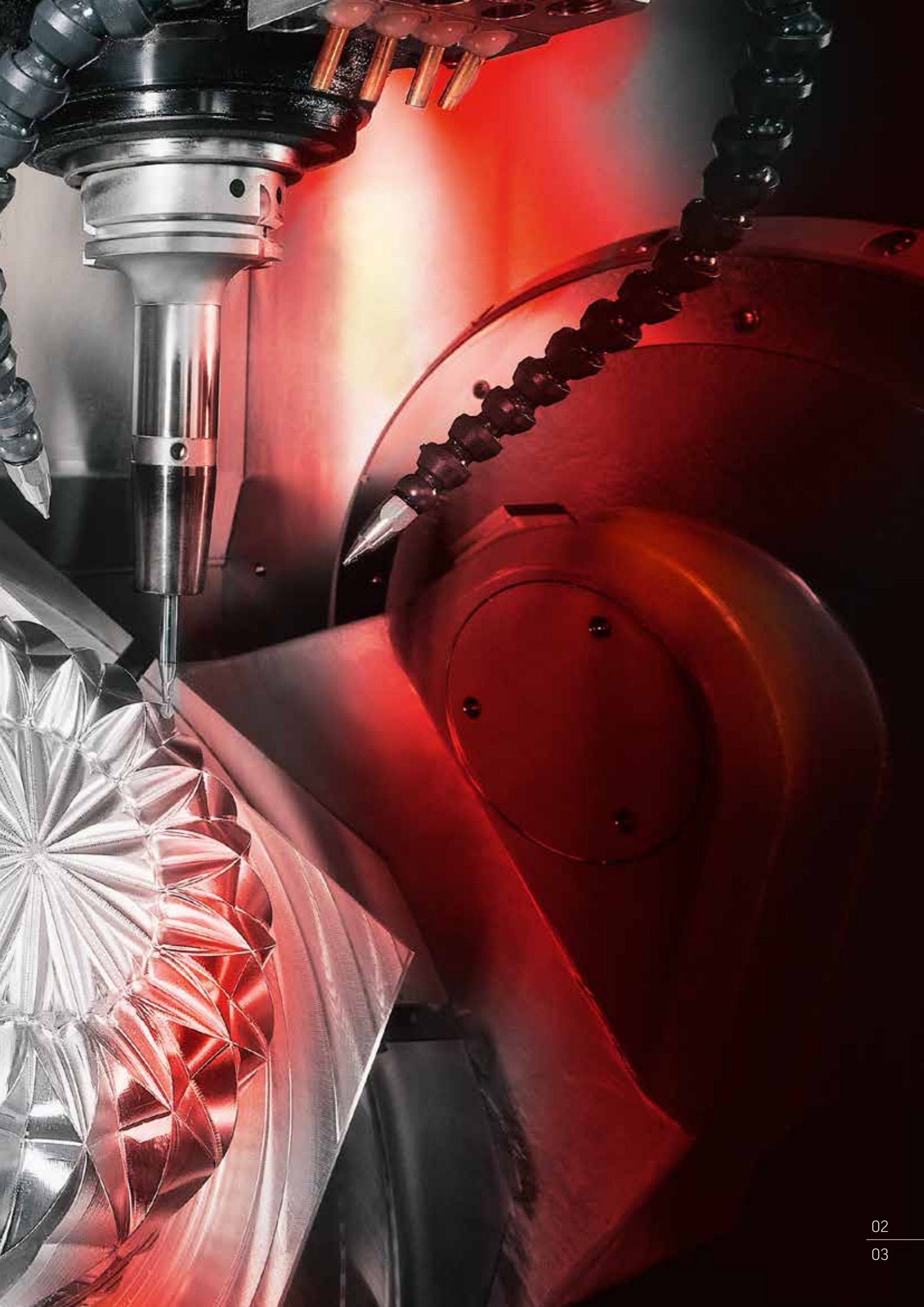
C 32
www.hermle.de

HERMLE
Milling at its best

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.



Contents.

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.

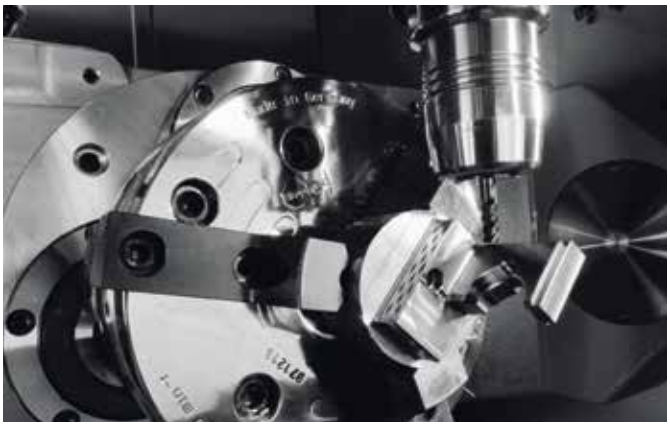
Precision mechanics

Medical engineering

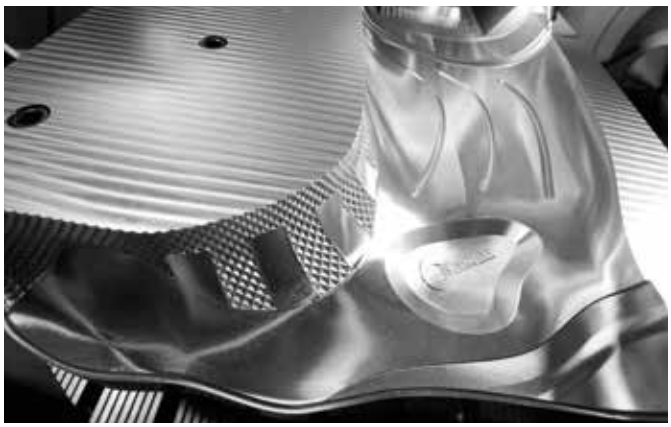
Tool technology

Aerospace industry

Machine construction



Tools and mould construction



Subcontractor industry

01.1 Applications

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

Top

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

Left

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

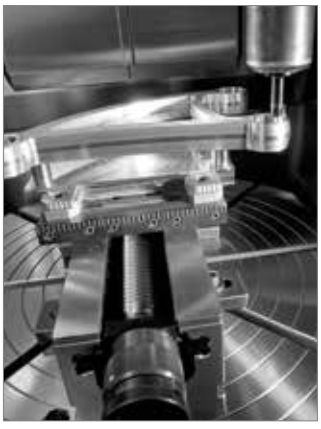
Bottom

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

Bottom left



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

Bottom left

02
The machine

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/s^2
Control unit:	iTNC 530 / TNC 640 / S 840 D sl
Rigid clamping table:	900 x 665 mm
Max. table load:	1500 kg

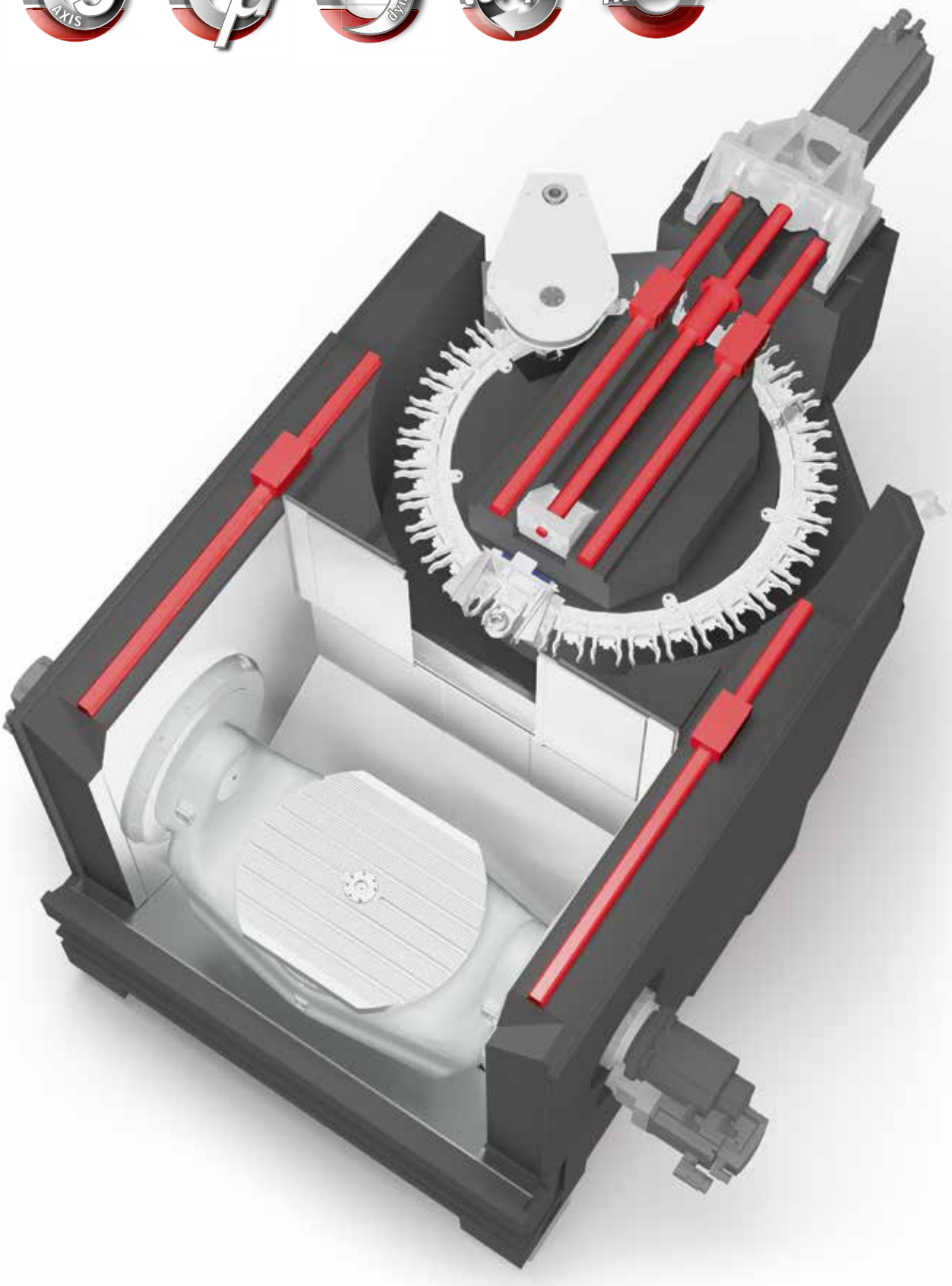
NC swivelling rotary tables:

