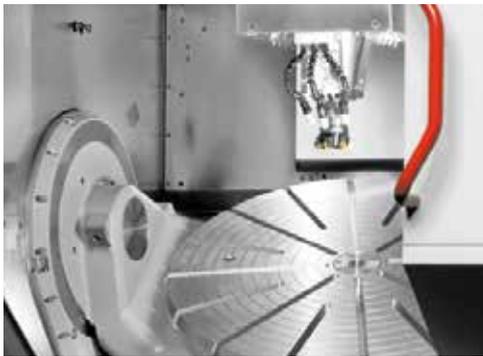
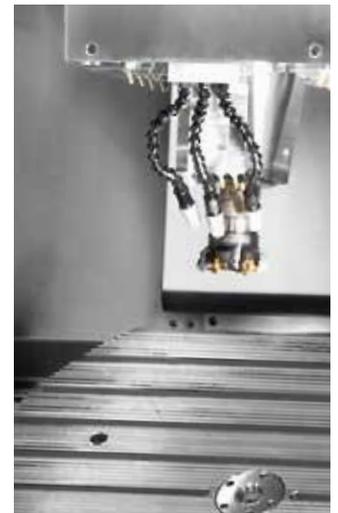


C 42

www.hermle.de



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.

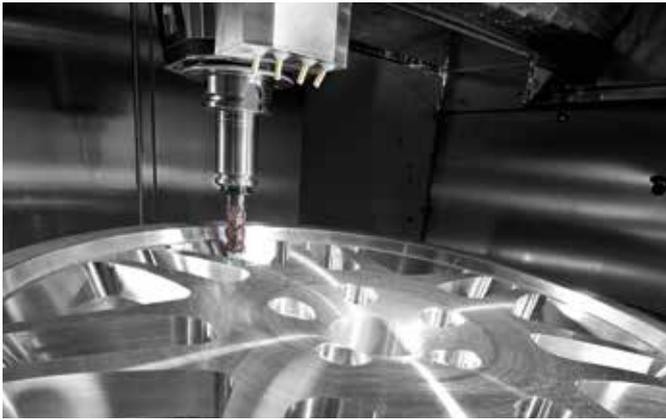
01 Industry sectors	6
02 The machine	10
03 Technical data	44
04 Automation	56
05 Precision	66
06 Energy efficiency	68
07 Services	70



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.

Automotive industry



Precision mechanics



Medical engineering



Motor sports and racing



Aerospace industry



Machine construction



Tool and mould construction



Subcontractor industry



01.1 Applications

Dynamic, precise and reliable Hermle's C 42 can provide highly dynamic processing of workpieces up to 1400 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.



Socket

5-axis milling and turning

Branch: Machine construction
 Material: 1.7139
 Tool: Turning tool for face and longitudinal machining, VHM end milling and die-sinking cutters, solid drills
 Spindle: 18000 rpm
 Main power/torque: 180 Nm/20 kW

Left



Blisks

5-axis simultaneous machining

Branch: Aerospace industry
 Material: Titanium
 Tool: Cylindrical High-performance corner radius mills Ø 20, conical high-performance R 4 spherical cutter
 Spindle: 18000 rpm
 Main power/torque: 180 Nm/20 kW

Left



Car rims

5-axis milling and turning

Branch: Automotive industry
 Material: AlMgSi1
 Tool: Turning tools, Roughing-interior and exterior, Finishing, equipped with PCD panels, Grooving tool, Milling head, VHM end milling cutter, VHM lollipop milling cutter, VHM drill
 Spindle: 18000 rpm
 Main power/torque: 180 Nm/20 kW

Left

Table plate

5-axis milling and turning

Branch: Machine construction
 Material: GG 25
 Tool: Step drill, shoulder milling head/face groove lathe tool
 Spindle: 18000 rpm
 Main power/torque: 180 Nm/20 kW

Bottom



Work boot

5-axis simultaneous machining

Branch: Tool and mould construction
 Material: AlMgSi1
 Tool: End milling cutter and spherical cutter
 Spindle: 25000 rpm
 Main power/torque: 100 Nm/29 kW

Top





02

The machine

The C 42: 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:	800 - 800 - 550 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:	1050 x 805 mm	
Max. table load:	2000 kg	
NC swivelling rotary tables:		
Table with worm:	Ø 420 mm	Ø 800 x 630 mm
Swivelling range:	+/- 130°	+/- 130°
A axis speed:	25 rpm	15 rpm
C axis speed:	35 rpm	25 rpm
Max. table load:	400 kg	850 kg
Tables with torque:	Ø 440 mm	Ø 800 x 630 mm
Swivelling range:	+/- 130°	+/- 130°
A axis speed:	55 rpm	25 rpm
C axis speed:	65 rpm	65 rpm
Max. table load:	450 kg	1400 kg





02.1

The machine . MT



Combines highly dynamic milling/turning simultaneously in up to 5 axes:
Thanks to the revolutionary MT design, all turning operations can be performed even with the table swivelled. The C 42 U MT machining centre can also process workpieces up to 1400 kg in weight.

TECHNICAL DATA

<i>Traverse X-Y-Z:</i>	800 - 800 - 550 mm
<i>Speed:</i>	18000 rpm
<i>Rapid linear traverse X-Y-Z (dynamic):</i>	45 (60) - 45 (60) - 40 (60) m/min

<i>Linear acceleration X-Y-Z (dynamic):</i>	6 (10) m/s ²
---	-------------------------

<i>Control unit:</i>	TNC 640 / S 840 D sl
----------------------	----------------------

NC swivelling rotary table:

<i>Table with torque:</i>	Ø 750 mm
<i>Swivelling range:</i>	+/- 130°
<i>A axis speed:</i>	25 rpm
<i>C axis speed:</i>	800 rpm
<i>Max. turning table load:</i>	700 kg
<i>Max. milling table load:</i>	1400 kg

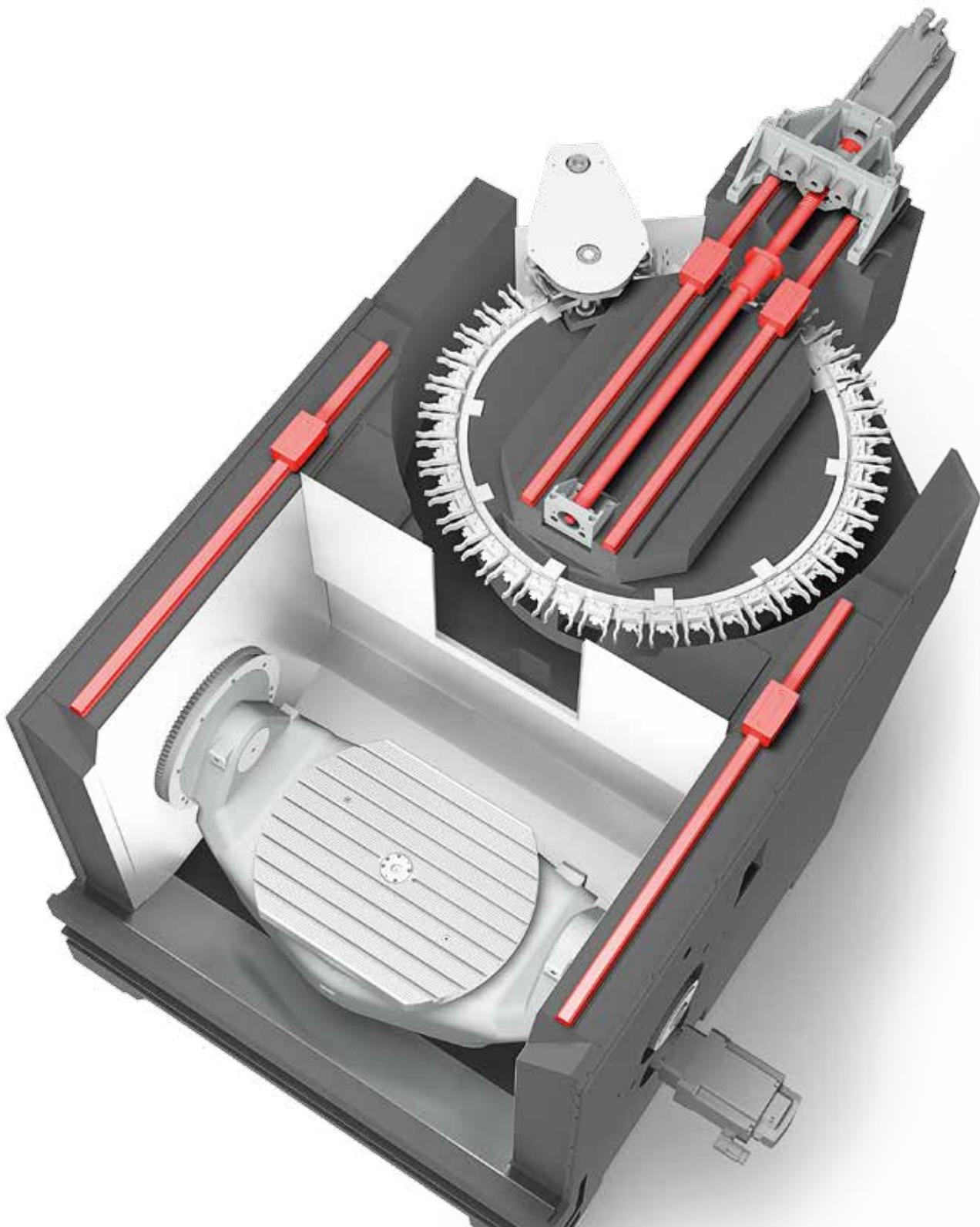
- Fully integrated rotary technology
- Integrated balancing system
- Reinforced top
- Production booth
- Milling operations: 5-side machining/up to 5 axes simultaneous machinings
- Turning operations: Horizontal/vertical turning, up to 5 axes simultaneous machinings





02.2

A new dimension of 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 dampening properties

02.3

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 42 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

