

C 22

for flexibility

C 22

The perfect symbiosis of flexibility, compactness, dynamics and equipment

The C22 U -
at home in all fields

Tool and mould making

Highly dynamic simultaneous
5-axes machining up to a
component weight of 300 kg

Medical engineering

Difficult to machine material -
in record time

Aerospace

Precision in perfection

Mechanical engineering

Fully automatic and flexible
manufacturing systems

Motor sport

Highest precision at
high availability

Subcontract industry

Dynamic, precise and reliable





C 22

for flexibility

3 axes in the tool

component independent dynamics with individual axis acceleration rates of up to 15 m/s²

Collision protection

with collision inquiry for spindles up to 18000 rpm

Linear axes

above the working area

Ideal chip clearance

no projecting edges / stainless steel design

Large, nearly cubic / homogeneous working area

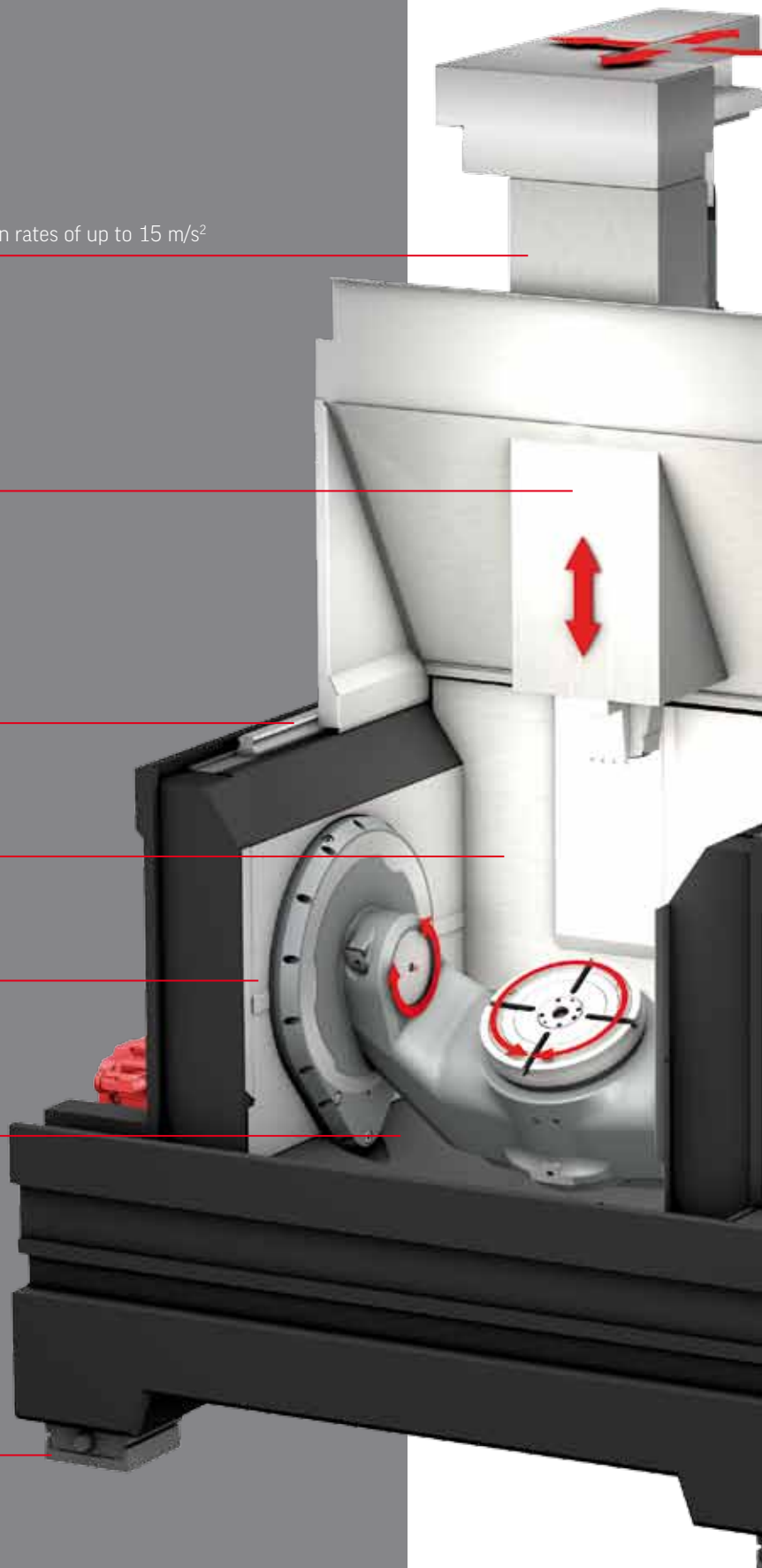
for a high degree of freedom in 5-axis machining