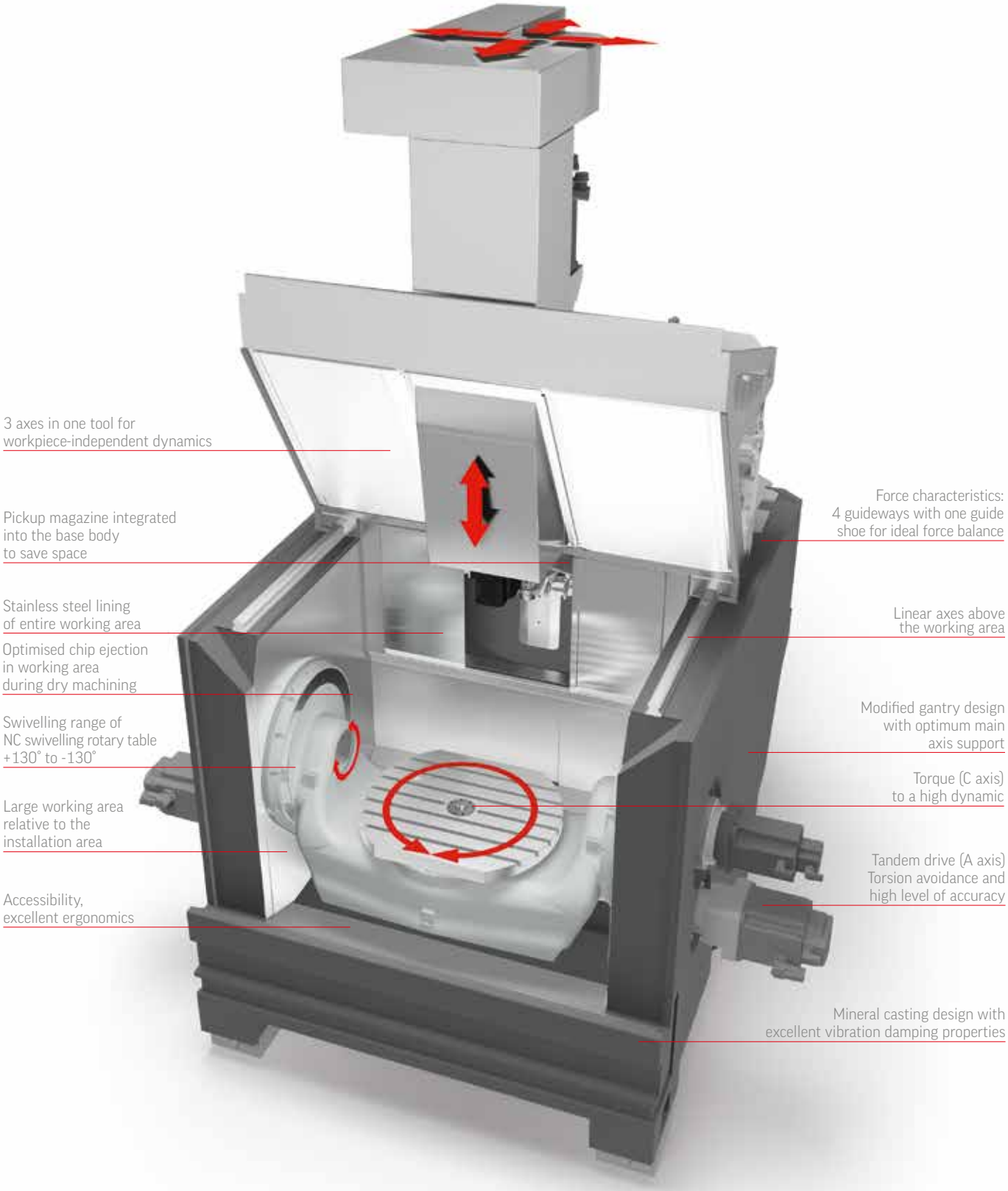
Table with worm:	Ø 320 mm	Ø 650 x 540 mm
Swivelling range:	+/- 130°	+/- 130°
A axis speed:	25 rpm	25 rpm
C axis speed:	40 rpm	30 rpm
Max. table load:	300 kg	600 kg
Tables with torque:	Ø 320 mm	Ø 650 x 540 mm
Swivelling range:	+/- 130°	+/- 130°
A axis speed:	25/55* rpm	25 rpm
C axis speed:	80 rpm	65 rpm
Max. table loading:	200 kg	600/1000* kg

*with tandem drive


C 32 U

02.1
New dimensions in dynamics



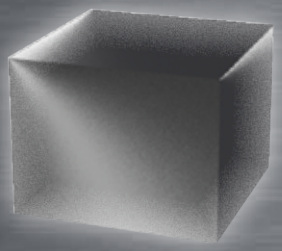

3 axes in one tool for workpiece-independent dynamics
Pickup magazine integrated into the base body to save space
Stainless steel lining of entire working area
Optimised chip ejection in working area during dry machining
Swivelling range of NC swivelling rotary table +130° to -130°
Large working area relative to the installation area
Accessibility, excellent ergonomics
Force characteristics: 4 guideways with one guide shoe for ideal force balance
Linear axes above the working area
Modified gantry design with optimum main axis support
Torque (C axis) to a high dynamic
Tandem drive (A axis) Torsion avoidance and high level of accuracy
Mineral casting design with excellent vibration damping properties

02.2
The workpiece

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

- *Unlimited crane top loading to above the table centre*
- *When loading the crane the spindle moves to the magazine – this means the working area is completely clear and accessible*
- *Extensive automation solutions for optimum workpiece handling*



3-axis	5-axis
650 x 650 x 500 mm	Ø 650 x 420 mm
max. 1500 kg	max. 1000 kg
	Collision circle: Ø 840 mm
	Vertical table clearance: 600/635 mm

3-axis machining

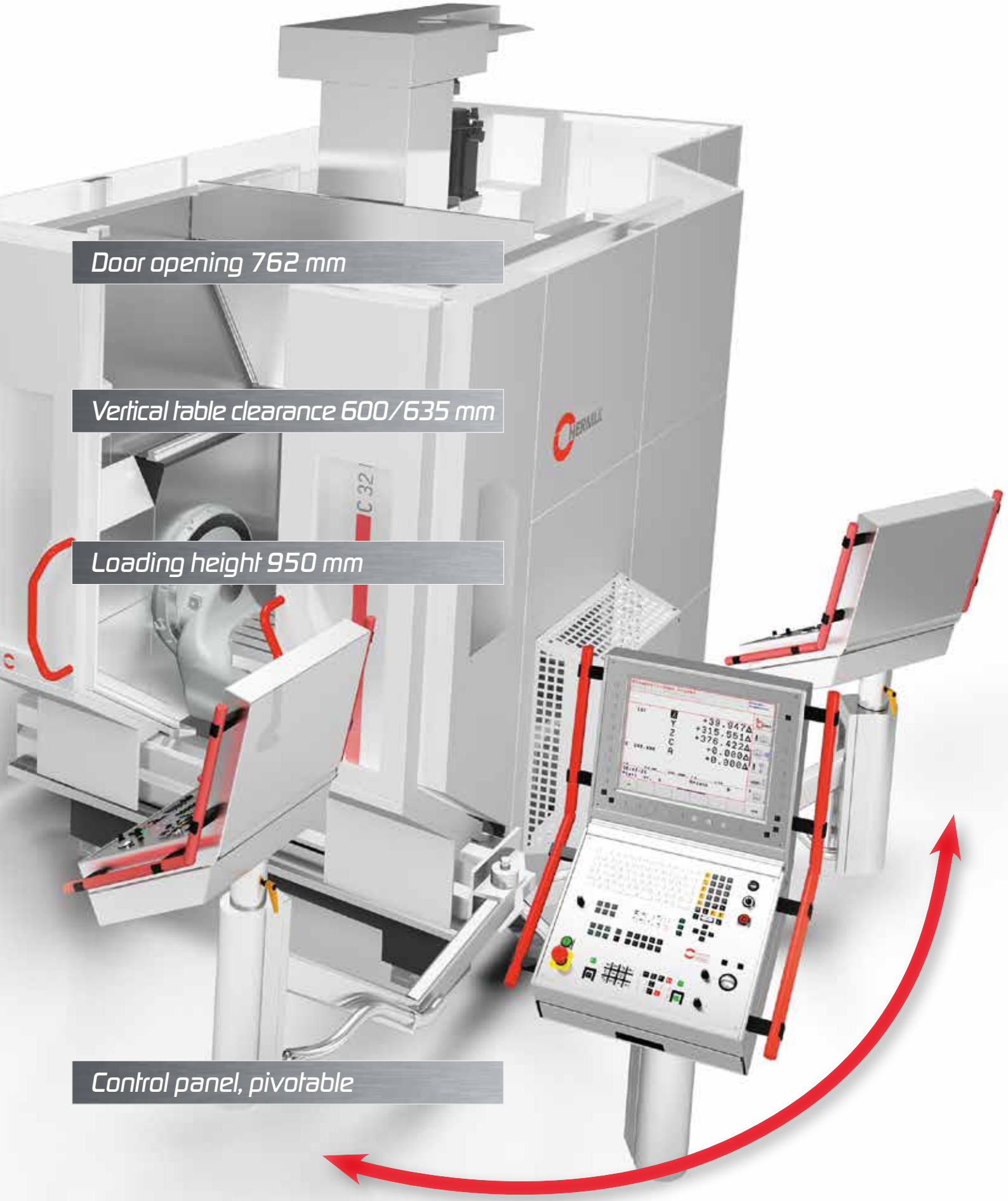
5-axis machining

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*


Door opening 762 mm
Vertical table clearance 600/635 mm
Loading height 950 mm
Control panel, pivotable

02.4
Table variants

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:	Ø 650 x 540 mm
Table plate collision circle:	Ø 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.

