5-axis milling / turning machining centres

DMU P / FD and DMC U / FD duoBLOCK® Series

DMG MORI SEIKI

5 axis CHAMPION
Over 25 Years of 5-axis Expertise

DMU / DMC duoBLOCK®:
Simple and high-tech work pieces manufactured to the highest precision. Work piece illustrated: HP compressor housing / Aerospace.

3rd Generation duoBLOCK®: 20 % more flexibility with 5-axis machining.

The 5-axis machines in the highly stable duoBLOCK® design allow maximum precision with the highest dynamics. In addition to drilling and milling operations, turning operations can be carried out with the FD machines in the same setting. The duoBLOCK® of the 3rd generation, with larger traverse paths and a higher table load, provides the foundation for this. The pallet changer of the DMC machines allow set-up parallel to production time for maximum productivity.

Aerospace

|1| Compressor plate
|2| Integral component

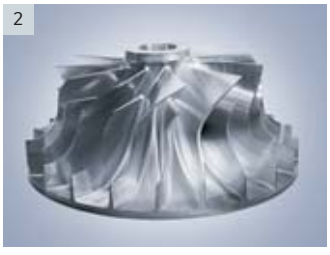
Tool and mould making

|1| Mould insert
|2| Segment for a tyre mould

Mechanical engineering

|1| Pinion cage
|2| Tool turret

Energy technology



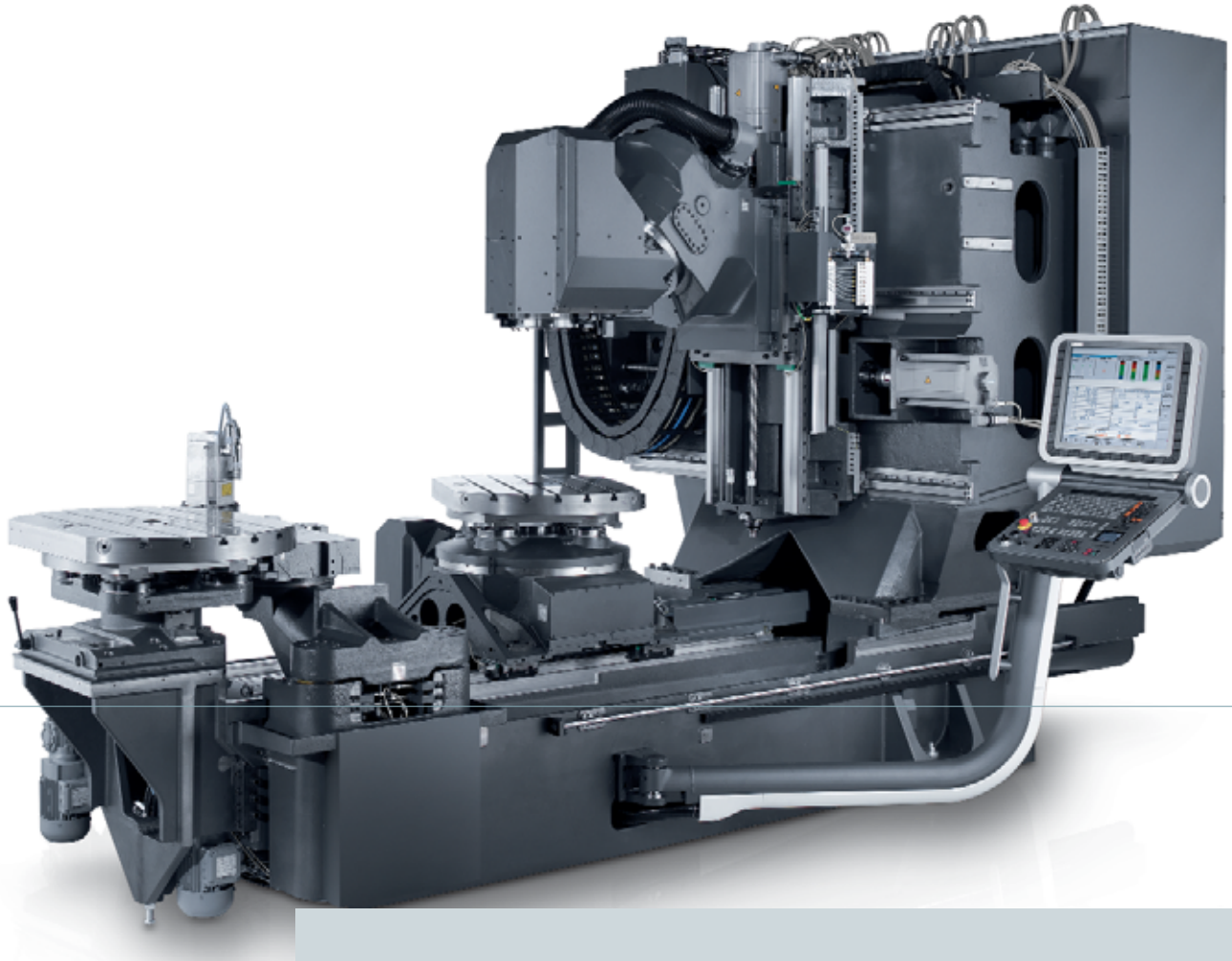
|1| Pelton blade
|2| Impeller

Automotive / Fluid

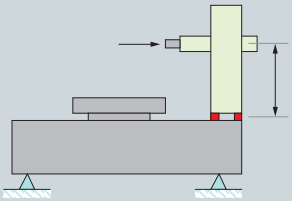
|1| Crank housing
|2| Hydraulic component

3rd generation compact duoBLOCK® – high stability and consistent long-term precision.

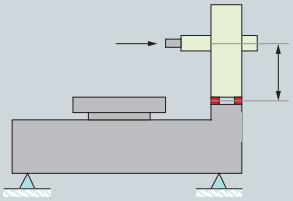
_ **B-axis as standard equipment**
_ Reduced dynamic mass means **higher dynamics** and **lower energy use**
_ Longer Y-axis results in a **larger work space**
_ Optimised machine design supports **heavier workpiece weights**
_ Cooling in all 5 axes delivers the **greatest precision**



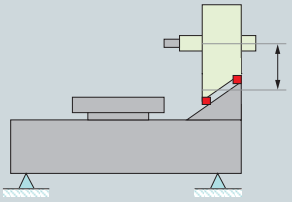
Development of the duoBLOCK®: Maximum rigidity for the highest, constant precision with continuous further development of the machine design.



