Milling at its best: Hermle machines are often at the forefront when it comes to optimized results. The proverbial Hermle precision in conjunction with process consultation and project management has made us an important machine manufacturer in nearly all key sectors: from large complex components to the smallest components in the high-tech area. Versatile applications, uncompromising results – Hermle “The Original”.
## Contents

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<th>Page</th>
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</tbody>
</table>
01
Industry sectors

Hermle is at home in all sectors. For us, ensuring the highest precision and reliable machining is always paramount. Our machines are made for daily operation, whether as linked linear segments in production or as stand-alone workshop machinery.
The C 22: a highly dynamic machining centre designed consistently for 5-axis/5-side machining. Features galore to ensure high-precision, economical parts production. Numerous automation solutions extend the application range many times over.

**TECHNICAL DATA**

**Traverse X-Y-Z:** 450 – 600 – 330 mm

**Speed:** 15000 / 18000 / 25000 / 30000 / 42000 rpm

**Rapid linear traverse X-Y-Z (dynamic):** 30 (50) m/min

**Linear acceleration X-Y-Z (dynamic):** 8 (15) m/s²

**Control unit:** TNC 640 / S 840 D sl

**Rigid clamping table:** 600 x 630 mm

**Max. table load:** 750 kg

**Swivelling rotary tables:**
- **Machining table with worm:** Ø 320 mm
- **Swivelling range:** +/- 135°
- **A-axis speed:** 25 rpm
- **C-axis speed:** 40 rpm
- **Max. table load:** 300 kg

- **Machining table with torque:** Ø 320 mm
- **Swivelling range:** +/- 135°
- **A-axis speed:** 25/55* rpm
- **C-axis speed:** 80 rpm
- **Max. table load:** 150 kg

*with tandem drive
A new dimension of dynamics
Modified gantry design with optimum main axis support

Tandem drive mechanical / Torque
Avoidance of torsion and high accuracy

Large pick-up magazine integrated to save space with up to 55/65 tool pockets

Optimum chip ejection, no interfering edges, made of stainless steel

Swivelling range of the swivelling rotary table: +135° to -135°

Large, almost cubic/homogeneous working area for high flexibility in 5-axis machining

Accessibility 750 mm door opening and excellent ergonomics

4-point installation with calotte wedge shoes

Central drive
Centrally arranged Y axis main drive (directly driven ball screw spindle)

Force characteristics: 4 guideways with one guide shoe for ideal force balance

Modified pantry design with optimum main axis support

Collision protection with collision inquiry for tool spindles up to 18000 rpm

Mineral casting design with excellent vibration dampening properties

3 axes in a tool dynamics independent from workpiece with single acceleration of up to 15 m/s²
Many important points must be observed in order to guarantee that every workpiece is machined perfectly. For this reason, Hermle has been working on perfecting and optimising the machining process for many years. This is the reason that the C 22 is now equipped with:

- The largest working area relative to the installation area
- The largest swivelling range of workpieces in the working area
- Utilisation of the entire traverse range
- A large collision circle between the table flanges

### THE WORKPIECE DIMENSION

- **3-axis**
  - **Dimensions:** 450 x 600 x 330 mm
  - **Mass:** max. 750 kg
  - **Collision Circle:** Ø 450 x 370 mm

- **5-axis**
  - **Dimensions:** 0 450 x 370 mm
  - **Mass:** max. 300 kg
  - **Collision Circle:** Ø 610 mm
  - **Max. Vertical Table Clearance:** 470 mm
3-axis machining

5-axis machining
02.3
Ergonomics

Built for daily use: the Hermle C 22 can be ergonomically adapted for every machine operator for optimum ease of use, simple operation and uncomplicated maintenance.

HIGHLIGHTS

- Ergonomic control panel:
  - Adjustable height +/- 100 mm
  - Tilting screen 5 - 35°
  - 19" screen
  - Control panel pivotable from the tool loading point to the working area
- Optimum loading height
- Crane loading
- Minimum interval between table and operator
- Large door opening
- Lockable fluid cabinet

Screen pivotable by up to 30°

Practical, slide-in storage

Control panel +/- 100 mm height adjustable
Door opening 750 mm

Max. vertical table clearance 470 mm

Loading height 900 mm

Control panel pivotable
02.4
Table variants

Hermle’s swivelling rotary table has revolutionised the concept of 5-axis machining. Also with the C 22, five axis operation is a key attribute, this capability is enhanced through the use of a worm gear driven table on the entry machine, and a torque drive on the highly dynamic version. All machine tables are manufactured exclusively and entirely at our plant in Gosheim.

Uncompromised perfection: This drive design accesses the gear on the table housing directly and so completely eliminates shaft torsion. This is the only way to achieve the highest precision for both one-sided and tandem drives.
02.4
Table variants

Made in Germany – made in Gosheim: the C 22 table variants stand for the highest quality and optimum material usage from the cast housing to the installed gearbox and torque motors. At our main plant in Gosheim, these machining tables are laying the foundations for the precision, accuracy and quality of the machined surfaces.