Clamping surface . Ø 450 x 360 mm

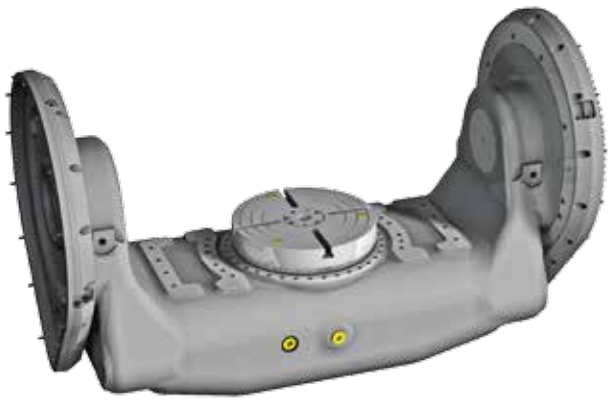
Secondary clamping plates . 760 x 370 mm

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



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

NC swivelling rotary table

Drive type C axis: Torque

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

Clamping surface:	Ø 320 mm
T grooves:	star 4 / 14 H7
Swivelling range:	+/- 130°
Drive type rotary axis C:	Torque
Speed rotary axis C:	80 rpm
Speed swivelling axis A (one-sided drive):	25 rpm
(tandem drive):	55 rpm
Max. table load (one-sided drive):	200 kg
(tandem drive):	200 kg

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

Secondary clamping plates . 760 x 370 mm

System table with table plate . Ø 320 mm

Zero-point clamping systems /
pallet clamping systems

02.5 Spindles

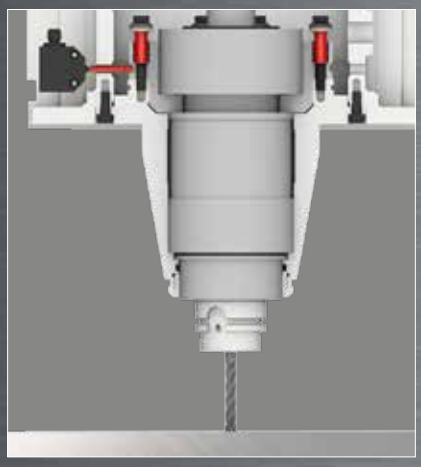
The C 32 can be equipped with two-piece or compact spindles. All spindles can be replaced quickly and easily in case of failure.
With the different speed ranges and tool holding fixtures the spindles are suitable for a wide variety of machining tasks. Like the tables, all spindles are manufactured exclusively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

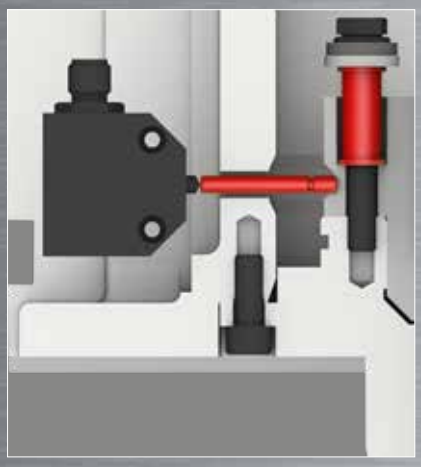
TECHNICAL DATA

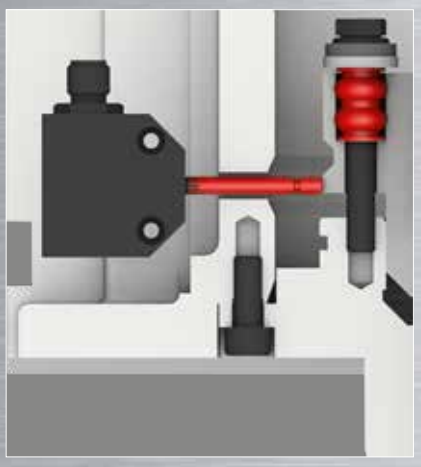
- *High-tech spindles for demanding milling processes*
- *Slim-end spindle for machining deep cavities*
- *Few projecting edges (prevention of collision)*
- *Two-part spindle (faster, easier replacement)*
- *Collision protection (collision sleeves) prevents damage in 50% of collisions*

Collision protection with collision inquiry

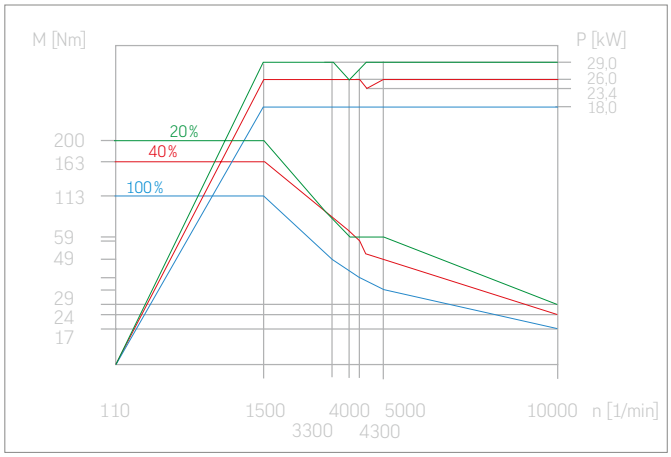
Each spindle has several collision sleeves which compensate collision energy in the Z direction.





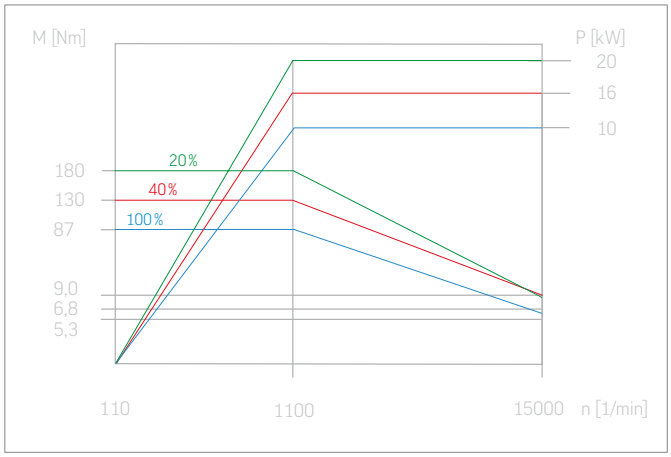


Spindle 10000 rpm



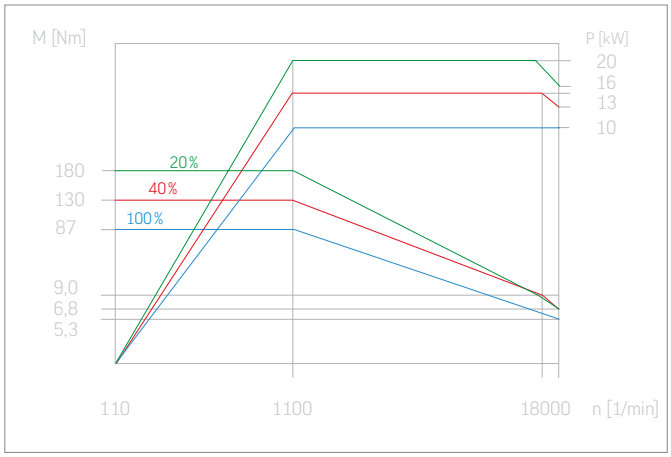
Maximum spindle speed:	10000 rpm
Output 20% c.d.f.:	29 kW
Torque 20% c.d.f.:	200 Nm
Tool holding fixture:	SK 40 / HSK A 63
Spindle:	two-piece
Collision protection:	collision sleeves

Spindle 15000 rpm



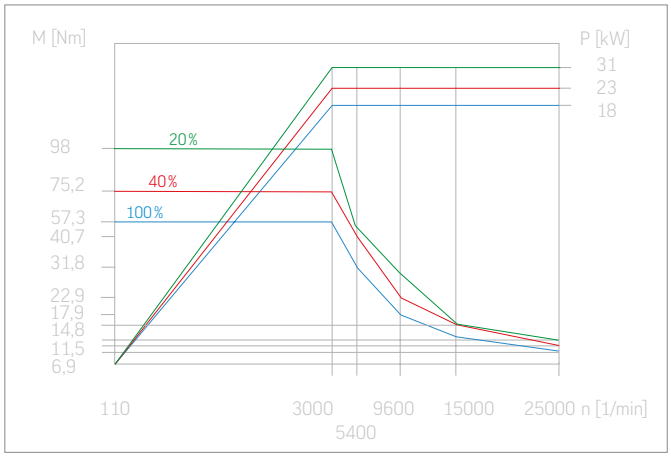
Maximum spindle speed:	15000 rpm
Output 20% c.d.f.:	20 kW
Torque 20% c.d.f.:	180 Nm
Tool holding fixture:	SK 40
Spindle:	two-piece
Collision protection:	collision sleeves

Spindle 18000 rpm



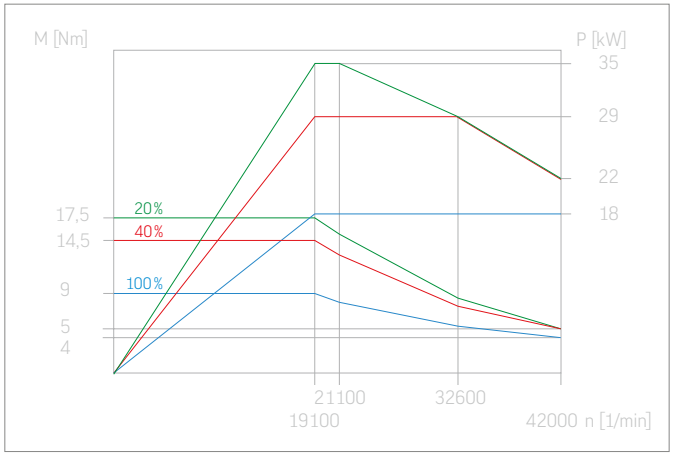
Maximum spindle speed:	18000 rpm
Output 20% c.d.f.:	20 kW
Torque 20% c.d.f.:	180 Nm
Tool holding fixture:	HSK A 63
Spindle:	two-piece
Collision protection:	collision sleeves

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

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

Speed:	*18000 rpm*
Torque:	*180 Nm*
Output:	*20 kW*
Interface:	*HSK A 63*
Collision protection:	*collision sleeves*

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

Material:	42CrMo4V
Tool:	face milling head D=63 mm with indexable inserts
Spindle speed:	1515 rpm
Vc:	300 m/min
Feed:	2272 mm/min
Fz:	0.3 mm
Depth of cut:	5.0 mm
Width of cut:	50.0 mm
Material removal rates:	568 cm^3/min

High-feed milling

Material:	42CrMo4V
Tool:	high-feed mill D=50 mm with indexable inserts
Spindle speed:	1900 rpm
Vc:	300 m/min
Feed:	9163 mm/min
Fz:	1.2 mm
Depth of cut:	1.2 mm
Width of cut:	42.5 mm
Material removal rates:	467 cm^3/min

Solid drilling

Material:	42CrMo4V
Tool:	solid drill D=40 mm with indexable inserts
Spindle speed:	1464 rpm
Vc:	230 m/min
Feed:	256 mm/min
Vu:	0.175 mm
Material removal rates:	320 cm^3/min

