Milling at its best: Hermle machines are often at the forefront when it comes to optimized results. The proverbial Hermle precision in combination with process consulting and project management has made us an important machine manufacturer in nearly all key sectors: From large complex components to the very smallest components in the high-tech sector. Versatile applications, uncompromising results Hermle – the original.
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.
Aerospace industry

Machine construction

Tools and mould construction

Subcontractor industry
Dynamic, precise and reliable: Hermle’s C 32 can provide highly dynamic processing of workpieces up to 1000 kg in weight simultaneously on 5 axes. In particular, materials which are difficult to machine can be milled in record time and with perfect precision. This is achieved fully automatically right up to entire flexible production systems. Our systems are always extremely precise and ensure high machine availability.

**Drill bit**

5-axis simultaneous milling

- **Sector:** mining
- **Material:** 1.7225
- **Tool:** end milling cutter, solid drill
- **Holding fixture:** HSK A 63
- **Spindle:** 18000 rpm
- **Output/Torque:** 180 Nm/20 kW

**Drill bit**

- **Silicone mask**
  
  - **5-axis simultaneous milling**
  - **Sector:** medical engineering
  - **Material:** 1.2085 Anticor
  - **Tool:** end milling cutter
  - **Holding fixture:** HSK A 63
  - **Spindle:** 18000 rpm
  - **Output/Torque:** 180 Nm/20 kW

**Cake mould**

5-axis simultaneous milling

- **Sector:** tool and mould construction
- **Material:** STM-Stahl SP-300
- **Tool:** spherical cutter
- **Holding fixture:** HSK A 63
- **Spindle:** 25000 rpm
- **Output/Torque:** 100 Nm/29 kW

**Jaws for sheet metal forming**

5-axis simultaneous milling

- **Sector:** tool and mould construction
- **Material:** 1.1191
- **Tool:** spherical cutter
- **Holding fixture:** HSK A 63
- **Spindle:** 18000 rpm
- **Output/Torque:** 180 Nm/20 kW

**Stabiliser**

5-axis milling

- **Sector:** apparatus engineering
- **Material:** 1.1191
- **Tool:** T grooves, milling cutter, end milling cutter
- **Holding fixture:** HSK A 63
- **Spindle:** 10000 rpm
- **Output/Torque:** 200 Nm/29 kW
The C 32: 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 path X-Y-Z:** 650 – 650 – 500 mm

**Speed:** 10000 / 15000 / 18000 / 25000 / 42000 rpm

**Rapid linear traverse X-Y-Z (dynamic):** 45 (60) – 45 (60) – 40 (60) m/min

**Linear acceleration X-Y-Z (dynamic):** 6 (10) m/s²

**Control unit:** iTNC 530 / TNC 640 / S 840 D sl

**Rigid clamping table:** 900 x 665 mm

Max. table load: 1500 kg

**NC swivelling rotary tables:**

Table with worm: 0 320 mm

Swivelling range: +/- 130°

A axis speed: 25 rpm

C axis speed: 40 rpm

Max. table load: 300 kg

Tables with torque: 0 320 mm

Swivelling range: +/- 130°

A axis speed: 25/55* rpm

C axis speed: 80 rpm

Max. table loading: 200 kg

*with tandem drive
02.1
New dimensions in dynamics
3 axes in one tool for workpiece-independent dynamics

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

Torque (C axis)
to a high dynamic

Modified gantry design with optimum main axis support

Tandem drive (A axis)
Torsion avoidance and high level of accuracy

Mineral casting design with excellent vibration damping properties

Pickup magazine integrated into the base body to save space

Stainless steel lining of entire working area

Optimised chip ejection in working area during dry machining

Swivelling range of NC swivelling rotary table +130° to -130°

Large working area relative to the installation area

Accessibility, excellent ergonomics

Linear axes above the working area

Optimised chip ejection in working area during dry machining

Torsion avoidance and high level of accuracy

Stainless steel lining of entire working area

Accessibility, excellent ergonomics

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

Torque (C axis) to a high dynamic

Modified gantry design with optimum main axis support

Tandem drive (A axis)
Torsion avoidance and high level of accuracy

Mineral casting design with excellent vibration damping properties
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 32 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

