

C 20

The Dynamic

C 20

Unbeatable in 5-axes / 5-sided machining



The C 20 U -
at home in all fields

Tool and mould making
Highly dynamic simultaneous
5-axes machining

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 20

Dynamic in a new dimension

Central drive

centrally arranged Y axis main drive

Collision protection

with collision monitor

Easy to service

ideal accessibility to the auxiliary units

3 axes in the tool

component independent dynamics

Force characteristics

3 guideways with one guideshoe
for ideal force balance

Linear axes

above the working area

Pick-up magazine

integrated in the base, thereby saving space

Ideal chip clearance

dry machining

Accessibility

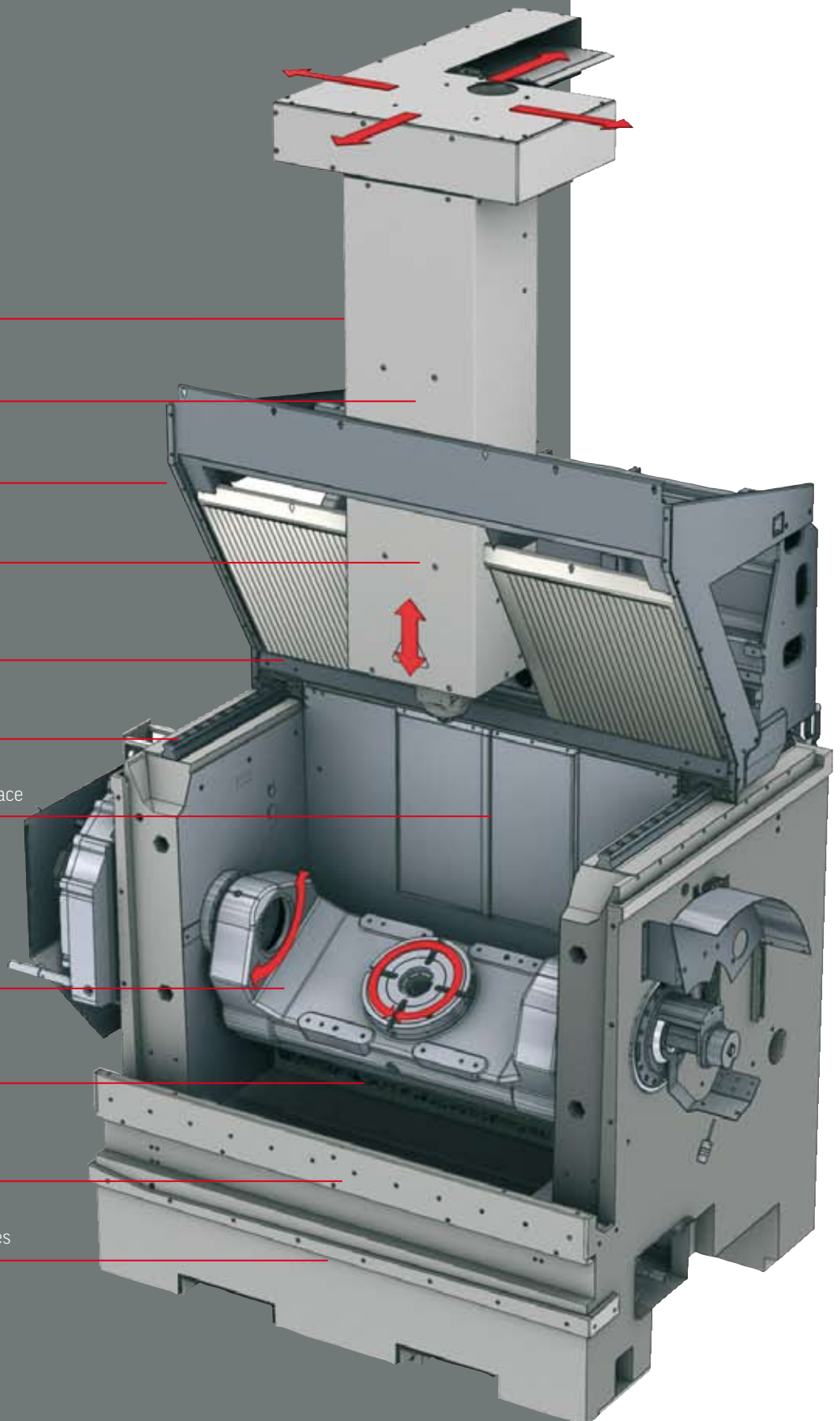
very good ergonomics

Modified gantry design

with ideal main axis support

Mineral casting design

very good vibration dampening properties



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 45 m/min.
- Modular configuration of the table and expansion variants in the multi-functional machine base
- 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 (3-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 6 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 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 30 tools as SK 40, HSK A 63 or HSK E 40
- 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
- Frequency-based recovery of the braking energy into the mains
- Switch cabinet with air-conditioning unit

