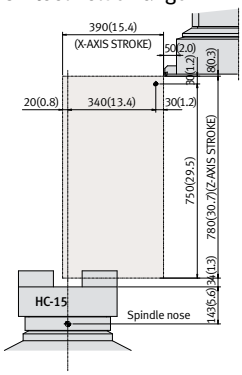



Angular milling head

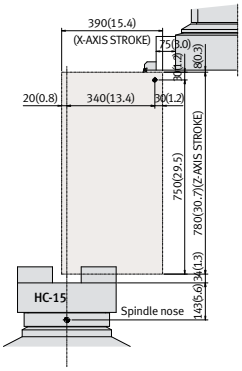



## PUMA V550/V550-2SP

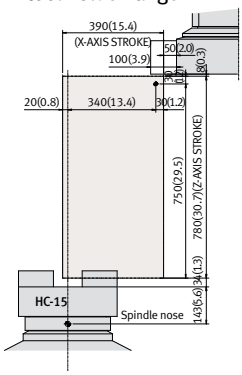
OD tool holder range




Extended OD tool holder range

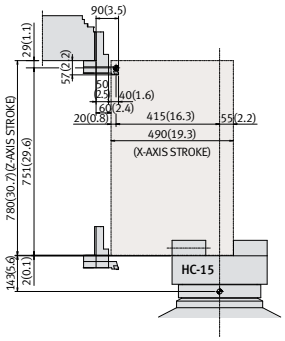



ID tool holder range

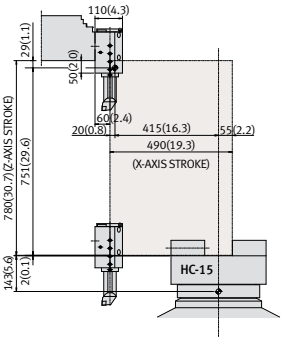



## PUMA V550M

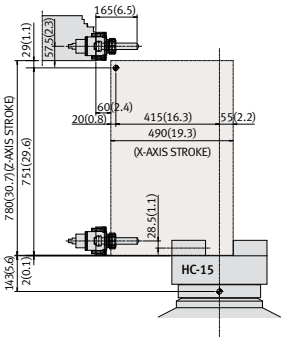
OD tool holder range



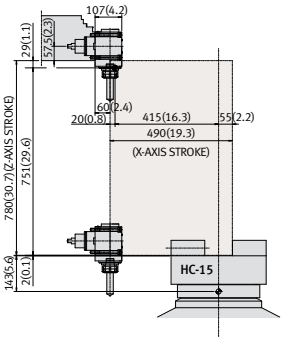

ID tool holder range




Straight milling unit




Angular milling head

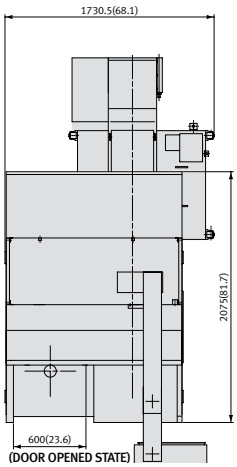


# External Dimension

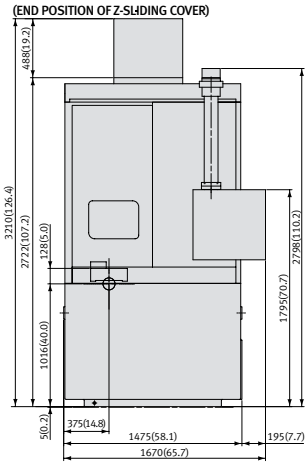
Unit: mm (inch)

