PUMA TL2000/2500 series

High Productivity 4-Axis Turning Center
High Productivity
4-Axis Turning Center

The Puma TL series of machines is engineered to increase productivity through high efficiency. As a process-integrated machine the TL provides a new level of performance and capabilities.

PUMA TL 2000 / 2500
Main Spindle

The powerful built-in spindle motor allows for a wide range machining operations from precise finishing to high powered metal removal using both tools at the same time.

Oil Cooling Unit for Spindles

Motor is surrounded by an oil jacket cooling system to minimize thermal displacement and ensure consistency through a wide range of cutting conditions.

Tail Stock

The widely spaced guide ways and heavy-duty tailstock design ensures ample rigidity. The tailstock is positioned by a drive bar that engages with the carriage.

<table>
<thead>
<tr>
<th>Tail stock quill type</th>
<th>unit</th>
<th>MT#5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tail stock quill diameter</td>
<td>mm</td>
<td>100</td>
</tr>
<tr>
<td>Tail stock quill travel</td>
<td>mm</td>
<td>120</td>
</tr>
<tr>
<td>Tail stock quill thrust force</td>
<td>kN</td>
<td>17</td>
</tr>
</tbody>
</table>
Turret

Total 20 tool stations of upper (optional milling upper turret only TL2000M/2500M) and lower turrets make it possible to complete complicated parts requiring many tools in just one set-up. Reliable servo driven turrets reduce the total cycle time required to machine parts.

**Index time**
(1-station swivel)

0.15 s

**No. of tool station**
(Upper+Lower turret)

20 stations (12+8)

Radial BMT

The turret features BMT55P style tooling in which the toolholders are mounted directly to the turrets periphery using 4 large bolts.

Rotary tool spindle power-torque diagram

- Max. speed: 5000 r/min

Rapid Traverse

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.

X-axis **20 m/min**

Z-axis **24 m/min**
Machine Construction

The combining of a high performance integral spindle motor with upper and lower multi-axis turrets yields a machine perfectly engineered for high productivity and optimum efficiency.

Robust Design

The heavily ribbed triangular torque frame resists eccentric loads. A 45° inclined wall is inserted into triangular frame under the center of the frame, to endure high stress due to X direction forces.

*Shown with milling option

A 4-axis linear controlled machine establishes multi-axis functional performance with simultaneous control of both turrets for middle diameter shaft workpieces

FEM Structural Analysis

Torque Tube of Triangular Frame
Machining Flexibility

- Accuracy and time savings by virtue of a single set-up.
- Unmanned operation by automation support.
- Less floor space and increased productivity.

Working Range

Max. bar working dia. **Ø65/76** mm

A : Max. turning dia.

**370** mm (on upper turret)

**240** mm (on lower turret)

B : Max. turning length

**600 [1000]** mm

SYSTEMIZED COMPACT STRUCTURE

Travel

<table>
<thead>
<tr>
<th>X1-axis</th>
<th>Z1-axis</th>
</tr>
</thead>
<tbody>
<tr>
<td>250 mm</td>
<td>650 [1050] mm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>X2-axis</th>
<th>Z2-axis</th>
</tr>
</thead>
<tbody>
<tr>
<td>150 mm</td>
<td>630 [1030] mm</td>
</tr>
</tbody>
</table>

*: on TL2500 series, [: ]: Long bed models

**: on TL2000[L] / TL2500[L]
Working Ranges

**PUMA TL 2000[L]/2500[L]**

**OD tool holder**

**ID tool holder**

**PUMA TL 2000M[LM]/2500M[LM]**

**OD tool holder**

**ID tool holder**

**Angular milling tool holder (Option)**

**Straight milling tool holder (Option)**

unit: mm
PUMA TL 2000/2500

**Top View**

**Front View**

**Side View**

*Some peripheral equipment can be placed in other places*
External Dimension

PUMA TL 2000L/2500L

Top View

Front View

Side View

* Some peripheral equipment can be placed in other places
## Machine Specifications