Machine

ADVANTAGES OF A UNIQUE MACHINE CONCEPT

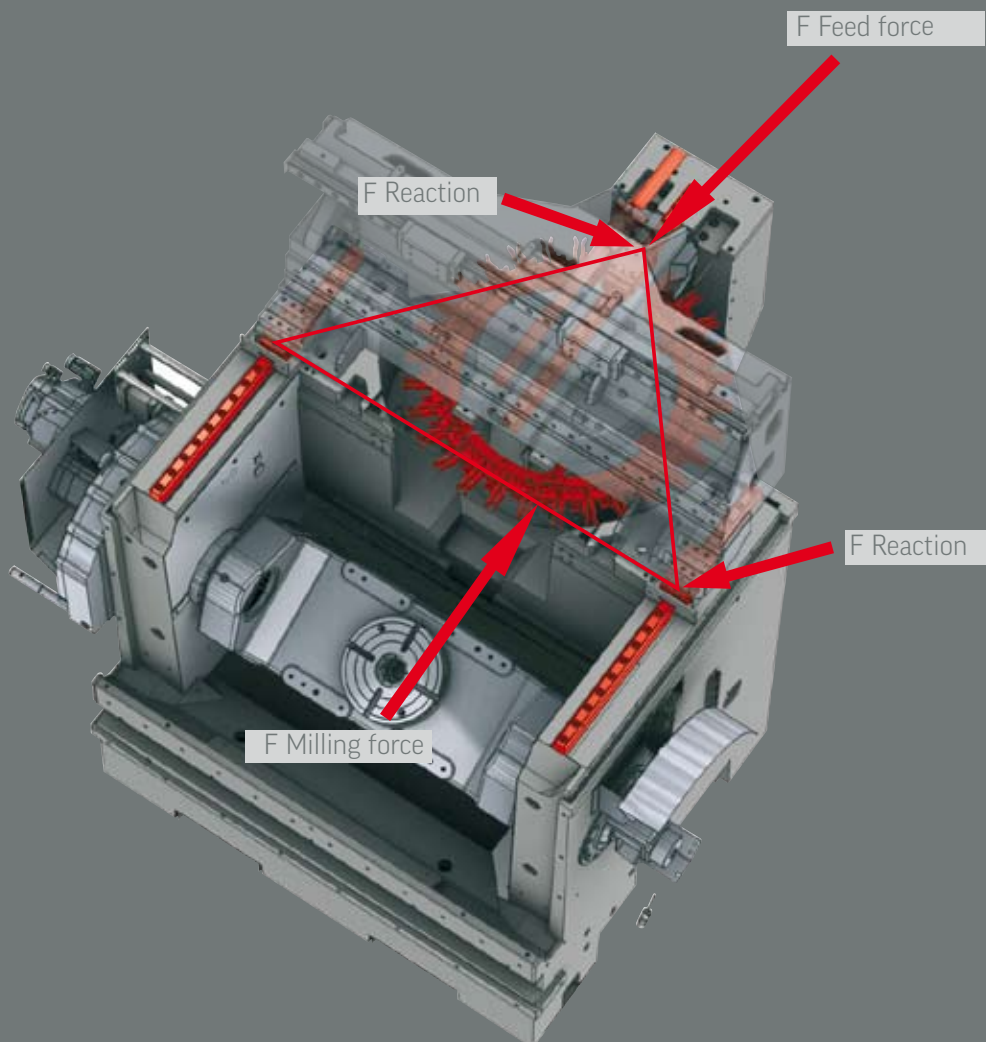
LARGEST WORKING AREA RELATIVE TO THE INSTALLATION SURFACE

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



Ideal power transmission through
three staggered guideways with central drive



Working area

Traverse
X-Y-Z 600-450-450 mm

Rapid linear traverse
X-Y-Z 45 m/min

Linear acceleration
X-Y-Z 6 m/s²

Main spindle drive

Speed: 10,000, 18,000,
or 40,000 rpm

Torque up to 200 Nm

Main power up to 32 kW

Tool changer (pick-up)

Magazine positions 30

Chip-to-chip time* approx. 5,0 s

Control

Heidenhain iTNC530

Siemens S 840 D

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

Table variants

HIGH DEGREES OF FREEDOM IN THE WORKING AREA

VERY HIGH TABLE LOAD (UP TO 1,000 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