## PUMA V400/M

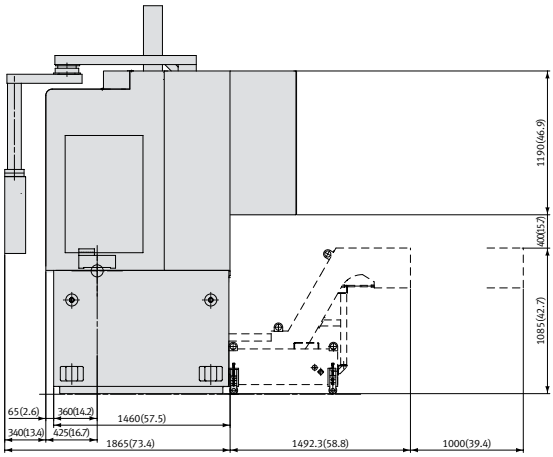
Top view




Front view



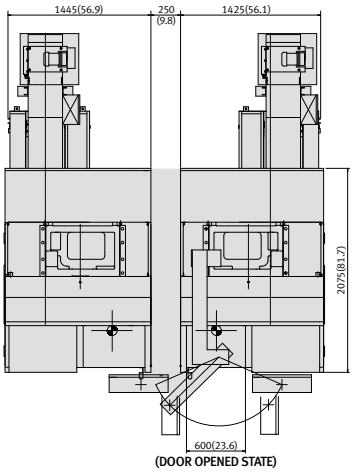

Side view



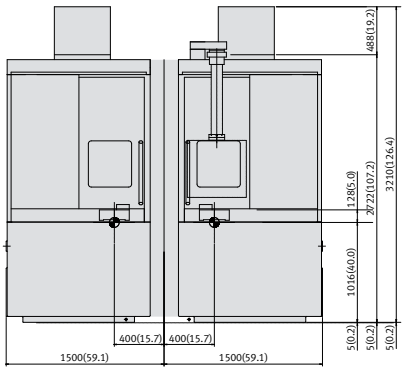

Note) Right Handed Model of PUMA V400 series

## PUMA V400-2SP

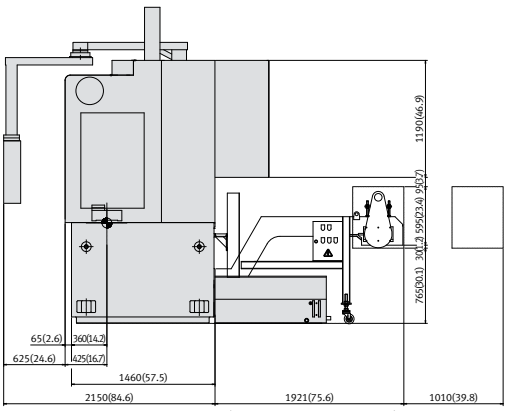
Top view




Front view




Side view

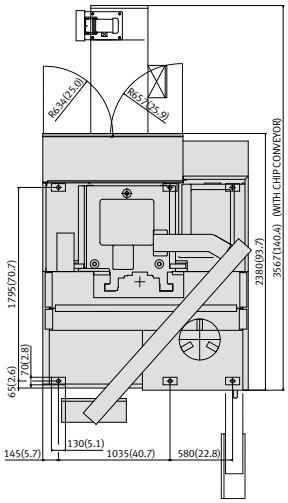



(REAR HINGED TYPE CONVEYOR)
(REFER TO PUMA V400 FOR MAGNET SCRAPER TYPE)

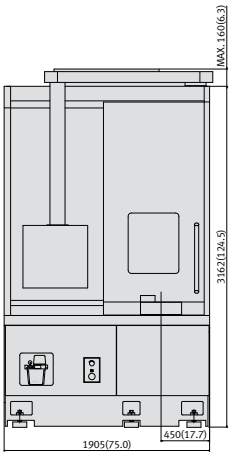
Unit: mm (inch)