TECHNICAL DATA

High degree of freedom in working area
- Very high table load (up to 300 kg with the highest accuracy)
- No accumulation of chip on the table (swivel table)
- Swivelling axis A and rotary axis C are located within the workpiece (U-shape)
- Torsion prevented by tandem drive
- Wide spacing between the A axes flanges results in a very large collision circle
- High swivelling range for undercuts

Worm table
- Generously dimensioned worm gear
- Low torsion attachment
- Direct, absolute measuring system

Torque table
- High dynamics on the A and C axes
- No wear
- Direct, absolute measuring system
Hermle machining tables are equipped with cutting-edge drive technology for high dynamic performance during 5-axis machining, as it is the slowest axis that determines the speed when milling in 5-axes. High-torque motors and the adapted gearbox can position loads of up to 300 kg rapidly and, most importantly, with exceptional precision.

DRIVE TECHNOLOGY

- Centric load on the machining table
- Drive directly on table housing = low torsion A axis
- Direct, absolute measuring system
- Good maintenance accessibility
- A axis integrated in machine bed

One-sided drive

- Mechanical drive on left of table housing

Tandem drive

- Mechanical tandem drive to left and right of table housing
Swivelling rotary table
Drive type of C axis: Worm

The swivelling rotary table "Worm" equals the standards of the torque table, apart from the dynamics. It is an ideal introduction to the world of 5-axis technology.

Clamping surface: Ø 320 mm
T-grooves: star-shaped 4 units / 14 H7
Swivelling range: +/- 135°
Drive type of C axis: worm
Speed - rotary axis C: 40 rpm
Speed - swivelling axis A (one-sided drive): 25 rpm
Maximum table load: 300 kg
**Swivelling rotary table**

Drive type of C axis: Torque

The Torque swivelling rotary table provides the ideal conditions for highly dynamic 5-axis and 5-axis simultaneous machining.

- Rigid clamping table
  - Clamping surface: 630 x 600 mm

  Equipped with the rigid clamping table, the machine can deal with clamping weights of up to 750 kg – ideal for 3-axis machining of large, bulky and heavy workpieces.

  T-grooves: parallel 10 units / 14 H7

- System table with table plate, Ø 320 mm

- Zero-point clamping systems / pallet clamping systems

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clamping surface:</td>
<td>Ø 320 mm</td>
</tr>
<tr>
<td>T-grooves:</td>
<td>star-shaped 4 units / 14 H7</td>
</tr>
<tr>
<td>Swivelling range:</td>
<td>+/- 135°</td>
</tr>
<tr>
<td>Drive type of C axis:</td>
<td>torque</td>
</tr>
<tr>
<td>Speed - rotary axis C:</td>
<td>80 rpm</td>
</tr>
<tr>
<td>Speed - swivelling axis A (one-sided drive):</td>
<td>25 rpm</td>
</tr>
<tr>
<td>Speed - swivelling axis A (tandem drive):</td>
<td>55 rpm</td>
</tr>
<tr>
<td>Maximum table load:</td>
<td>150 kg</td>
</tr>
</tbody>
</table>
02.5

Tool spindles

The C 22 can be equipped with two-piece or compact spindles. All tool spindles can be replaced quickly and easily in case of failure. With the different speed ranges and tool holding fixtures the tool spindles are suitable for a wide variety of machining tasks. Like the machining tables, all tool spindles are manufactured exclusively and entirely at our plant in Gosheim.

TECHNICAL DATA

- High-tech tool spindles for demanding milling processes
- Slim-end tool spindle for machining deep cavities
- Few projecting edges (prevention of collision)
- Two-part tool spindle (faster, easier replacement)
- Collision protection (collision sleeves) prevents damage in 50% of collisions

Collision protection with collision inquiry

Each tool spindle has several collision sleeves which compensate collision energy in the Z direction
**Tool spindle 15000**

- Maximum spindle speed: 15000 rpm
- Main Power 20 % c.d.f.: 31 kW
- Torque 20 % c.d.f.: 98 Nm
- Tool holding fixture: SK 40
- Tool spindle: two-piece
- Collision protection: collision sleeves

**Tool spindle 18000**

- Maximum spindle speed: 18000 rpm
- Main Power 20 % c.d.f.: 31 kW
- Torque 20 % c.d.f.: 98 Nm
- Tool holding fixture: HSK A 63 / HSK A 50
- Tool spindle: two-piece
- Collision protection: collision sleeves

**Tool spindle 25000**

- Maximum spindle speed: 25000 rpm
- Main Power 20 % c.d.f.: 37 kW
- Torque 20 % c.d.f.: 35 Nm
- Tool holding fixture: HSK A 63
- Tool spindle: compact
### Tool spindle 30000

- **Maximum spindle speed:** 30000 rpm
- **Main Power 20 % c.d.f.:** 37 kW
- **Torque 20 % c.d.f.:** 32 Nm
- **Tool holding fixture:** HSK A 50
- **Tool spindle:** compact

### Tool spindle 42000

- **Maximum spindle speed:** 42000 rpm
- **Main Power 20 % c.d.f.:** 35 kW
- **Torque 20 % c.d.f.:** 17.5 Nm
- **Tool holding fixture:** HSK E 40
- **Tool spindle:** compact
The C 22’s tool magazine holds up to 65 tools in the standard version and is integrated into the machine bed to save space. It can be filled from the side by swivelling the control panel to the loading point.