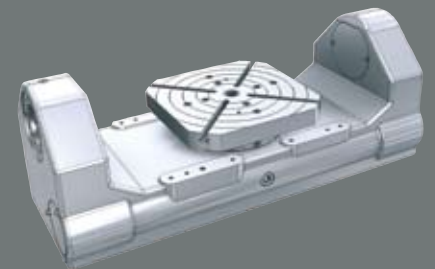
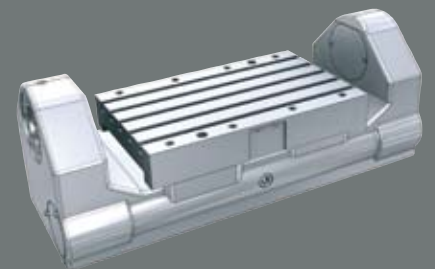
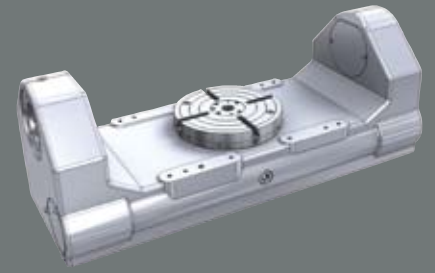
Important table features

- Indexing device to be used as 4th axis
- Zero-point clamping system / pallet clamping system
- Medium supply lines



NC-controlled swivelling rotary table

Clamping surface:	Ø 280 mm
Swivel range:	+ / - 115°
Speed - swivelling axis A:	25 1/min
Speed - rotary axis C:	25 1/min
Type of drive:	worm
Maximum table load:	300 kg
T-grooves:	star 4 / 14 H7
Adjacent clamping plate (option)	650 x 370 mm
Upper clamping plate (option)	600 x 370 mm
Clamping plate (option)	Ø 450, 370 x 370 mm



Rigid clamping table

Clamping surface:	800 x 465 mm
Maximum table load:	1,000 kg
T-grooves:	parallel 7 / 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 REPLACEMENT)