## PUMA V550M

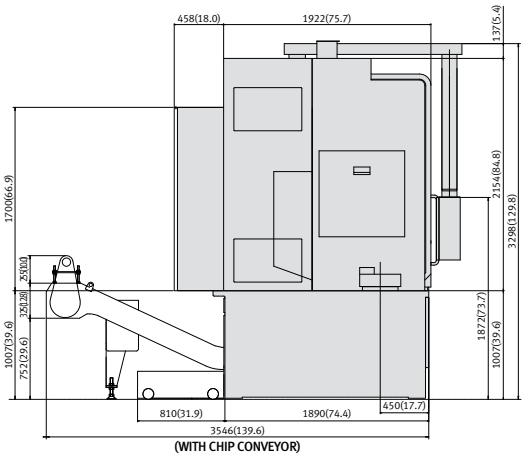
Top view




Front view



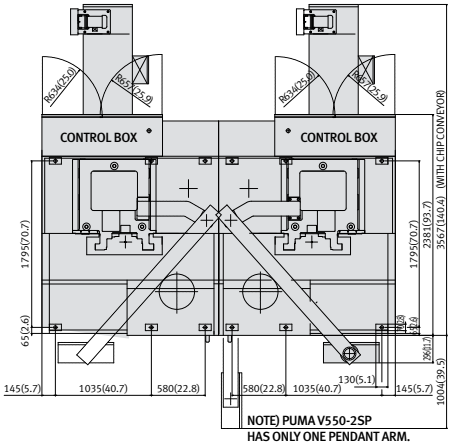

Side view



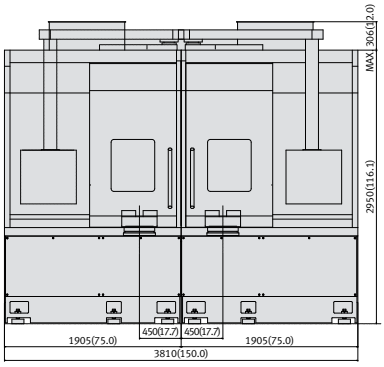

Note) Left Handed Model of PUMA V550 series

## PUMA V550/V550-2SP

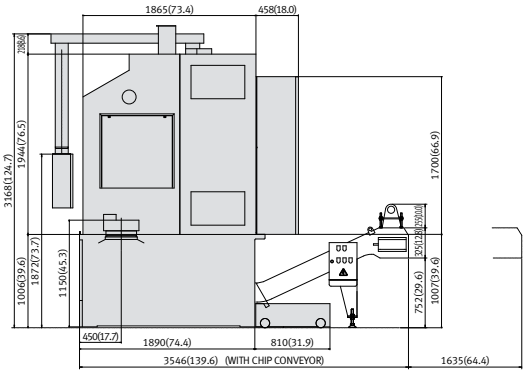
Top view




Front view




Side view



# Machine Specifications

| Description | | | Unit | PUMA V400 | PUMA V400M | PUMA V400-2SP | PUMA V550 | PUMA V550M | PUMA V550-2SP |
|---|---|---|---|---|---|---|---|---|---|
| Capacity | Swing over bed | | mm (inch) | 610 (24.0) | | | 800 (31.5) | | |
| | Swing over saddle | | mm (inch) | 500 (19.7) | | | 490 (19.3) | | |
| | Recom. turning diameter | | mm (inch) | 305 (12.0) | | | 550 (21.7) | | |
| | Max. turning diameter | | mm (inch) | 496 (19.5) | 420 (16.5) | 496 (19.5) | 730 (28.7) | 800 (31.5) | 730 (28.7) |
| | Max. turning length | | mm (inch) | 461 (18.1) | 400 (15.7) | 461 (18.1) | 750 (29.5) | | |
| Travels | Travel distance | X-axis travel | mm (inch) | 268 (10.6) | | | 390 (15.4) | 490 (19.3) | 390 (15.4) |
| | | Z-axis travel | mm (inch) | 488 (19.2) | | | 780 (30.7) | | |
| | Chuck size | | mm (inch) | 305(12") | | | 380(15") | | |
| Feedrates | Rapid traverse | X-axis | m/min | 20 | | | 20 | 12 | 20 |
| | | Z-axis | m/min | 20 | | | 16 | | |
| Main Spindle | Spindle speed | | r/min | 3000 | | | 2000 | | |
| | Spindle nose | | ASA | A2#8 | | | A2#11 | | |
| | Spindle bearing diameter (Front) | | mm (inch) | 130 (5.1) | | | 160 (6.3) | | |
| | Spindle through hole | | mm (inch) | 90 (3.5) | | | 140 (5.5) | | |
| | Main spindle indexing angle (C-axis) | | deg | - | 360 (0.001) | - | - | 360 (0.001) | - |
| Turret | No. of tool stations | | station | 12 {8} | 12 | 12+12 {8+8} | 8 {10, 12} | 12 | 8+8 {10+10, 12+12} |
| | OD tool size | | mm (inch) | 25 (1.0) | | | 32 (1.3) | 25 (1.0) | 32 (1.3) |
| | Max. boring bar size | | mm (inch) | 50 (2.0) | 40 (1.6) | 50 (2.0) | 60 (2.4) | | |
| | Turret Indexing time (1 station swivel) | | s | 0.15 | | | 0.15 | 0.25 | 0.15 |
| | Rotary tool spindle speed | | r/min | - | 4000 | - | - | 3000 | - |
| Motor | Main spindle motor power (30min) | | kW | 22 | | | 37 | | |
| | Rotary tool spindle motor | | kW | - | 5.5 | - | - | 11 | - |
| Power Source | Electric power supply | | kVA | 40.3 | 44.7 | 81 | 54.4 | 56.6 | 103.9 |
| Machine Dimensions | Height | | mm (inch) | 3210 (126.4) | | | 3260 (128.3) | 3390 (133.5) | 3260 (128.3) |
| | Length | | mm (inch) | 1455 (57.3) | | 2910 (114.6) | 1905 (75.0) | | 3810 (150.0) |
| | Width | | mm (inch) | 2075 (81.7) | | | 2720 (107.1) | | |
| | Weight | | kg | 6000 | | 12000 | 9000 | 9100 | 18000 |