800 x 800 x 550 mm

max. 2000 kg



5-axis/MT

Ø 800 x 560 mm

max. 1400 kg

MT: max. 700 / 1400 kg

Collision circle Ø 1030 mm

max. vertical table clearance 700 mm



3-axis machining

5-axis machining



02.4 Ergonomics

Built for daily use: The Hermle C 42 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

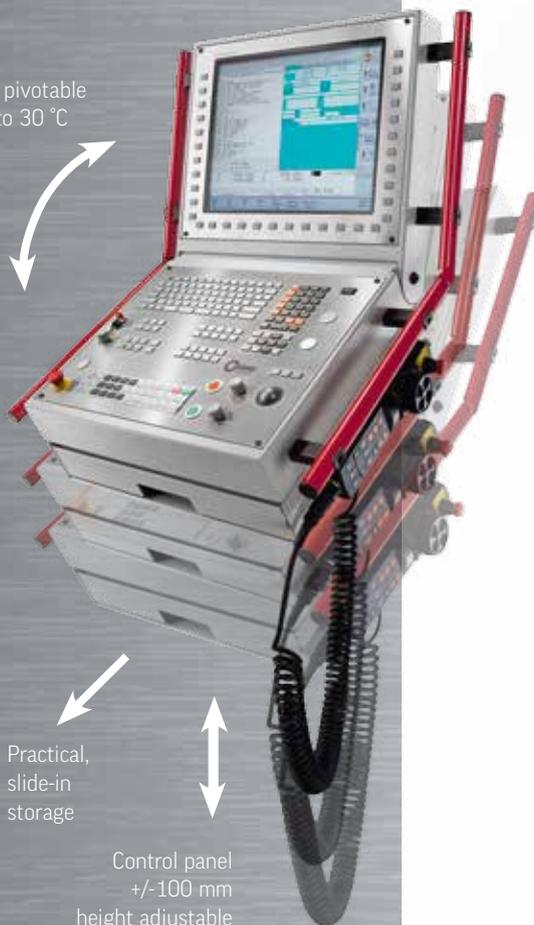
Screen pivotable by up to 30 °C



Practical, slide-in storage



Control panel +/-100 mm height adjustable



Door opening 940 mm

Vertical table clearance 700 mm

Loading height 950 mm

Control panel pivotable

02.5

Table variants

Hermle's NC swivelling rotary table has revolutionised the concept of 5-axis machining. The C 42 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. This is the only way to achieve the highest precision for both one-sided and tandem drives.





02.5

Table variants

Made in Germany – made in Gosheim: The C 42 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 load (up to 1400 kg with the highest accuracy)*
- *No accumulation of chips 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 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 1400 kg rapidly and, most importantly, with exceptional precision.

DRIVE TECHNOLOGY

- Central 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



NC swivelling rotary table

Drive type of 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.



Secondary clamping plates 930 x 490

Clamping surface:	Ø 420 mm
T grooves:	parallel 5 / 14 H7
Swivelling range:	+/- 130°
Drive type of C axis:	Worm
Speed - rotary axis C:	35 rpm
Speed - swivelling axis A (one-sided drive):	25 rpm
Maximum table load (one-sided drive):	400 kg
Secondary clamping plates (option)	
T grooves:	parallel 8 / 14 H7



Clamping surface:	Ø 800 x 630 mm
Table plate collision circle:	Ø 800 mm
T grooves:	parallel 9 / 14 H7
Swivelling range:	+/- 130°
Drive type - rotary axis C:	Worm
Speed - rotary axis C:	25 rpm
Speed - swivelling axis A (one-sided drive):	15 rpm
Maximum table load (one-sided drive):	850 kg

NC swivelling rotary table

Drive type of C axis: Torque



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



Secondary clamping plates 920 x 490



Zero-point clamping systems/pallet clamping systems



Clamping surface:	Ø 440 mm
T grooves:	parallel 5 / 14 H7
Swivelling range:	+/- 130°
Drive type - rotary axis C:	Torque
Speed - rotary axis C:	65 rpm
Speed - swivelling axis A (tandem drive):	55 rpm
Maximum table load (tandem drive):	450 kg
Secondary clamping plates (option)	
T grooves:	parallel 8 / 14 H7



Clamping surface:	Ø 800 x 630 mm
Table plate collision circle:	Ø 800 mm
T grooves:	parallel 9 / 14 H7
Swivelling range:	+/- 130°
Drive type - rotary axis C:	Torque
Speed - rotary axis C:	65 rpm
Speed - swivelling axis A (tandem drive):	25 rpm
Maximum table load (tandem drive):	1400 kg



Zero-point clamping systems/pallet clamping systems

NC swivelling rotary table . MT

Drive type of C axis: Torque



Zero-point clamping systems/pallet clamping systems

Clamping surface:	Ø 750 mm
Swivelling range:	+/- 130°
Swivelling axis A speed:	25 rpm
A-axis drive mode:	Tandem
Speed - rotary axis C:	800 rpm
Drive type of C axis:	Torque
Max. turning table load:	700 kg
Max. milling table load:	1400 kg
T grooves:	star 16/14 H7

Rigid clamping table

Clamping surface: 1050 x 805 mm



Equipped with the rigid clamping table, the machine can deal with clamping weights of up to 2000 kg - ideal for 3-axis machining of large, bulky and heavy workpieces.
T grooves: parallel 12/14 H7



02.6 Spindles



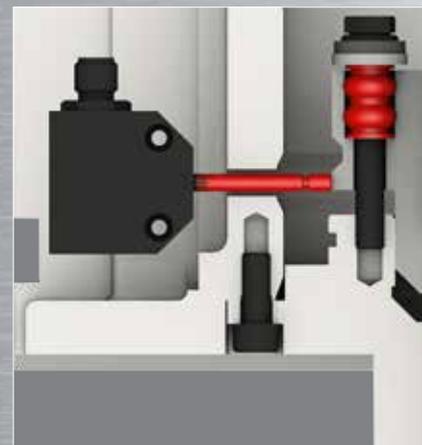
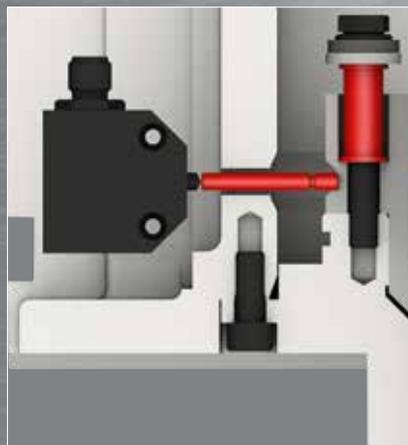
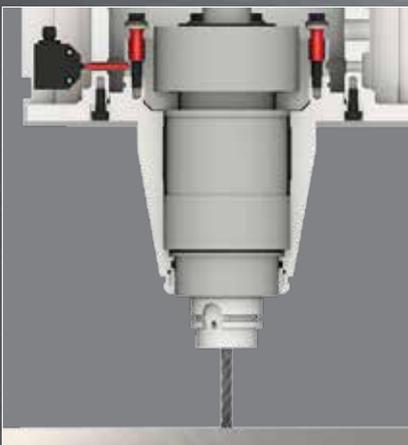
The C 42 can be equipped with two-piece or compact spindles. All spindles can be replaced quickly and easily in case of failure. With the different speed ranges and tool holding fixtures the spindles are suitable for a wide variety of machining tasks. Like the tables, all spindles are manufactured exclusively 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

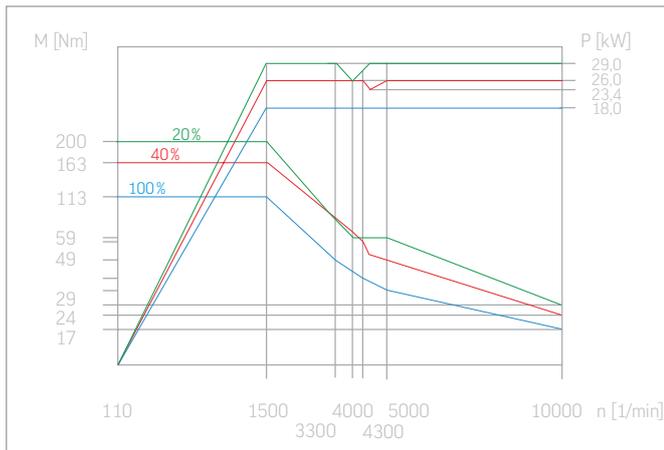
Collision protection with collision inquiry

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



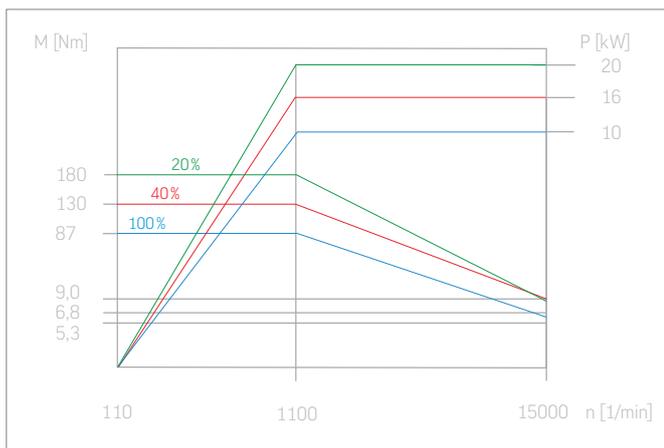


Spindle 10000 rpm



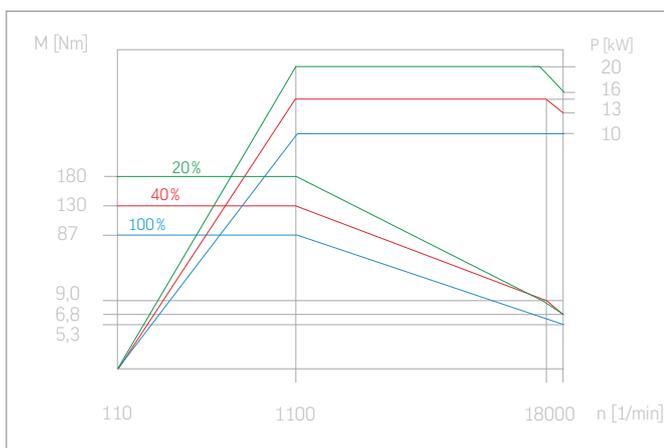
Maximum spindle speed: 10000 rpm
Main power 20% c.d.f.: 29 kW
Torque 20% c.d.f.: 200 Nm
Tool holding fixture: SK 40 / HSK A 63
Spindle: two-piece
Collision protection: collision sleeves