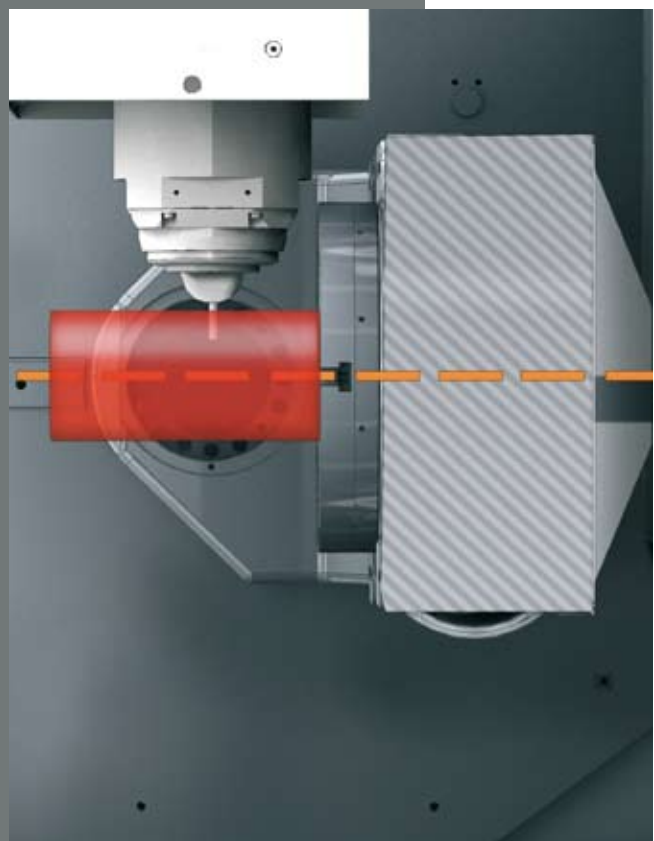
Each spindle has six displacement sleeves to compensate the collision energy.

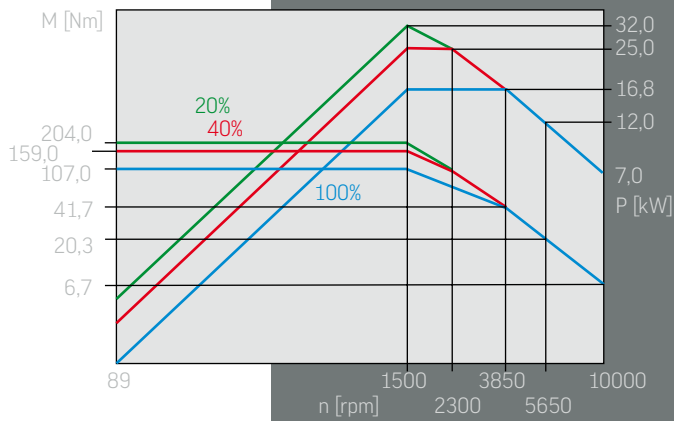
Prior to a collision

After a collision



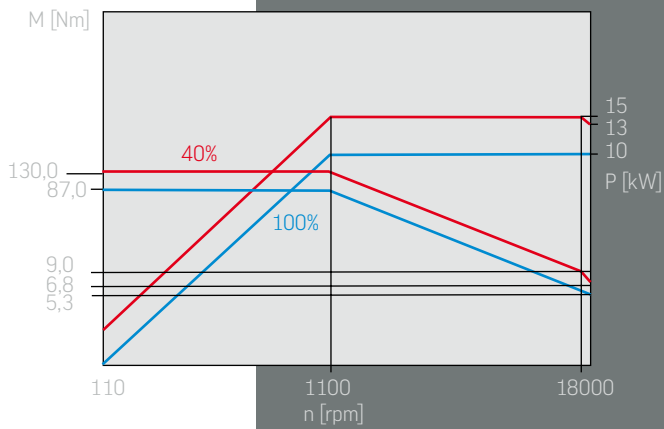
Very slender spindle end.