<table>
<thead>
<tr>
<th>Aspect</th>
<th>3-axis</th>
<th>5-axis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working Area</td>
<td>650 x 650 x 500 mm</td>
<td>Ø 650 x 420 mm</td>
</tr>
<tr>
<td>Maximum Weight</td>
<td>max. 1500 kg</td>
<td>max. 1000 kg</td>
</tr>
<tr>
<td>Collision Circle</td>
<td>Ø 840 mm</td>
<td></td>
</tr>
<tr>
<td>Vertical Table Clearance</td>
<td>600/635 mm</td>
<td></td>
</tr>
</tbody>
</table>
3-axis machining

5-axis machining
02.3 Ergonomics

Built for daily use: the Hermle C 32 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 0 − 30°
  - 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 box

Screen pivotable by up to 30 °C

Control panel +/− 100 mm height adjustable

Practical, slide-in tray
Door opening 762 mm

Vertical table clearance 600/635 mm

Loading height 950 mm

Control panel, pivotable
Hermle's NC swivelling rotary table has revolutionised the concept of 5-axis machining. The C 32 also relies on 5-axis operation and takes full advantage of its advantages. These include worm gears on the entry-level table and torque drive on the highly dynamic version. All 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 on the table. 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 32 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 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 loading (up to 1000 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 flange spacing results in a very large collision circle
  in the working area
- 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’s tables are equipped with cutting-edge drive technology for high dynamic during 5-axis machining as the slowest axis determines the speed of 5-axis simultaneous milling. High-torque motors and the adapted gearbox can position loads of up to 1000 kg rapidly and, most importantly, with exceptional precision.

**DRIVE TECHNOLOGY**

- Centrical table load
- 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 right of table housing

**Tandem drive**

- Mechanical tandem drive to left and right of table housing
Rigid clamping table
Clamping surface: 900 x 665 mm

Equipped with the rigid clamping table, the machine can deal with clamping weights of up to 1500 kg - ideal for 3-axis machining of large, bulky and heavy workpieces.

T grooves: parallel 10 / 14 H7

NC swivelling rotary table
Drive type C axis: worm

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

Clamping surface: 650 x 540 mm
Table plate collision circle: 650 mm
T grooves: parallel 7 / 14 H7
Swivelling range: +/- 130°
Drive type rotary axis C: worm
Speed rotary axis C: 30 rpm
Speed swivelling axis A (one-sided drive): 25 rpm
Max. table load (one-sided drive): 600 kg
NC swivelling rotary table
Drive type C axis: worm

The NC swivelling rotary table "Worm" almost comes up to the standards of the Torque table, apart from the dynamics. It is an ideal introduction to the world of 5-axis technology.

**Installation clamping device . SK 50**

**Clamping surface: Ø 320 mm**
T grooves: star 4 / 14 H7
Swivelling range: +/- 130°
Drive type – rotary C axis: worm
Speed rotary axis C: 40 rpm
Speed swivelling axis A (one-sided drive): 25 rpm
Max. table load (one-sided drive): 300 kg
Secondary clamping plates (optional)
T grooves: parallel 8 / 14 H7

**System table with table plate . Ø 320 mm**
(Ø 450 x 360 mm)

**Zero-point clamping systems/pallet clamping systems**

**Installation clamping device . SK 50**

**Installation clamping device . HSK 100**
The “Torque” NC swivelling rotary table provides the ideal conditions for highly dynamic 5-axis and simultaneous 5-axis machining.