Spindle 15000 rpm



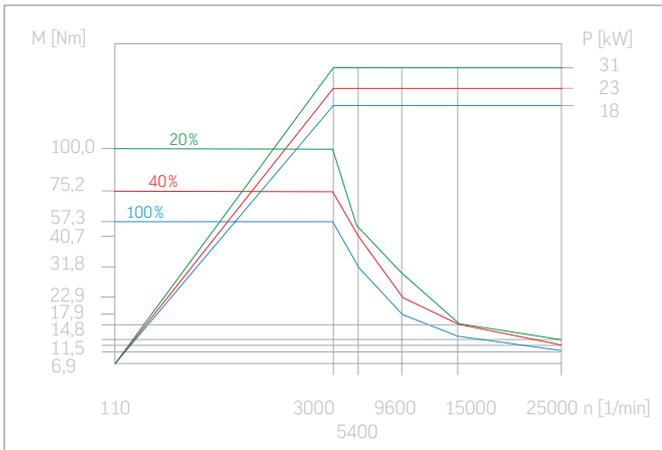
Maximum spindle speed: 15000 rpm
Main power 20% c.d.f.: 20 kW
Torque 20% c.d.f.: 180 Nm
Tool holding fixture: SK 40
Spindle: two-piece
Collision protection: collision sleeves

Spindle 18000 rpm



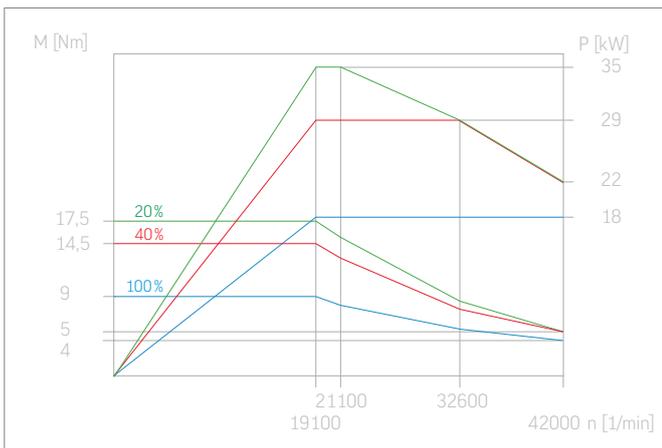
Maximum spindle speed: 18000 rpm
Main power 20% c.d.f.: 20 kW
Torque 20% c.d.f.: 180 Nm
Tool holding fixture: HSK A 63
Spindle: two-piece
Collision protection: collision sleeves

Spindle 25000 rpm



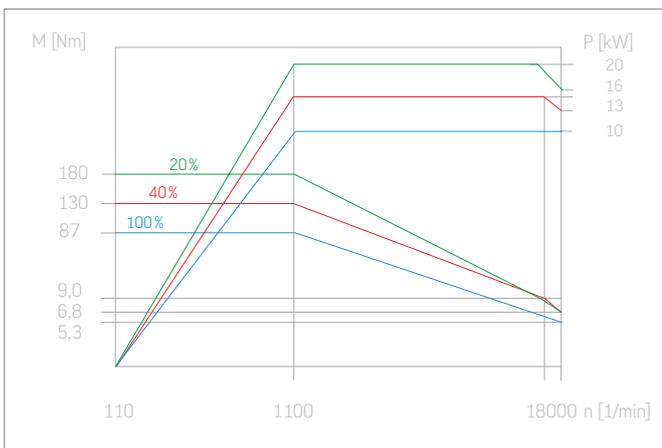
Maximum spindle speed: 25000 rpm
 Main power 20% c.d.f.: 31 kW
 Torque 20% c.d.f.: 100 Nm
 Tool holding fixture: HSK A 63
 Spindle: compact

Spindle 42000 rpm



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
 Spindle: compact

Spindle 18000 rpm. MT



Maximum spindle speed: 18000 rpm
 Main power 20% c.d.f.: 20 kW
 Torque 20% c.d.f.: 180 Nm
 Tool holding fixture: HSK T 63
 Spindle: two-piece



02.7

High-performance machining

The C 42 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
Main power:	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=50 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



02.8

The magazine

The C 42's tool magazine holds up to 42 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

Integration into the machine bed

Excellent accessibility

Control panel pivotable to the loading point

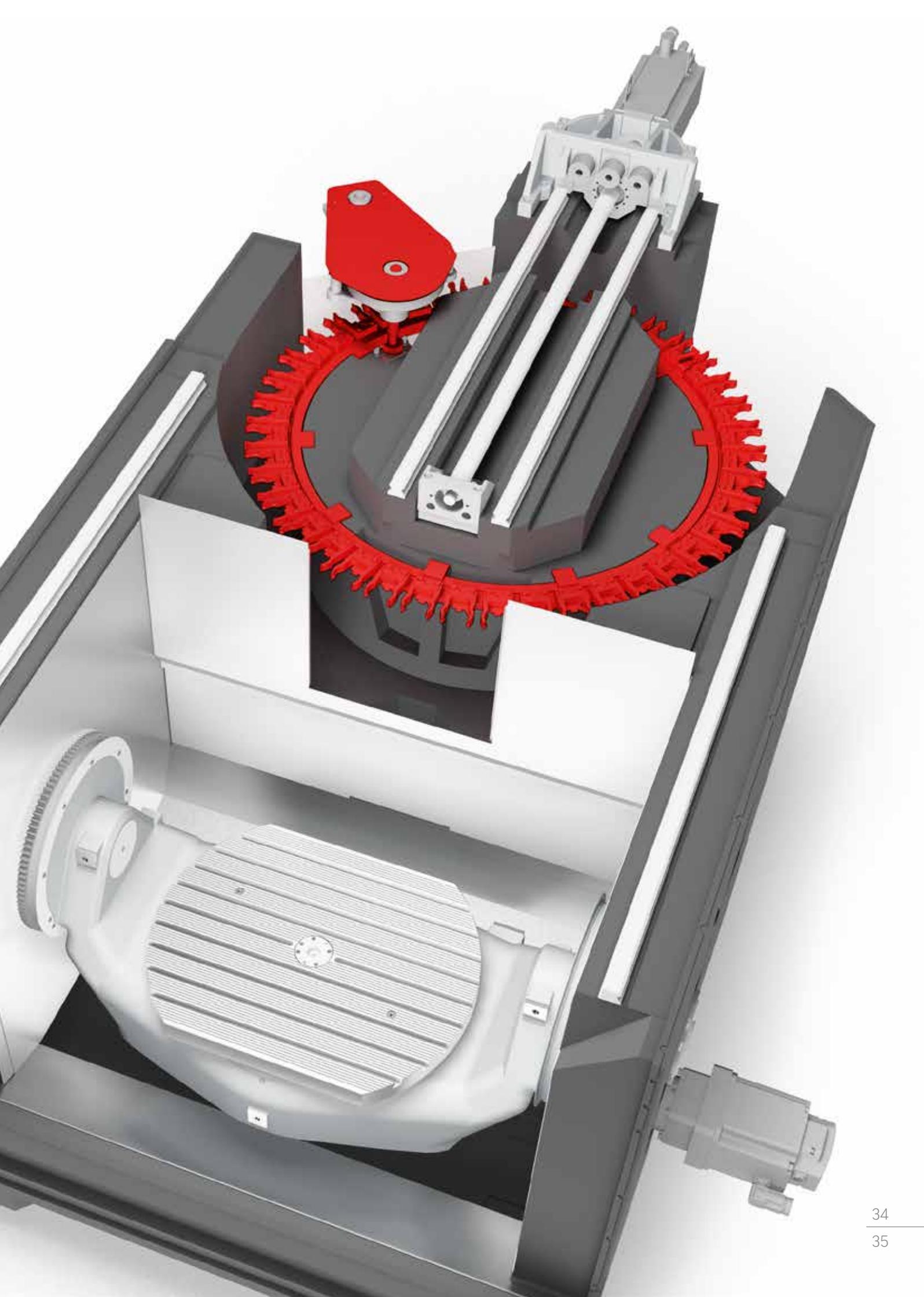
Covers for tool holding fixture

Tool changer (pick-up)

<i>Interface:</i>	<i>SK 40 / HSK A 63</i>
<i>Interface MT:</i>	<i>HSK A 63 / HSK T 63</i>
<i>Magazine pockets:</i>	<i>42</i>
<i>Max. tool weight:</i>	<i>8 kg</i>
<i>Max. tool diameter:</i>	<i>Ø 80 with empty adjacent pockets Ø 125 mm</i>
<i>Max. tool length:</i>	<i>300 mm</i>
<i>Max. magazine load:</i>	<i>168 kg</i>
<i>Chip-to-chip time*:</i>	<i>4.5 s</i>

**(chip-to-chip times for 3-axis units in milling mode calculated in keeping with German standard VDI 2852, page 1)*





Additional magazine ZM 43 / ZM 87



Magazine pockets: 43 / 87
Max. tool weight: 8 kg
Max. tool diameter: Ø 80,
with empty adjacent
pockets
Ø 125 mm
Max. tool length: 300 mm