**TECHNICAL DATA**

<table>
<thead>
<tr>
<th>Pick-up magazine</th>
</tr>
</thead>
<tbody>
<tr>
<td>High number of tools with revolving ring magazine</td>
</tr>
<tr>
<td>Excellent accessibility</td>
</tr>
<tr>
<td>Control panel pivotable to the loading point</td>
</tr>
<tr>
<td>Tool change positions with blowing nozzles</td>
</tr>
<tr>
<td>Tool changer (pick-up)</td>
</tr>
</tbody>
</table>

**Interface:**
- SK 40 / HSK A 63
- HSK A 50
- HSK E 40

**Magazine pockets:**
- 55
- 70
- 70

**Max. tool weight:**
- 8 kg
- 6 kg
- 2.5 kg

**Max. tool diameter:**
- Ø 80
- Ø 65
- Ø 65

(with corresponding adjacent pocket allocation Ø 125)

**Max. tool length:**
- 250 mm
- 250 mm
- 250 mm

**Max. magazine load:**
- 220 kg
- 195 kg
- 163 kg

**Chip-to-chip time:**
- approx 4.5 s
- approx 4.5 s
- approx 4.5 s
### Additional tool magazine ZM 50 / ZM 88 k

<table>
<thead>
<tr>
<th>Magazine pockets:</th>
<th>50 / 88</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. tool weight:</td>
<td>8 kg</td>
</tr>
<tr>
<td>Max. tool diameter:</td>
<td>Ø 80,</td>
</tr>
<tr>
<td></td>
<td>with corresponding adjacent pocket allocation Ø 125 mm</td>
</tr>
<tr>
<td>Max. tool length:</td>
<td>250 mm</td>
</tr>
</tbody>
</table>

### Additional tool magazine single

<table>
<thead>
<tr>
<th>Magazine pockets:</th>
<th>192</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. tool weight:</td>
<td>8 kg</td>
</tr>
<tr>
<td>Max. tool diameter:</td>
<td>Ø 80,</td>
</tr>
<tr>
<td></td>
<td>with corresponding adjacent pocket allocation Ø 125 mm</td>
</tr>
<tr>
<td>Max. tool length:</td>
<td>250 mm</td>
</tr>
</tbody>
</table>

### Additional tool magazine double

<table>
<thead>
<tr>
<th>Magazine pockets:</th>
<th>462</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. tool weight:</td>
<td>8 kg</td>
</tr>
<tr>
<td>Max. tool diameter:</td>
<td>Ø 80,</td>
</tr>
<tr>
<td></td>
<td>with corresponding adjacent pocket allocation Ø 125 mm</td>
</tr>
<tr>
<td>Max. tool length:</td>
<td>250 mm</td>
</tr>
</tbody>
</table>
02.8
Control unit

The C 22 can be equipped with two types of control unit. All control units provide diverse program functions. Hermle simplifies programming and operation still further with comprehensive extra features.

Heidenhain TNC 640

- Dynamic Efficiency – Active Chatter Control (ACC), Adaptive Feed Control (AFC), trochoidal milling
- Dynamic Precision – Cross Talk Compensation (CTC), Active Vibration Damping (AVD), Load Adaptive Control (LAC)
- 19” TFT colour flat screen
- Keyboard unit with full keyboard, integrated trackball, USB and Ethernet interfaces
- Fully digital with HSCI interface and EnDat interface
- Programming in Heidenhain plain text or per DIN/ISO
- Standard drilling and milling cycles
- Touch probe system cycles
- Free contour programming
- Special functions for fast 3D machining
- Automatic calculation of cutting data
- Pallet management
- Software option Kinematic Opt (Measurement cycle for improving accuracy of rotational and swivelling operations)

Siemens S 840 D sl

- 19” TFT colour flat screen
- Keyboard unit with full keyboard, additional panel with integrated trackball, key-operated switch and buttons
- USB and Ethernet interfaces
- Complete and flexible diagnostics and service concept
- All inverter and control components are connected with each other by the Drive-Cliq-Interface
- Including shell transformation, 5-axis transformation, process-oriented measuring, 3D tool radius compensation and Spline-Interpolation
- Incl. software option Kinematic Opt (Measurement cycle for improving accuracy of rotational and swivelling operations)
- Tool management for all machines HOTS
- Operating Interface OPERATE with ShopMill
- SINUMERIK MDynamics incl. Advanced Surface
- High Speed Settings - CYCLE832

For further advantages and detailed technical data, please see the Heidenhain brochures.

