Vertical shaft machining
VTC 100-2
VTC 100-4
Shaft machining in medium to large scale production places special challenges on the machine concept. Short idle times, flexible automation systems for workpiece families and the use of the perfect manufacturing technology are the main criteria for ensuring efficient production processes. EMAG supplies machines which are perfectly tailored to these requirements in the form of the VTC 100-2 and VTC 100-4. The sturdy machine design, their dynamic axes and simple operation open the way for new possibilities for machining precision shafts. Workpieces up to 63 mm in diameter and 400 mm in length can be machined automatically on these machines.
VERTICAL PICK-UP TURNING MACHINES FOR SHAFT COMPONENTS
The VTC 100-2 is specially designed for vertical shaft machining and turns this classic horizontal machining process on its head. Users of these vertical turning centers benefit from minimized throughput times, safer processes and high accuracy.

The VTC 100-2 is loaded by a gripper in the turret. This picks up the workpieces from the lateral workpiece supply and places them in the spindle / tailstock.

VTC 100-2 – 2-axis shaft machining.
The benefits

- Integrated loading and unloading
- Raw and finished parts storage areas form an integral part of the machine
- Can be used as a stand-alone machine or as part of a manufacturing system
- The vertical design of the machine ensures the free flow of chips and prevents the build-up of chip clusters
- Short tooling and retooling times due to excellent accessibility and ease of operation
- Direct-driven machine axes and modern control systems reduce the need and expenditure for sensors
- Smaller footprint due to compact, vertical design
VTC 100-4 – 4-axis shaft machining.

The strength of the VTC 100-4 is its 4-axis machining of large quantities of shafts up to 400 mm in length. Since the machine concept comprises a fully integrated automated loading and unloading system, a manufacturing system can be created which features very short transport distances. The machine is loaded and unloaded by the two turrets which ensures that the process is fast and straightforward.

In addition, it has a powerful main spindle (40% duty cycle – 34 kW, 144 Nm, 6,000 rpm). For the machining process, there are two turrets with eleven tool positions which can be equipped with either turning tools or driven tools. There are closed transport belts on both sides of the machining area. This is where the raw and finished parts are stored.
The benefits

• Reduced machining times due to four-axis machining
• Integrated loading and unloading
• Shorter idle times with simultaneous loading and unloading of components
• Raw and finished parts storage areas form an integral part of the machine
• Can be used as a stand-alone machine or as part of a manufacturing system
• Lower costs for automation and peripherals
• The vertical design of the machine ensures the free flow of chips and prevents the build-up of chip clusters
MINERALIT® polymer concrete – longer tool service life and higher workpiece quality.

All vertical pick-up turning machines from EMAG have a machine base made of MINERALIT® polymer concrete which has eight times better damping properties than gray cast iron.

The benefits

- Excellent vibration damping, resulting in extended tool life and superb surface finishes
- MINERALIT® polymer concrete is thermally stable which ensures constant production results.

Vibration damping effect on EMAG machine bases in MINERALIT® polymer concrete

In comparison: vibration damping by machine bases made of gray cast iron
The high-speed, 12-station, disk-type turret features very short swiveling times. Powered tools can be used on all 11 turret stations for drilling or milling operations. The EMAG turret gear box combines high speeds with high capacity while requiring minimum floor space.
Complete operator comfort.

EMAG attaches a great deal of value to the ease of operation and high accessibility of its machines. For example, large doors provide easy access to the machining area. This means that tools, clamping jaws and chucks can be changed quickly and easily. The EMAG control panel is another new feature.

Its control interface remains the same regardless of the control unit, making EMAG machines easy to set up while also reducing the amount of training required.
Quality and ease of servicing.

The ergonomic design of the EMAG machine provides the basis for excellent working conditions. All access points for the operator are within reach to facilitate operation and servicing. The layout ensures very short maintenance and servicing times with clear views and full access to all the units (hydraulics, cooling system, cooling lubricant and central lubrication system).

Automation.

Automatic loading and unloading is an integral part of the concept for the VTC 100-2 / VTC 100-4.

The raw parts are transported from the workpiece belt in a vertical position into the machine by a workpiece gripper in the turret. The belt takes the form of a chain cycle belt with workpiece carriers.

Different workpiece heights and diameters are defined in the NC part program.
Technical data.