{ } : Option

## Standard Feature

- Coolant supply equipment
- Controller : Doosan Fanuc i series*1
- Controller : Fanuc 31i*2
- Full enclosure chip and coolant shield
- Hand tool kit, including small hand tool for operations
- Hydraulic chuck & actauating cylinder
- Hydraulic power unit
- Leveling jack screw & plates
- Lubrication equipment
- Soft jaws (total)
- Standard tooling kit (tool holders & boring sleeve)
- Work light

## Optional Feature

- Air blast for chuck jaw cleaning
- Automatic door
- Automatic door with safety device
- Chip conveyor & Chip bucket
- Controller : Fanuc 32i*1
- Coolant flushing
- Dual chucking pressure
- Hardened & ground jaws
- Manual tool presetter
- Oil skimmer
- Signal tower (yellow, red, green)
- Chuck clamp confirmation
- Special chucks

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

*1 : PUMA V400/400M/V550/V550M *2 : PUMA V400-2SP, V550-2SP

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

# NC Unit Specifications

| Description | | Spec. | Doosan Fanuc i series | Fanuc 32i | Fanuc 31i |
|---|---|---|---|---|---|
| Controls | Controlled axes | | X, Z, C (!) | X, Z, C (!) | X1, Z1, X2, Z2 |
| | Simultaneously controlled axes | Std. 2 axes | 4 axes (!) | 3 axes (!) | 4 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, G03 | ○ | ○ | ○ |
| | 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 | 1st Spindle orientation | | ○ | ○ | ○ |
| | Constantant surface speed control | | ○ | ○ | ○ |
| | M-function | M3 digit | ○ | ○ | ○ |
| | Multi-spindle control | | ○ (!) | ○ (!) | ○ |
| | Rigid tapping | | ○ | ○ | ○ |
| | Spindle speed override | 0~150% | ○ | ○ | ○ |
| Programming Functions | Absolute / Incremental programming | | ○ | ○ | ○ |
| | Canned cycle for drilling | | ○ | ○ | ○ |
| | Custom macro | | ○ | ○ | ○ |
| | Decimal point programming / pocket calculator type decimal point programming | | ○ | ○ | ○ |
| | Direct drawing dimension programming | | ○ | ○ | ○ |
| | Manual guide i | Conversational programming | ○ | ○ | ○ |
| | Maximum program dimension | ▫ 9 digits | ○ | ○ | ○ |
| | Multi repetitive canned cycle | G70~G76 | ○ (!) | ○ | ○ |
| | Optional block skip(without hardware) | Total 9 (Only NC function) | - | ○ | ○ |
| | Sequence number | | N5 | N8 | N8 |
| | Programmable data input | G10 | ○ | ○ | ○ |
| | Sub program call | Nested holds | 4 | 10 | 10 |
| | Tape format for FANUC series 10/11 | | ○ | ○ | - |
| | Tape format for FANUC series 15 | | - | - | ○ |
| | Work coordinate system selection | G52~G59 | ○ | ○ | ○ |
| Tool Functions | Auto tool offset | | ○ | ○ | ○ |
| | Tool monitoring system | | - | Opt. | Opt. |
| | Direct input of tool offset value measured B | | ○ | ○ | ○ |
| | Tool geometry / wear compensation | Geometry & wear data | ○ | ○ | ○ |
| | Tool life management | | ○ | ○ | ○ |
| | Tool nose radius compensation | G40~G42 | ○ | ○ | ○ |
| | T-code function | T2+2 digits | ○ | ○ | ○ |
| | Tool offset pairs | | 64 | 64 | 32 |
| | Tool offset value counter input | | - | ○ | ○ |
| Editing Op. Functions | Background editting | | ○ | ○ | ○ |
| | Expanded part program editting | Copy, Move, Change of NC program | ○ | ○ | ○ |
| | No. of Registered programs | | 400ea | 500ea | 500ea |
| | Part program editing / Program protect | | ○ | ○ | ○ |
| | Part program storage length*1 | | 640m | 640m | 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 | | ○ | ○ | ○ |
| | Tool path graphic display | | ○ | Opt. (!) | ○ |
| Data Input & Output | 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 | 10.4" color TFT LCD | 10.4" color TFT LCD |
| | PMC system | | ○ | ○ | ○ |

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

Fanuc 31i-A : PUMA V550-2SP
PUMA V400-2SP

*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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