For further advantages and detailed technical data, please see the Siemens brochures.
### Hermle control tools

<table>
<thead>
<tr>
<th>System</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hermle &quot;Tool-Management-Control&quot;</td>
<td>Simple, Hermle tool management for Heidenhain controls.</td>
</tr>
<tr>
<td>Hermle &quot;Automation-Control-System&quot;</td>
<td>Simple, Hermle order management software.</td>
</tr>
<tr>
<td>Hermle &quot;Information-Monitoring-Software&quot;</td>
<td>The &quot;Information-Monitoring-Software&quot; is used to display the live status of machines and send events via e-mail.</td>
</tr>
<tr>
<td>Hermle &quot;Wear-Diagnosis-System&quot;</td>
<td>Machine status is continually monitored by the Hermle wear diagnosis system. It facilitates rapid machine diagnostics and status-oriented detection of maintenance tasks.</td>
</tr>
</tbody>
</table>

### Hermle setups

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standard</strong></td>
<td>- Standard setting.</td>
</tr>
<tr>
<td></td>
<td>- Switches back to the standard setting after a different setup has been used.</td>
</tr>
<tr>
<td><strong>Heavy Duty Machining</strong></td>
<td>- For roughing in conjunction with high milling power.</td>
</tr>
<tr>
<td></td>
<td>- Greater machining performance possible thanks to reduced machine vibration (depending on the tool and the selected technology data).</td>
</tr>
<tr>
<td><strong>High Production</strong></td>
<td>- Quicker machining with programs which have many cycle calls or subprograms.</td>
</tr>
</tbody>
</table>
**3D Contour Tolerance max.**

3D contour tolerance max.

- For 3D roughing with low machining performance.
- Very high machining speed, mainly for free-form surfaces.

**3D Contour Tolerance min.**

3D contour tolerance min.

- For very high demands of machining accuracy, mainly for free-form surfaces.
- Can also be used with conventional programs.

**3D Path Smoothing**

3D path smoothing

- For very high demands on the surface quality, mainly for free-form surfaces.
The C 22 is built using an elegant cassette panel construction. This high-tech building block concept is used throughout from the standard machine to the flexible manufacturing system. The machining centre can be transported without any disassembly and set up without a foundation. Furthermore, all units are arranged for easy maintenance and servicing.

**HIGHLIGHTS**

- Comprehensive fluid technology
- Optimised chip management
- Diverse cooling lubricant units
- Cooling units, fluid cabinet and switch cabinet integrated in the compact machine enclosure
- Space-saving chip conveyor ejector for maintenance and service
03
Technical data. C 22
Traverse X axis 450 mm
Traverse Y axis 600 mm
Traverse Z axis 330 mm
Rapid linear traverse (dynamic) X-Y-Z 30 (50) m/min.
Linear acceleration (dynamic) X-Y-Z 8 (15) m/s²
Linear feed force X-Y-Z 4500 N
Max. vertical table clearance 470 mm
Max. workpiece diameter Ø 450 mm
Max. workpiece height 370 mm
Collision circle (A axis) in 0° position Ø 610 mm

Main spindle drive

<table>
<thead>
<tr>
<th>Speed</th>
<th>Main power/Torque</th>
<th>Main spindle drive</th>
</tr>
</thead>
<tbody>
<tr>
<td>15000 rpm</td>
<td>31 kW / 98 Nm</td>
<td>SK 40</td>
</tr>
<tr>
<td>18000 rpm</td>
<td>31 kW / 98 Nm</td>
<td>HSK A 63 / HSK A 50</td>
</tr>
<tr>
<td>25000 rpm</td>
<td>37 kW / 35 Nm</td>
<td>HSK A 63</td>
</tr>
<tr>
<td>30000 rpm</td>
<td>37 kW / 32 Nm</td>
<td>HSK A 50</td>
</tr>
<tr>
<td>42000 rpm</td>
<td>35 kW / 17.5 Nm</td>
<td>HSK E 40</td>
</tr>
</tbody>
</table>

Control unit

<table>
<thead>
<tr>
<th>Tool changer (pick-up)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface</td>
</tr>
<tr>
<td>SK 40 / HSK A 63</td>
</tr>
<tr>
<td>HSK A 50 / HSK E 40</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Magazine pockets</th>
<th>55</th>
<th>65</th>
<th>65</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chip-to-chip time*</td>
<td>approx. 4.5 s</td>
<td>approx. 4.5 s</td>
<td>approx. 4.5 s</td>
</tr>
<tr>
<td>Max. tool length</td>
<td>250 mm</td>
<td>250 mm</td>
<td>250 mm</td>
</tr>
<tr>
<td>Max. tool diameter</td>
<td>Ø 80 mm</td>
<td>Ø 65 mm</td>
<td>Ø 65 mm</td>
</tr>
<tr>
<td></td>
<td>Ø 125 mm</td>
<td>Ø 125 mm</td>
<td>Ø 125 mm</td>
</tr>
<tr>
<td>Max. magazine load</td>
<td>220 kg</td>
<td>195 kg</td>
<td>163 kg</td>
</tr>
</tbody>
</table>
### Extension of tool storage capacity