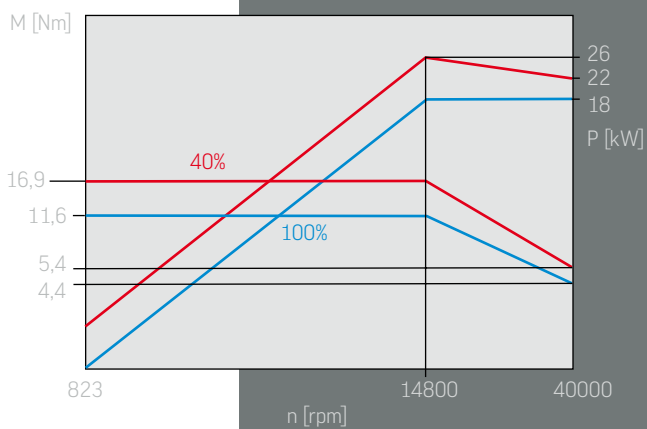
Spindle

Spindle speed:	10,000 rpm.
Torque:	200 Nm
Main power:	32 kW
Interface:	SK 40 / HSK A 63
Collision protection:	Upsetting sleeves



Spindle

Spindle speed:	18,000 rpm.
Torque:	130 Nm
Main power:	15 kW
Interface:	SK 40 / HSK A 63
Collision protection:	Upsetting sleeves



Spindle

Spindle speed:	40,000 rpm.
Torque:	17 Nm
Main power:	26 kW
Interface:	HSK E 40
Collision protection:	-

Magazine

PICK-UP MAGAZINE

INTEGRATION INTO THE MACHINE BASE

VERY GOOD ACCESSIBILITY

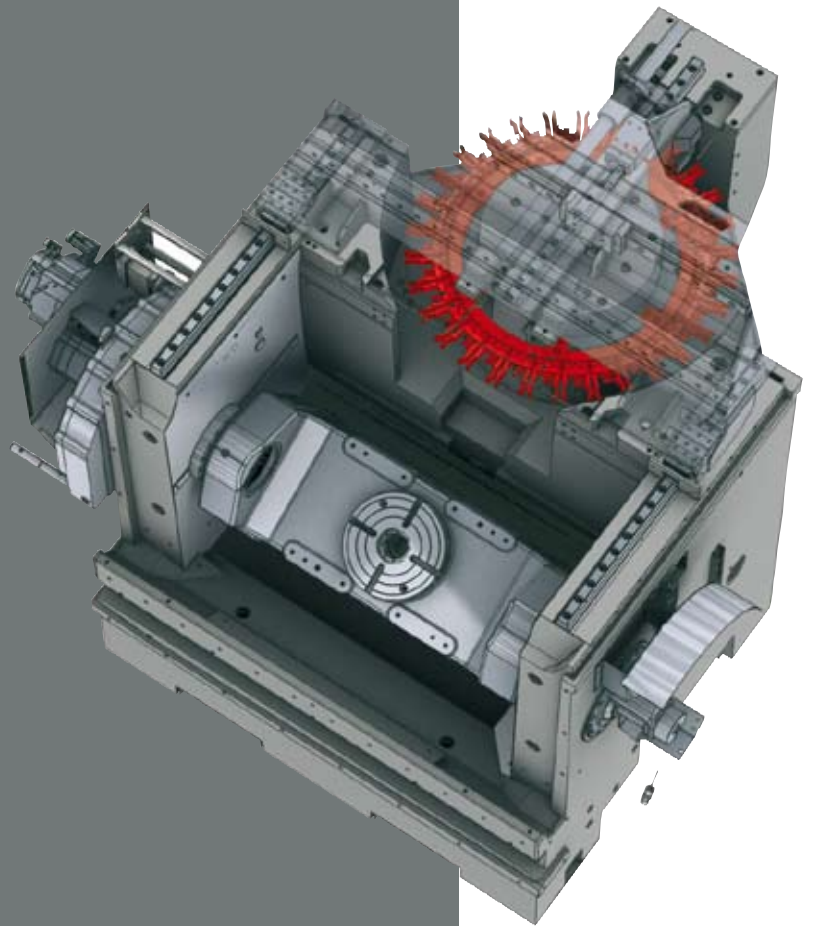
CONTROL PANEL MOVEABLE TO THE LOADING POINT

COVERS FOR THE SPINDLE TAPERS

Tool changer (pick-up)