Classic operator stands
>> large leverage



Raised guide ways
>> reduced leverage



Tiered guide ways
>> optimised leverage

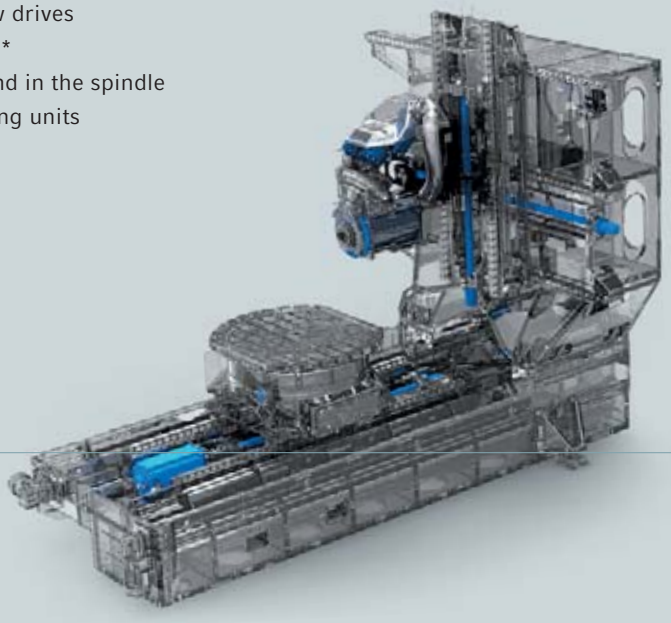
Highlights of the duoBLOCK® design

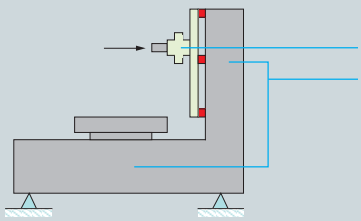
_ FEM-optimised, patented duoBLOCK® construction results in maximum rigidity for consistent long-term precision
_ High static mass and low dynamic mass of the dynamic components in GGG60 mean high machine dynamics
_ Three X-axis guideway provide consistent rigidity over the entire travel range (starting with DMU 80 P duoBLOCK®)