02.7
The magazine

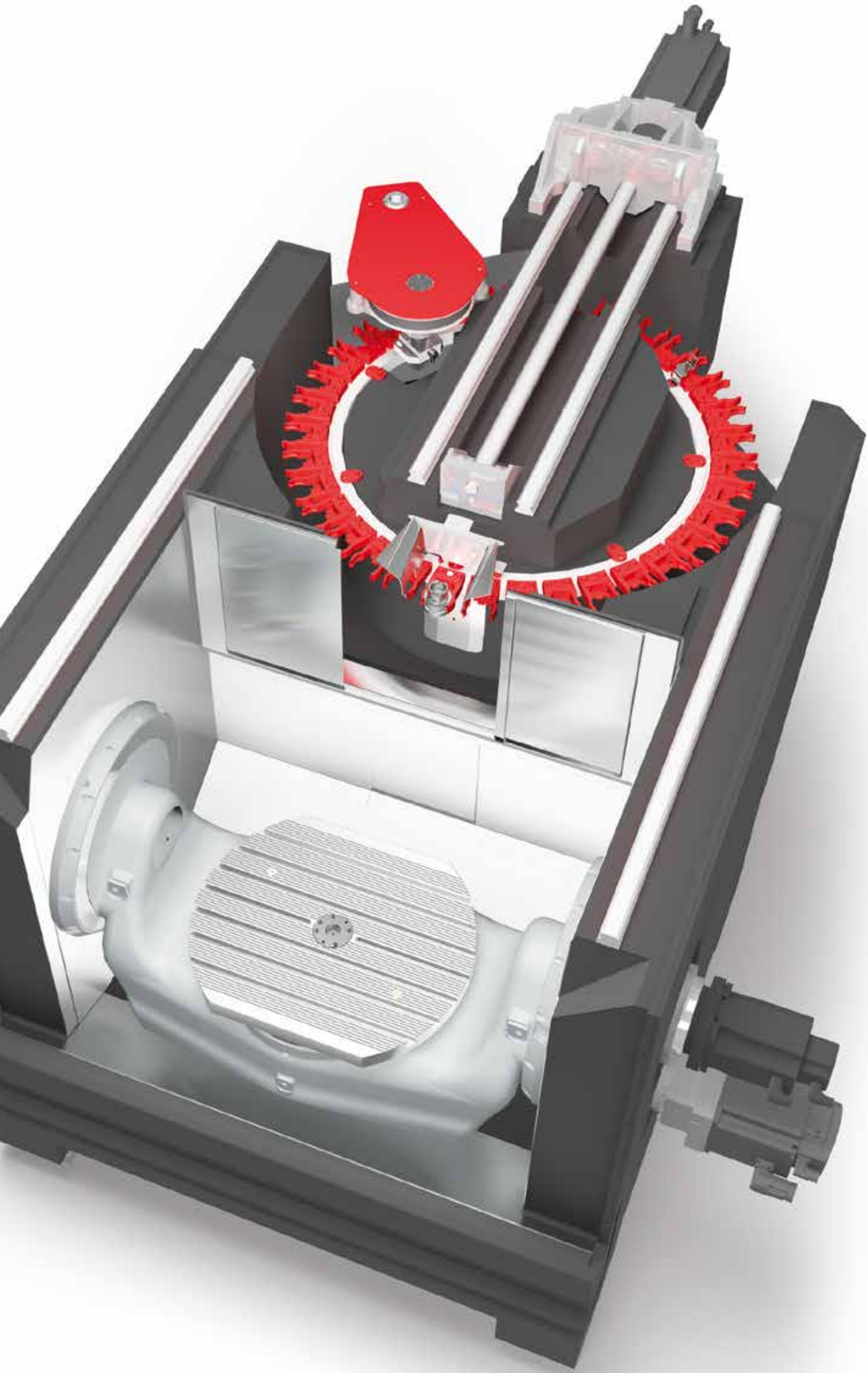
The C 32's tool magazine holds up to 36 tools in the standard version and is integrated into the machine bed to save space. It can be filled form the side by swivelling the control panel to the loading point.

TECHNICAL DATA

- Pick-up magazine
- Integration into the machine bed
- Excellent accessibility
- Control panel pivotable to the loading point
- Covers for tool holding fixture
- Tool changer (pick-up)

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	
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

02.8
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

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)

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

Siemens

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.


G-
Funktionen
Hilfs-
funktionen
Basis-
sätze
X1
233.856
Y1
-0.820
Z1
615.165
S1

02.8
Control unit

Hermle control tools

Hermle "Tool Management Control"

Simple Hermle tool management for Heidenhain controls.

Hermle "Adaptive Feed Control"

In adaptive feed control (AFC), the feed rate is automatically controlled (depending on the percentage of spindle output).

Hermle "Tool Data Information"

Simple, Hermle tool management for the Siemens S 840 D sl.

Hermle "Wear Diagnosis System"

Machine status is continually monitored by the Hermle wear diagnosis system. It facilitates rapid machine diagnostics and status-oriented detection of maintenance tasks.

Hermle "Automation Control System"

Simple, Hermle pallet management software.

Hermle setups

Standard

Standard

- Standard setting.
- Switches back to the standard setting after a different setup has been used.

Heavy Duty Machining

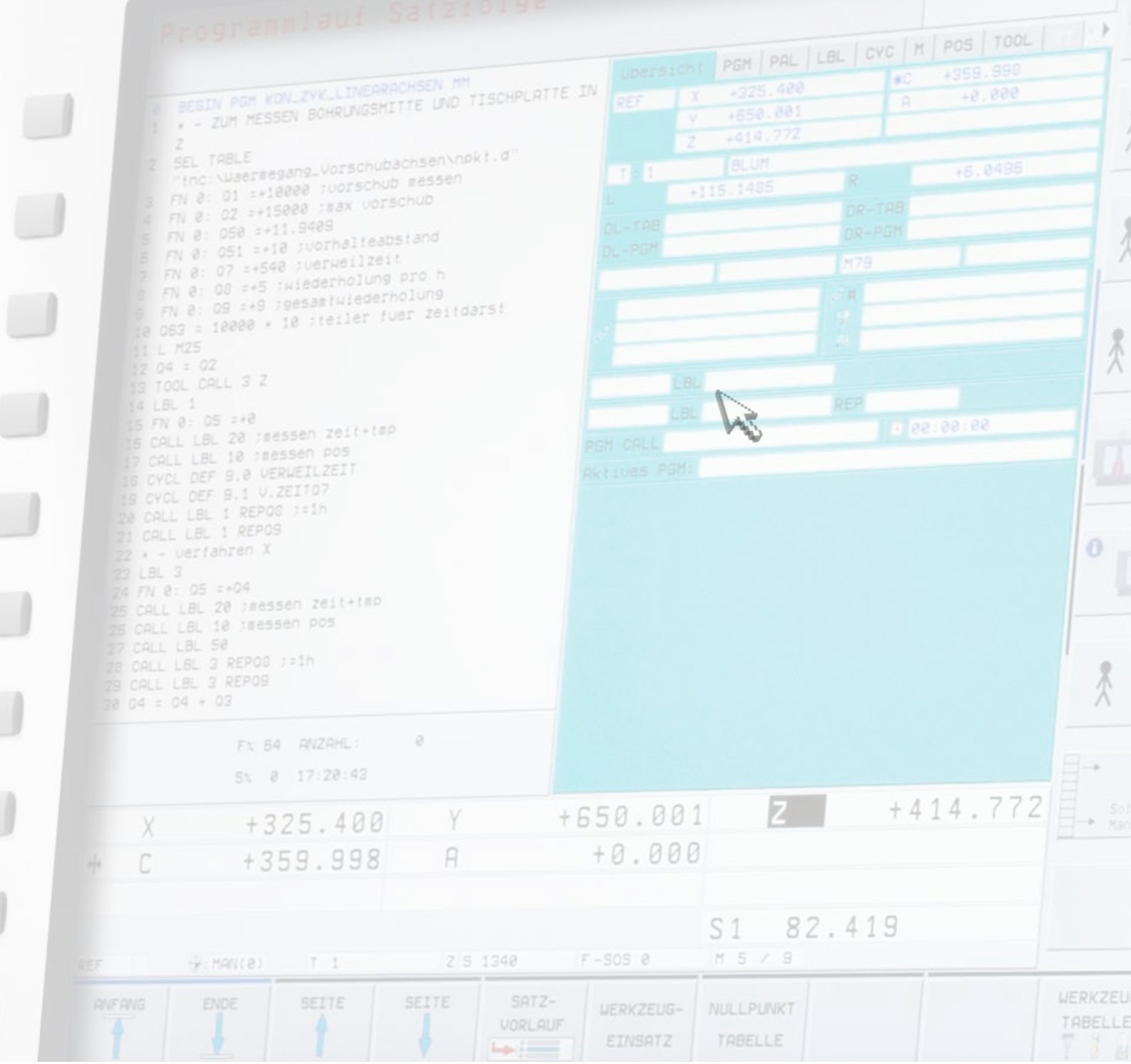
Heavy duty machining

- For roughing in conjunction with high milling power.
- Greater machining performance possible thanks to reduced machine vibration (depending on the tool and the selected technology data).

High Production

Production

- Quicker machining with programs which have many cycle calls or subprograms.



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.