Magazine positions:	30
Chip-to-chip time*:	ca. 5,0 s
Maximum tool length:	250 mm
Maximum tool diameter:	Ø 80 mm
Maximum tool diameter with corresponding adjacent pocket allocation:	Ø 125 mm
Maximum magazine load at 30 units:	120 kg

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

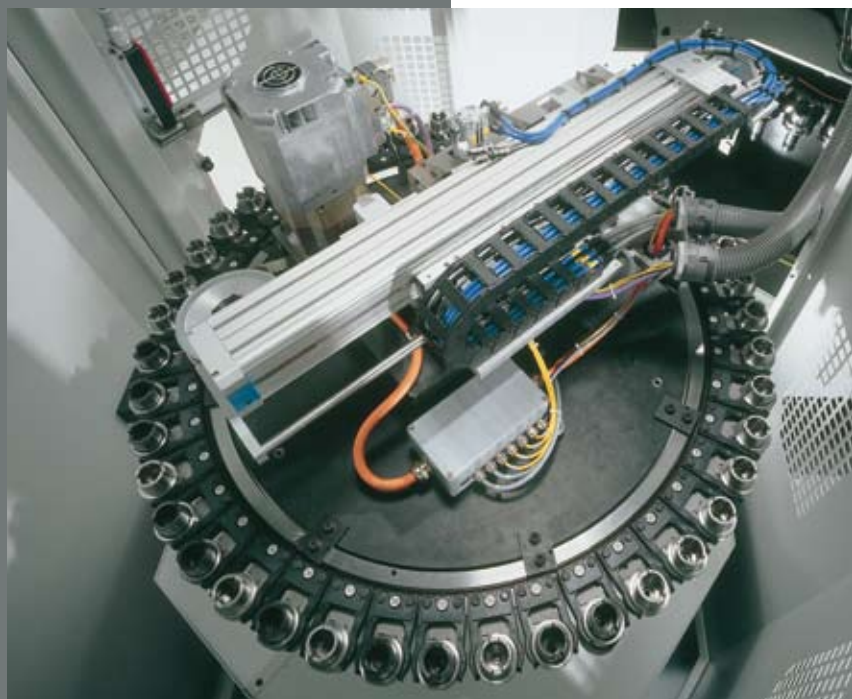


Additional magazines for complex machining processes

- Own tool management software integrated in the control
- Adapted to magazine loading point
- Control panel moveable up to the machining point of the additional magazines

Expansion of the tool storage capacity by:

Additional magazine:	43 pockets
Additional magazine:	87 pockets
Maximum tool length:	250 mm
Maximum tool diameter:	Ø 80 mm
Maximum tool diameter with corresponding adjacent pocket allocation:	Ø 125 mm
Maximum tool weight:	6 kg



Pallet loading

PALLET CHANGER PW 160

PALLET STORAGE SYSTEMS

HERMLE PALLET CLAMPING SYSTEM

RETRACTABLE ROOF TOP SECTION FOR CRANE LOADING

FEED CHUTE WITH DRAWER



Pallet changer PW 160

NC-controlled swivelling rotary table: \varnothing 280 mm

Swivel range: $\pm 115^\circ$

Pallet dimensions: 320 x 320 / \varnothing 400 mm

400 x 400 / \varnothing 500 mm

Number of pallets without storage: 3 pallets

Number of pallets with 4-fold storage: 7 pallets

Transport weight per side including pallet: max. 160 kg

Repeating accuracy < 0,01 mm

Options

OPTIONS FOR

INCREASING THE SAFETY FEATURES

THE INDIVIDUAL APPLICATION POSSIBILITIES

THE PROCESS SAFETY

THE ECONOMIC EFFICIENCY

Options in detail

- Through the spindle coolant supply (paper tape filter)
- Chip conveyor (scraper belt or hinged belt conveyor)
- Minimal quantity lubrication internal + external
- Blowing attachment / bed flushing
- Oil mist extractors
- Accuracy packages
- Graphite machining packages
- Tool breakage monitoring system
- Tool measurement
- Automatic front doors / automatic cabin roof
- Laminated safety glass panes