**NC swivelling rotary table**

**Drive type C axis: Torque**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clamping surface:</td>
<td>Ø 320 mm</td>
</tr>
<tr>
<td>T grooves:</td>
<td>star 4 / 14 H7</td>
</tr>
<tr>
<td>Swivelling range:</td>
<td>+/- 130°</td>
</tr>
<tr>
<td>Drive type rotary axis C:</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>(tandem drive):</td>
<td>55 rpm</td>
</tr>
<tr>
<td>Max. table load (one-sided drive):</td>
<td>200 kg</td>
</tr>
<tr>
<td>(tandem drive):</td>
<td>200 kg</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clamping surface:</td>
<td>Ø 650 x 540 mm</td>
</tr>
<tr>
<td>Table plate collision circle:</td>
<td>Ø 650 mm</td>
</tr>
<tr>
<td>T grooves:</td>
<td>parallel 7 / 14 H7</td>
</tr>
<tr>
<td>Swivelling range:</td>
<td>+/- 130°</td>
</tr>
<tr>
<td>Drive type rotary axis C:</td>
<td>Torque</td>
</tr>
<tr>
<td>Speed rotary axis C:</td>
<td>65 rpm</td>
</tr>
<tr>
<td>Speed swivelling axis A (one-sided drive):</td>
<td>25 rpm</td>
</tr>
<tr>
<td>(tandem drive):</td>
<td>25 rpm</td>
</tr>
<tr>
<td>Max. table load (one-sided drive):</td>
<td>600 kg</td>
</tr>
<tr>
<td>(tandem drive):</td>
<td>1000 kg</td>
</tr>
</tbody>
</table>
02.5 Spindles

The C 32 can be equipped with two-piece or compact spindles. All spindles can be replaced quickly and easily in case of failure. With the different speed ranges and tool holding fixtures the spindles are suitable for a wide variety of machining tasks. Like the tables, all spindles are manufactured exclusively and entirely at our plant in Gosheim.

TECHNICAL DATA

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

Collision protection with collision inquiry

Each spindle has several collision sleeves which compensate collision energy in the Z direction.
Spindle 10000 rpm

Maximum spindle speed: 10000 rpm
Output 20% c.d.f.: 29 kW
Torque 20% c.d.f.: 200 Nm
Tool holding fixture: SK 40 / HSK A 63
Spindle: two-piece
Collision protection: collision sleeves

Spindle 15000 rpm

Maximum spindle speed: 15000 rpm
Output 20% c.d.f.: 20 kW
Torque 20% c.d.f.: 180 Nm
Tool holding fixture: SK 40
Spindle: two-piece
Collision protection: collision sleeves
### Spindle 18000 rpm

- **Maximum spindle speed:** 18000 rpm
- **Output 20% c.d.f.:** 20 kW
- **Torque 20% c.d.f.:** 180 Nm
- **Tool holding fixture:** HSK A 63
- **Spindle:** two-piece
- **Collision protection:** collision sleeves

### Spindle 25000 rpm

- **Maximum spindle speed:** 25000 rpm
- **Output 20% c.d.f.:** 31 kW
- **Torque 20% c.d.f.:** 98 Nm
- **Tool holding fixture:** HSK A 63
- **Spindle:** compact

### Spindle 42000 rpm

- **Maximum spindle speed:** 42000 rpm
- **Output 20% c.d.f.:** 35 kW
- **Torque 20% c.d.f.:** 17.5 Nm
- **Tool holding fixture:** HSK E 40
- **Spindle:** compact

---

Maximum spindle speed: 18000 rpm
Output 20% c.d.f.: 20 kW
Torque 20% c.d.f.: 180 Nm
Tool holding fixture: HSK A 63
Spindle: two-piece
Collision protection: collision sleeves

Spindle 18000 rpm

Maximum spindle speed: 25000 rpm
Output 20% c.d.f.: 31 kW
Torque 20% c.d.f.: 98 Nm
Tool holding fixture: HSK A 63
Spindle: compact

Spindle 25000 rpm

Maximum spindle speed: 42000 rpm
Output 20% c.d.f.: 35 kW
Torque 20% c.d.f.: 17.5 Nm
Tool holding fixture: HSK E 40
Spindle: compact

Spindle 42000 rpm
02.6
High-performance machining

The C 32 with the 18000 spindle is a machining miracle. 568 cm³/min in alloyed heat-treated steel shows what this machining centre can do - and still at the highest levels of precision.