<table>
<thead>
<tr>
<th>Description</th>
<th>Unit</th>
<th>PUMA TL2000</th>
<th>PUMA TL2000M</th>
<th>PUMA TL2500</th>
<th>PUMA TL2500M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swing over bed</td>
<td>mm</td>
<td>600</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Swing over saddle(Upper)</td>
<td>mm</td>
<td>430</td>
<td></td>
<td></td>
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<tr>
<td>Recom. Turning diameter</td>
<td>mm</td>
<td>210</td>
<td></td>
<td>255</td>
<td></td>
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<tr>
<td>Max. Turning diameter(Upper/Lower turret)</td>
<td>mm</td>
<td>370/240</td>
<td>350/240</td>
<td>370/240</td>
<td>350/240</td>
</tr>
<tr>
<td>Max. Turning length</td>
<td>mm</td>
<td></td>
<td>600</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bar working diameter</td>
<td>mm</td>
<td>ø65</td>
<td></td>
<td>ø76</td>
<td></td>
</tr>
<tr>
<td>Spindle speed</td>
<td>r/min</td>
<td>5000</td>
<td>4000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spindle rose</td>
<td>ASA</td>
<td>A2#6</td>
<td>A2#8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spindle bearing diameter (Front)</td>
<td>mm</td>
<td>110</td>
<td>130</td>
<td></td>
<td></td>
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<tr>
<td>Spindle through hole</td>
<td>mm</td>
<td>ø76</td>
<td>ø86</td>
<td></td>
<td></td>
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<tr>
<td>Cx Spindle Index angle</td>
<td>deg</td>
<td>-</td>
<td>360, (in 0.001,)</td>
<td>-</td>
<td>360, (in 0.001,)</td>
</tr>
<tr>
<td>Tail Stock</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quill diameter</td>
<td>mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quill bore taper</td>
<td>ASA</td>
<td></td>
<td>MT#5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quill travel</td>
<td>mm</td>
<td></td>
<td>120</td>
<td></td>
<td></td>
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<tr>
<td>Carriage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Travel distance X1/2-axis</td>
<td>mm</td>
<td>X1 250 / X2 150</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>X1/2-axis Z1/2-axis</td>
<td>mm</td>
<td>Z1 650/1050 / Z2 630/1050</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Rapid traverse X1/2-axis</td>
<td>m/min</td>
<td>20</td>
<td></td>
<td></td>
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<tr>
<td>Z1/2-axis</td>
<td>m/min</td>
<td>24</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turret</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of tool stations(Upper/Lower)</td>
<td>st</td>
<td>12 + 8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OD tool height</td>
<td>mm</td>
<td></td>
<td>25</td>
<td></td>
<td></td>
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<tr>
<td>Boring bar diameter</td>
<td>mm</td>
<td></td>
<td>40</td>
<td></td>
<td></td>
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<tr>
<td>Indexing time</td>
<td>s</td>
<td></td>
<td></td>
<td>0.15</td>
<td></td>
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<tr>
<td>Rotary tool spindle speed*</td>
<td>r/min</td>
<td>-</td>
<td>5000</td>
<td>-</td>
<td>5000</td>
</tr>
<tr>
<td>Left spindle motor(ckt.)</td>
<td>kW</td>
<td>22 (10min)</td>
<td></td>
<td>26 (50min)</td>
<td></td>
</tr>
<tr>
<td>Rotary tool spindle motor*</td>
<td>kW</td>
<td>5.5</td>
<td></td>
<td>5.5</td>
<td></td>
</tr>
<tr>
<td>Motor</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Servo motor X1-axis</td>
<td>kW</td>
<td>3.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X2-axis</td>
<td>kW</td>
<td>1.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Z1-axis</td>
<td>kW</td>
<td>3.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Z2-axis</td>
<td>kW</td>
<td>3.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coolant pump</td>
<td>kW</td>
<td>0.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electric power supply(Rated capacity)</td>
<td>kVA</td>
<td>42</td>
<td>43</td>
<td>50</td>
<td>52</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Machine height</td>
<td>mm</td>
<td></td>
<td>890</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Machine dimensions length</td>
<td>mm</td>
<td>3250 [5900]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>width</td>
<td>mm</td>
<td>2138 [2144]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Machine weight</td>
<td>kg</td>
<td></td>
<td>7000 [8200]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* : Rotary tool spindle is available on only upper turret of TL2000M(LM)/ TL2500M(LM).

### Standard Feature

- Absolute positioning encoder
- Coolant supply equipment
- Foot switch
- Front guard door inter lock
- Full enclosure chip and coolant shield
- Hand tool kit (including small tool for operations)
- Hydraulic power unit
- Leveling jack screw & plates
- Lubrication equipment
- Manuals
- Safety precaution name plates
- Spindle oil cooling unit
- Standard tool kit (tool holder & boring sleeve)
- Work light

### Optional Feature

- Air gun
- Automatic door
- Automatic door with safety device
- Automatic power off
- Automatic measuring system [*In process touch probe]
- Air blast for chuck jaw cleaning
- Bar feeder interface
- Bar fullener
- Chip bucket
- Collet chuck
- Dual chucking pressure
- Hardened & ground jaws
- Hydraulic steady rest on lower turret
- Minimum quantity lubrication (MQL) system
- Oil skimmer
- Parts catcher
- Pressure switch for chucking pressure check
- Proximity switches for chuck clamp detection
- Signal tower (yellow, red, green)
- Tail stock quill for built-in (dread) center
- Tool monitoring system
- Tool pre-setter (manual type, or auto type-removable mode)
- Coolant level switch : Sensitive level - Low
- Quick change tooling(CAPTO)

* 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.
## Major Specifications

### PUMA TL2000 / 2500 series

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. turning dia.</td>
<td>mm (inch)</td>
<td>370 / 350 (14.6 / 13.8)</td>
<td>370 / 350 (14.6 / 13.8)</td>
</tr>
<tr>
<td>Max. turning length</td>
<td>mm (inch)</td>
<td>600 [1000] (23.6 [39.4])</td>
<td>600 [1000] (23.6 [39.4])</td>
</tr>
<tr>
<td>Standard chuck size</td>
<td>inch</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Bar working dia.</td>
<td>mm (inch)</td>
<td>65 (2.6)</td>
<td>76 (3.0)</td>
</tr>
<tr>
<td>Max. spindle speed</td>
<td>r/min</td>
<td>5000</td>
<td>4000</td>
</tr>
<tr>
<td>Max. spindle power</td>
<td>kW (Hp)</td>
<td>22 (29.5)</td>
<td>26 (34.9)</td>
</tr>
</tbody>
</table>

* (): Option

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**Doosan Machine Tools**

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**Fire Safety Precautions**  
There is a high risk of fire when using non-water-soluble cutting fluids, processing flammable materials, neglecting use coolants and modifying the machine without the consent of the manufacturer. Please check the SAFETY GUIDANCE carefully before using the machine.

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