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 drawer

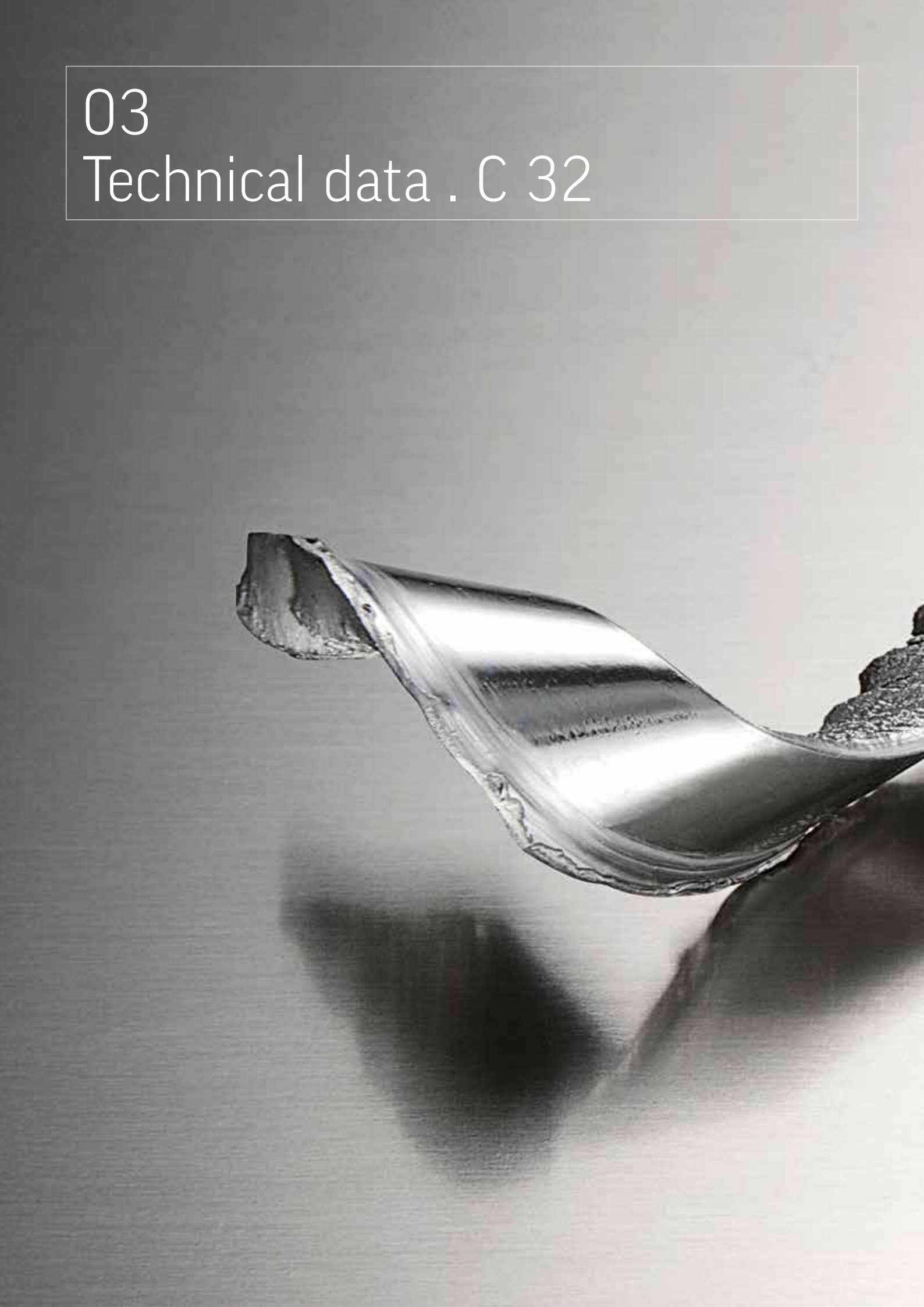
Chip conveyor

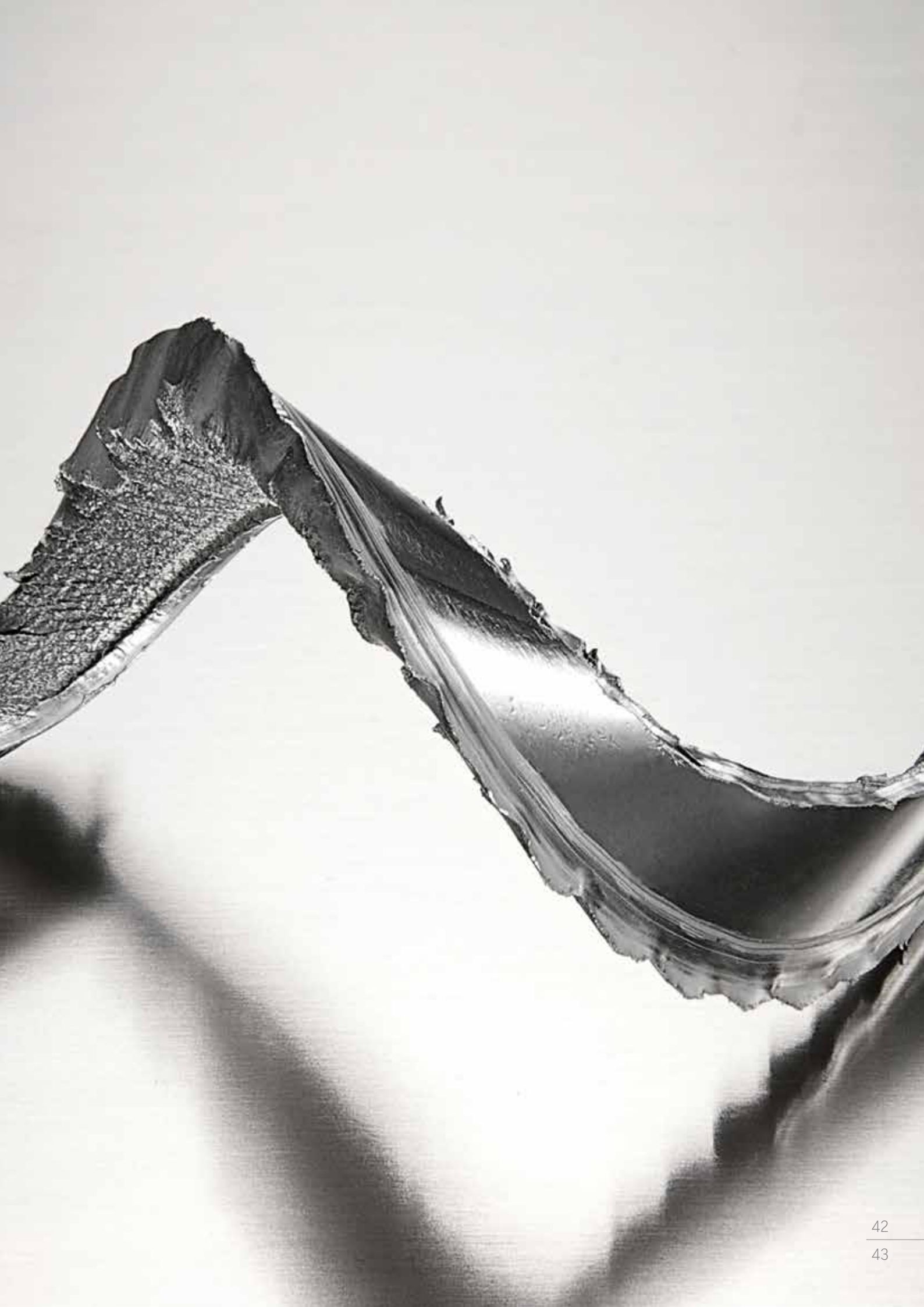
Chip conveyor with internal cooling lubricant supply ICS 40

Chip conveyor with internal cooling lubricant supply ICS 80

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

03
Technical data . C 32





03.1
Technical data . C 32

Working area	Traverse	X axis	650 mm	
	Traverse	Y axis	650 mm	
	Traverse	Z axis	500 mm	
	Rapid linear traverse (dynamic)	X-Y-Z	45 – 45 – 40 m/min (60 – 60 – 60 m/min)	
	Linear acceleration (dynamic)	X-Y-Z	6 (10) m/s²	
	Linear feed force	X-Y-Z	8500 N	
	Max. vertical table clearance		600/635 mm	
	Max. workpiece diameter		Ø 650 mm	
	Max. workpiece height		420 mm	
Main spindle drive	Speed Main power/Torque	10000 rpm 20% c.d.f.	SK 40 / HSK A 63 29 kW / 200 Nm	●
	Speed Main power/Torque	15000 rpm 20% c.d.f	SK 40 20 kW / 180 Nm	○
	Speed Main power/Torque	18000 rpm 20% c.d.f	HSK A 63 20 kW / 180 Nm	○
	Speed Main power/Torque	25000 rpm 20% c.d.f	HSK A 63 31 kW / 100 Nm	○
	Speed Main power/Torque	42000 rpm 20% c.d.f	HSK E 40 35 kW / 17,5 Nm	○
Control unit	Heidenhain		iTNC 530 / TNC 640	●
	Siemens		Sinumerik 840 D sl	●
Tool changer (pick-up)	Interface	SK 40 / HSK A 63	HSK E 40	
	Magazine pockets	36 items	36 items	●
	Chip-to-chip time*	approx. 4.5 s	approx. 4.5 s	
	*(Chip-to-chip times for 3-axis unit calculated in keeping with German standard VDI 2852, page 1)			
	Max. tool length	300 mm	300 mm	
	Max. tool diameter with empty adjacent pockets	Ø 80 mm Ø 125 mm	Ø 80 mm Ø 125 mm	
	Max. magazine load	144 kg	90 kg	

Extension of tool storage capacity

Additional magazine ZM 43	Additional 43 pockets	○
Additional magazine ZM 87	Additional 87 pockets	○
Additional magazine single ZM 192	Additional 192 pockets	○
Additional magazine double ZM 462	Additional 462 pockets	○

Interface	SK 40 / HSK A 63	HSK E 40
Max. tool diameter in the additional magazine	Ø 80 mm	Ø 80 mm
Maximum tool diameter with corresponding adjacent pocket allocation in additional magazine	Ø 125 mm	Ø 125 mm
Max. tool weight	8 kg	2.5 kg

*Table variants**

NC swivelling rotary table	Ø 650		Ø 650
Clamping surface	Ø 650 x 540 mm		Ø 650 x 540 mm
Collision circle of table plate	Ø 650 mm		Ø 650 mm
Swivelling range	+/- 130°		+/- 130°
C axis drive mode	Worm		Torque
Swivelling axis A speed			
One-sided drive	25 rpm		25 rpm
Tandem drive	-		25 rpm
Rotary axis C speed	30 rpm		65 rpm
Max. table load			
One-sided drive	600 kg		600 kg
Tandem drive	-		1000 kg
T grooves parallel	7 / 14 H7		7 / 14 H7
NC swivelling rotary table	Ø 320	Ø 320	Rigid clamping table
Clamping surface	Ø 320 mm	Ø 320 mm	900 x 665 mm
Swivelling range	+/- 130°	+/- 130°	-
C axis drive mode	Worm	Torque	-
Swivelling axis A speed			
with one-sided drive	25 rpm	25 rpm	-
Tandem drive	-	55 rpm	-
Rotary axis C speed	40 rpm	80 rpm	-
Max. table load			1500 kg
One-sided drive	300 kg	200 kg	-
Tandem drive	-	200 kg	-
T grooves parallel	4 / 14 H7	4 / 14 H7	10 / 14 H7
T grooves star-shaped	-		
Clamping surface	Ø 450 x 360 mm	-	-
Secondary clamping plates	760 x 370 mm	760 x 370 mm	-
T grooves parallel	8 / 14 H7	8 / 14 H7	-