<table>
<thead>
<tr>
<th>Additional tool magazine</th>
<th>Additional pockets</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZM 50</td>
<td>50</td>
</tr>
<tr>
<td>ZM 88 k</td>
<td>88</td>
</tr>
<tr>
<td>Single ZM 192</td>
<td>192</td>
</tr>
<tr>
<td>Double ZM 462</td>
<td>462</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Interface</th>
<th>SK 40 / HSK A 63</th>
</tr>
</thead>
<tbody>
<tr>
<td>HSK A 50</td>
<td></td>
</tr>
<tr>
<td>HSK E 40</td>
<td></td>
</tr>
</tbody>
</table>

| Max. tool length         | 250 mm             |
|                         | 250 mm             |
|                         | 250 mm             |

| Max. tool diameter       | Ø 80 mm            |
|                         | Ø 70 mm            |
| with corresponding pocket allocation | Ø 125 mm |
|                         | Ø 125 mm           |
|                         | Ø 125 mm           |

| Max. tool weight         | 8 kg               |
|                         | 6 kg               |
|                         | 2.5 kg             |

### Table variants*

| Swivelling rotary table  | Ø 320              |
| Clamping surface         | Ø 320 mm           |
| Swivelling range         | +/- 135°           |
| C-axis drive mode        | torque             |
| Swivelling axis A speed  | 25 rpm             |
| One-sided drive          | 55 rpm             |
| Tandem drive             |                    |
| Rotary axis C speed      | 80 rpm             |
| Max. table load          | 150 kg             |
| T grooves star-shaped    | 4 units / 14 H7    |
| Clamping surface         |                    |
| System table (can be extended with table plate) | Ø 320 mm / Ø 450 x 360 mm |
| Zero-point system / pallet clamping system | SK 50 |
| Installation clamping device | -          |
| Installation clamping device | HSK 100 |
| Rigid clamping table     |                    |
| Clamping surface         | 630 x 600 mm       |
| Max. table load          | 750 kg             |
| T grooves parallel       | 10 units / 14 H7   |

*All machining tables available on demand

- Included in standard delivery
- Available upon request
<table>
<thead>
<tr>
<th><strong>Positional uncertainty</strong></th>
<th>P in X-Y-Z axes according to VDI/DGQ 3441</th>
<th>0.008 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(calculated at a constant ambient temperature of 20 °C +/-1 °C. Our products are subject to the German Export Law and require authorization since the attainable precision may be less/greater than 6 µm.)</td>
<td></td>
</tr>
<tr>
<td><strong>Chip slide</strong></td>
<td>Space-saving mounting on the left or right</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Capacity</td>
<td>210 l</td>
</tr>
<tr>
<td><strong>Chip conveyor</strong></td>
<td>Scraper belt or hinge conveyor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chip conveyor, left or right (short version)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Capacity</td>
<td>280 l</td>
</tr>
<tr>
<td></td>
<td>Chip conveyor to the rear (long version)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Capacity</td>
<td>280 l</td>
</tr>
<tr>
<td></td>
<td>Chip conveyor ejection height</td>
<td>at least 940 mm</td>
</tr>
<tr>
<td></td>
<td>Chip cart</td>
<td>450 l</td>
</tr>
<tr>
<td><strong>Internal cooling lubricant supply with Paper band filter</strong></td>
<td>Capacity of standard tank</td>
<td>100 l</td>
</tr>
<tr>
<td></td>
<td>Capacity of cooling lubricant tank</td>
<td>570 l</td>
</tr>
<tr>
<td></td>
<td>Pressure (manually adjustable up to)</td>
<td>max. 40 bar / 27 l/min</td>
</tr>
<tr>
<td></td>
<td>Mains connection (ICS)</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Power consumption (ICS)</td>
<td>-</td>
</tr>
<tr>
<td><strong>Hydraulics</strong></td>
<td>Operating pressure</td>
<td>120 bar</td>
</tr>
<tr>
<td><strong>Central lubrication</strong></td>
<td>Minimum grease lubrication quantity</td>
<td></td>
</tr>
<tr>
<td><strong>Connected loads (machine)</strong></td>
<td>Mains connection</td>
<td>400 V / 50 Hz</td>
</tr>
<tr>
<td></td>
<td>Power consumption</td>
<td>55 kVA</td>
</tr>
<tr>
<td></td>
<td>Compressed air</td>
<td>6 bar</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>(standard version without optional extras, workpieces and cooling lubricant)</td>
<td>Approx. 8.7 t</td>
</tr>
</tbody>
</table>

- Included in standard delivery
- Available upon request
03.2 Options

The C 22 is prepared for anything: Numerous optional extras make machining even more efficient and powerful in real applications and enable you to optimise your work with the machining centre still further.

C 22 standard machine dimensions

1 Machining centre
2 Cooling unit
3 Emulsion mist extraction
4 Chip conveyor rear
5 Chip cart
6 Chip slide left or right
7 Internal cooling lubricant supply
8 Recooling unit to internal cooling lubricant supply
Options

- Additional magazine
- Automatic cabin door
- Automatic cabin top
- Bed flushing
- BDE-signal
- Blow air through spindle centre
- Chip cart
- Chip conveyor
- Chip drawer
- Chip slide
- Control panel height adjustable with 19” swivel screen
- Cooling lubricant nozzle
- Electr. hand-held control module
- Electr. heat compensation
- Emulsion mist extraction
- External minimum quantity lubrication
- Graphite machining packages
- Internal cooling lubricant supply
- Laminated safety glass panes
- Pallet clamping system
- Pallet storage
- Pallet changer
- Precision packages
- Preparation button
- Recooling unit for ICS
- Rotating transparent window
- Sealing air for scales
- Stainless steel production booth
- Status lamp
- Touch probe with preparation
- Tool breakage monitoring / measuring