**Main spindle**

<table>
<thead>
<tr>
<th>Speed:</th>
<th>18000 rpm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Torque:</td>
<td>180 Nm</td>
</tr>
<tr>
<td>Output:</td>
<td>20 kW</td>
</tr>
<tr>
<td>Interface:</td>
<td>HSK A 63</td>
</tr>
<tr>
<td>Collision protection:</td>
<td>collision sleeves</td>
</tr>
</tbody>
</table>

**Material**

42CrMo4V (1.7225)
Alloyed heat-treated steel for workpieces with higher stress resistance and larger tempering diameter.
42CrMo4V is used for gear shafts, gear wheels, worms
Tensile strength: 1000 – 1200 N/mm²
(see CK 45 650 – 800 N/mm²)

**Face milling**

<table>
<thead>
<tr>
<th>Material:</th>
<th>42CrMo4V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tool:</td>
<td>face milling head D=63 mm with indexable inserts</td>
</tr>
<tr>
<td>Spindle speed:</td>
<td>1515 rpm</td>
</tr>
<tr>
<td>Vc:</td>
<td>300 m/min</td>
</tr>
<tr>
<td>Feed:</td>
<td>2272 mm/min</td>
</tr>
<tr>
<td>Fz:</td>
<td>0.3 mm</td>
</tr>
<tr>
<td>Depth of cut:</td>
<td>5.0 mm</td>
</tr>
<tr>
<td>Width of cut:</td>
<td>50.0 mm</td>
</tr>
<tr>
<td>Material removal rates:</td>
<td>568 cm³/min</td>
</tr>
</tbody>
</table>

**High-feed milling**

<table>
<thead>
<tr>
<th>Material:</th>
<th>42CrMo4V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tool:</td>
<td>high-feed mill D=50 mm with indexable inserts</td>
</tr>
<tr>
<td>Spindle speed:</td>
<td>1900 rpm</td>
</tr>
<tr>
<td>Vc:</td>
<td>300 m/min</td>
</tr>
<tr>
<td>Feed:</td>
<td>9163 mm/min</td>
</tr>
<tr>
<td>Fz:</td>
<td>1.2 mm</td>
</tr>
<tr>
<td>Depth of cut:</td>
<td>1.2 mm</td>
</tr>
<tr>
<td>Width of cut:</td>
<td>42.5 mm</td>
</tr>
<tr>
<td>Material removal rates:</td>
<td>467 cm³/min</td>
</tr>
</tbody>
</table>

**Solid drilling**

<table>
<thead>
<tr>
<th>Material:</th>
<th>42CrMo4V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tool:</td>
<td>solid drill D=40 mm with indexable inserts</td>
</tr>
<tr>
<td>Spindle speed:</td>
<td>1464 rpm</td>
</tr>
<tr>
<td>Vc:</td>
<td>230 m/min</td>
</tr>
<tr>
<td>Feed:</td>
<td>256 mm/min</td>
</tr>
<tr>
<td>Vu:</td>
<td>0.175 mm</td>
</tr>
<tr>
<td>Material removal rates:</td>
<td>320 cm³/min</td>
</tr>
</tbody>
</table>
The C 32's tool magazine holds up to 36 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

#### Pick-up magazine

- **Interface:** SK 40 / HSK A 63 | HSK E 40
- **Magazine pockets:** 36 | 36
- **Max. tool weight:** 8 kg | 2.5 kg
- **Max. tool diameter:** Ø 80 with empty adjacent pockets Ø 125 mm | Ø 125 mm
- **Max. tool length:** 300 mm | 300 mm
- **Max. magazine load:** 144 kg | 90 kg
- **Chip-to-chip time:** 4.5 s | 4.5 s