*All tables available on demand

● Included in standard delivery
○ Available upon request

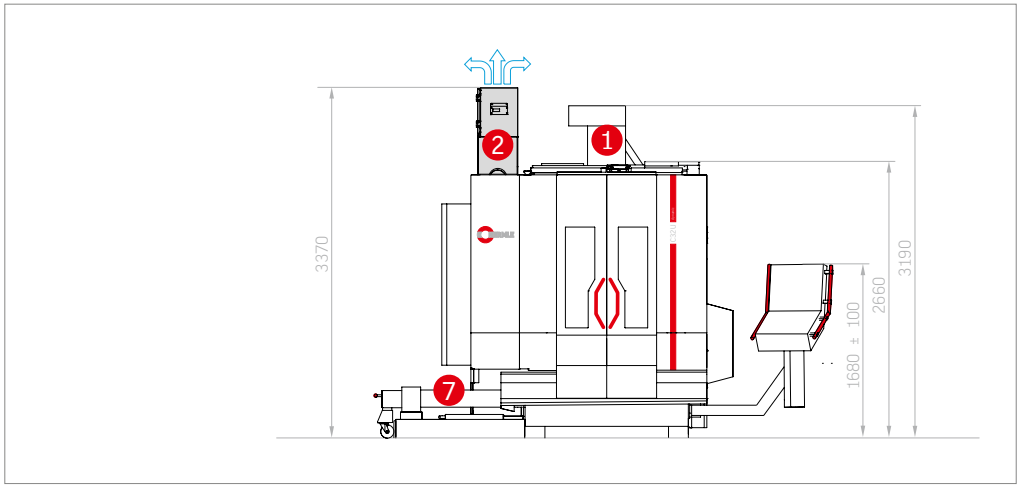
Position measuring system, direct	Resolution		0.0001 mm	●
Positional tolerance	Tp in X-Y-Z axes according to VDI/DGQ 3441 (calculated at a constant ambient temperature of 20 °C +/-1 °C. Our products are subject to the German Export Law and require authorization since the attainable precision may be less/greater than 6 µm.)		0.008 mm	●
Chip drawer	Removable chip drawer			●
Chip conveyor	Scraper belt or hinge conveyor ejection height			
	ejection height		1100 mm	○
	chip cart		450 l	○
External cooling lubricant supply	With chip drawer and cooling lubricant tank			●
	Cooling lubricant tank capacity		375 l	
	Cooling lubricant system without high-pressure pump with sieve basket			○
	Capacity of standard tank		100 l	
	Capacity of cooling lubricant tank		500 l	
	Cooling lubricant system without high-pressure pump with paper band filter			○
	Capacity of standard tank		100 l	
	Capacity of cooling lubricant tank		570 l	
Internal cooling lubricant supply with paper band filter	Capacity of standard tank	100 l	100 l	○
	Capacity of cooling lubricant tank	570 l	1000 l	
	Pressure (manually adjustable up to)	max. 40 bar / 26 l/min	max. 80 bar / 29 l/min	
	Mains connection (ICS)	-	400 V / 50 Hz	
	Power consumption (ICS)	-	17 kVA	
Hydraulics	Operating pressure		120 bar	●
Central lubrication	Minimum grease lubrication quantity			●
Connected loads (machine)	Mains connection		400 V / 50 Hz	
	Power consumption		45 kVA	
	Compressed air		6 bar	
Weight	(Standard version without optional extras, attachments, workpieces and cooling lubricant)		about 11.0 t	

● Included in standard delivery
○ Available upon request

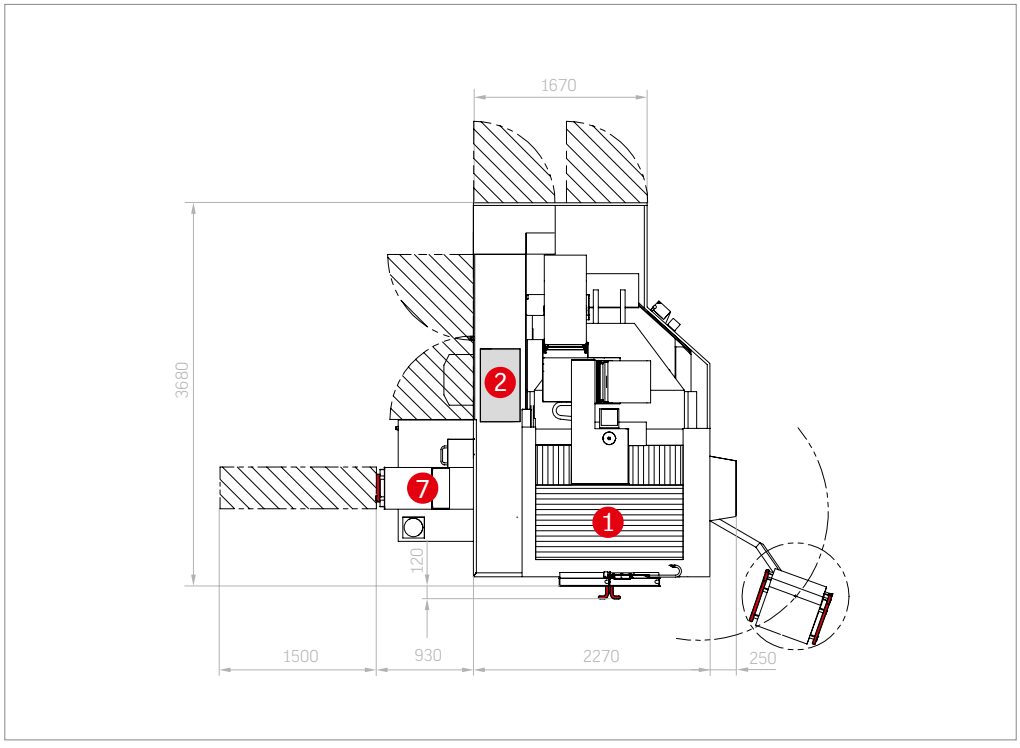
03.2 Options

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



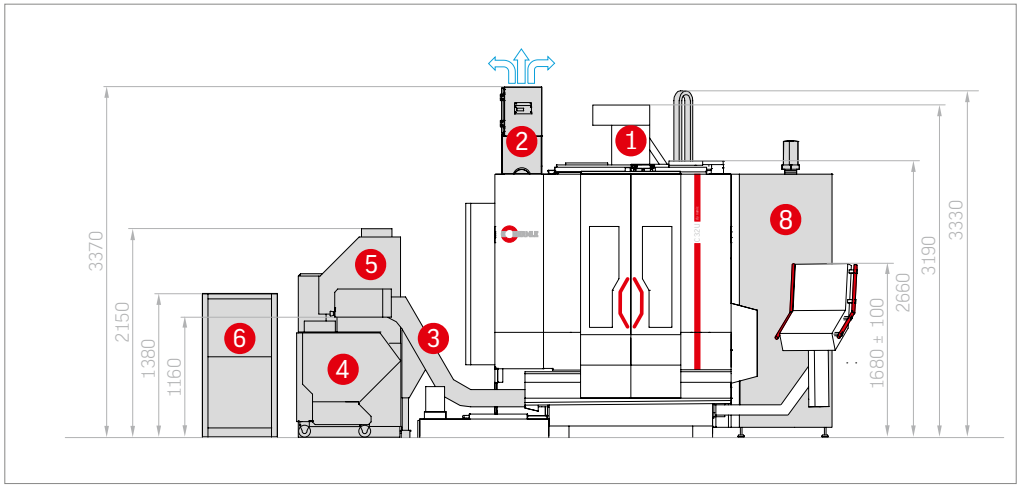
1 Machine
2 Emulsion mist extraction
7 Chip drawer

