

C 400 basic

C 400 basic

strong and precise in
5-axis / 5-sided machining



The C 400 basic –
at home in all fields

Tool and mould making

Highly dynamic simultaneous
5-axes machining up to
a component weight of 600 kg

Medical engineering

Difficult to machine material –
in record time

Aerospace

Precision in perfection

Mechanical engineering

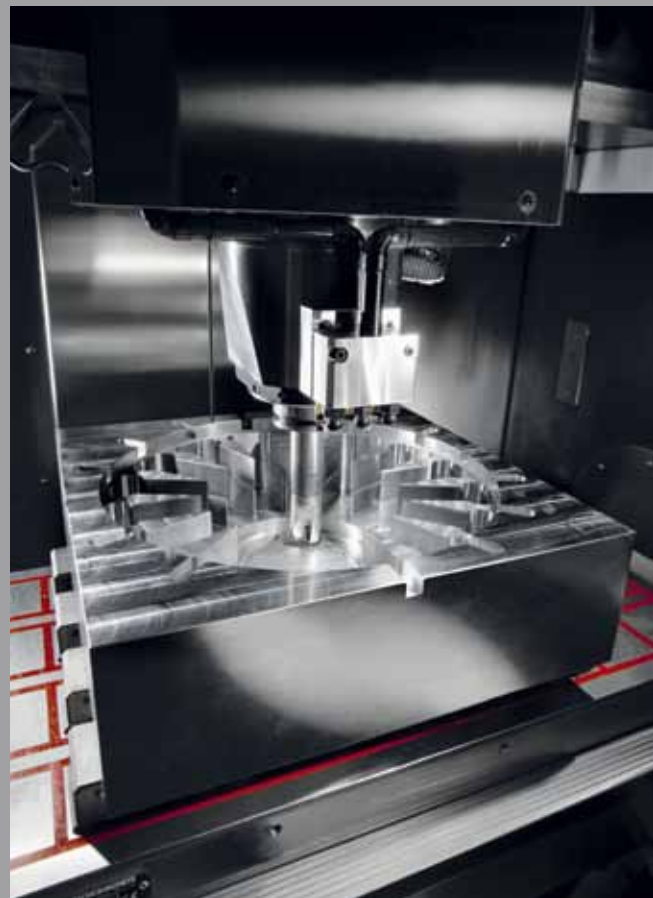
Large, bulky workpieces
up to 2,000 kg

Motor sport

Highest precision at
high availability

Subcontract industry

Dynamic, precise and reliable



C 400 basic



Collision protection
with collision monitor

3 axes in the tool
component independent dynamics

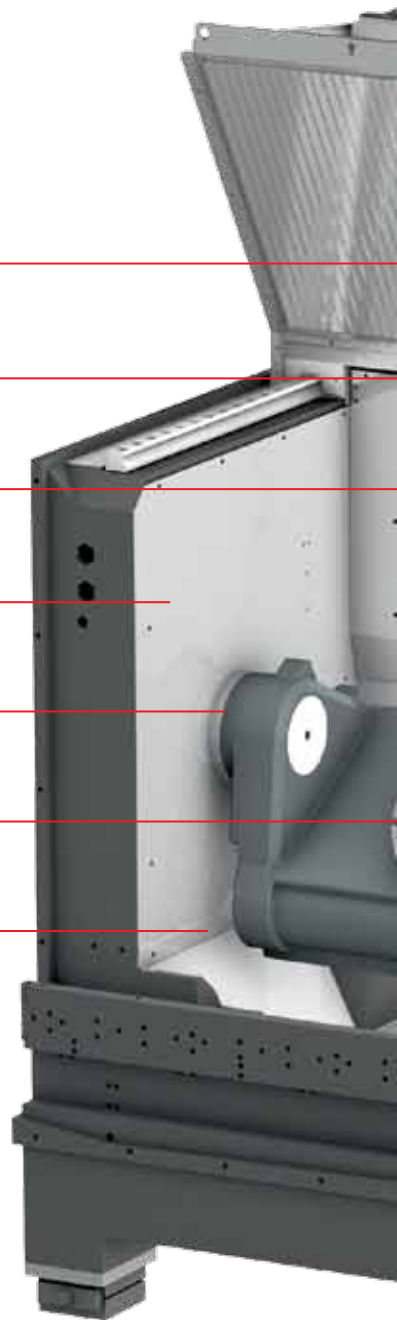
Pick-up magazine
integrated in the base, thereby saving space