Accessibility

750-mm door opening for excellent ergonomics

4-point installation

via wedge mounts with spherical seat



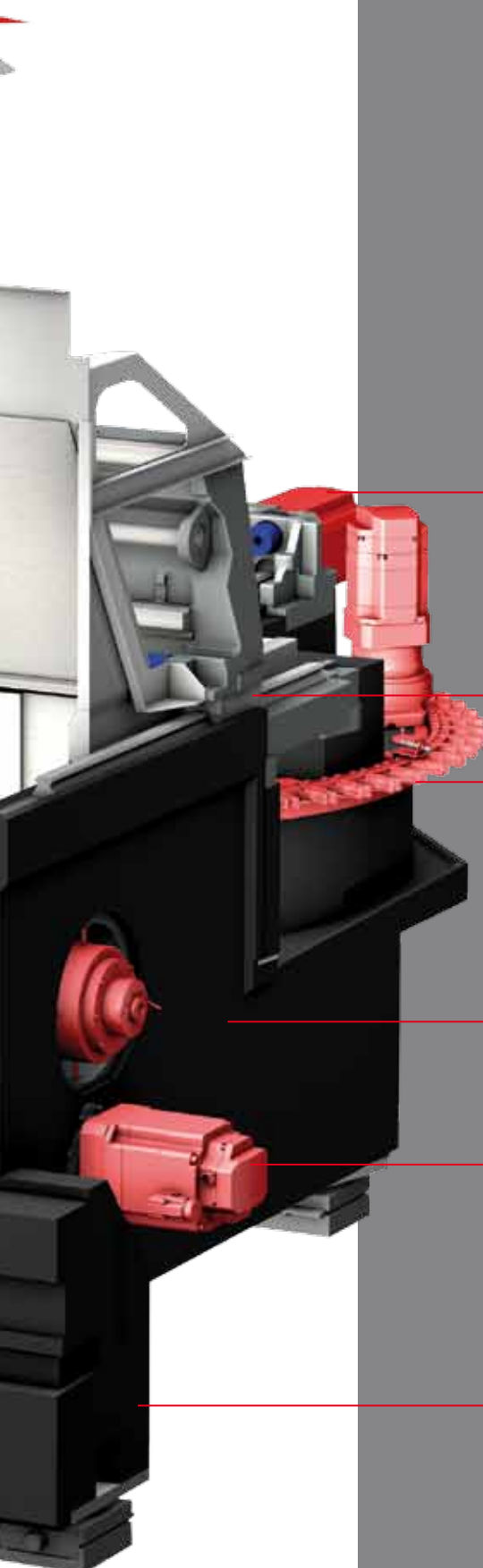
DYNAMICS

ACCURACY

COMPACTNESS

FLEXIBILITY

EQUIPMENT



Central drive

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

Force characteristics

four guideways with one guideshoe for ideal force balance

Large pick-up magazine

integrated to save space with 55/65 tool pockets

Modified gantry design

with ideal main axis support

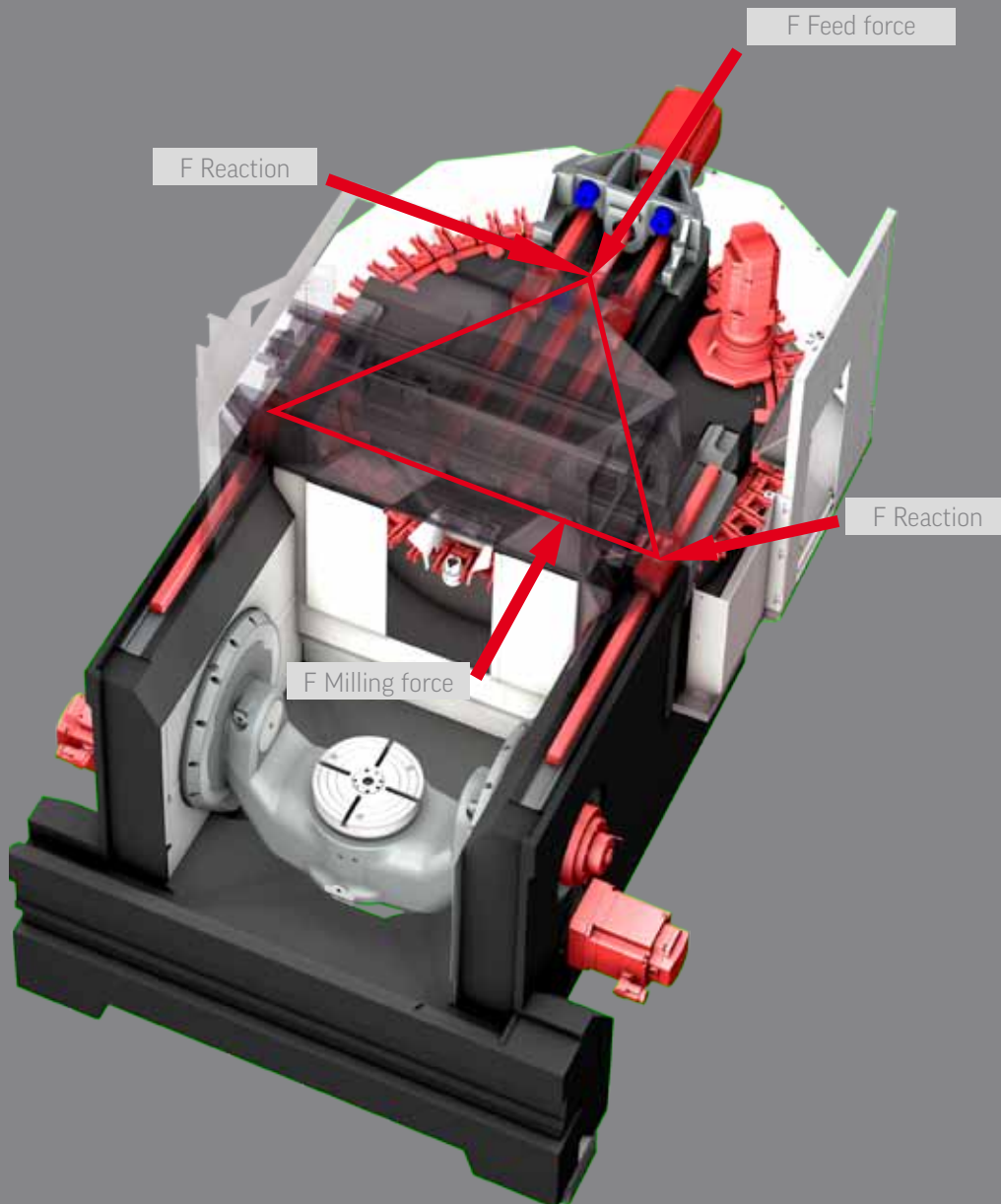
Tandem mechanical/torque drive

Torsion avoidance and high level of accuracy

Mineral casting design

very good vibration dampening properties

Construction



Ideal power transmission through
four 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.

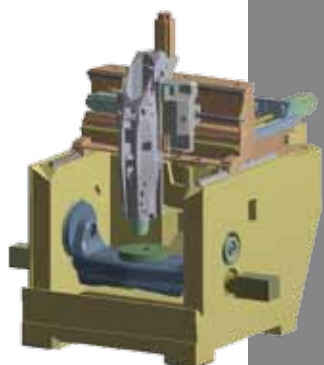
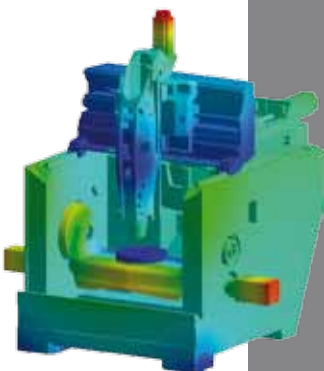
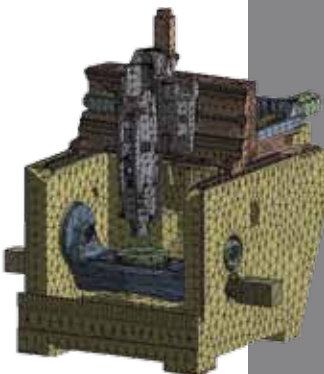
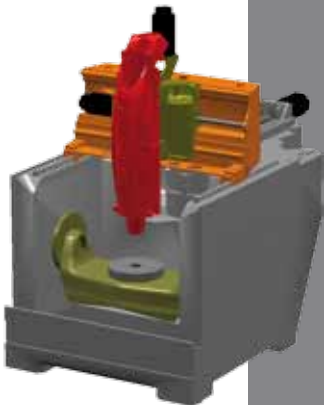
CONSTRUCTION