_ Larger cube-shaped work space facilitates use of large multi-clamp devices or larger component machining
_ Inherently rigid machine bed allows 3-point support, and crank hook machine design makes for the simplest installation
_ SK50 / HSK-A100 as standard equipment starting with DMU 80 P duoBLOCK®

Cooling in all linear axes as standard equipment delivers consistent long-term precision

_ Cooling of all ball screw drives
_ Cooling in Y-axis drives*
_ Cooling in the B-axis and in the spindle
_ Cooling via active cooling units

*160: X / Y / Z





duoBLOCK®
>> no leverage

duoBLOCK®*

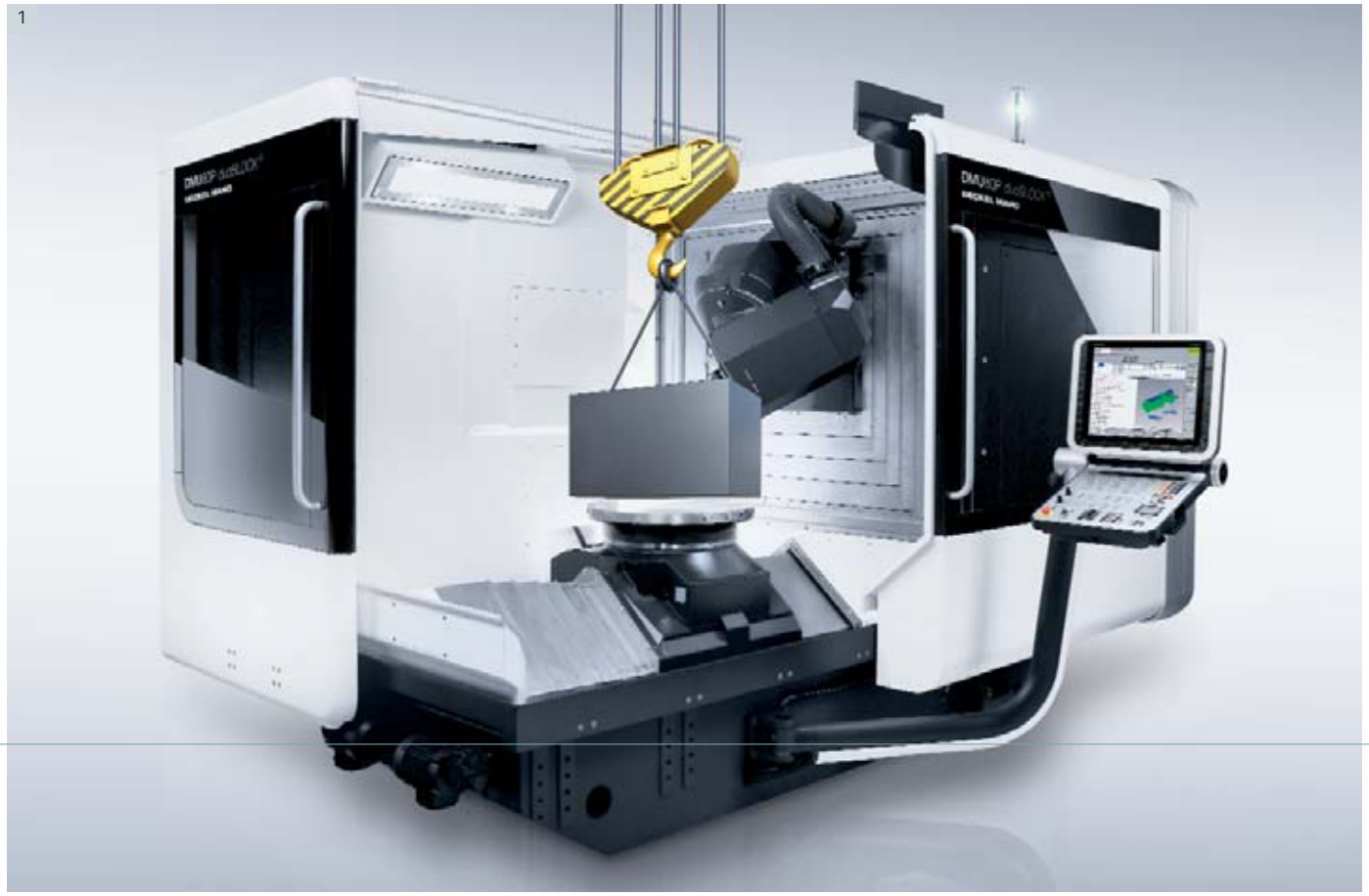
1,200 kg dynamic mass
8,000 kg static mass