Ideal chip clearance
dry machining

A-axis drive
outside working area

Large working area
relative to the machine footprint

Accessibility
very good ergonomics



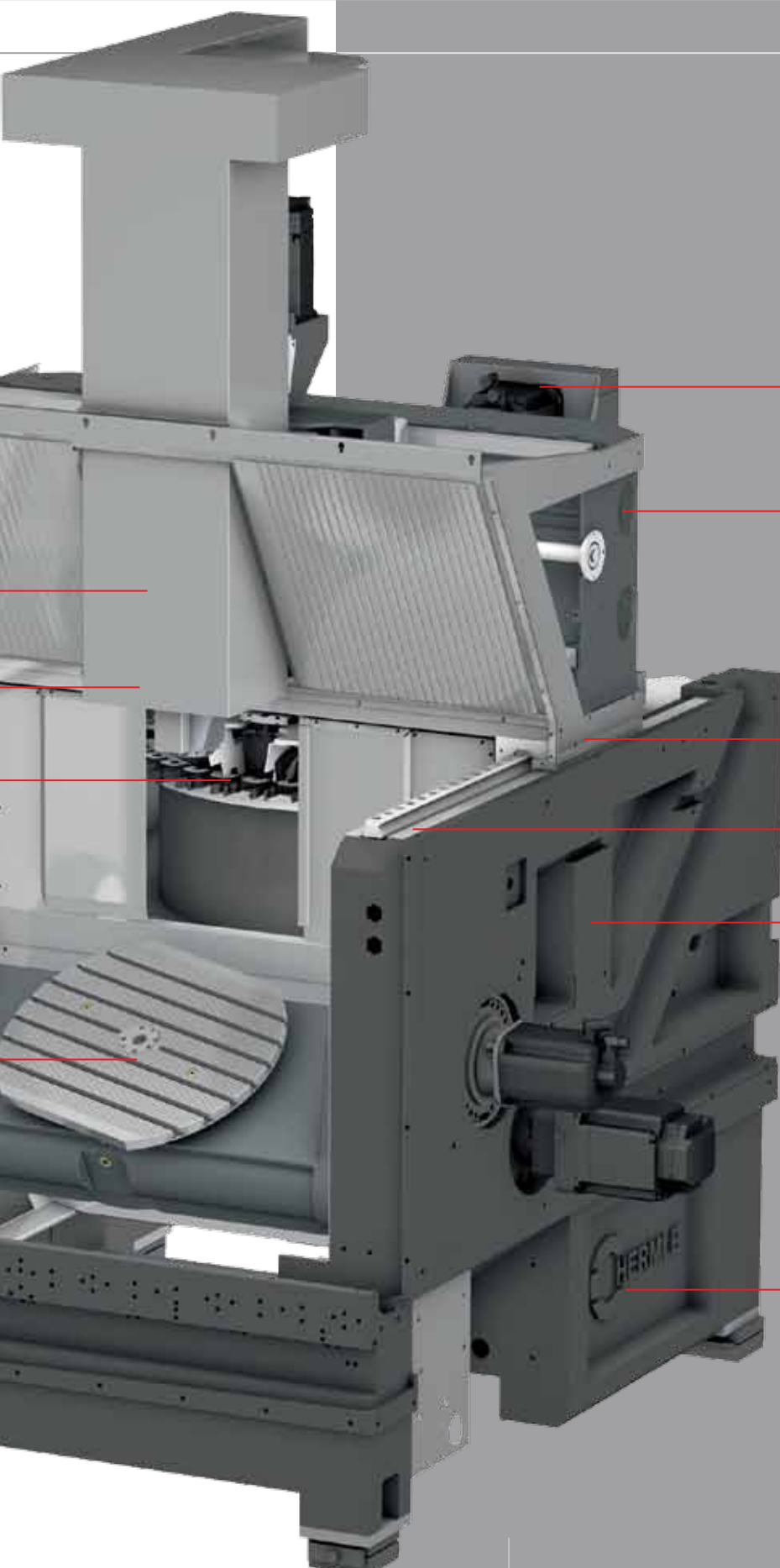
DYNAMICS

ACCURACY

COMPACTNESS

SURFACE QUALITY

AVAILABILITY



Central drive
centrally arranged Y axis main drive

Easy to service
ideal accessibility to the auxiliary units

Force characteristics
three guideways with one guideshoe
for ideal force balance

Linear axes
above the working area

Modified gantry design
with ideal main axis support

Mineral casting design
very good vibration
dampening properties

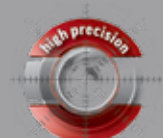


Illustration with extras

Construction

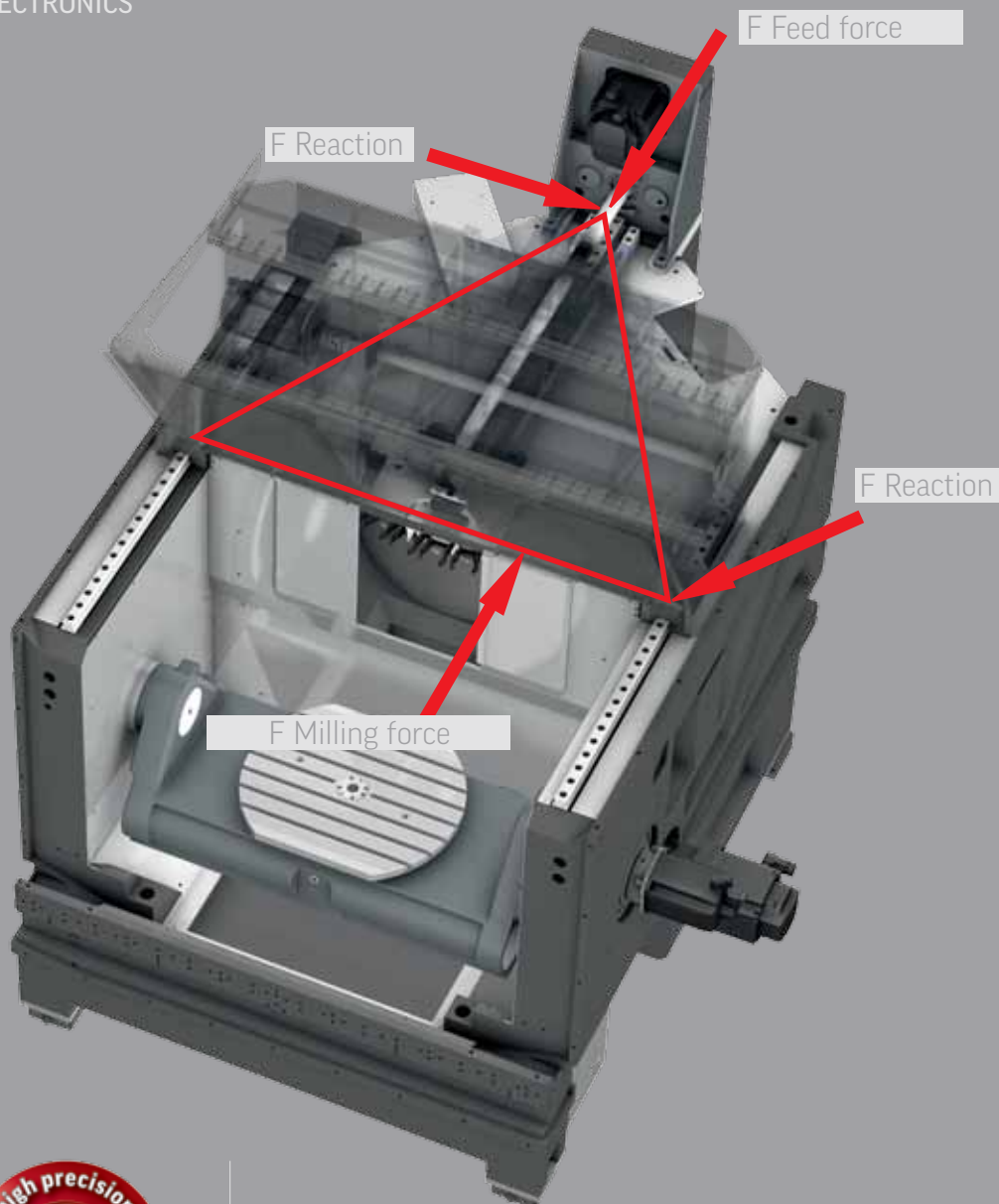
CONSTRUCTION

DESIGN

DRIVE

TOOL

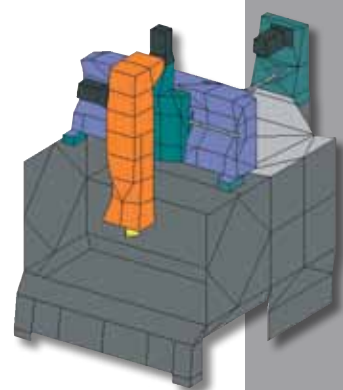
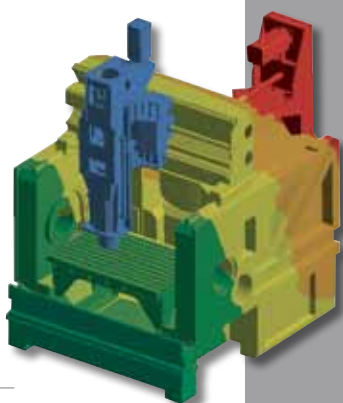
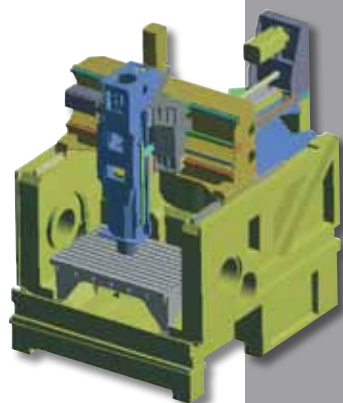
ELECTRONICS



Ideal power transmission through
three staggered guideways with central drive

Development principle

At Hermle, the static, dynamic and thermal properties of the machine are optimized by means of FEM calculations and machine simulations based on the 3-D CAD data and verified on the real machine using experimental studies.



Design principle

- Modified gantry design, the disadvantages of the conventional gantry design have been avoided
- Three axes in the tool, thus workpieces independent dynamics, ideal pre-requisite for rapid traverses and feed up to 35 m/min
- Drives and guideways outside/above the working area
- Z axis with electrical and mechanical quick stop against uncontrolled drop
- Compact design, thus little space required