Additional magazine single

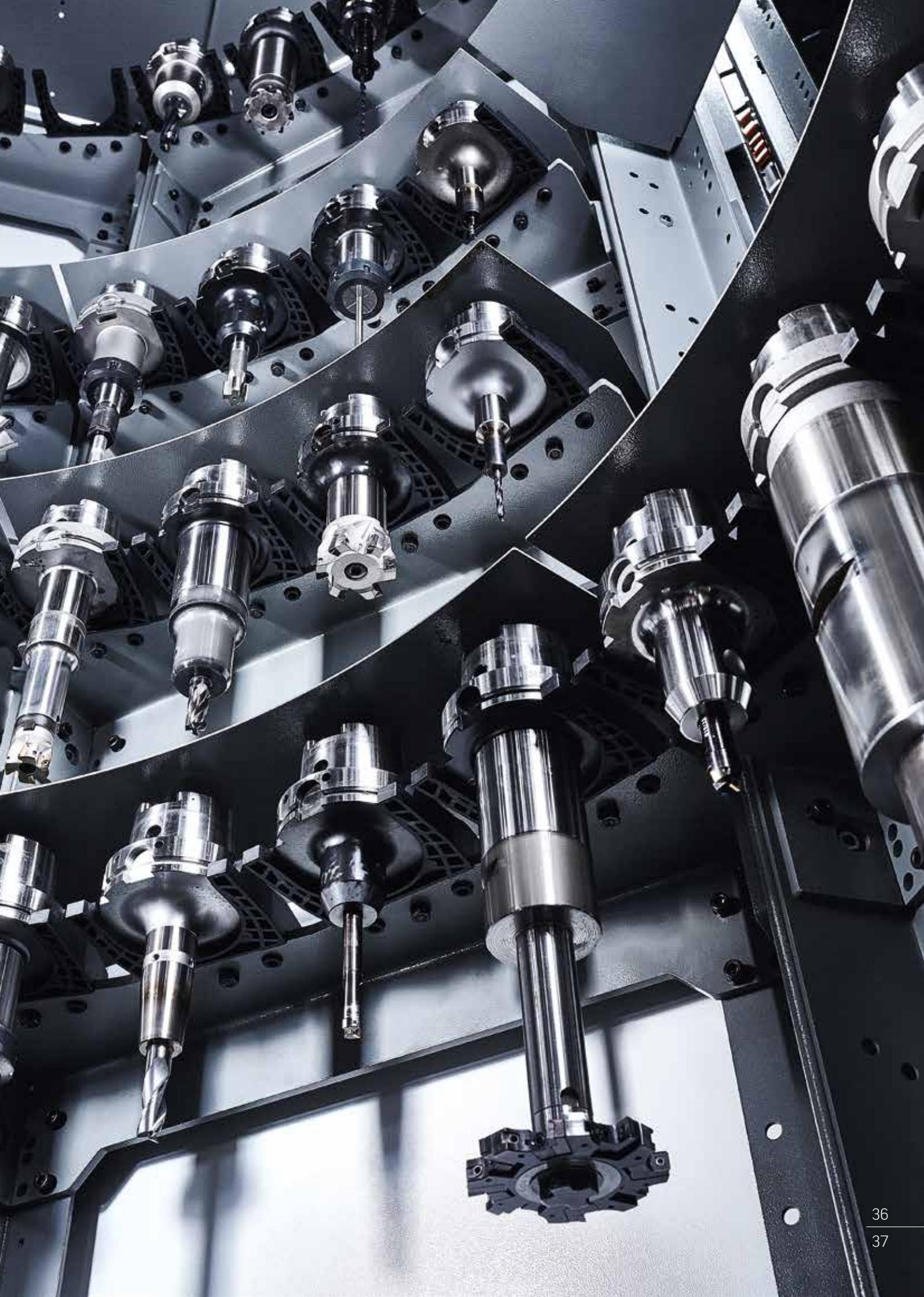


Magazine pockets: 192
Max. tool weight: 8 kg
Max. tool diameter: Ø 80,
with empty adjacent
pockets
Ø 125 mm
Max. tool length: 300 mm

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



02.9

Control unit

The C 42 can be equipped with three types of control unit. All control units provide diverse program functions. Hermle simplifies programming and operation still further with comprehensive extra features.

Heidenhain

Milling and turning using one control unit

Heidenhain TNC 640

- The TNC 640 comes with all the following functions of the iTNC 530
- Further special turning cycles are integrated such as roughing, finishing, grooving and threading
- Easy to switch from milling to turning mode
- Incl. Dynamic Efficiency – Active Chatter Control (ACC), Adaptive Feed Control (AFC), trochoidal milling
- Incl. Dynamic Precision – Cross Talk Compensation (CTC), Active Vibration Damping (AVD)

Milling

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

Milling and turning using one control unit

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
- The S 840 D sl is also equipped for turning mode and can handle all integrated milling and turning processes
- 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.



NC/UKS/OUT/HEIDTLE

RESET	Position [mm]	TFS	HEIDTLE
MES	X1 233.856	T ³	R1.000
	Y1 -0.820	Q D1	L100.000
	Z1 615.165	F 0.000	
D1		0.000 mm/min	0.0%
C1		0.000°	

HEIDENHAIN

PROGRAMMIERUNG

Y	X	Z
+325.400	+650.000	+414.772
+355.928		+0.000

S1 B2.419

02.9

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.



```

0 BEGIN PGM KON_ZYK_LINERRACHSEN MM
1 * - ZUM MESSEN BOHRUNGSMITTE UND TISCHPLATTE IN
  Z
2 SEL TABLE
  "trc:\waeregang_vorschubachsen\npkt.d"
3 FN 0: 01 =+10000 ;vorschub messen
4 FN 0: 02 =+15000 ;max vorschub
5 FN 0: 050 =+11.9409
6 FN 0: 051 =+10 ;vorhalteabstand
7 FN 0: 07 =+540 ;verweilzeit
8 FN 0: 08 =+5 ;wiederholung pro h
9 FN 0: 09 =+9 ;gesamtwiederholung
10 063 = 10000 * 10 ;teiler fuer zeitdarst
11 L M25
12 04 = 02
13 TOOL CALL 3 Z
14 LBL 1
15 FN 0: 05 =+0
16 CALL LBL 20 ;messen zeit+tap
17 CALL LBL 10 ;messen pos
18 CYCL DEF 9.0 VERWEILZEIT
19 CYCL DEF 9.1 U.ZEIT07
20 CALL LBL 1 REPOS ;=1h
21 CALL LBL 1 REPOS
22 * - verfahren X
23 LBL 3
24 FN 0: 05 =+04
25 CALL LBL 20 ;messen zeit+tap
26 CALL LBL 10 ;messen pos
27 CALL LBL 50
28 CALL LBL 3 REPOS ;=1h
29 CALL LBL 3 REPOS
30 04 = 04 + 03
    
```

Übersicht	PGM	PAL	LBL	CYC	M	POS	TOOL
REF	X	+325.400		#C		+359.998	
	Y	+650.001		A		+0.000	
	Z	+414.772					
T-1		BLUM		R		+8.0495	
L		+115.1485					
DL-TAB				DR-TAB			
DL-PGM				DR-PGM			
				M79			
				H			
				P			
				Q			
		LBL					
		LBL		REP			
PGM CALL						00:00:00	
Aktives PGM:							

Fx 64 ANZAHL: 0
 Sx 0 17:20:43

X	+325.400	Y	+650.001	Z	+414.772
C	+359.998	A	+0.000		

S1 82.419

REF: MAN(0) T 1 Z S 1340 F-SOS 0 M 5 / 9

ANFANG ENDE SEITE SEITE SATZ-VORLAUF WERKZEUG-EINSATZ NULLPUNKT TABELLE WERKZEUG TABELLE

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.