C 22 standard machine dimensions

![Machine Dimensions Diagram]
- Additional magazine
- Automatic cabin door
- Automatic cabin top
- Bed flushing
- BDE-signal
- Blow air through spindle centre
- Chip cart
- Chip conveyor
- Chip drawer
- Chip slide
- Control panel height adjustable with 19” swivel screen
- Cooling lubricant nozzle
- Electr. hand-held control module
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- Emulsion mist extraction
- External minimum quantity lubrication
- Graphite machining packages
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- Recooling unit for ICS
- Rotating transparent window
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- Stainless steel production booth
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C 22 dimensions. Additional tool magazine ZM 50 / ZM 88 k

1 Machining centre
2 Cooling unit
3 Emulsion mist extraction
4 Chip conveyor left or right
5 Chip cart
7 Internal cooling lubricant supply
8 Recooling unit for ICS
9 Additional tool magazine ZM 50 / ZM 88 k
C 22 dimensions . Additional tool magazine single

1 Machining centre
2 Cooling unit
3 Emulsion mist extraction
4 Chip conveyor left or right
5 Chip cart
7 Internal cooling lubricant supply
8 Recooling unit to internal cooling lubricant supply
10 Additional tool magazine single
Options

- Additional magazine
- Automatic cabin door
- Automatic cabin top
- Bed flushing
- BDE-signal
- Blow air through spindle centre
- Chip cart
- Chip conveyor
- Chip drawer
- Chip slide
- Control panel height adjustable with 19” swivel screen
- Cooling lubricant nozzle
- Electr. hand-held control module
- Electr. heat compensation
- Emulsion mist extraction
- External minimum quantity lubrication
- Graphite machining packages
- Internal cooling lubricant supply
- Laminated safety glass panes
- Pallet clamping system
- Pallet storage
- Pallet changer
- Precision packages
- Preparation button
- Recooling unit for ICS
- Rotating transparent window
- Sealing air for scales
- Stainless steel production booth
- Status lamp
- Touch probe with preparation
- Tool breakage monitoring / measuring

C 22 dimensions. Additional tool magazine double

1 Machining centre
2 Cooling unit
3 Emulsion mist extraction
4 Chip conveyor left or right
5 Chip cart
7 Internal cooling lubricant supply
8 Recooling unit to internal cooling lubricant supply
11 Additional tool magazine double

Options

- Sealing air for scales
- Stainless steel production booth
- Status lamp
- Touch probe with preparation
- Tool breakage monitoring / measuring

C 22 dimensions. Additional tool magazine double

1 Machining centre
2 Cooling unit
3 Emulsion mist extraction
4 Chip conveyor left or right
5 Chip cart
7 Internal cooling lubricant supply
8 Recooling unit to internal cooling lubricant supply
11 Additional tool magazine double
04 Automation
Everybody is talking about automation, but it’s much more than just a trend. We ourselves have developed from a machine manufacturer to a process provider because we believe that the decisive criterion for automated efficiency is integration of the entire environment. In keeping with this philosophy, what began with economical pallet changing and intelligent handling systems, continues now with highly advanced robot solutions. Therefore, we have long been capable of converting machines into flexible manufacturing cells.
Our pallet changer is setting new standards for parallel setup in our highly dynamic machining centres. A further increase in productivity allows for more adaptable storage systems. Machining centres can be setup via pallet storage for production-oriented machine runs with minimum operator interference/without operator interference or for customer-specific runs using a wide range of parts. Furthermore, multiple machining centres can be linked to form a complete manufacturing system.
THE ADVANTAGES

- Completely free access to the machining centre
- Quick and easy installation
- No floor anchorage required
- Complete transport (no disassembly)
- Side-mounted setup station
- Setup station optionally rotatable
- Large pallet storage
- Additional pallet storage space

PW 150 . Compact pallet changer:

<table>
<thead>
<tr>
<th>Pallet changer</th>
<th>3x pallet storage</th>
<th>3x pallet storage</th>
<th>8x pallet storage</th>
<th>8x pallet storage</th>
<th>15x pallet storage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>double gripper</td>
<td>single gripper</td>
<td>double gripper</td>
<td>single gripper</td>
<td>double gripper</td>
</tr>
<tr>
<td>Pallet storage</td>
<td>6 units</td>
<td>4 units</td>
<td>11 units</td>
<td>10 units</td>
<td>18 units</td>
</tr>
<tr>
<td>Pallet dimensions</td>
<td>400 x 320 mm</td>
<td>400 x 320 mm</td>
<td>400 x 320 mm</td>
<td>400 x 320 mm</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>320 x 320 mm</td>
<td>320 x 320 mm</td>
<td>320 x 320 mm</td>
<td>320 x 320 mm</td>
<td>320 x 320 mm</td>
</tr>
<tr>
<td>Max. workpiece diameter</td>
<td>Ø 400 x 360 mm</td>
<td>Ø 400 x 360 mm</td>
<td>Ø 400 x 360 mm</td>
<td>Ø 400 x 360 mm</td>
<td>Ø 320 mm</td>
</tr>
<tr>
<td>Max. workpiece height</td>
<td>360 mm</td>
<td>360 mm</td>
<td>360 mm</td>
<td>360 mm</td>
<td>305 mm</td>
</tr>
<tr>
<td>Max. transport weight (incl. pallet)</td>
<td>2 x 150 kg</td>
<td>1 x 250 kg</td>
<td>2 x 150 kg</td>
<td>1 x 250 kg</td>
<td>2 x 150 kg</td>
</tr>
<tr>
<td>Pallet change time</td>
<td>approx. 18 s</td>
<td>approx. 45 s</td>
<td>approx. 18 s</td>
<td>approx. 45 s</td>
<td>approx. 18 s</td>
</tr>
</tbody>
</table>