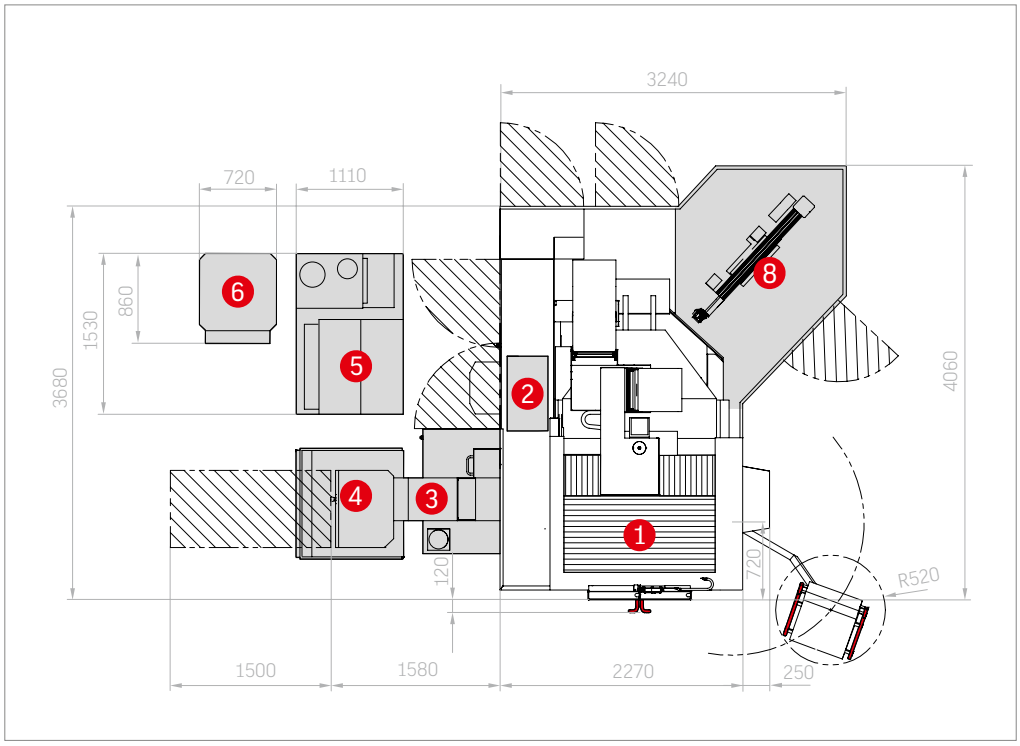


Options

- 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
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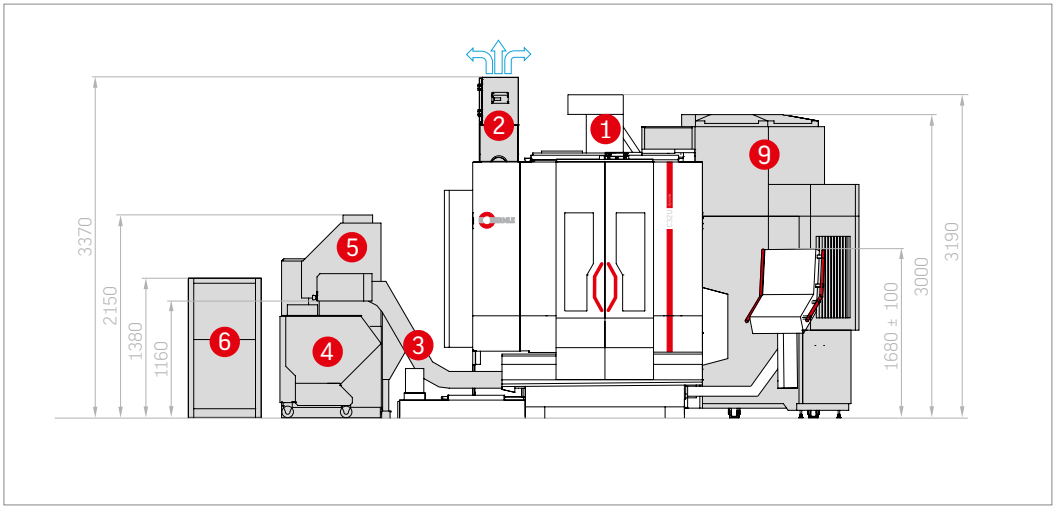
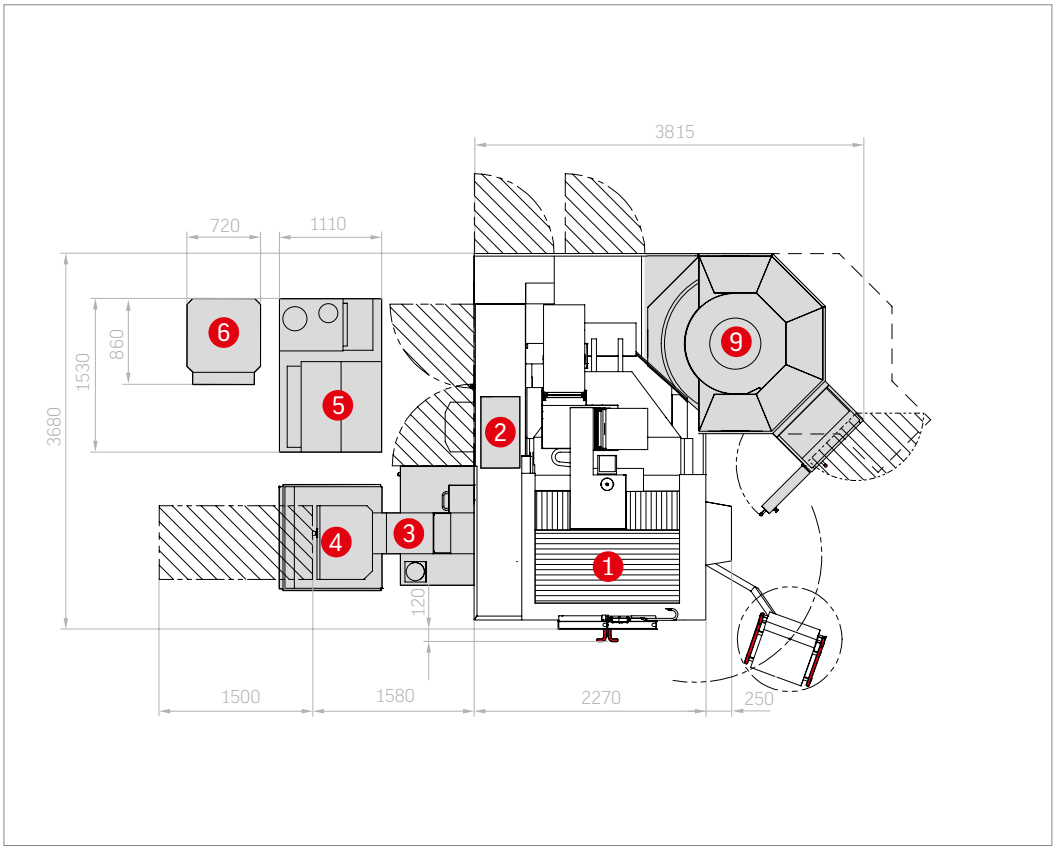
- Status lamp
- Touch probe with preparation
- Tool breakage monitoring / measuring

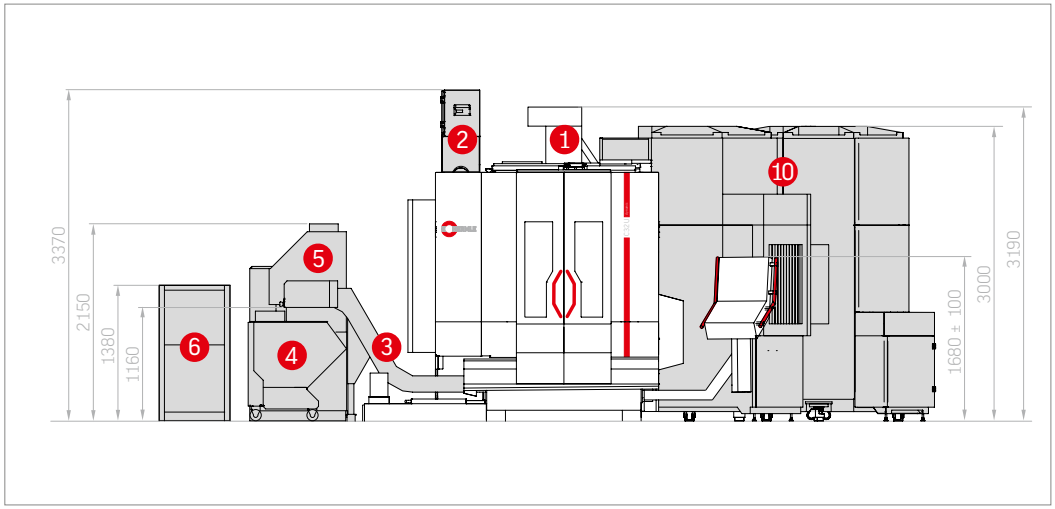
C 32 dimensions . Additional magazine single

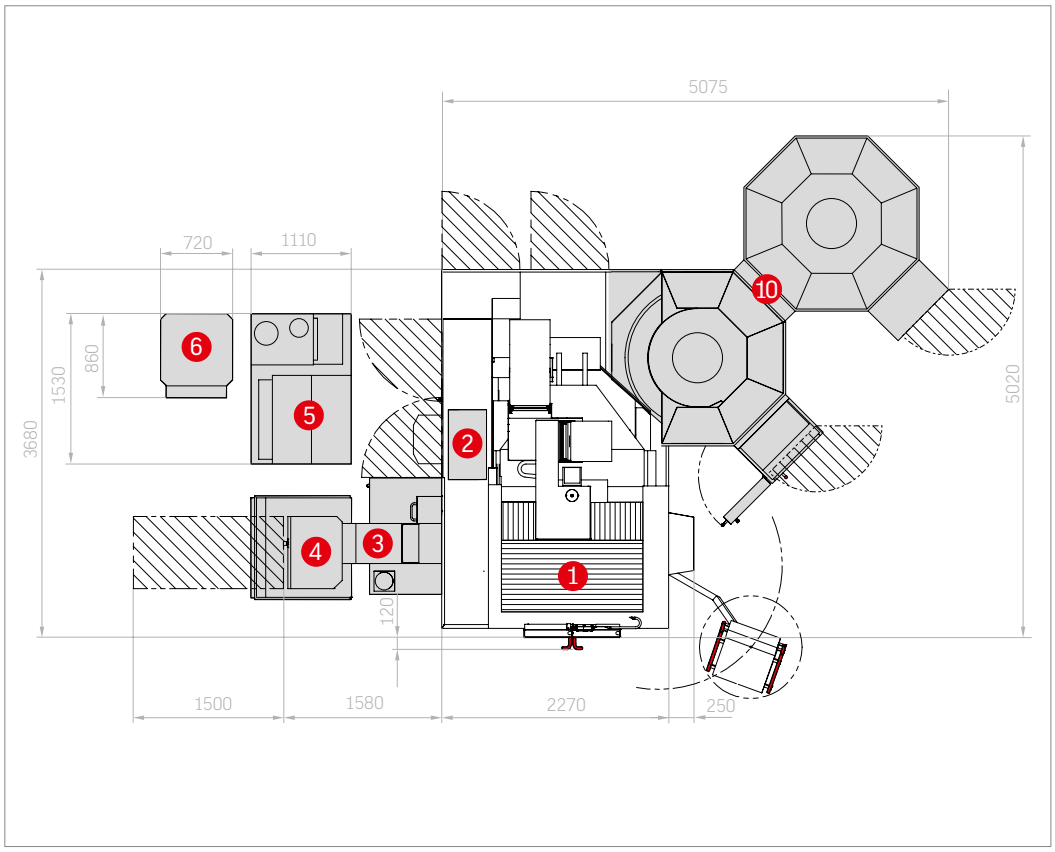


1 Machine
2 Emulsion mist extraction
3 Chip conveyor
4 Chip cart
5 Internal cooling lubricant supply
6 Recooling unit for ICS
9 Additional magazine single



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

04
Automation

04.1
Automation . C 32

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.

Robot system with pallet racks

Robot system with pallet racks

Robot system with pallet racks

04.1
Automation . C 32

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

Pallet changer PW 250

Pallet changer PW 250 - side access for manual processing or in setting up mode ►

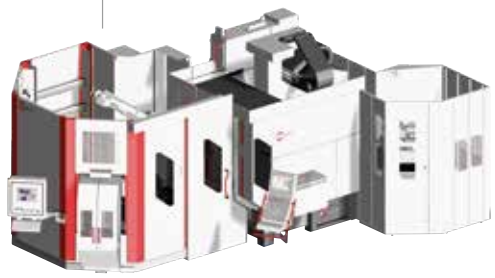
04.2 All components. From a single source.

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.