*Chip-to-chip times for 3-axis units calculated in keeping with German standard VDI 2852, page 1*
**Additional magazine ZM 43 / ZM 87**

- Magazine pockets: 43 / 87
- Max. tool weight: SK 40 / HSK A 63: 8 kg, HSK E 40: 2.5 kg
- Max. tool diameter: Ø 80, with empty adjacent pockets Ø 125 mm
- Max. tool length: 300 mm

**Additional magazine single**

- Magazine pockets: 192
- Max. tool weight: 8 kg
- Max. tool diameter: Ø 80, with empty adjacent pockets Ø 125 mm
- Max. tool length: 300 mm

**Additional magazine double**

- Magazine pockets: 462
- Max. tool weight: 8 kg
- Max. tool diameter: Ø 80, with empty adjacent pockets Ø 125 mm
- Max. tool length: 300 mm
Control unit

The C 32 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**
- The TNC 640 comes with all the following functions of the iTNC 530
- Incl. Dynamic Efficiency – Active Chatter Control (ACC), Adaptive Feed Control (AFC), trochoidal milling
- Incl. Dynamic Precision – Cross Talk Compensation (CTC), Active Vibration Damping (AVD)

**Heidenhain iTNC 530 HSCI**
- 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 with smarT.NC 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 HTDI
- Operating Interface OPERATE with ShopMill
- SINUMERIK MDynamics incl. Advanced Surface
- High Speed Settings - CYCLE832

For further advantages and detailed technical data, please see the Siemens brochures.
## 02.8 Control unit

### Hermle control tools

<table>
<thead>
<tr>
<th>Hermle &quot;Tool Management Control*</th>
<th>Hermle &quot;Adaptive Feed Control*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple Hermle tool management for Heidenhain controls.</td>
<td>In adaptive feed control (AFC), the feed rate is automatically controlled (depending on the percentage of spindle output).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hermle &quot;Tool Data Information*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple, Hermle tool management for the Siemens S 840 D sl.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hermle &quot;Automation Control System*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple, Hermle pallet management software.</td>
</tr>
</tbody>
</table>

### Hermle setups

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

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

**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**

- For very high demands on the surface quality, mainly for free-form surfaces.
02.9
The details

The C 32 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
- Scraper belt conveyor
- Hinged belt conveyor

We provide the correct method of chip removal from the working area for all kinds of chip

Space-saving chip conveyor arrangement
Chip conveyor with internal cooling lubricant supply ICS 80

Chip drawer

Chip conveyor

Chip conveyor with internal cooling lubricant supply ICS 80 and recooling unit

Chip conveyor with internal cooling lubricant supply ICS 40

Chip conveyor with internal cooling lubricant supply ICS 80
03
Technical data. C 32
## 03.1 Technical data . C 32

<table>
<thead>
<tr>
<th>Working area</th>
<th>Traverse X axis</th>
<th>Traverse Y axis</th>
<th>Traverse Z axis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>650 mm</td>
<td>650 mm</td>
<td>500 mm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rapid linear traverse (dynamic) X-Y-Z</th>
<th>45 – 45 – 40 m/min</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear acceleration (dynamic) X-Y-Z</td>
<td>6 (10) m/s²</td>
</tr>
<tr>
<td>Linear feed force X-Y-Z</td>
<td>8500 N</td>
</tr>
<tr>
<td>Max. vertical table clearance</td>
<td>600/635 mm</td>
</tr>
<tr>
<td>Max. workpiece diameter</td>
<td>Ø 650 mm</td>
</tr>
<tr>
<td>Max. workpiece height</td>
<td>420 mm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Main spindle drive</th>
<th>Speed</th>
<th>Main power/Torque</th>
<th>Main power/Torque</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10000 rpm</td>
<td>20% c.d.f.</td>
<td>SK 40 / HSK A 63</td>
</tr>
<tr>
<td></td>
<td>15000 rpm</td>
<td>20% c.d.f.</td>
<td>SK 40</td>
</tr>
<tr>
<td></td>
<td>18000 rpm</td>
<td>20% c.d.f.</td>
<td>SK A 63</td>
</tr>
<tr>
<td></td>
<td>25000 rpm</td>
<td>20% c.d.f.</td>
<td>SK A 63</td>
</tr>
<tr>
<td></td>
<td>42000 rpm</td>
<td>20% c.d.f.</td>
<td>HSK E 40</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Speed</th>
<th>Main power/Torque</th>
<th>Main power/Torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>10000 rpm</td>
<td>20% c.d.f.</td>
<td>SK 40 / HSK A 63</td>
</tr>
<tr>
<td>15000 rpm</td>
<td>20% c.d.f.</td>
<td>SK 40</td>
</tr>
<tr>
<td>18000 rpm</td>
<td>20% c.d.f.</td>
<td>HSK A 63</td>
</tr>
<tr>
<td>25000 rpm</td>
<td>20% c.d.f.</td>
<td>HSK A 63</td>
</tr>
<tr>
<td>42000 rpm</td>
<td>20% c.d.f.</td>
<td>HSK E 40</td>
</tr>
</tbody>
</table>