- Complete transport
- No foundation required (4-point-support)
- Optimised static and dynamic properties
- Maximum utilisation, positioning and long term accuracy
- High dynamics in the machining process
- Short positioning and start times on account of high acceleration

Mineral casting version

- Mineral casting has excellent cushioning properties, very low thermal conductivity and will not absorb moisture
- Extremely high form and contour accuracy in all planes
- Optimum surface finish in combination with very narrow tolerances
- Ecological manufacturing and disposal of mineral casting

Drives and guideways

- Y slide as a traverse rests on three carriages with three staggered guideways
- Good guideway ratio of the traverse through three-point rest and central drive
- Ball screw and position measuring system are in direct vicinity of the central linear guideway
- Very rigid dynamic cross slide rest
- Roller recirculating guideways in all linear axes, thus constant dynamic conditions
- Digital AC servo motors with pretensioned ball screws
- Permanent position monitoring system
- Low-maintenance automatic central grease lubrication system

Tool change

- Automatic tool change in cycle
- Ring magazine for 38 tools as SK 40 or HSK A 63
- Integrated in the machine base unit
- Protected outside of the working area, thus no contamination of the tools

Electronics

- Digital drives
- Absolute measuring systems
- Latest control technologies
- All electronics have been integrated in a central cabinet
- Frequency-based recovery of the braking energy into the mains
- Switch cabinet with air-conditioning unit