DESIGN

DRIVE

TOOL

ELECTRONICS



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 50 m/min
- Modular configuration of the table and expansion variants in the multi-functional machine base
- Drives and guideways outside / above the working area
- 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 of 15 m/s²

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 four carriages with four staggered guideways
- Good guideway ratio of the traverse through four-point rest and central drive
- Ball screw and position measuring system are in direct vicinity of the central linear guideways
- 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 55/65 tools as SK 40 or HSK A 63 (HSK A 50/HSK E 40)
- Integrated in the machine base unit
- Protected outside the work area and thus minimised risk of tools becoming soiled

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

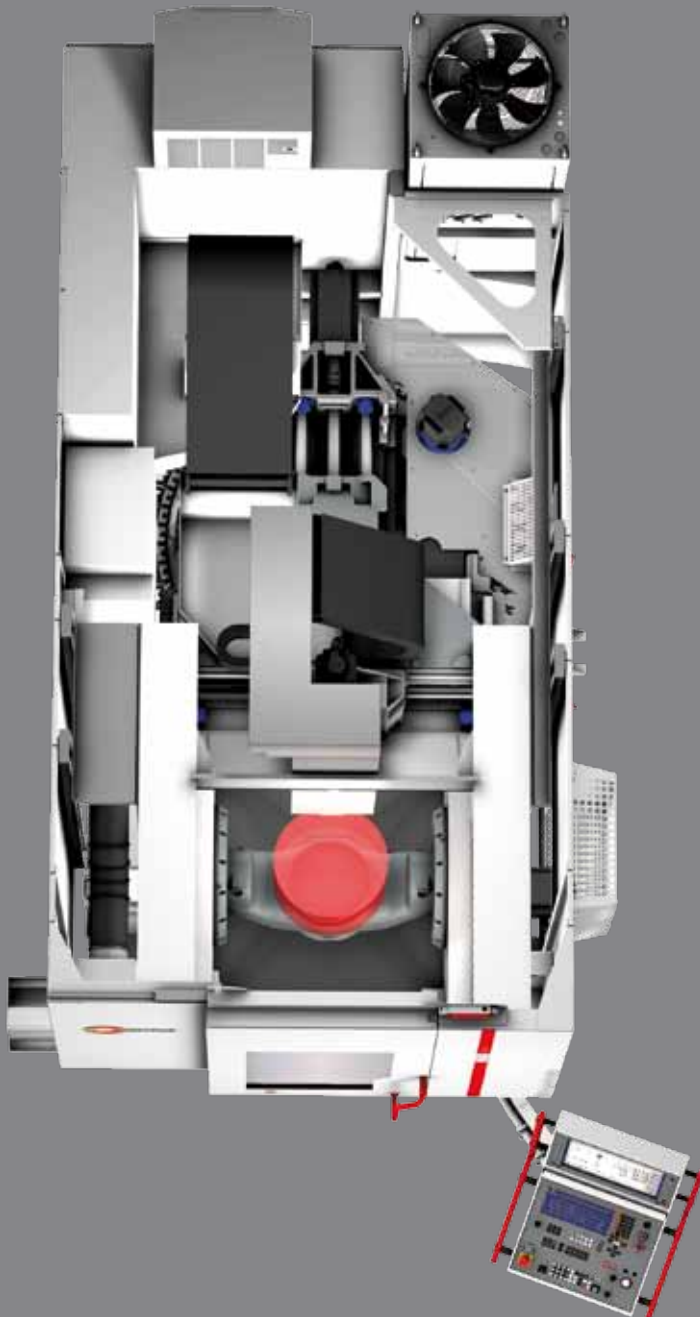
LARGEST WORKING AREA RELATIVE TO THE INSTALLATION SURFACE

UNIQUE AXIS CONCEPT

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

SINGLE LIFT TRANSPORT AND BOLT FREE INSTALLATION

CONSISTENT MODULAR DESIGN FROM THE STANDARD MACHINE
TO THE FLEXIBLE MACHINING CENTRE





Working area

Traverse	
X-Y-Z	450-600-330 mm
Rapid linear traverse	
X-Y-Z (dynamic)	30 (50) m/min
Linear acceleration	
X-Y-Z (dynamic)	8 (15) m/s ²

Main spindle drive

Speed	15,000, 18,000, 30,000, 42,000 rpm
Torque	up to 80 Nm
Main power	up to 38 kW

Tool changer (pick-up)

Magazine position	55/65
Chip-to-chip time*	approx. 4.5 s

Control

Heidenhain	iTNC530
Siemens	S 840 D SL

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

Table variants

TWO-SIDED TABLE BEARINGS FOR MAXIMUM PRECISION

HIGH DEGREES OF FREEDOM IN THE WORKING AREA

TABLE LOAD UP TO 300 KG WITH MAXIMUM PRECISION

NO CHIP COLLECTION ON THE TABLE (TABLE SWIVELLING)