Controls

HEIDENHAIN iTNC 530 OR SIEMENS S 840 D

3D SOFTWARE

15" TFT-TECHNOLOGY

USER-DEFINED SOFTKEYS

smarTNC

ShopMill

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 EN 954-1.

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.



Automation

HANDLING SYSTEMS

ROBOT SOLUTIONS

TURN-KEY SOLUTIONS



From machine supplier to process supplier

The demand of the market for turn-key solutions for machining processes has caused us to further expand our activities in the so-called "turn-key projects".

Not only complicated machining with every increasing demands for automation, handling and equipment, but also intricate manufacturing strategies for part time guarantee, clamping means and tool packages, programming systems and the integration in an existing PPS system are demands which are increasingly voiced.

MACHINE

CLAMPING UNITS

TOOL SELECTION

PROGRAMMING

AUTOMATION

CAD / CAM



Technical data

Working area	Traverse	X axis	600 mm	
	Traverse	Y axis	450 mm	
	Traverse	Z axis	450 mm	
	Linear rapid traverse	X-Y-Z	45 m/min	
	Linear acceleration	X-Y-Z	6 m/s ²	
	Linear feed force	X-Y-Z	7,000 N	
Main spindle drive	Speed	10,000 rpm.	SK 40 / HSK A 63	■
	Main power / torque	20% c.d.f.	32 kW / 200 Nm	
	Speed	18,000 rpm.	SK 40 / HSK A 63	●
	Main power / torque	40% c.d.f.	15 kW / 130 Nm	
	Speed	40,000 rpm.	HSK E 40	●
	Main power / torque	40% c.d.f.	26 kW / 17 Nm	
Control unit	Heidenhain		iTNC 530	■
	Siemens		Sinumerik 840 D	■
Tool changer (pick-up)	Magazine pockets		30	■
	Chip-to-chip time*		approx. 5,0 s	
	*(chip-to-chip times were determined in accordance with VDI 2852, sheet 1 in a 3-axis design)			
	Maximum tool length		250 mm	
	Maximum tool diameter		Ø 80 mm	
	Maximum tool diameter with corresponding adjacent pocket allocation		Ø 125 mm	
	Maximum magazine load at 30 units		120 kg	
	Extension of tool storage capacity	Additional magazine		43 pockets
Additional magazine			87 pockets	●
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			6 kg	
Connection-values (machine)	Mains connection		400 V / 50 Hz	
	Power consumption		41 kVA	
	Compressed air		6 bar	
Weight	(Standard version)		approx. 7.0 t	
Transport dimensions C 20 (basic machine)	Width		2,350 mm	
	Depth		3,300 mm	
	Height		2,800 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	Ø 280 ●	Rigid Clamping table ●
	Clamping surface	Ø 280 mm	800 x 465 mm
	Swivel range	+ / - 115°	-
	Speed - swivelling axis A	25 1/min	-
	Speed - rotary axis C	25 1/min	-
	Maximum table load	300 kg	1000 kg
	T-grooves radially arranged	4 / 14H7	-
	T-grooves parallel	-	7 / 14H7
	Adjacent clamping plates	650 x 370 mm ●	-
	T-grooves parallel	5 / 14 H7	-
	Upper clamping plate	600 x 370 mm ●	-
	T-grooves parallel	5 / 14 H7	-
	Clamping plate	Ø 450, 370 x 370 mm ●	-
	T-grooves radially arranged	4 / 14 H7	-

In another version the clamping table can be fitted 30 mm lower.