Machine

ADVANTAGES OF A UNIQUE MACHINE CONCEPT

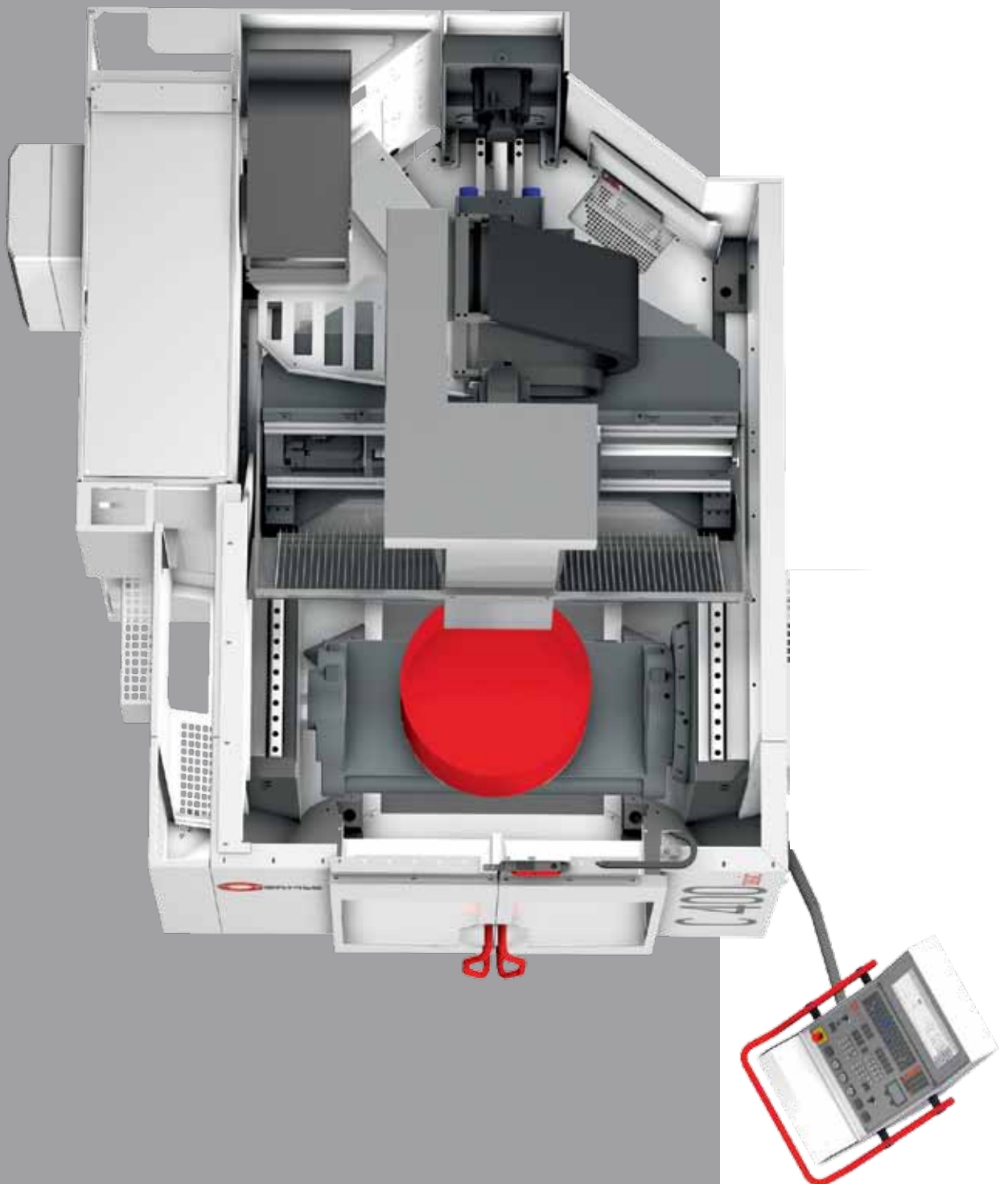
LARGEST WORKING AREA RELATIVE TO THE INSTALLATION SURFACE

UNIQUE AXIS CONCEPT

SHORT CHIP-TO-CHIP TIMES ON ACCOUNT OF INTEGRATED TOOL MAGAZINE

SINGLE LIFT TRANSPORT AND BOLT FREE INSTALLATION

CONSISTENT MODULAR DESIGN



Working area

Traverse	
X-Y-Z	850-700-500 mm
Rapid linear traverse	
X-Y-Z	35 m/min
Linear acceleration	
X-Y-Z	6 m/s ²

Main spindle drive

Speed	15,000/18,000 rpm
Torque	up to 180 Nm
Main power	up to 20 kW

Tool changer (pick-up)

Magazine positions	38
Chip-to-chip time*	approx. 6.0 s

Control

Heidenhain	iTNC530
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*(chip-to-chip times were determined in accordance with VDI 2852, sheet 1 in a 3-axis design)



Table variants

What makes our table concept so special

HIGH DEGREES OF FREEDOM IN THE WORKING AREA

VERY HIGH TABLE LOAD (UP TO 2,000 KG AT HIGHEST PRECISION)

NO CHIP COLLECTION ON THE TABLE (TABLE SWIVELLING)