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

LINEAR TECHNOLOGY ENSURES HIGH DYNAMICS

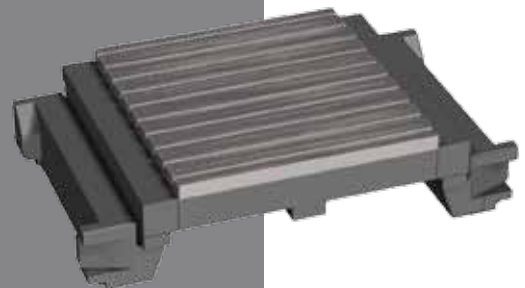
WIDE TRUNNION SUPPORT DISPLACEMENT RESULTS
IN A LARGE COLLISION FREE CIRCLE

Rigid clamping table

Clamping surface: 600 x 630 mm

Max. table load: 750 kg

Rigid



NC-controlled swivelling rotary table

Clamping surface: Ø 320 mm

Swivel range: +/- 135°

Type of drive/speed

C-axis rotary axis: Torque 80 rpm

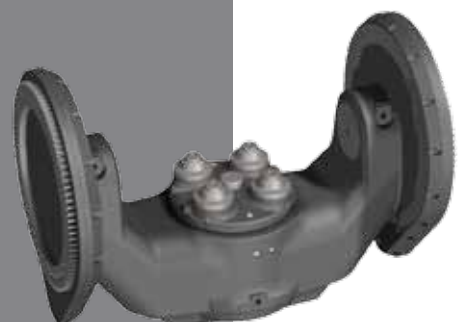
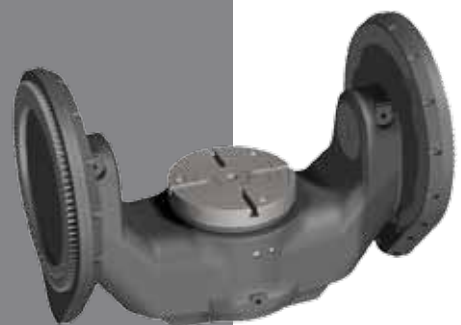
A-axis swivelling axis: mechanical one-sided 25 rpm

mechanical tandem 55 rpm

Torque tandem 80 rpm

Max. table load: 100 kg

Torque



NC-controlled swivelling rotary table

Zero-point clamping systems /
pallet clamping system

Worm

NC-controlled swivelling rotary table

Table plate with clamping surface: \varnothing 320 mm

Swivel range: +/- 135°

Type of drive/speed

C-axis rotary axis: worm 40 rpm

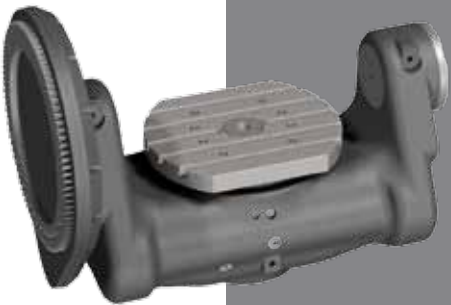
A-axis swivelling axis: mechanical one-sided 25 rpm

Max. table load: 300 kg



NC-controlled swivelling rotary table

Table plate with clamping surface: \varnothing 450 x 360 mm



NC-controlled swivelling rotary table

Built-in clamping device: SK 50



NC-controlled swivelling rotary table

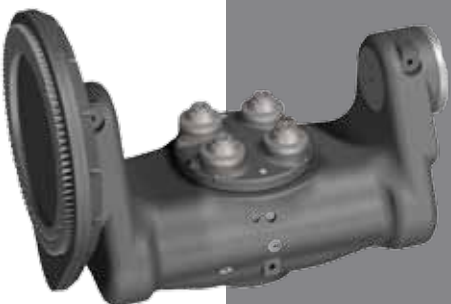
Built-in clamping device: HSK 100



NC-controlled swivelling rotary table

Zero-point clamping systems

pallet clamping system



Spindles

HIGH-TECH SPINDLES FOR DEMANDING MILLING PROCESSES

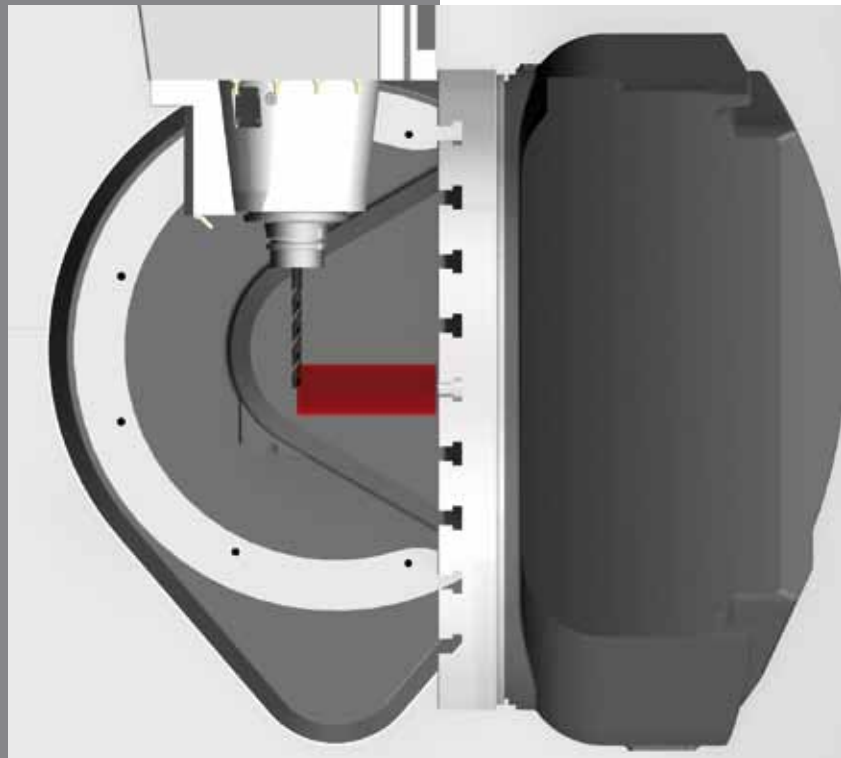
SLIM-END SPINDLE FOR MACHINING DEEPER CAVITIES

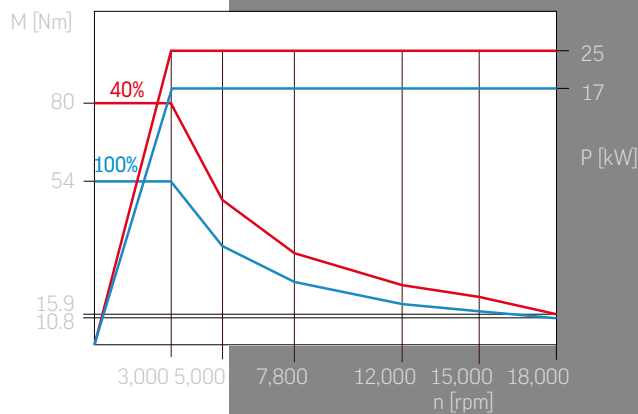
FEW IRREGULAR EDGES (PREVENTION OF COLLISION)