02.10

The details

The C 42 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 chips



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

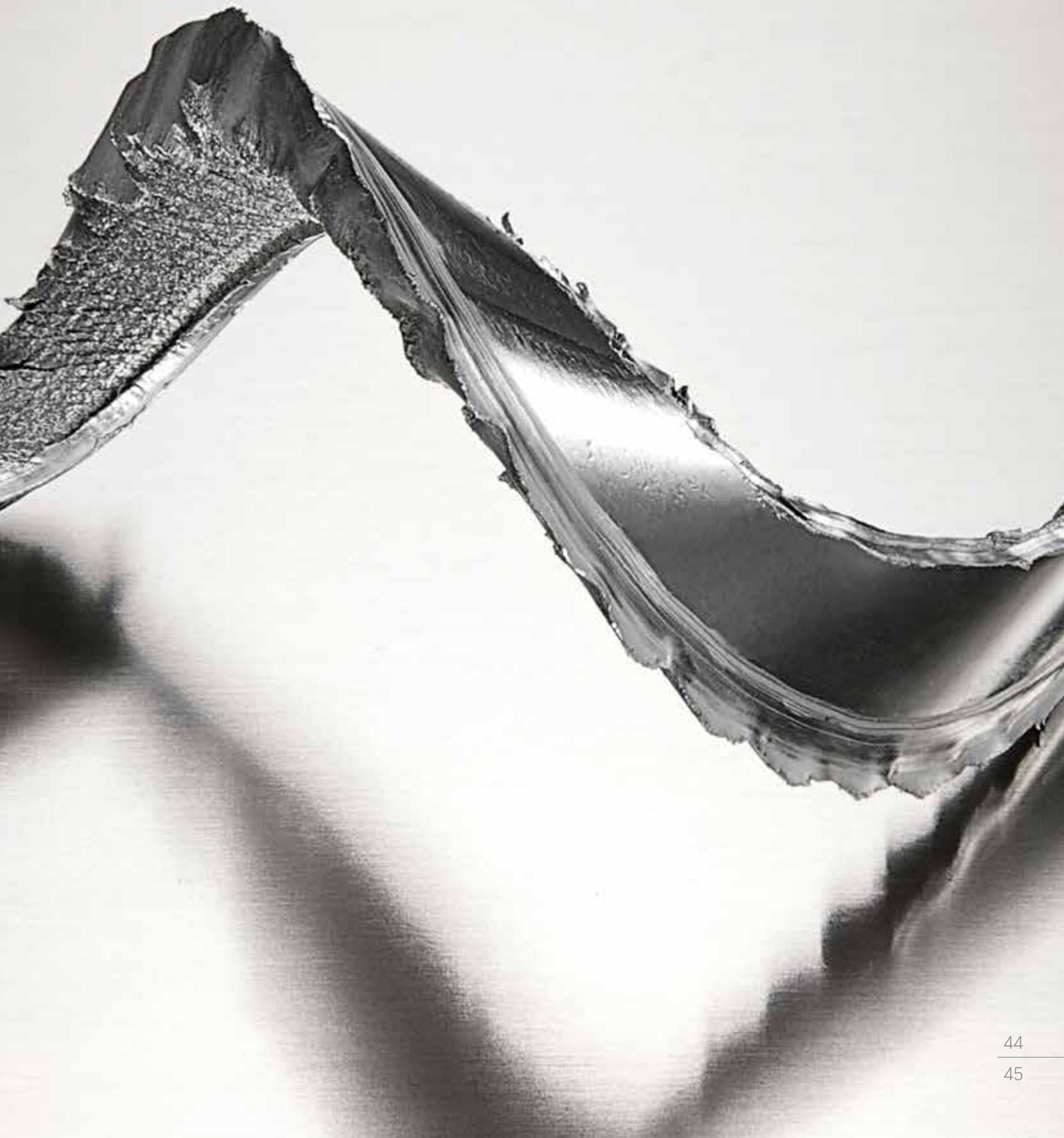


Chip conveyor with internal cooling lubricant supply ICS 80 and recooling unit

03

Technical data . C 42





03.1

Technical data . C 42

Working area	Traverse	X axis	800 mm
	Traverse	Y axis	800 mm
	Traverse	Z axis	550 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/s ²
	Linear feed force	X-Y-Z	8500 N
	Max. vertical table clearance		700 mm
	Max. workpiece diameter		Ø 800 mm
	Max. workpiece height		560 mm
Main spindle drive	Speed	10000 rpm	SK 40 / HSK A 63 ●
	Main power/Torque	20% c.d.f.	29 kW / 200 Nm
	Speed	15000 rpm	SK 40 ○
	Main power/Torque	20% c.d.f.	20 kW / 180 Nm
	Speed	18000 rpm	HSK A 63 ○
	Main power/Torque	20% c.d.f.	20 kW / 180 Nm
	Speed	25000 rpm	HSK A 63 ○
Main power/Torque	20% c.d.f.	31 kW / 100 Nm	
Speed	42000 rpm	HSK E 40 ○	
Main power/Torque	20% c.d.f.	35 kW / 17,5 Nm	
Speed (MT variants)	18000 rpm	HSK A 63 / HSK T 63 ●	
Main power/Torque	20% c.d.f.	20 kW / 180 Nm	
Control unit	Heidenhain		iTNC 530 / TNC 640 ●
	Siemens		Sinumerik 840 D sl ●
Tool changer (pick-up)	Magazine pockets		42 items ●
	Chip-to-chip time*		approx. 4.5 s
	*(chip-to-chip times for 3-axis units in milling mode 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		168 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 ○
	Max. tool diameter in the additional magazine		Ø 80 mm
	Maximum tool diameter with corresponding adjacent pocket allocation in additional magazine		Ø 125 mm
	Max. tool weight		8 kg

Table variants *

NC swivelling rotary table	Ø 800	Ø 800	Ø 440
Clamping surface	Ø 800 x 630 mm	Ø 800 x 630 mm	Ø 440 mm
Collision circle of the table plate	Ø 800 mm	Ø 800 mm	-
Swivelling range	+/- 130°	+/- 130°	+/- 130°
C-axis drive mode	Worm	Torque	Torque
Swivelling axis A speed			
One-sided drive	15 rpm	-	-
Tandem drive	-	25 rpm	55 rpm
Rotary axis C speed	25 rpm	65 rpm	65 rpm
Max. table load			
One-sided drive	850 kg	-	-
Tandem drive	-	1400 kg	450 kg
Parallel T grooves	9 / 14 H7	9 / 14 H7	5 / 14 H7
Secondary clamping plates	-	-	920 x 490 mm
Parallel T grooves	-	-	8 / 14 H7
NC swivelling rotary table	Ø 420	MT variants	Rigid Clamping table
Clamping surface	Ø 420 mm	Ø 750 mm	1050 x 805 mm
Swivelling range	+/- 130°	+/- 130°	-
C-axis drive mode	Worm	Torque	-
Swivelling axis A speed with one-sided drive	25 rpm	-	-
Tandem drive	-	25 rpm	-
Rotary axis C speed	35 rpm	800 rpm	-
Max. table load			2000 kg
One-sided drive	400 kg	-	-
Tandem drive milling	-	1400 kg	-
Tandem drive turning	-	700 kg	-
Parallel T grooves	5 / 14 H7	-	12 / 14 H7
Star-shaped T grooves		16 / 14 H7	
Secondary clamping plates	930 x 490 mm	-	-
Parallel T grooves	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	1100 mm	○
	chip cart	450 l	○
External cooling lubricant supply	With chip drawer and cooling lubricant tank		●
	Cooling lubricant tank capacity	390 l	
	Cooling system without high-pressure pump with sieve basket		○
	Capacity of standard tank	100 l	
	Capacity of cooling lubricant tank	570 l	
	Cooling 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 / 20 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)	Approx. 13.0 t	

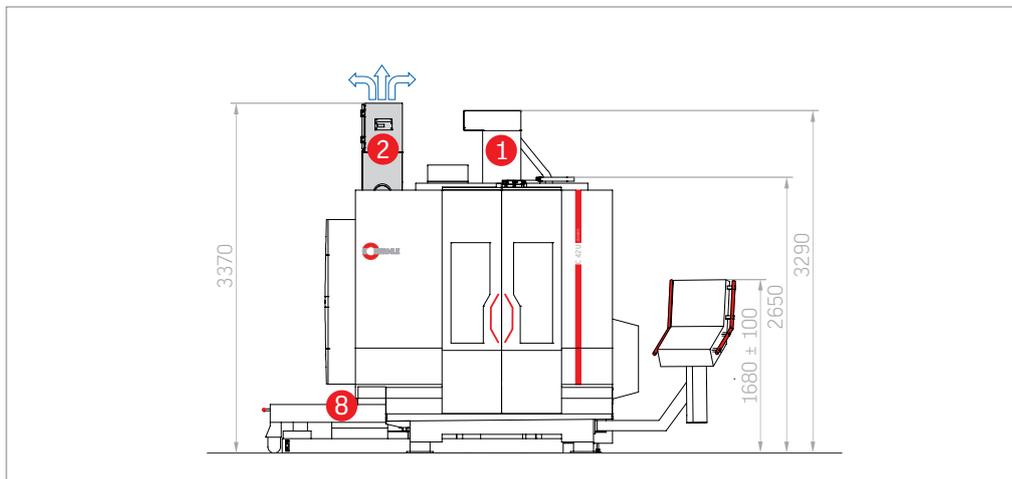
- Included in standard delivery
- Available upon request



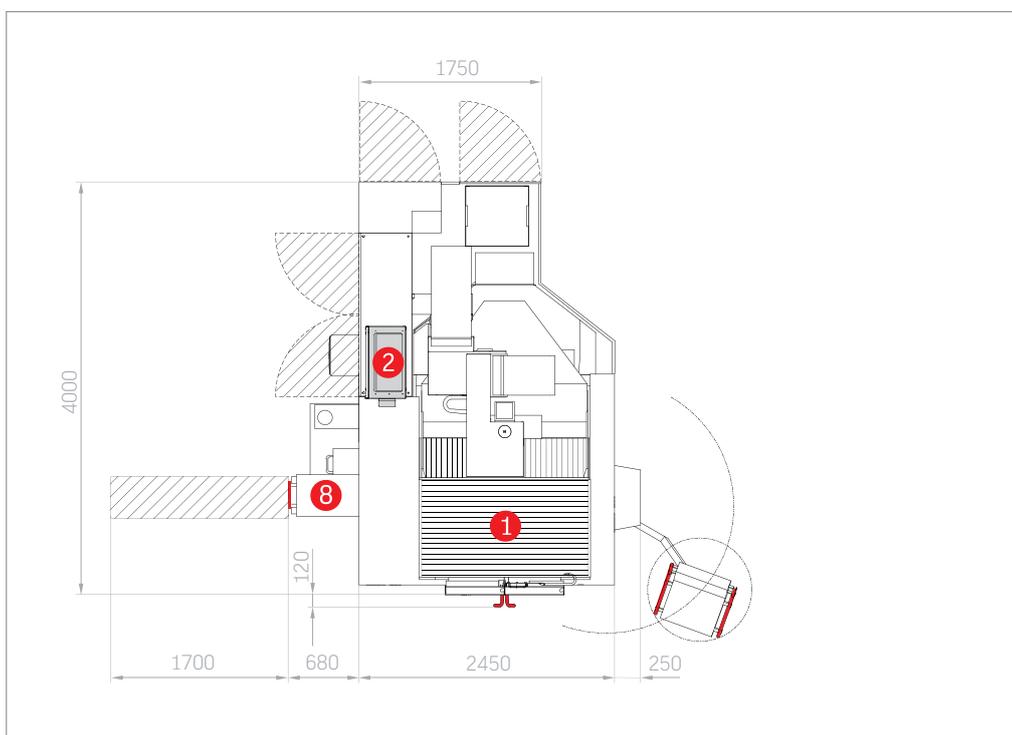
03.2 Options

The C 42 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 42 standard machine dimensions



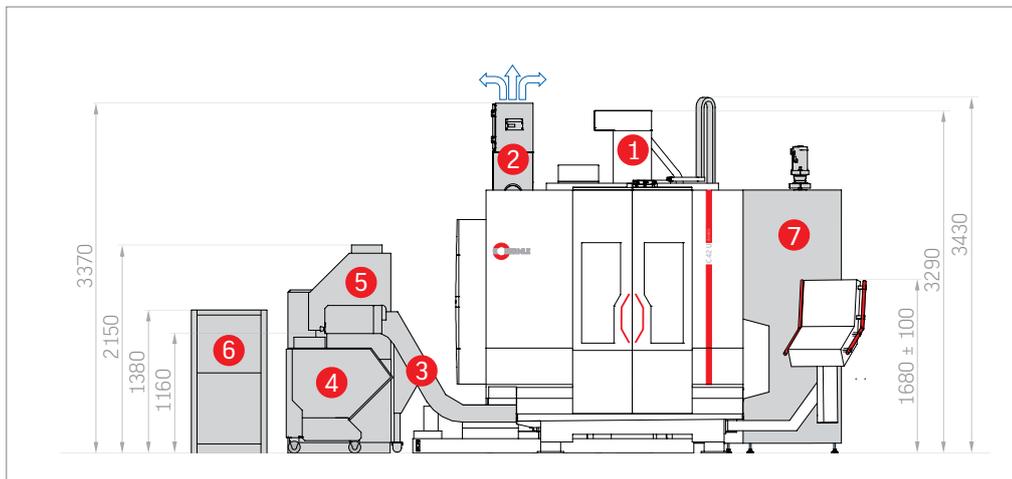
- 1 Machine
- 2 Emulsion mist extraction
- 8 Chip drawer