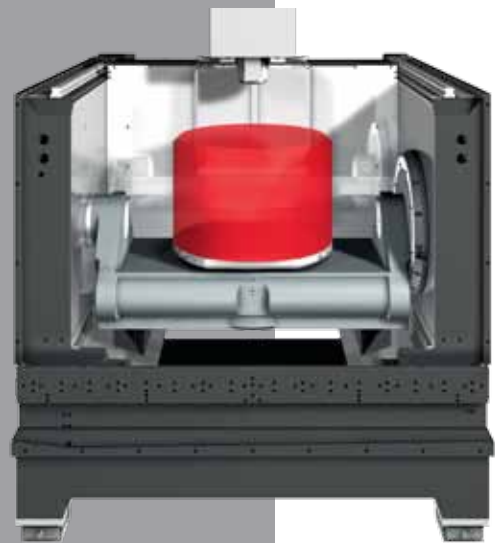
SWIVELLING AXIS A AND ROTARY AXIS C ARE IN THE WORKPIECE (U SHAPE)

WIDE TRUNNION SUPPORT DISPLACEMENT RESULTS
IN A LARGE COLLISION FREE CIRCLE



SWIVELLING AXIS A IN THE COMPONENT

Complicated 5-axis machining processes are carried out by comparatively small traverses of the linear axes



VERY LARGE COLLISION CIRCLE

Optimum utilization of the working area

SEPARATION OF THE ROTARY AND SWIVELLING AXES

User and programmer friendly based on easy follow-up of the table movements

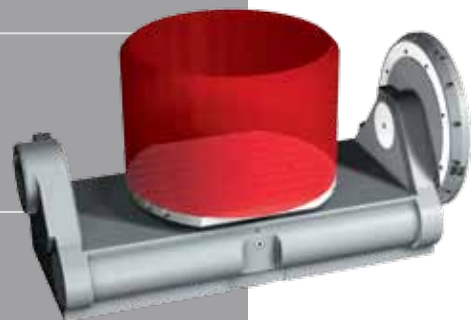
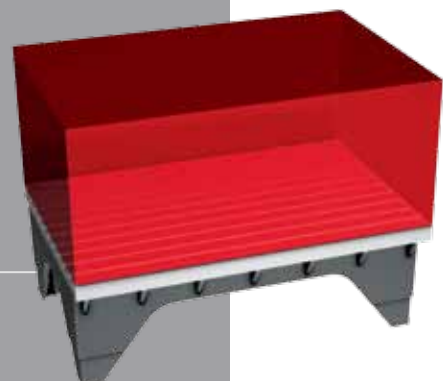


TABLE LOAD

High masses on all table variants

2.0 TONNES AND 400 dm³

Workpieces with 1,070 x 700 x 500 mm external dimensions to be machined in three axes at higher precision





Worm

NC-controlled swivelling rotary table

Clamping surface:	Ø 650 x 540 mm
Interference area of table plate:	Ø 650 mm
Swivel range:	+91° / - 139°
Drive type of swivelling axis A:	one-sided
Speed of swivelling axis A:	25 rpm
Drive type of rotary axis C:	Worm
Speed of rotary axis C:	35 rpm
Maximum table load:	600 kg
T grooves:	parallel 7 / 14 H7
Rotary feedthrough:	Sixfold



Rigid clamping table

Clamping surface:	1070 x 700 mm
Maximum table load:	2,000 kg
T grooves:	parallel 10 / 14 H7

Spindles

HIGH-TECH SPINDLES FOR DEMANDING MILLING PROCESSES

COLLISION PROTECTION WITH COLLISION MONITORING

SLIM-END SPINDLE FOR MACHINING DEEPER CAVITIES

FEW IRREGULAR EDGES (PREVENTION OF COLLISION)

TWO-PART SPINDLE (FASTER EXCHANGE IN THE EVENT OF A SERVICE CALL, MINIMAL TIME AND EXPENSE)

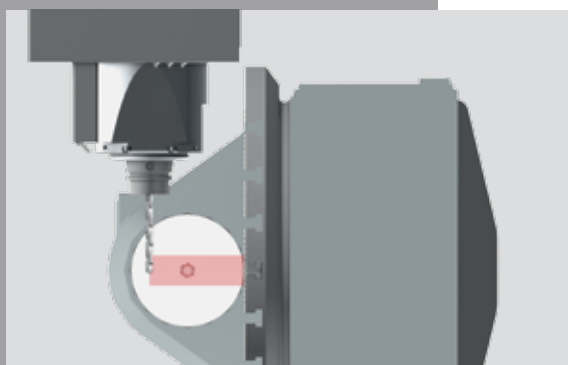
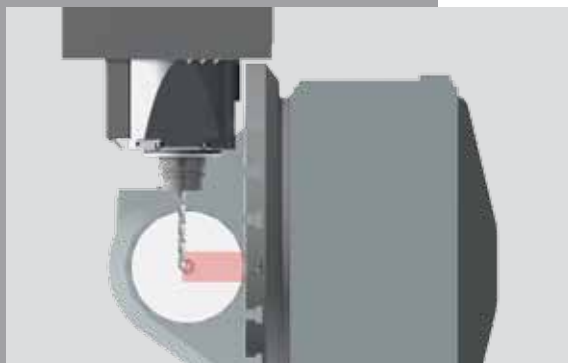
Each spindle has six displacement sleeves to compensate the collision energy in case of a collision in the Z-direction