FLEXIBILITY IN SPINDLE TECHNOLOGY

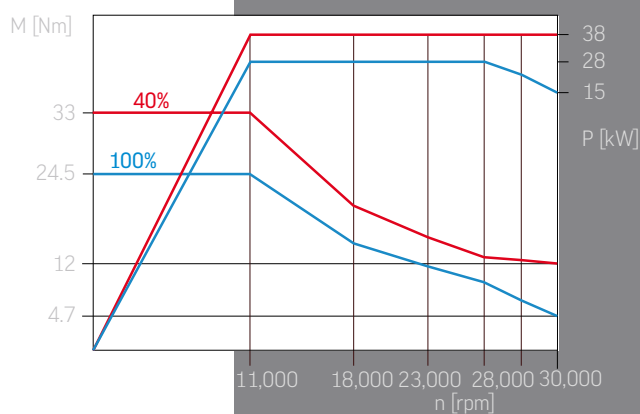
Speed	Interface	Number of tools	Collision protection
15,000 rpm	SK 40	55	Yes
18,000 rpm	HSK A 50	65	Yes
18,000 rpm	HSK A 63	55	Yes
30,000 rpm	HSK A 50	65	No
42,000 rpm	HSK E 40	65	No

Very slender spindle end

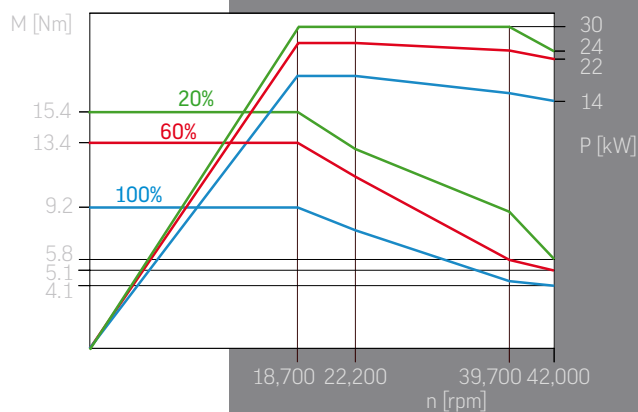




Spindle	
Spindle speed:	15,000 rpm
Torque:	80 Nm
Main power:	25 kW
Interface:	SK 40
Collision protection:	Upsetting sleeves
Spindle speed:	18,000 rpm
Torque:	80 Nm
Main power:	25 kW
Interface:	HSK A 63 / HSK A 50
Collision protection:	Upsetting sleeves



Spindle	
Spindle speed:	30,000 rpm
Torque:	33 Nm
Main power:	38 kW
Interface:	HSK A 50



Spindle	
Spindle speed:	42,000 rpm
Torque:	16 Nm
Main power:	30 kW
Interface:	HSK E 40

Chip removal

CHIP SLIDE CAN BE ADAPTED TO THE LEFT OR RIGHT

CHIP CONVEYOR OPTIONAL TO THE LEFT OR RIGHT (SHORT VERSION)
OR TO THE REAR (LONG VERSION)

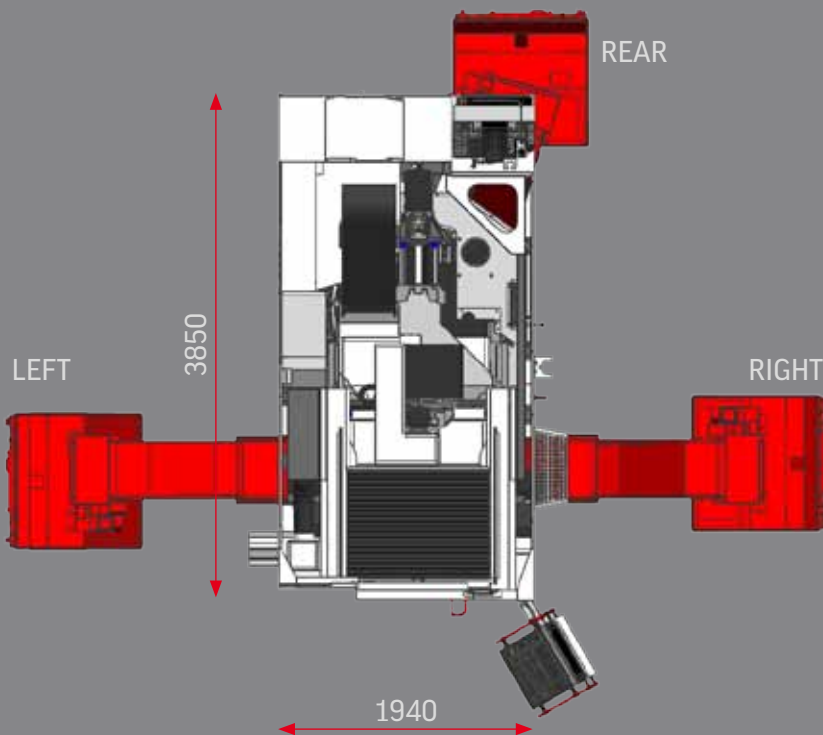
VARIABLE ARRANGEMENT OF UNITS FOR MAXIMUM FLEXIBILITY

FLEXIBLE ARRANGEMENT OF VARIOUS INTERNAL COOLANT SUPPLY SYSTEMS

COOLING UNITS INTEGRATED INTO THE MACHINE ENCLOSURE

FLUID BOX AND SWITCH CABINET INTEGRATED INTO THE MACHINE ENCLOSURE

COMPACT STANDARD MACHINE DIMENSIONS





Space-saving
chip conveyor arrangement

Flexible chip removal

A chip slide or different chip conveyors are available depending on the amount of chip produced. As a special feature, the chip conveyor can be arranged in the rear or on the left or right side depending on the installation situation.