NC indexing device	Clamping chuck	Ø 200 mm ●
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Position measuring system direct	Resolution	0,0001 mm ■
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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 ■
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Volume of coolant	Amount of coolant	300 l ■
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Through the spindle coolant supply with paper tape filter	Amount of coolant	1000 l ●
	Pressure (infinitely variable manuel)	max. 80 bar / 20 l/min
	Mains connection	400 V / 50 Hz
	Power consumption	18,5 kVA

Chip pan	Removable chip pan	●
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Chip conveyor	Scraper belt or hinged belt conveyor	●
	Ejection height of swarf conveyor	1,100 mm ●
	Chip cart	450 l ●

Hydraulic system	Operating pressure	120 bar ■
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Central lubrication system	Minimum quantity lubrication	■
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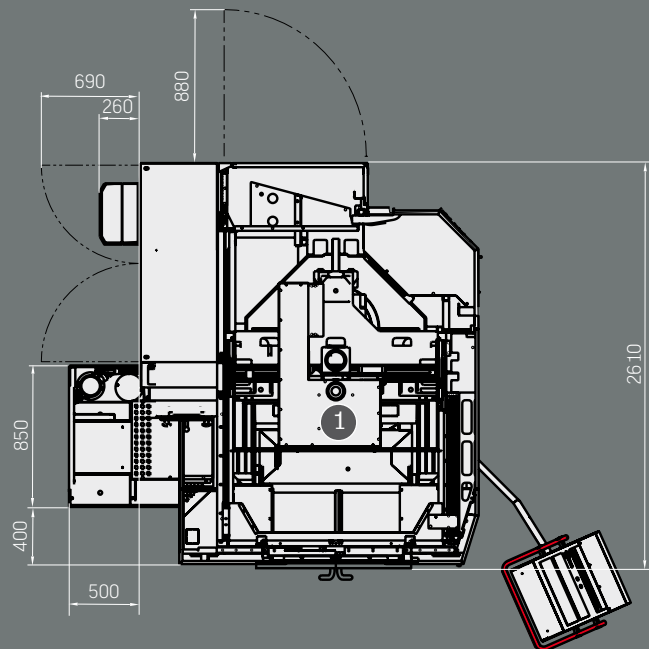
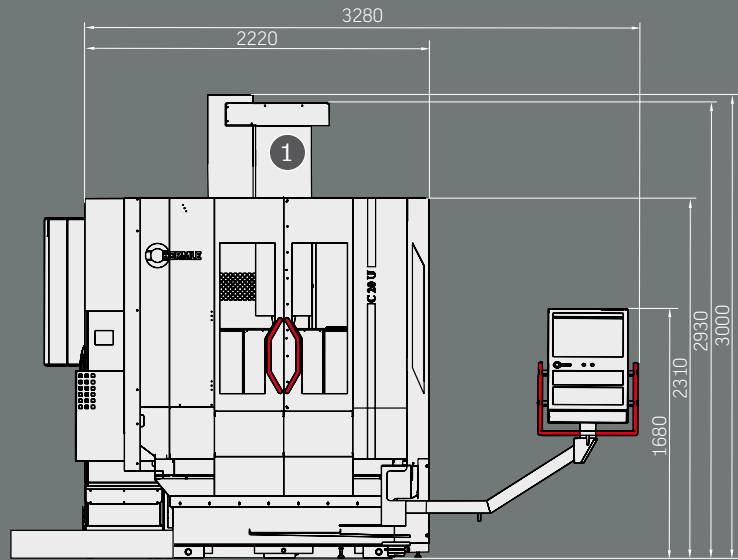
Options

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 internal + 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 PW 160	●
Pallet storage	●
Pallet clamping system	●
Handling System HS 30	●

■ standard equipment

● to order

Dimensions



C 20

1 Standard machine

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



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