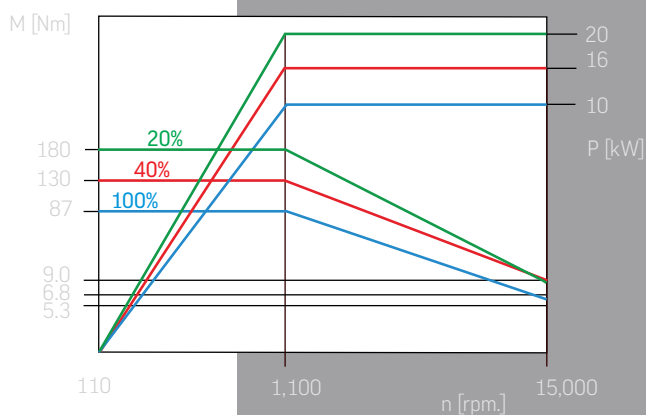
Prior to a collision

After a collision



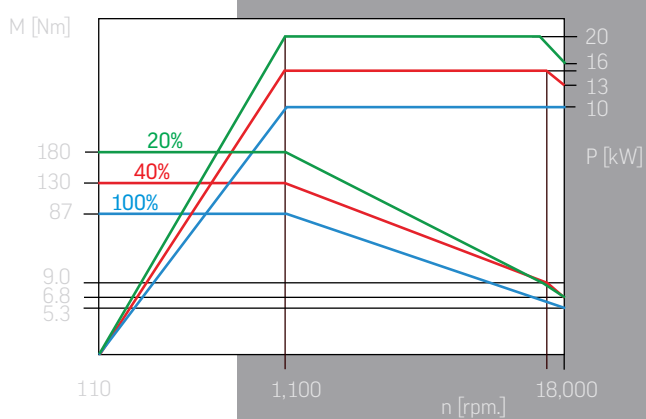
Very slender spindle end.





Spindle

Spindle speed:	15,000 rpm.
Torque:	180 Nm
Main power:	20 kW
Interface:	SK 40 / HSK A 63
Collision protection:	Upsetting sleeves



Spindle

Spindle speed:	18,000 rpm.
Torque:	180 Nm
Main power:	20 kW
Interface:	HSK A 63
Collision protection:	Upsetting sleeves

Magazine

PICK-UP MAGAZINE

INTEGRATION INTO THE MACHINE BASE

VERY GOOD ACCESSIBILITY

CONTROL PANEL MOVEABLE TO THE LOADING POINT

COVERS FOR THE SPINDLE TAPERS



Illustration with extras

Tool changer (pick-up)

Magazine positions:	38
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Chip-to-chip time*:	approx. 6 s
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Maximum tool length:	300 mm
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Maximum tool diameter:	Ø 80 mm
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Maximum tool diameter with corresponding adjacent pocket allocation:	Ø 125 mm
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Maximum magazine load at 38 units:	152 kg
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*(chip-to-chip times were determined in accordance
with VDI 2852, sheet 1 in a 3-axis design)

Expansion of the tool storage capacity by:

Additional magazine:	87 pockets
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Maximum tool length:	300 mm
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Maximum tool diameter:	Ø 80 mm
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Maximum tool diameter with corresponding adjacent pocket allocation:	Ø 125 mm
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Maximum tool weight:	8 kg
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Control

HEIDENHAIN iTNC 530

3D SOFTWARE

15" TFT-TECHNOLOGY

USER-DEFINED SOFTKEYS

smarTNC

CONTROLS FOR DEMANDING MILLING PROCESSES

Whether for tool and mould making, in production or in high-speed machining, they stand out for their many advantages.

SAFE CONTROL

Control with integrated safety technology.

E-MESSENGER

Increases the availability of the machines and minimises production failures.

TELESERVICE

Teleservice ensures even faster support in case of programming and operating problems.

HERMLE WDS

The Maintenance Diagnostic System (WDS) makes it possible to record informative values and evaluate them, thus facilitating preventive and status-oriented maintenance and efficient diagnostics in case of malfunctions.



* For detailed information, please refer to the individual leaflets.

Technical data

Working area	Traverse	X axis	850 mm	
	Traverse	Y axis	700 mm	
	Traverse	Z axis	500 mm	
	Linear rapid traverse	X-Y-Z	35 m/min	■
	Linear acceleration	X-Y-Z	6 m/s ²	
	Linear feed force	X-Y-Z	7000 N	
Main spindle drive	Speed	15,000 rpm.	SK 40 / HSK A 63	■
	Main power / torque	20 c.d.f.	20 kW/180 Nm	
	Speed	18,000 rpm.	HSK A 63	●
	Main power / torque	20 c.d.f.	20 kW/180 Nm	
Control unit	Heidenhain		iTNC 530	■
Tool changer (pick-up)	Magazine pockets		38	■
	Chip-to-chip time*		approx. 6 s	
	*(chip-to-chip times were determined in accordance with VDI 2852, sheet 1 in a 3-axis design)			
	Maximum tool length		300 mm	
	Maximum tool diameter		Ø 80 mm	
	Maximum tool diameter with corresponding adjacent pocket allocation		Ø 125 mm	
	Maximum magazine load at 38 units		152 kg	
Extension of tool storage	Additional magazine		87	●
	Maximum tool diameter in additional magazine		Ø 80 mm	
	Maximum tool diameter with corresponding adjacent pocket allocation in additional magazine		Ø 125 mm	
	Maximum tool weight		8 kg	
Connection-values (machine)	Mains connection		400 V / 50 Hz	
	Power consumption		43 kVA	
	Compressed air		6 bar	
Weight	(Standard version)		approx. 9.5 t	

Hermle AG reserves the right to carry out modifications without prior notification, which may lead to deviating technical data.