Space-saving chip conveyor output
for service and maintenance

Magazine

PICK-UP MAGAZINE

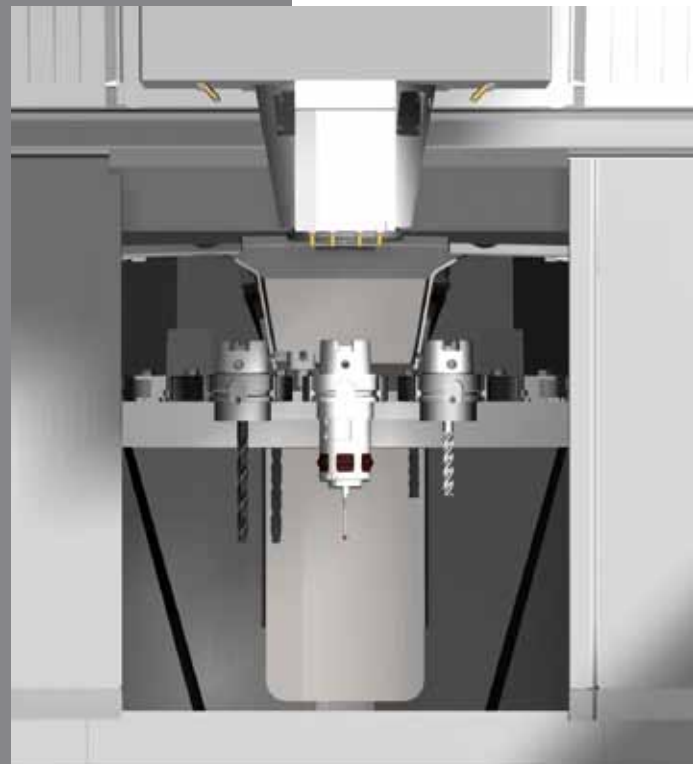
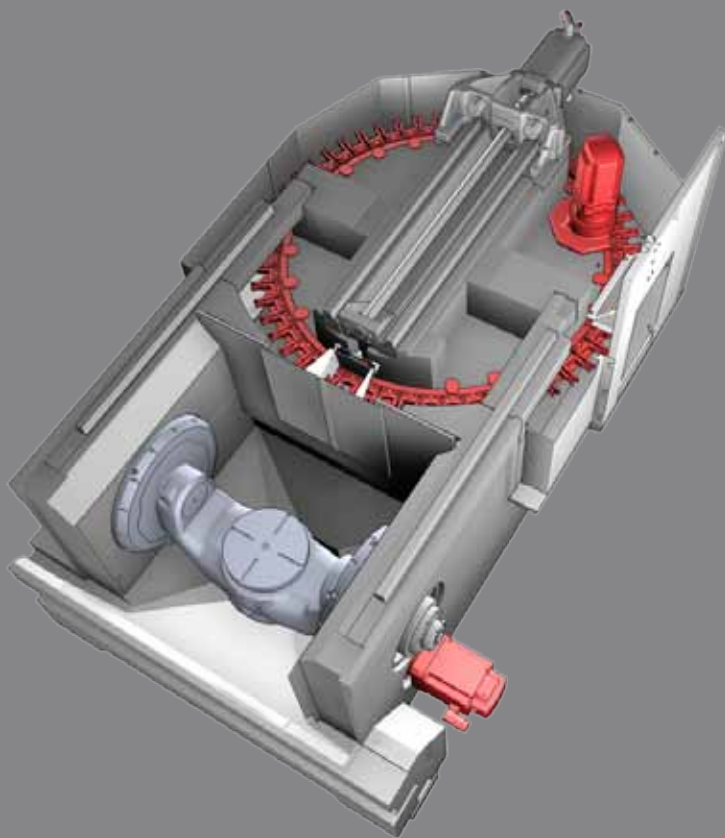
HIGH NUMBER OF TOOLS WITH REVOLVING RING MAGAZINE

VERY GOOD ACCESSIBILITY

CONTROL PANEL MOVEABLE TO THE LOADING POINT

TOOL CHANGE POSITIONS WITH BLOWING NOZZLE

ADDITIONAL MAGAZINES



Tool changer (pick-up)

	SK 40 / HSK A 63	HSK A 50	HSK E 40
Magazine positions:	55	65	65
Chip-to-chip time:	approx. 4.5 s	approx. 4.5 s	4.5 s
Max. magazine load:	220 kg	195 kg	162.5 kg
Maximum tool diameter:	Ø 125 mm	Ø 125 mm	Ø 125 mm
Maximum tool length:	250 mm	250 mm	250 mm

Automation

PALLET CHANGER

PALLET STORAGE SYSTEMS

TO BE EXTENDED TO A FLEXIBLE MANUFACTURING CELL

HANDLING SYSTEMS

ROBOT SYSTEM SOLUTIONS

TURN-KEY SOLUTIONS



Flexible manufacturing cell – manufacturing system

The machining centre may be set up for production by means of a pallet storage system for unmanned / minimal manning machine production times or by means of a customised system with various component ranges. By linking several machining centres, the machining centres can be extended to a complete manufacturing system.



Options

OPTIONS FOR

INCREASING THE SAFETY FEATURES

THE INDIVIDUAL APPLICATION POSSIBILITIES

THE PROCESS SAFETY

THE ECONOMIC EFFICIENCY

Options in detail

- Internal Coolant Supply with paper band filter
- Chip conveyor (scraper belt or hinged belt conveyor)
- Minimal quantity lubrication external
- Blowing attachment / bed flushing
- Oil mist extractor
- Accuracy packages
- Graphite machining packages
- Tool breakage monitoring system
- Tool measurement
- Automatic front door / automatic cabin roof
- Laminated safety glass panes
- Switch cabinet with locking door



Controls

HEIDENHAIN iTNC 530 OR SIEMENS S 840 D SL

3D SOFTWARE

19" TFT-TECHNOLOGY

USER-DEFINED SOFTKEYS

ERGONOMIC CONTROL PANEL

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 CONTROLS

Controls with integrated safety technology keeping with category 3 described in European standard ISO 13849-1.

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.



Screen pivots 30°

Control panel vertically adjustable +/-100 mm

Practical slide-in tray

Technical data

Working area	Traverse	X axis	450 mm	
	Traverse	Y axis	600 mm	
	Traverse	Z axis	330 mm	
	Linear rapid traverse (dynamic)	X-Y-Z	30 (50) m/min	
	Linear acceleration (dynamic)	X-Y-Z	8 (15) m/s ²	
	Linear rapid traverse	X-Y-Z	4500 N	
Main spindle drive	Speed	15,000 rpm	SK 40 ■	
	Main power / torque	40% c.d.f.	25 kW / 80 Nm	
	Speed	18,000 rpm	HSK A 63 / HSK A 50 ●	
	Main power / torque	40% c.d.f.	25 kW / 80 Nm	
	Speed	30,000 rpm	HSK A 50 ●	
	Main power / torque	40% c.d.f.	38 kW / 33 Nm	
	Speed	42,000 rpm	HSK E 40 ●	
	Main power / torque	20% c.d.f.	30 kW / 16 Nm	
Control unit	Heidenhain		iTNC 530 ■	
	Siemens		Sinumerik 840 D SL ●	
Tool changer (pick up)	Interface	SK 40 / ■ HSK A 63 ● HSK A 50 ● HSK E 40 ●		
	Magazine pockets	55	65	
	Chip-to-chip time*	approx. 4.5 s	approx. 4.5 s	
	*(chip-to-chip times were determined in accordance with VDI 2852, sheet 1 in a 3-axis design)			
	Maximum tool length	250 mm	250 mm	
	Maximum tool diameter	Ø 125 mm	Ø 125 mm	
	Maximum magazine load	220 kg	220 kg	
	Extension of tool storage with additional magazine			
Connection-values (machine)	Mains connection	400 V / 50 Hz		
	Power consumption	40-55 kVA		
	Compressed air	6 bar		
Weight	(Standard version)	approx. 8.5 t		
Transport dimensions C 22 (basic machine)	Width	2,170 mm		
	Depth	3,820 mm		
	Height	3,000 mm		
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 ■		