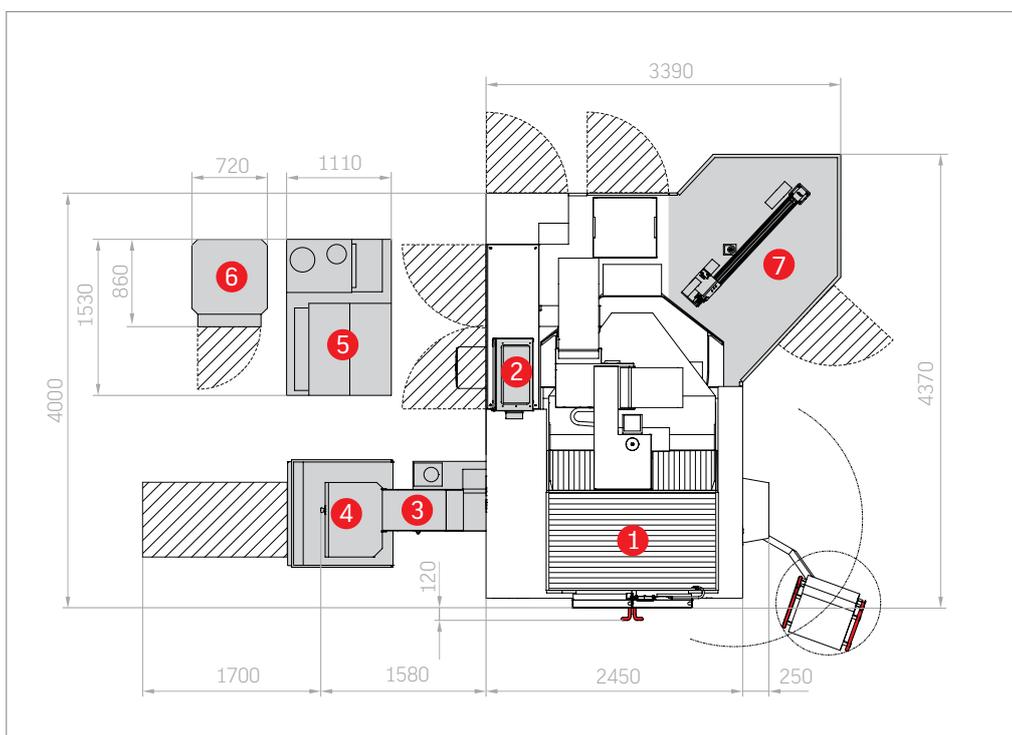
Options

- Additional magazine
- Automatic cabin door
- 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
- Cooling lubricant nozzle
- Electr. heat compensation
- Recooling unit for ICS
- 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
- Rotating transparent window
- Sealing air for scales
- Stainless steel production booth
- Status lamp
- Touch probe with preparation
- Tool breakage monitoring / measuring

C 42 dimensions . Additional magazine ZM 43 / ZM 87



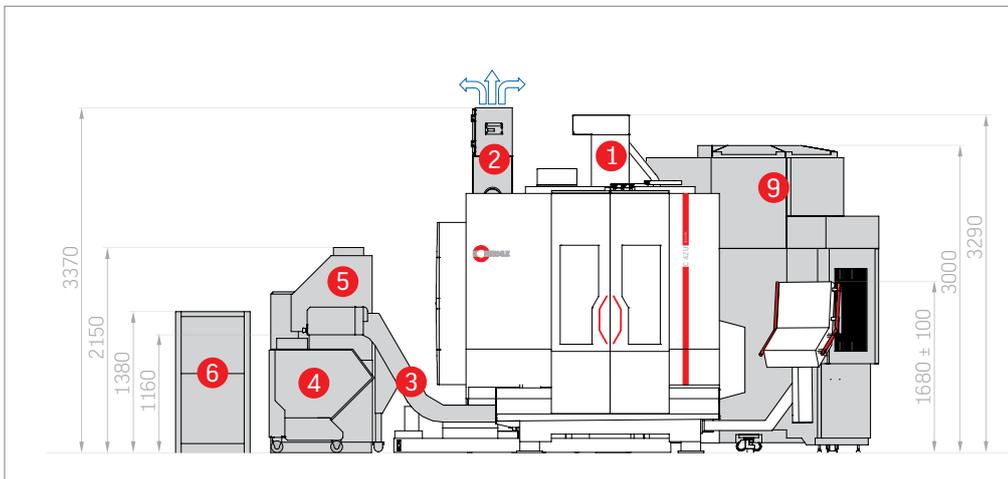
- 1 Machine
- 2 Emulsion mist extraction
- 3 Chip conveyor
- 4 Chip cart
- 5 Internal cooling lubricant supply
- 6 Recooling unit for ICS
- 7 Additional magazine ZM 43 / ZM 87



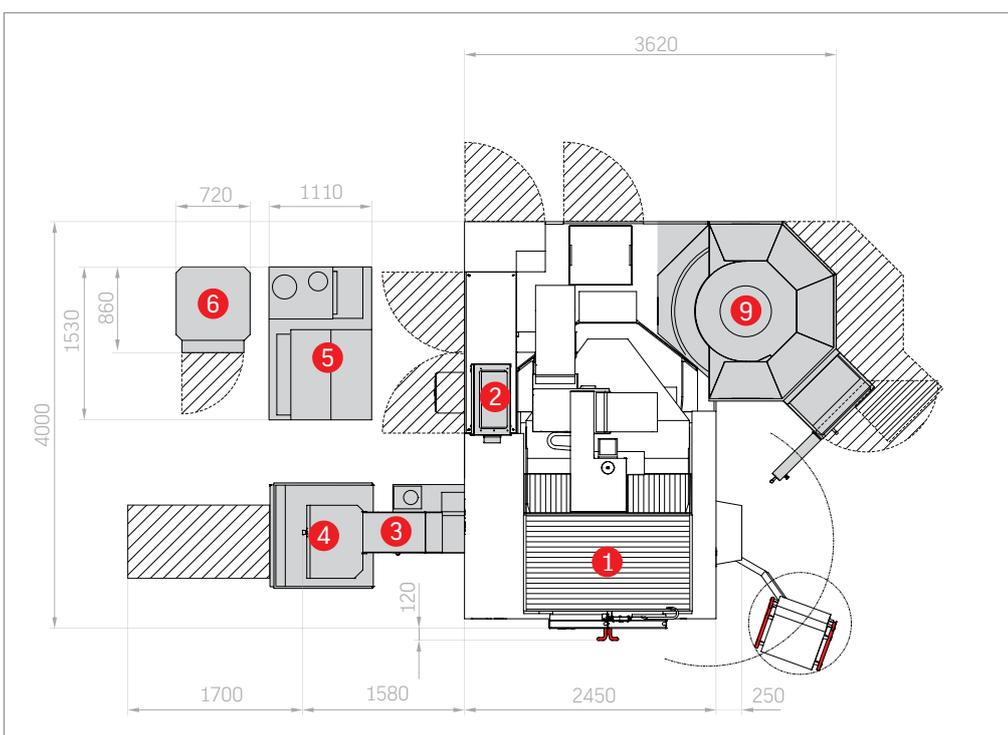
Options

- Additional magazine
- Automatic cabin door
- 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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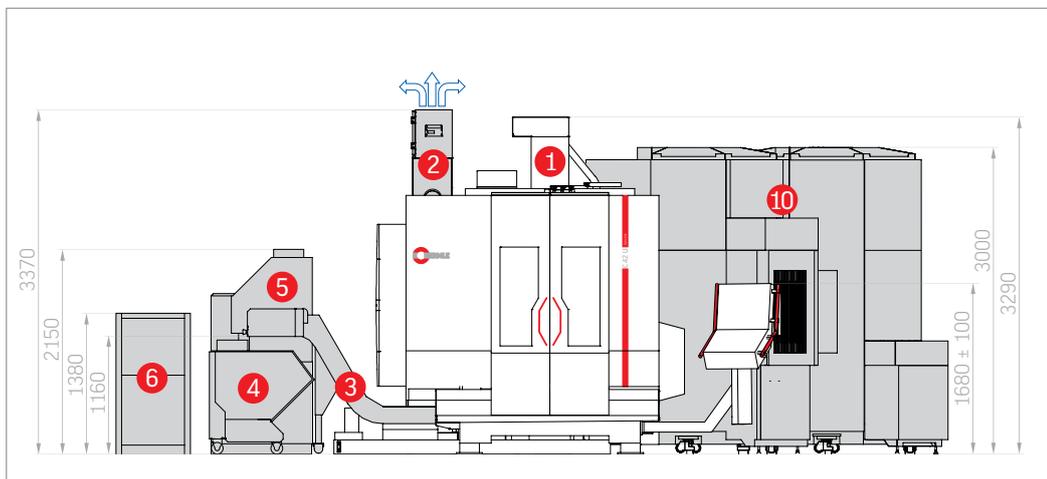
C 42 dimensions . Additional magazine single