Repeating accuracy < 0.01 mm
The new HS flex handling system is an automation solution providing cost-effective entry into machining centre automation. The HS flex handling system is an automation solution providing cost-effective entry into machining centre automation. The front-sided adaptation ensures a space-saving layout with direct connection to the machining centre. The large intermediate space provides direct access to the working area for manual operator activities. In automatic mode, a double door blocks operator access; and in setup mode, access to the handling system. The customisable pallet storage module offers numerous combination options for a large range of parts. A second pallet storage module can be additionally integrated in the handling system, thus enhancing the storage of parts significantly.

The Hermle Automation-Control-System (HACS), which is operated via an integrated touch panel, provides an ideal platform for intuitive operation and control of the handling system.
Basic system plus 2 machines.

Function and movement concept of the handling system. Compact design and space-saving arrangement with optimum access for the machine operator.

Technical Data. HS flex

<table>
<thead>
<tr>
<th>Pallet storage modul (storage modul 1 or 2)</th>
<th>20x pallet storage</th>
<th>12x pallet storage</th>
<th>9x pallet storage</th>
<th>8x pallet storage</th>
<th>6x pallet storage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage capacity per modul</td>
<td>20 units</td>
<td>12 units</td>
<td>9 units</td>
<td>8 units</td>
<td>6 units</td>
</tr>
<tr>
<td>Pallet dimensions</td>
<td>240 x 320 mm</td>
<td>240 x 320 mm</td>
<td>240 x 320 mm</td>
<td>240 x 320 mm</td>
<td>240 x 320 mm</td>
</tr>
<tr>
<td></td>
<td>320 x 320 mm</td>
<td>320 x 320 mm</td>
<td>320 x 320 mm</td>
<td>320 x 320 mm</td>
<td>320 x 320 mm</td>
</tr>
<tr>
<td></td>
<td>400 x 320 mm</td>
<td>400 x 320 mm</td>
<td>400 x 320 mm</td>
<td>400 x 320 mm</td>
<td>400 x 320 mm</td>
</tr>
<tr>
<td>Max. workpiece height*</td>
<td>260 mm</td>
<td>260 mm</td>
<td>485 mm</td>
<td>260 mm</td>
<td>485 mm</td>
</tr>
<tr>
<td>Interfacial storage level</td>
<td>625 mm</td>
<td>625 mm</td>
<td>625 mm</td>
<td>625 mm</td>
<td>625 mm</td>
</tr>
<tr>
<td>Sovereign storage level</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. transport weight**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(incl. Pallet)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single taper</td>
<td>300 kg</td>
<td>300 kg</td>
<td>300 kg</td>
<td>300 kg</td>
<td>300 kg</td>
</tr>
<tr>
<td>Pallet weight min.</td>
<td>20 kg</td>
<td>300 kg</td>
<td>300 kg</td>
<td>300 kg</td>
<td>300 kg</td>
</tr>
<tr>
<td>Pallet change time</td>
<td>50 s</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Please note the max workable workpiece height
** Please note the max permitted table load

YOUR ADVANTAGES

- Automation solution for enhanced storage of pallets
- Optimised, operator-friendly access to the machining centre
- Large configurable pallet storage modul
- Additional, configurable pallet storage modul
- Lateral setup station (optionally rotatable)
- Touch pad with integrated operating software HACS
- No floor anchorage required
- Easy and quick installation and commissioning
Hermle - milling at its best. We stand for
- Machining centres and automation solutions from a single source.
- High system expertise during planning, installation and maintenance.
- 3-, 4- and 5-axis machining centres for which we ourselves manufacture and install all components including table units, main spindles and entire sheet metal enclosures.
- Automation solutions from pallet changing systems and pallet storage, tool magazines and flexible manufacturing systems to custom turnkey solutions.
Basic system plus 2 machines . 90°

Basic system plus 2 machines . 180°

Basic system plus 3 machines

RS 05 robot system

RS 2 robot system
PRECISION IN EVERY DIMENSION: Hermle has a thorough understanding of the requirements for manufacturing high-precision machining centres for processing smaller and larger workpieces of up to 2.5 t in weight. For this reason, “The Original” only uses German machines for production and materials from European suppliers. Furthermore, the entire machining facility is fully air conditioned and is serviced by a central chip disposal system that ensures the highest levels of cleanliness.