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

Table variants	NC-controlled swivelling rotary table system table	Ø 320 ●
	Table plate with clamping surface	Ø 320 mm
	Swivel range	+/- 135°
	Type of drive axis C	worm
	Speed - swivelling axis A mechanical one-sided	25 rpm
	Speed - rotary axis C	40 rpm
	Maximum table load	300 kg
	Table plate with clamping surface	Ø 450 x 360 mm
	Built-in clamping device	SK 50
	Built-in clamping device	HSK 100
	Zero-point clamping systems / pallet clamping system	

	NC-controlled swivelling rotary table Ø 320 ●	Rigid clamping table ■
	Clamping surface	Ø 320 mm / 600 x 630 mm
	Swivel range	+/- 135° / -
	Type of drive axis C	Torque / -
	Speed - swivelling axis A mechanical one-sided	25 rpm / -
	mechanical tandem	55 rpm
	Torque tandem	80 rpm
	Speed - rotary axis C	80 rpm / -
	Maximum table load	100 kg / 750 kg
	T-grooves	4 / 14H7 star / 10 / 14H7 parallel
	Zero-point clamping systems / pallet clamping system -	

Chip slide	Space-saving output on the left or right Capacity	210 l ■
Chip conveyor	Scraper belt or hinged belt conveyor ●	
	Chip conveyor to the left or right (short version) Capacity	300 l
	Chip conveyor to the rear (long version) Capacity	280 l
	Ejection height of chip conveyor	1,160 mm
	Chip cart	450 l

Internal coolant supply with paper band filter	Capacity of base container	88 l ●
	Capacity of cooling lubricant tank	650 l
	Pressure (infinitely variable manual)	max. 80 bar / 18 l/min
	Mains connection	400 V / 50 Hz
	Power consumption	17 kVA

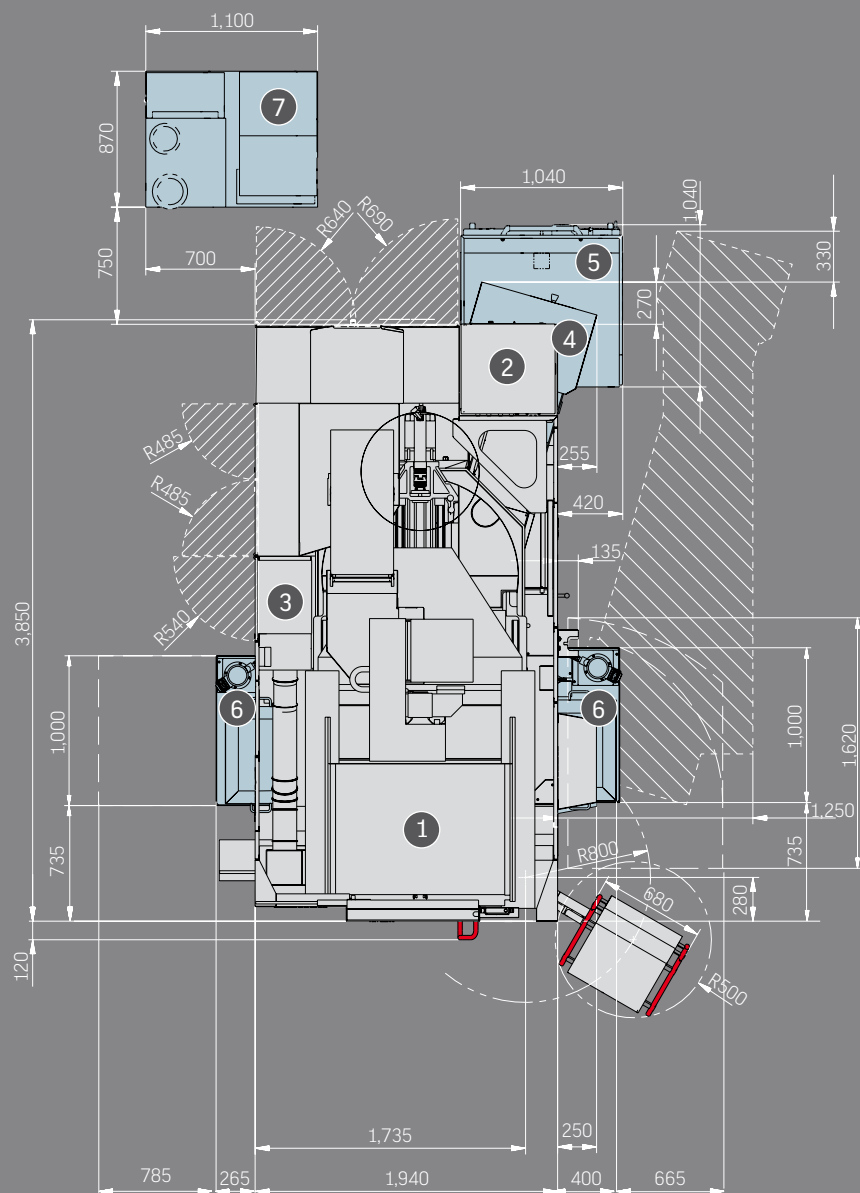
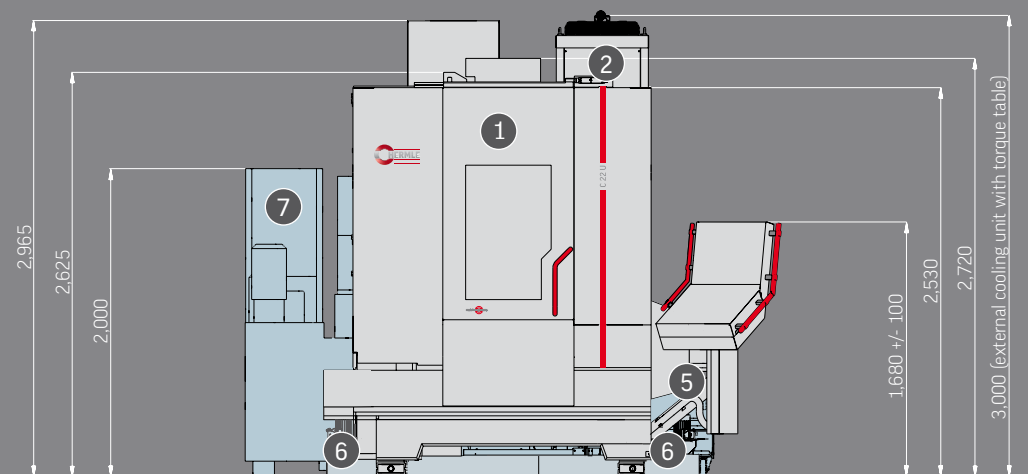
Hydraulic system	Operating pressure	120 bar ■
------------------	--------------------	-----------