| Control unit | Heidenhain iTNC 530 / TNC 640 | Siemens Sinumerik 840 D sl |

<table>
<thead>
<tr>
<th>Tool changer (pick-up)</th>
<th>Interface</th>
<th>Magazine pockets</th>
<th>Chip-to-chip time*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SK 40 / HSK A 63</td>
<td>36 items</td>
<td>approx. 4.5 s</td>
</tr>
<tr>
<td></td>
<td>HSK E 40</td>
<td>36 items</td>
<td>approx. 4.5 s</td>
</tr>
</tbody>
</table>

*Chip-to-chip times for 3-axis unit calculated in keeping with German standard VDI 2852, page 1

| Max. tool length       | 300 mm |
| Max. tool diameter with empty adjacent pockets | Ø 80 mm | Ø 125 mm |
| Max. magazine load     | 144 kg | 90 kg |
### Table variants*

<table>
<thead>
<tr>
<th>NC swivelling rotary table</th>
<th>Ø 650</th>
<th>Ø 650</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clamping surface</td>
<td>Ø 650 x 540 mm</td>
<td>Ø 650 x 540 mm</td>
</tr>
<tr>
<td>Collision circle of table plate</td>
<td>Ø 650 mm</td>
<td>Ø 650 mm</td>
</tr>
<tr>
<td>Swivelling range</td>
<td>+/- 130°</td>
<td>+/- 130°</td>
</tr>
<tr>
<td>C axis drive mode</td>
<td>Worm Torque</td>
<td>Torque</td>
</tr>
<tr>
<td>Swivelling axis A speed</td>
<td>25 rpm</td>
<td>25 rpm</td>
</tr>
<tr>
<td>One-sided drive</td>
<td>25 rpm</td>
<td>25 rpm</td>
</tr>
<tr>
<td>Tandem drive</td>
<td>25 rpm</td>
<td>25 rpm</td>
</tr>
<tr>
<td>Rotary axis C speed</td>
<td>30 rpm</td>
<td>65 rpm</td>
</tr>
<tr>
<td>Max. table load</td>
<td>600 kg</td>
<td>600 kg</td>
</tr>
<tr>
<td>One-sided drive</td>
<td>-</td>
<td>1000 kg</td>
</tr>
<tr>
<td>Tandem drive</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>T grooves parallel</td>
<td>7 / 14 H7</td>
<td>7 / 14 H7</td>
</tr>
<tr>
<td>NC swivelling rotary table</td>
<td>Ø 320</td>
<td>Ø 320</td>
</tr>
<tr>
<td>Clamping surface</td>
<td>Ø 320 mm</td>
<td>Ø 320 mm</td>
</tr>
<tr>
<td>Swivelling range</td>
<td>+/- 130°</td>
<td>+/- 130°</td>
</tr>
<tr>
<td>C axis drive mode</td>
<td>Worm Torque</td>
<td>Torque</td>
</tr>
<tr>
<td>Swivelling axis A speed</td>
<td>25 rpm</td>
<td>25 rpm</td>
</tr>
<tr>
<td>with one-sided drive</td>
<td>25 rpm</td>
<td>25 rpm</td>
</tr>
<tr>
<td>Tandem drive</td>
<td>25 rpm</td>
<td>25 rpm</td>
</tr>
<tr>
<td>Rotary axis C speed</td>
<td>40 rpm</td>
<td>80 rpm</td>
</tr>
<tr>
<td>Max. table load</td>
<td>300 kg</td>
<td>1500 kg</td>
</tr>
<tr>
<td>One-sided drive</td>
<td>200 kg</td>
<td>200 kg</td>
</tr>
<tr>
<td>Tandem drive</td>
<td>200 kg</td>
<td>200 kg</td>
</tr>
<tr>
<td>T grooves parallel</td>
<td>4 / 14 H7</td>
<td>10 / 14 H7</td>
</tr>
<tr>
<td>T grooves star-shaped</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Clamping surface</td>
<td>Ø 450 x 360 mm</td>
<td>-</td>
</tr>
<tr>
<td>Secondary clamping plates</td>
<td>760 x 370 mm</td>
<td>-</td>
</tr>
<tr>
<td>T grooves parallel</td>
<td>8 / 14 H7</td>
<td>-</td>
</tr>
</tbody>
</table>