## Capacity

<table>
<thead>
<tr>
<th></th>
<th>VTC 100-2</th>
<th>VTC 100-4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chuck diameter</td>
<td>mm 160</td>
<td>mm 160</td>
</tr>
<tr>
<td></td>
<td>in 6.3</td>
<td>in 6.3</td>
</tr>
<tr>
<td>Workpiece diameter max.</td>
<td>mm 63</td>
<td>mm 63</td>
</tr>
<tr>
<td></td>
<td>in 2.5</td>
<td>in 2.5</td>
</tr>
<tr>
<td>X-axis travel</td>
<td>mm 340</td>
<td>mm 340</td>
</tr>
<tr>
<td></td>
<td>in 13.4</td>
<td>in 13.4</td>
</tr>
<tr>
<td>Z-axis travel</td>
<td>mm 625</td>
<td>mm 625</td>
</tr>
<tr>
<td></td>
<td>in 24.6</td>
<td>in 24.6</td>
</tr>
</tbody>
</table>

## Workpiece

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Length, max.</td>
<td>mm 400*</td>
<td>mm 400*</td>
</tr>
<tr>
<td></td>
<td>in 15.8*</td>
<td>in 15.8*</td>
</tr>
<tr>
<td>Weight, max.</td>
<td>kg 10</td>
<td>kg 10</td>
</tr>
<tr>
<td></td>
<td>lb 22</td>
<td>lb 22</td>
</tr>
<tr>
<td>Loading time, depending on workpiece and clamping mode</td>
<td>s 4 – 5</td>
<td>s 8</td>
</tr>
</tbody>
</table>

## Main spindle

| Main spindle Qty | 1 | 1 |
| Size 5          | 5 | 5 |
| Spindle bearing, front dia. in mm | 80 | 80 |
|                      | in 3.2 | in 3.2 |
| Speed, max. rpm   | 6,000 | 6,000 |

## Main drive

| Power rating, 40% / 100% duty cycle kW | 19.5 / 12.5 | 34 / 26.5 |
|                                       | hp 26 / 17 | 46 / 36 |
| Full power at speed of rpm 2,500      | 2,500   | 2,250   |
| Torque, 40% / 100% duty cycle Nm | 75 / 48  | 144 / 112 |
|                                       | lbf ft 55 / 35 | 106 / 83 |
| or Power rating, 40% / 100% duty cycle kW | 34 / 26.5 | 19.5 / 12.5 |
|                                       | hp 46 / 36 | 26 / 17 |
| Full power at speed of rpm 2,250      | 2,500   | 2,500   |
| Torque, 40% / 100% duty cycle Nm | 144 / 112 | 72.5 / 48 |
|                                       | lbf ft 106 / 83 | 53 / 35 |

## Feed drives

| Rapid-traverse rate X / Z m/min | 30 / 30 | 30 / 30 |
|                                 | rpm 1,181 / 1,181 | 1,181 / 1,181 |
| Feed force X / Z kN            | 5 / 75 | 5 / 75 |
|                                 | lbf 1,124 / 1,686 | 1,124 / 1,686 |
| Ball screw X / Z dia. in mm    | 32 / 40 | 32 / 40 |
|                                 | dia. in inch 13 / 16 | 13 / 16 |

* dependent on clamping equipment
<table>
<thead>
<tr>
<th>Tool carrier</th>
<th>VTC 100-2</th>
<th>VTC 100-4</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMAG disc-type turret</td>
<td>Qty 1</td>
<td>Qty 2</td>
</tr>
<tr>
<td>Tool receptors per turret for BMT55</td>
<td>Qty 11</td>
<td>Qty 11</td>
</tr>
<tr>
<td>Optional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>for cylindrical shanks to DIN 69 880</td>
<td>Qty 11</td>
<td>Qty 11</td>
</tr>
<tr>
<td>Shank diameter</td>
<td>mm 30</td>
<td>mm 30</td>
</tr>
<tr>
<td></td>
<td>in 1.2</td>
<td>in 1.2</td>
</tr>
<tr>
<td>Loading gripper / unloading gripper</td>
<td>Qty 1</td>
<td>Qty 2 x 1</td>
</tr>
</tbody>
</table>

**Electrical equipment**

| Operating voltage             | V 400    | V 400    |
| Control voltage DC            | V 24     | V 24     |
| Control voltage AC            | V 230    | V 230    |
| Frequency                     | Hz 50    | Hz 50    |
| Electrics to                  | VDE 0113 | VDE 0113 |

**Control system**

SIEMENS SINUMERIK 840D sl with integral PLC S7-300

**Dimensions and weights**

| Depth                         | mm 3,555 | mm 3,555 |
|                              | in 140.0 | in 140.0 |
| Width                        | mm 1,250 | mm 1,880 |
|                             | in 49.2  | in 74.2  |
| Width with automation        | mm 1,620 | mm 2,350 |
|                             | in 63.8  | in 92.5  |
| Height                       | mm 2,495 | mm 2,496 |
|                             | in 98.2  | in 98.2  |
| Weight                       | approx. kg 6,000 | approx. kg 7,000 |
|                             | lb 13,227 | lb 15,432 |
Technical data.

Floor plan VTC 100-2

Dimensions in mm

- 2,495 (98.2 in)
- 1,250 (49.2 in)
- 3,550 (139.8 in)
- 950 (37.4 in)
- approx. 1,620 (63.8 in)
- 3,550 (139.8 in)
- 2,495 (98.2 in)
- 960 (37.4 in)
- 1,250 (49.2 in)
- 3,550 (139.8 in)

3,550 (139.8 in)
Floor plan VTC 100-4

Dimensions in mm

Subject to technical changes
At home in the world.

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