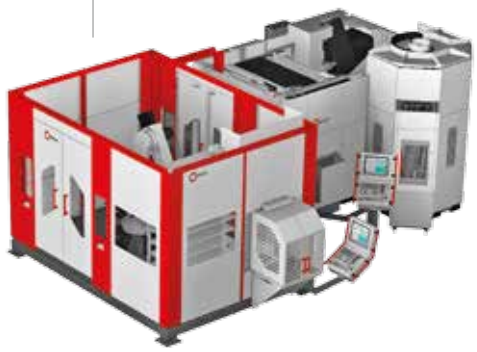
Pallet changer PW 250

IH systems

RS 1 robot system



RS 2 robot system

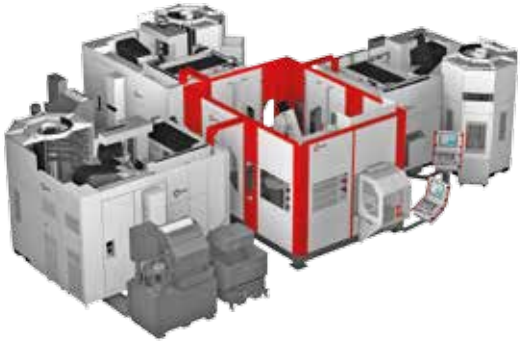


RS 3 robot system

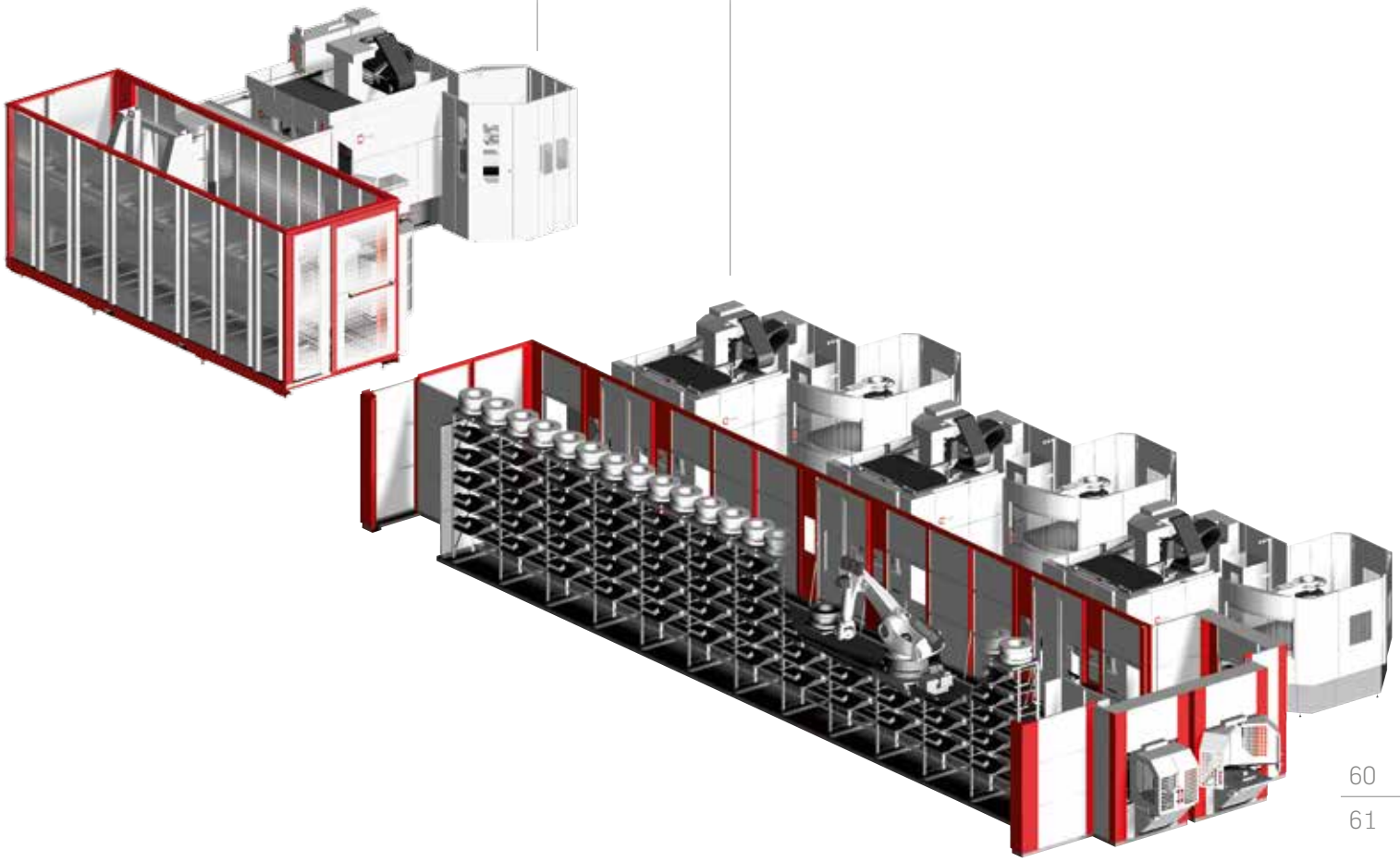
Basic system plus 2 machines . 90°

Basic system plus 2 machines . 180°

Basic system plus 3 machines



RS Linear robot system



05
Precision

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.

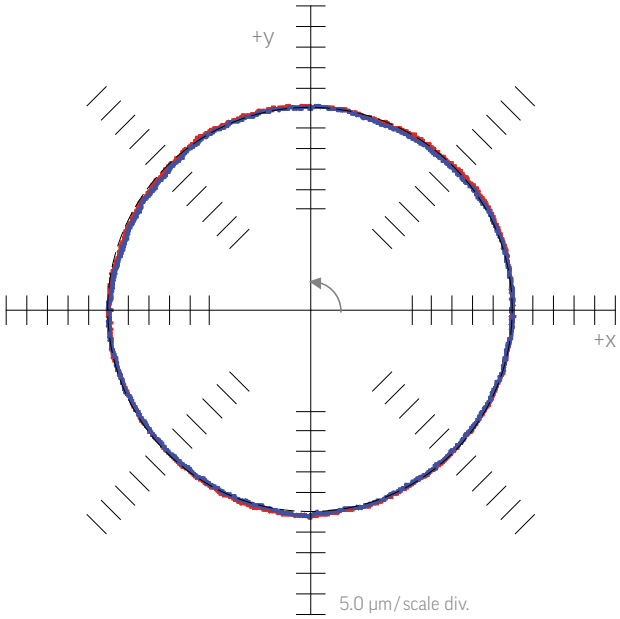
IMPROVED PRECISION PACKAGES

Precision package 1 (linear axes X, Y, and Z)

- 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 (rotary axes A and C)

- 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



Run 1

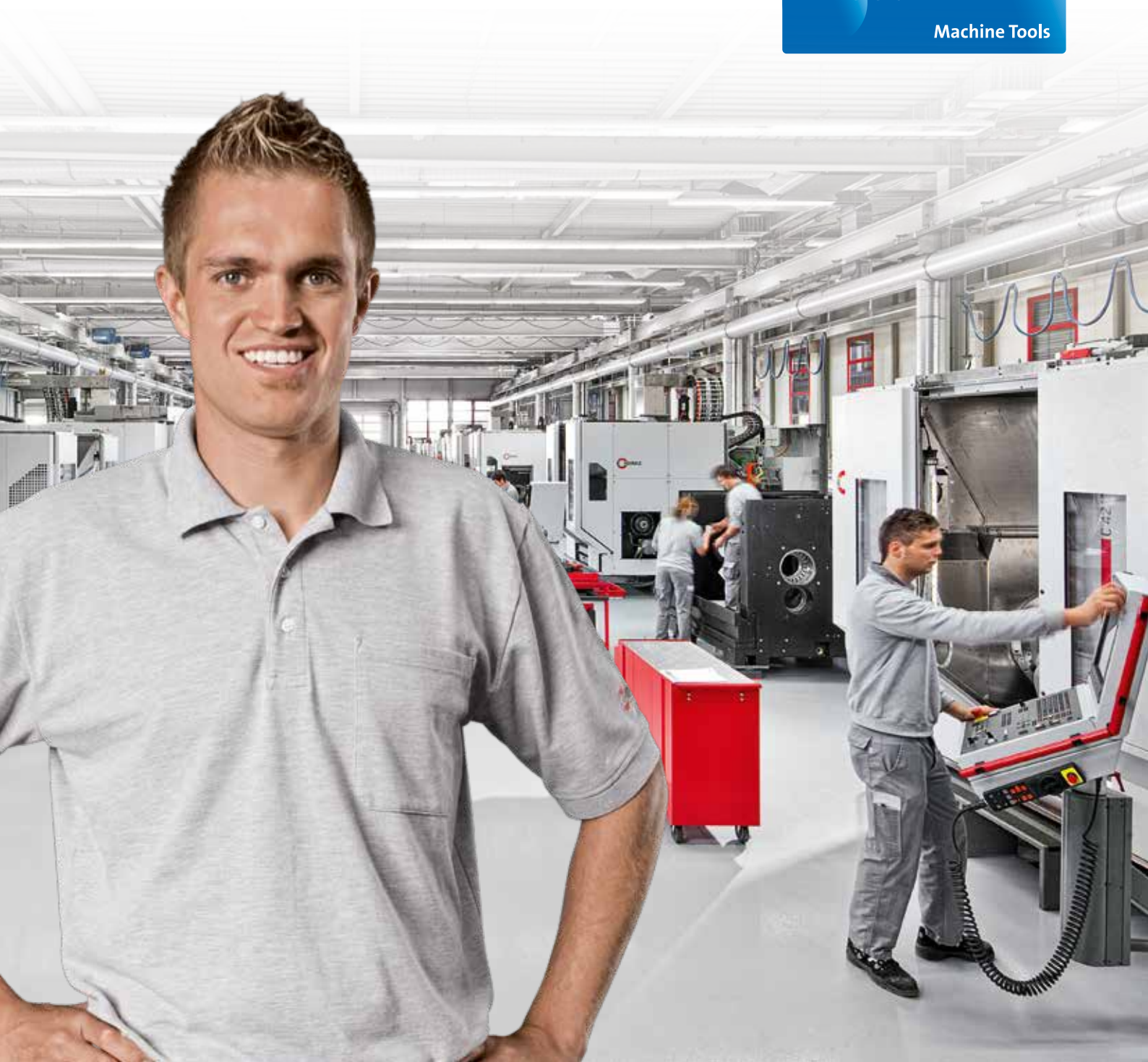
Run 2

Ovality test of a standard machine

06
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 "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.

BLUECOMPETENCE
Machine Tools



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

07
Services

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.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