*All tables available on demand

**Included in standard delivery**

**Available upon request**
<table>
<thead>
<tr>
<th><strong>Position measuring system, direct</strong></th>
<th>Resolution</th>
<th>0.0001 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Positional tolerance</strong></td>
<td>Tp in X-Y-Z axes according to VDI/DGQ 3441</td>
<td>0.008 mm</td>
</tr>
<tr>
<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>
<td></td>
</tr>
<tr>
<td><strong>Chip drawer</strong></td>
<td>Removable chip drawer</td>
<td></td>
</tr>
<tr>
<td><strong>Chip conveyor</strong></td>
<td>Scraper belt or hinge conveyor ejection height</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ejection height</td>
<td></td>
</tr>
<tr>
<td></td>
<td>chip cart</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1100 mm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>450 l</td>
<td></td>
</tr>
<tr>
<td><strong>External cooling lubricant supply</strong></td>
<td>With chip drawer and cooling lubricant tank</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cooling lubricant tank capacity</td>
<td>375 l</td>
</tr>
<tr>
<td></td>
<td>Cooling lubricant system without high-pressure pump with sieve basket</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Capacity of standard tank</td>
<td>100 l</td>
</tr>
<tr>
<td></td>
<td>Capacity of cooling lubricant tank</td>
<td>500 l</td>
</tr>
<tr>
<td></td>
<td>Cooling lubricant system without high-pressure pump with paper band filter</td>
<td></td>
</tr>
<tr>
<td></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><strong>Internal cooling lubricant supply</strong></td>
<td>Capacity of standard tank</td>
<td>100 l</td>
</tr>
<tr>
<td></td>
<td>Capacity of cooling lubricant tank</td>
<td>1000 l</td>
</tr>
<tr>
<td></td>
<td>Pressure (manually adjustable up to)</td>
<td>max. 40 bar / 26 l/min</td>
</tr>
<tr>
<td></td>
<td></td>
<td>max. 80 bar / 29 l/min</td>
</tr>
<tr>
<td></td>
<td>Mains connection (ICS)</td>
<td>- 400 V / 50 Hz</td>
</tr>
<tr>
<td></td>
<td>Power consumption (ICS)</td>
<td>- 17 kVA</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>45 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, attachments, workpieces and cooling lubricant)</td>
<td>about 11.0 t</td>
</tr>
</tbody>
</table>

| ● Included in standard delivery |
| ○ Available upon request |
03.2 Options

The C 32 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 32 standard machine dimensions