Central lubrication system	Minimum quantity lubrication	■
----------------------------	------------------------------	---

Options	
Automatic cabin door	●
Automatic cabin top	●
Laminated safety glass panes	●
Rotating clear-view window	●
Electrical heat compensation	●
Electrical hand-held control module	●
Touch probe including preparation	●
Preparation for touch probe	●
Tool breakage monitoring / measuring system	●
Coolant nozzle	●
Minimal quantity lubrication external	●
Air blast through the spindle centre	●
Bed flushing	●
BDE signal	●
Oil mist extractor	●
Air purge for linear scales	●
Status lamp	●
Accuracy packages	●
Graphite machining package	●
Pallet changer	●
Pallet storage	●
Pallet clamping system	●
Handling System	●

■ standard equipment
● to order

Dimensions C 22



- | | |
|---|--|
| 1 | Standard machine |
| 2 | Cooling unit integrated in the machine enclosure (external cooling unit with torque table) |
| 3 | Oil mist extractor integrated in the machine enclosure |
| 4 | Chip conveyor to the left or right or to the rear |
| 5 | Chip cart |
| 6 | Chip slide to the left or right |
| 7 | Internal coolant supply |

Hermle

all over the world

GERMANY

Hermle + Partner Vertriebs GmbH
Phone +49 (0)7426 95-0 info@hermle-hpv.de
Fax +49 (0)7426 95-6109 www.hermle-partner-vertrieb.de

Hermle-Leibinger Systemtechnik GmbH
Phone +49 (0)7461 96628-0 info.hls@hermle.de
Fax +49 (0)7461 96628-398

Hermle Maschinenbau GmbH
Phone +49 (0)89 6735950-0 info@hermle.de
Fax +49 (0)89 6735950-11 www.hermle.de

Hermle Demo Centre Kassel-Lohfelden
Phone +49 (0)561 5103879 awt.kassel@hermle.de
Fax +49 (0)561 5103889

SWITZERLAND

Hermle (Schweiz) AG
Phone +41 (0)52 67400-40 info@hermle-schweiz.ch
Fax +41 (0)52 67400-41 www.hermle-schweiz.ch

Hermle WWE AG
Phone +41 (0)41 768 51-51 info@hermle-wwe.com
Fax +41 (0)41 768 51-50

AUSTRIA

Hermle Österreich
Rudolf Fluch
Phone +43 (0)3842 83377 rudolf.fluch@hermle.co.at
Fax +43 (0)3842 82410

Florian König
Phone +43 (0)5244 62373 florian.koenig@hermle.co.at
Fax +43 (0)5244 62378

ITALY

Hermle Italia S.r.l.
Phone +39 02 95327-241 info@hermle-italia.it
Fax +39 02 95327-243 www.hermle-italia.it

THE NETHERLANDS

Hermle Nederland B.V.
Phone +31 (0)77 3961761 info@hermle-nederland.nl
Fax +31 (0)77 4641070 www.hermle-nederland.nl

BELGIUM

Sales Office Belgium
Phone +32 (0)13 5563-83 hermle@scarlet.be
Fax +32 (0)13 5563-84

DENMARK, FINLAND, NORWAY

Hermle Nordic
Phone +45 66 17 69 50 lars.lynge@hermle-nordic.dk
Fax +45 66 17 61 09 www.hermle-nordic.dk

BULGARIA

Hermle Southeast Europe
Phone +359 2 958 59 01 info@hermle.bg
Fax +359 2 859 83 99

CZECH REPUBLIC

Hermle Česká Republika
Miloš Branda
Phone +420 272 652 340 milos.branda@hermle.cz
Fax +420 272 652 977

Martin Skukálek
Phone +421 326 523 048 martin.skukalek.hpv@stonline.sk
Fax +421 326 523 050

USA

Hermle Machine Co. LLC
Phone +1 414 421-9770 info@hermlemachine.com
Fax +1 414 421-9771 www.hermlemachine.com

CHINA

Hermle China
Shanghai Representative Office
Phone +86 21 2281 9188 hermlesha@126.com
Fax +86 21 6427 1887

Beijing Representative Office
Phone +86 10 5822 0951/2/3 hermlebeijing@vip.163.com
Fax +86 10 5822 1426

RUSSIA

000 Hermle Vostok
Representative Office of Hermle WWE AG
Moscow
Phone +7 495 221 83 68 info@hermle-vostok.ru
Fax +7 495 221 83 93 www.hermle-vostok.ru

Representative Office of Hermle WWE AG
St. Petersburg
Phone +7 812 702 67 32 spb@hermle-wwe.com
Fax +7 812 702 67 33

Representative Office of Hermle WWE AG
Togliatti
Phone +7 8482 51 76 48 tlt@hermle-wwe.com
Fax +7 8482 51 76 47

The machining examples used in this leaflet are published with the explicit approval of our friendly customers. 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.

Subject to technical modifications - 09/10/C22/5000/ENV/ST • Printed on paper bleached without chlorine



Maschinenfabrik
Berthold Hermle AG
Industriestraße 8-12
D-78559 Gosheim
Phone +49 (0)7426 95-0
Fax +49 (0)7426 95-6109
info@hermle.de
www.hermle.de