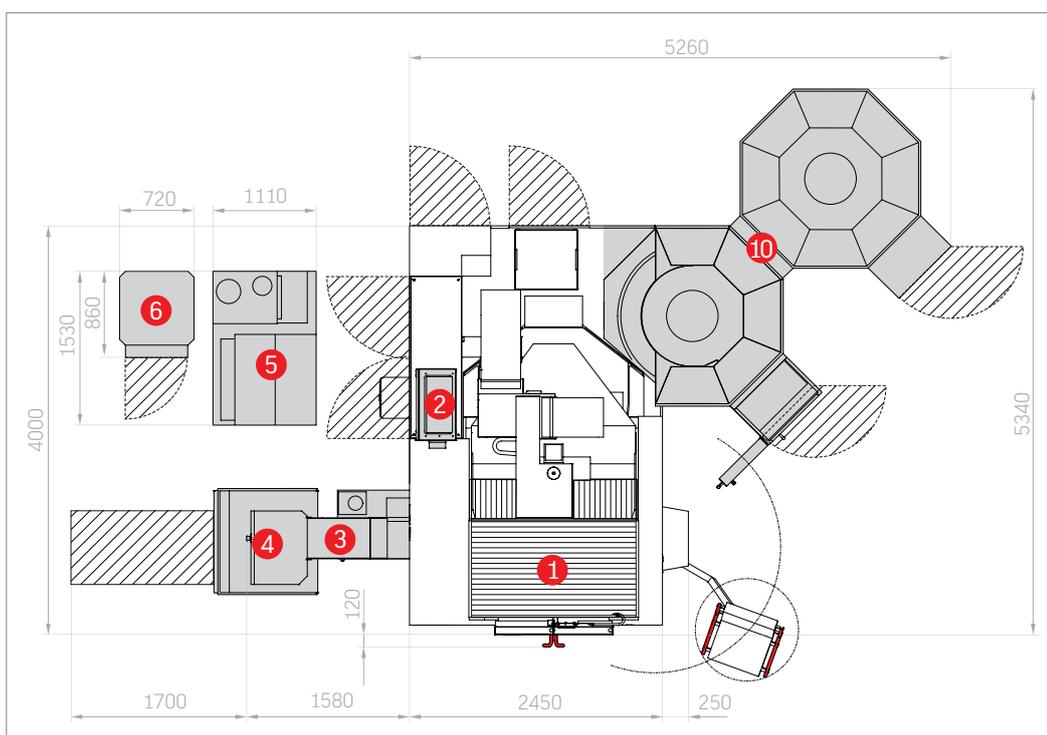
- 1 Machine
- 2 Emulsion mist extraction
- 3 Chip conveyor
- 4 Chip cart
- 5 Internal cooling lubricant supply
- 6 Recooling unit for ICS
- 9 Additional magazine single



C 42 dimensions . Additional magazine double

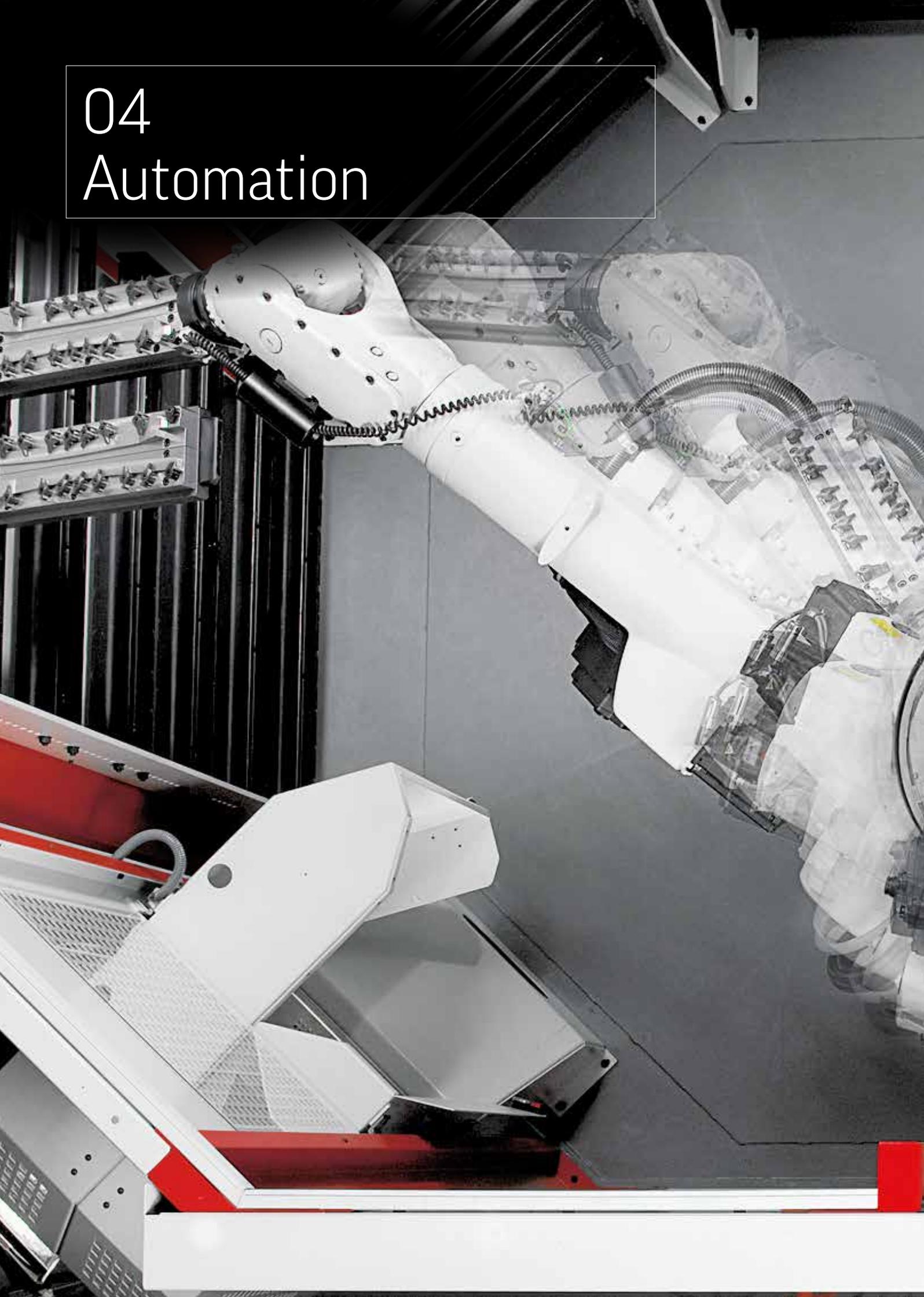


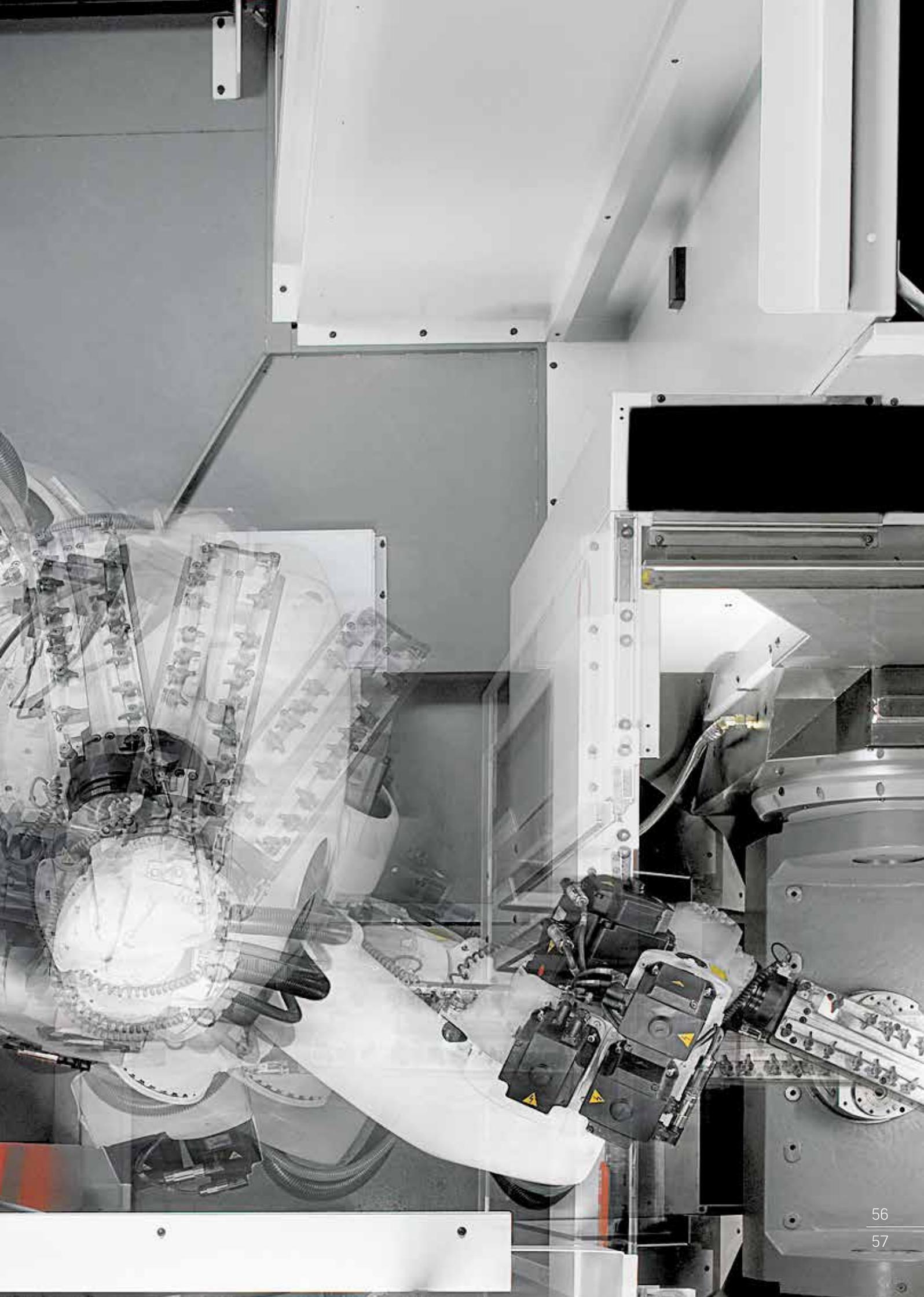
- 1 Machine
- 2 Emulsion mist extraction
- 3 Chip conveyor
- 4 Chip cart
- 5 Internal cooling lubricant supply
- 6 Recooling unit for ICS
- 9 Magazine extension ZM 87
- 10 Additional magazine double





04 Automation





04.1 Automation . C 42

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 loading the machine



RS 2 Kombi robot system setup station and rack arrangement



04.1 Automation . C 42

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.