1 Machine
2 Emulsion mist extraction
7 Chip drawer
Options

- Additional magazine
- Automatic cabin top
- Bed flushing
- BDE-signal
- Blow air through spindle centre
- Chip cart
- Chip conveyor
- Chip drawer
- Control panel height adjustable with 19" swivel screen
- Coolant nozzle
- Electr. heat compensation
- Graphite machining packages
- Internal cooling lubricant supply
- Laminated safety glass panes
- Emulsion mist extraction
- 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 32 dimensions . Additional magazine ZM 43 / ZM 87

1. Machine
2. Emulsion mist extraction
3. Chip conveyor
4. Chip cart
5. Internal cooling lubricant supply
6. Recooling unit for ICS
8. Additional magazine ZM 43 / ZM 87
Options

- Additional magazine
- Automatic cabin top
- Bed flushing
- BDE-signal
- Blow air through spindle centre
- Chip cart
- Chip conveyor
- Chip drawer
- Control panel height adjustable with 19" swivel screen
- Coolant nozzle
- Electr. heat compensation
- Emulsion mist extraction
- 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 32 dimensions. Additional magazine single

1 Machine
2 Emulsion mist extraction
3 Chip conveyor
4 Chip cart
5 Internal cooling lubricant supply
6 Recooling unit for ICS
9 Additional magazine single
C 32 dimensions . Additional magazine double

1 Machine  
2 Emulsion mist extraction  
3 Chip conveyor  
4 Chip cart  
5 Internal cooling lubricant supply  
6 Recooling unit for ICS  
10 Additional magazine double
Automation
Everybody is talking about automation, but it’s much more than just a trend. We ourselves have changed from being 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, we are continuing what began with economical pallet changing and intelligent handling systems 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 set up 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.

Technical data . PW 250 . Compact pallet changer:
- Repeating accuracy: < 0.01 mm
- Broad hinged double doors with optimum access to the setup station
- Side access door with direct access to working area
- Control panel swivels across machine working area
- Can be equipped with a quadruple storage

Pallet dimensions: Tool sizes:
320 x 320 / Ø 400 mm  Ø 400 mm
400 x 400 / Ø 500 mm  Ø 500 mm

Pallet spaces: Number: Tool sizes:
Without storage: 3 Ø 500 mm
With quadruple storage: 7 Ø 500 mm

Transport weight
incl pallet max. 250 kg
04.2 All components. From a single source.

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.

Pallet changer PW 250

RS 1 robot system

RS 2 robot system

RS 3 robot system

IH systems
Basic system plus 2 machines. 90°

Basic system plus 2 machines. 180°

Basic system plus 3 machines

RS Linear 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 production department is fully air conditioned and kept clean by a central chip disposal system.

Hermle machining centres have also been thoroughly tested by intensive endurance tests and in manufacture-oriented machining processes in our own machining manufacturing department. Our meticulous manufacturing processes allow Hermle to set new precision standards which undercut 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 is significant for 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 to one other.
- 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).
### Precision Levels

**Hermle Standard:**

- X-Y-Z: Pos. tolerance ≤ 8 µ
- A: Pos. tolerance ≤ 16"
- C: Pos. tolerance ≤ 9"

**Hermle Improved Precision:**

- X-Y-Z: Pos. tolerance ≤ 5 µ
- A: Pos. tolerance ≤ 10"
- C: Pos. tolerance ≤ 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.

### Improved Precision Packages

**Precision Package 1**

- Straightness optimisation
- Geometry adjustment and optimisation
- Straightness measurement
- X, Y, Z positioning accuracy: Pos. tolerance ≤ 5 µ
- 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
- Indexing precision A 10"
- Indexing precision C 6"
- Laser measurement according to VDI/DGQ 3441 or ISO 230-2

### Ovality Test of a Standard Machine

- Run 1
- Run 2

5.0 µm scale div.
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 “bluecompetence” 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 of transport energy consumption
- 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 shown may incorporate options, accessories and control variants.