Options

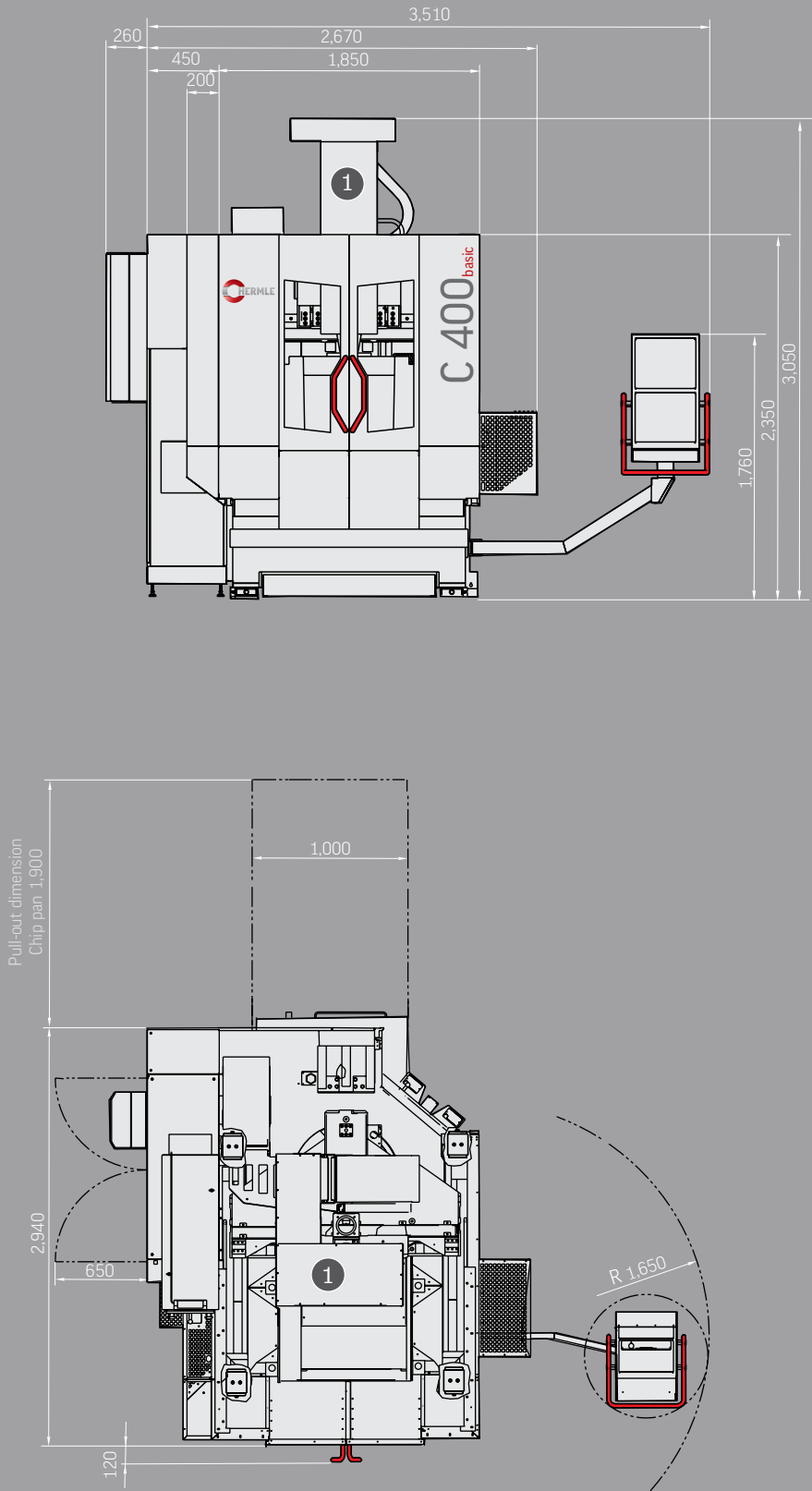
Electrical heat compensation	●
Electrical hand-held control module	●
Touch probe including preparation	●
Preparation for touch probe	●
Tool breakage monitoring / measuring system	●
Coolant nozzle	●
Air blast through the spindle centre	●
BDE signal	●
Emulsion mist extraction	●
Air purge for linear scales	●