Pallet changer PW 850



Pallet changer PW 850

Technical data PW 850 . 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 double or triple storage

- Pallet dimensions / workpiece sizes

400 x 400 / Ø 500 mm

500 x 500 / Ø 630 mm

630 x 500 / Ø 736 mm

630 x 630 / Ø 800 mm

- Pallet spaces

Without storage: 3

With double storage: 5

With triple storage: 6

- Transport weight

With double storage: max. 850 kg incl. pallet

With triple storage: max. 600 kg incl. pallet





GR2

GR1



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.

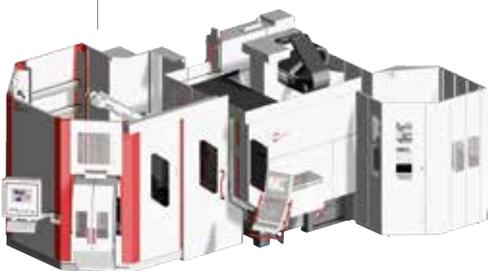
Pallet changer PW 850



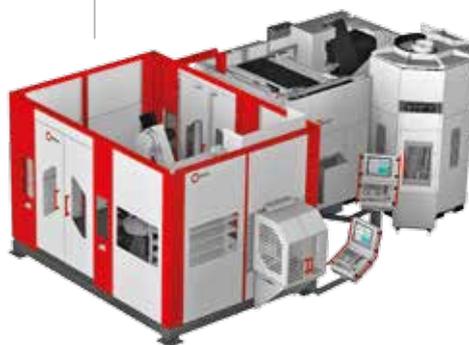
IH systems



RS 1 robot system



RS 2 robot system



RS 3 robot system



Basic system plus 2 machines . 90°



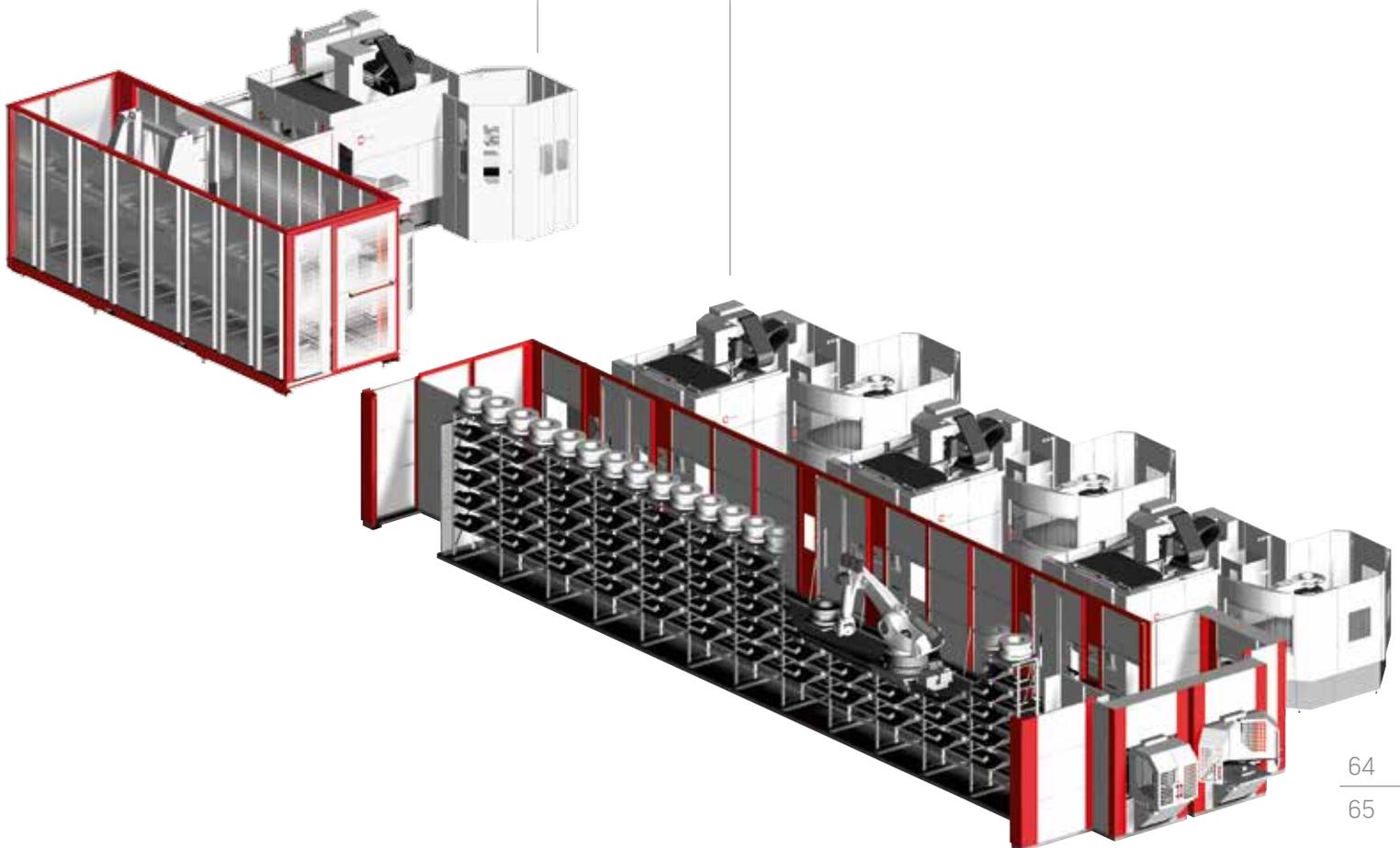
Basic system plus 2 machines . 180°



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 $\leq 8 \mu$
A: Pos. tolerance $\leq 16''$
C: Pos. tolerance $\leq 9''$

Hermle improved precision*:

X-Y-Z: Pos. tolerance $\leq 5 \mu$
A: Pos. tolerance $\leq 10''$
C: Pos. tolerance $\leq 6''$

*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, electr. 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

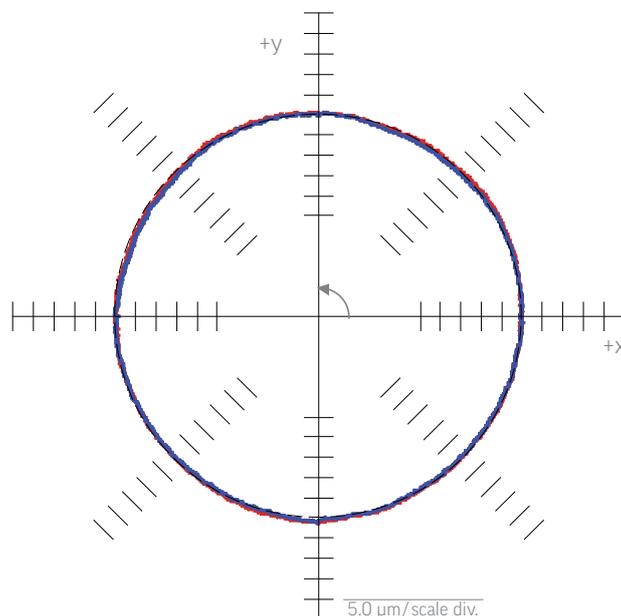
Precision package 1 (linear axes X, Y, and Z)

- Straightness optimisation
- Geometry adjustment and optimisation
- Straightness measurement
- X, Y, Z positioning accuracy Pos. tolerance $\leq 5 \mu$
- 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 position
- 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

*Not available for MT variants.



Run 1

Run 2

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 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.

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

Reduced 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

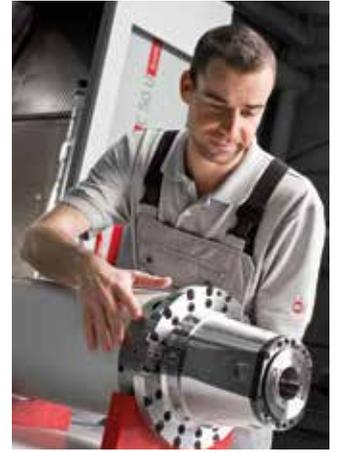
07 Services

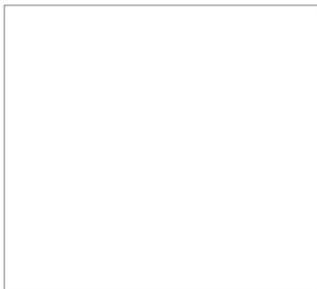
The perfection we insist on for our the development and production of our machines is also mirrored by our service department. Our service team provides more than just spare parts and rapid response support within hours. At Hermle, we see ourselves as a comprehensive service provider which provides customers 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.



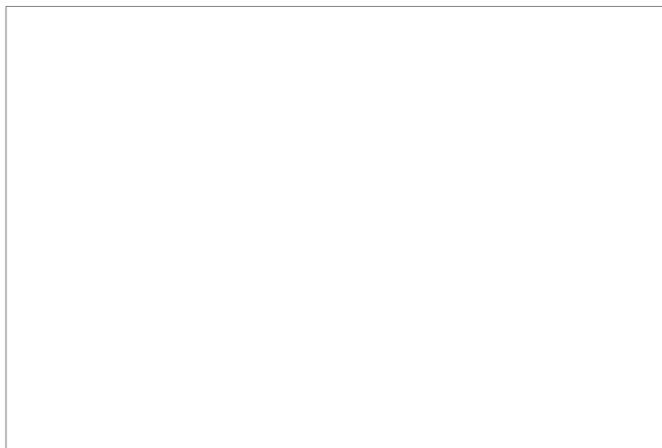




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Subject to technical modifications. 04/15/C42/1000/EN/ST



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