Hermle machining centres are put through extensive endurance protocols and are also exposed to demanding production processes within our own manufacturing department. Our meticulous manufacturing requirements allow Hermle to achieve levels of precision that are superior to those demanded by the DIN/ISO 10791 standard in every way.

At Hermle, we distinguish between positioning precision (accuracy with which a certain position within the working area can be pinpointed on one axis) and geometric precision. The latter relates to the precision of the entire machine – it encompasses the following factors:
- Positioning of linear and rotary axes
- Straightness and angular deviation of the linear axes
- Rectangularity and parallel alignment of all axes, one to another
- Concentricity and axial run-out of the table
- Concentricity of the working spindle

The precision of Hermle machining centres originates during mechanical production and is not produced by subsequent electronic compensation. This further improves the precision of the individual axes (precision package 1 and 2).
To achieve improved precision, components must be selected with care. Tolerances must also be taken into account whilst the machine is still being constructed. Hermle also recommends the HSK A 63 tool holding fixture, electric heat compensation, an ICS recooling unit and two-sided A axis drive.

Test and operating conditions are as follows: air conditioned room (+20 °C, +/- 2 °C) and temperature fluctuation of only 0.5 °C in one hour or max. 2 °C within 24 hours.

**Hermle standard:**
- X-Y-Z: Positional uncertainty $P \leq 8 \mu$
- A: Positional uncertainty $P \leq 10'' / 8''$
- C: Positional uncertainty $P \leq 8''$

**Hermle improved precision*:**
- X-Y-Z: Positional uncertainty $P \leq 5 \mu$
- A: Positional uncertainty $P \leq 6''$
- C: Positional uncertainty $P \leq 6''$

*To achieve improved precision, components must be selected with care. Tolerances must also be taken into account whilst the machine is still being constructed. Hermle also recommends the HSK A 63 tool holding fixture, electric heat compensation, an ICS recooling unit and two-sided A axis drive.

Test and operating conditions are as follows: air conditioned room (+20 °C, +/- 2 °C) and temperature fluctuation of only 0.5 °C in one hour or max. 2 °C within 24 hours.

**Precision package 1**
- Straightness optimisation
- Geometry adjustment and optimisation
- Straightness measurement
- X, Y, Z positioning accuracy: Positional uncertainty $\leq 5 \mu$
- Laser measurement according to VDI/DGQ 3441 or ISO 230-2

**Precision package 2**
- Table geometry
- Axial run-out bearings
- C-axis bearing
- Adjustment of complete table
- Position of A and C axes relative to basic geometry
- Positional uncertainty A 6''
- Positional uncertainty C 6''
- Laser measurement according to VDI/DGQ 3441 or ISO 230-2

Ovality test of a standard machine
Energy efficiency

Both manufacturer and customer benefit from efficient production processes. Therefore, Hermle has focused on integrated resource sustainability and energy efficiency for many years. We can rightly claim pioneer status in the Blue Competence initiative founded by the VDW (German Machine Tool Builders Association).

From development to low-energy manufacturing (with a high level of in-house production) to the operation of CNC machining centres – Hermle has stood for a principle of sustainable environmental protection combined with economic considerations for many years. Energy recovery is just one of the advantages enjoyed by our customers.
EFFICIENT MANUFACTURING

We use energy efficient manufacturing methods not because it is the current trend or because it is required of us, but on principle. And we always have.

- Low energy component manufacture
  - Mineral casting technology
  - Lightweight construction
- Virtual machine optimisation / machine development
- Reduction in the energy required for transport through:
  - High levels of in-house production
  - Just one production plant
  - Locally sourced components and materials
  - No material tourism
- High-quality, high-efficiency components
  - Ball screws
  - Guideways
  - Antifriction bearing etc.

EFFICIENT OPERATION

Our machining centres are energy efficient both during their manufacture and during operation.

- Energy recovery has been standard at Hermle for over 20 years
- High quality servo axes
- Ideal drive design for the respective application
- Demand-based cooling technology both for dimensioning and in application
- De-energize system:
  - Up to 80% less energy consumption in stand-by mode
- Very long machine service life
The perfection we insist on for the development and production of our machines is also mirrored by our service department. Our service team provides more than just spare parts and rapid response support within hours. At Hermle, we see ourselves as a comprehensive service provider which provides customers with numerous benefits.

Alongside standard services, these include:
- Our superior, cost-effective, practical and flexible training programmes carried out by sales representatives directly at the customers’ premises.
- Our continual pursuit of optimisation and perfection. Our motto – those who stop improving today will not make the grade tomorrow.
- Intensive expert consultation on milling in general, programming and handling of our products.
- Our application technicians who are experts in machining processes and who are quick to assist and advise our customers.
The machining examples used in this leaflet are published with the explicit and kind permission of our customers. The information in this brochure only contains general descriptions and/or performance features that, in a concrete application, may not always apply in the form described or represented here or may have changed due to further development of the products. The performance features desired shall only be binding if they have been expressly agreed upon in writing at the time of the contract. The machines illustrated may include some options, accessories and control unit alternatives.