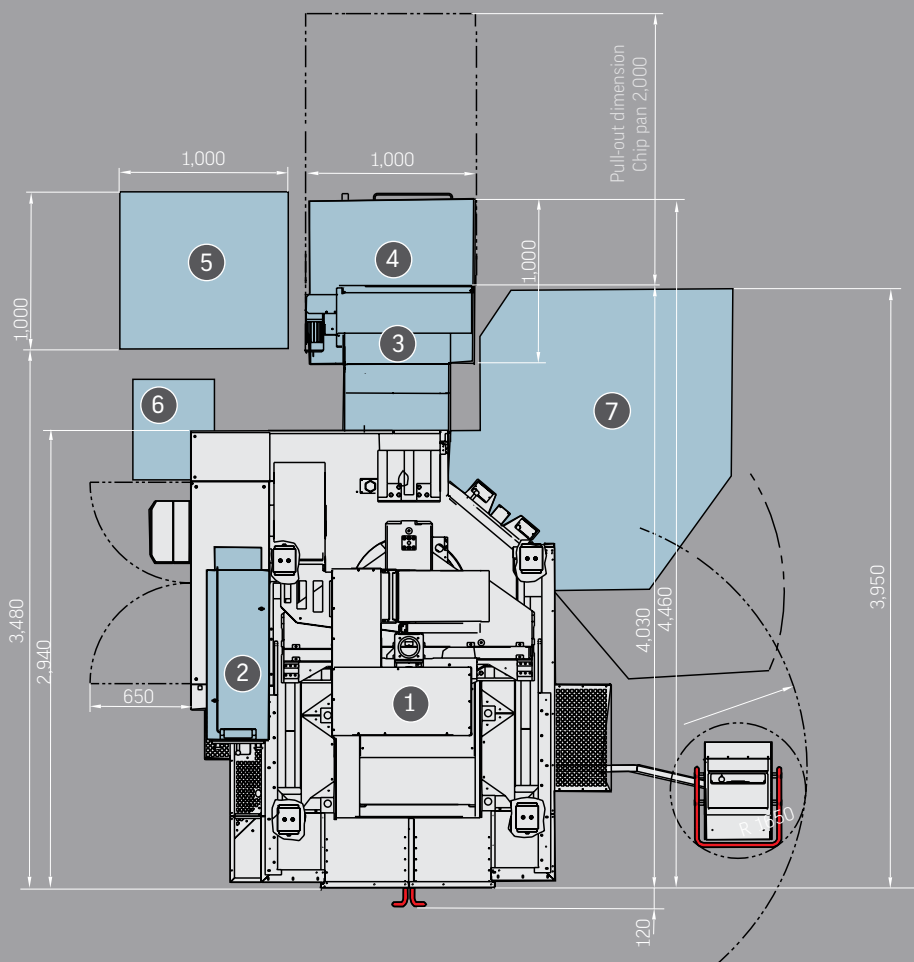
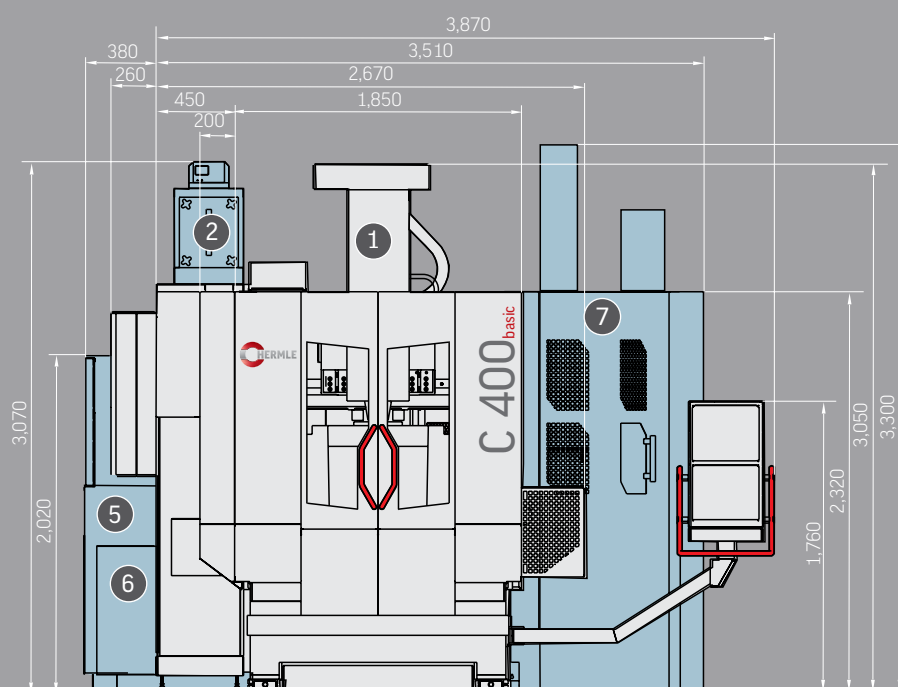
Table variants	NC-controlled swivelling rotary table			●
			Ø 650	
	Clamping surface flattened to	650 x 540 mm		
	Collision circle of the table plate	Ø 650 mm		
	Swivel range	+91° / - 139°		
	Swivel range swivelling axis A	one side		
	Speed - swivelling axis A	25 rpm.		
	Type of drive rotary axis C	worm		
	Speed rotary axis C	35 rpm.		
	Maximum table load	600 kg		
	T-grooves parallel	7 / 14H7		
	Rotary feedthrough	Sixfold		
	Rigid clamping table			●
	Clamping surface	1,070 x 700 mm		
	Maximum table load	2,000 kg		
	T-grooves parallel	10 / 14H7		
Position measuring system direct	Resolution	0.0001 mm		■
Position tolerance	Tp in X-Y-Z axis keeping with German standard VDI/DGQ 3441 (determined at 20° Celsius +/- 1° Celsius constant ambient temperature. Our products are subject to German export laws and exports have to be approved as the achievable accuracy may be smaller / equal than 6 µm.)	0.008 mm		■
Coolant system	Amount of coolant	350 l		■
Through the spindle coolant supply with paper tape filter	Amount of coolant	570 l		●
	Pressure (infinitely variable manuel)	max. 40 bar / 27 l/min		
Chip pan	Removable chip pan			●
Chip conveyor	Scraper belt conveyor			●
	Ejection height of chip conveyor	1,100 mm		
	Chip cart	450 l		●
Hydraulic system	Operating pressure	120 bar		■
Central lubrication system	Minimum quantity lubrication			■

■ standard equipment

● to order

Dimensions





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The information in this leaflet only contains general descriptions or performance characteristics which in a real application do not always meet the description or which may change by further development of the products.

The requested performance parameters shall be binding only, if they are explicitly agreed within the sales contract.



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