Travelling column machines*
2,400 kg dynamic mass
4,000 kg static mass

* Compare DMU 125 P duoBLOCK® with DMU 125 P *hi-dyn* (travelling columns)

\+ 50 % less dynamic mass
\+ 100 % more static mass
= **High dynamics and stability**
= **Lower energy use**
\+ Consistent rigidity over the entire travel range
\+ Basic thermosymmetric design
= **Consistent long-term precision**

1



2

duoBLOCK® – the standard for accessibility, large cube-shaped work space and unrestricted crane loading from above.

|1| Crane loading from above for workpieces up to 4,000 kg

|2–3| Pallet changer for workpieces up to 3,000 kg, large access door allows optimal accessibility to the work space and setup station

3

3rd generation duoBLOCK® – even larger work space with better accessibility.

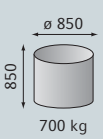
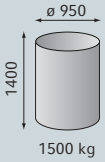
|4| Large cube-shaped work space and consistent precision even in the upper travelling ranges by virtue of 3 guideways in the X-axis **|5|** Steep (30°) 1-piece covers in the chip fall area **|6|** Fast chip removal to the rear

Highlights

_ Unrestricted crane loading from above the table centre for DMU machines and over the pallet centre for DMC machines (setup station)
_ Optimal accessibility to the large work space and setup station via the large access door allows fast and ergonomic set-up and tooling
_ Larger work space facilitates use of large multi-clamp devices or large component machining
_ Steep covers and cabin angles provide optimal chip flow in the work space
_ 1-piece cover in the chip fall area
_ Fast chip removal to the rear

DMU duoBLOCK® – largest cube-shaped work space and smallest footprint.

_**Standard equipment includes B-axis for 5-axis simultaneous machining**
_**Space-saving chip removal to the rear**
_**Larger work space** with Y-axis travel ranges up to 250 mm longer
_Optimised duoBLOCK® construction provides **greater maximum load**

	DMU 60 P duoBLOCK®	DMU 80 P duoBLOCK®
Traverse paths X / Y / Z	600 / 700 / 600 mm	800 / 1,050 / 800 mm
Table size	ø 630 mm	ø 900 × 700 mm
Load weight	700 kg	1,500 kg
Work piece measurements		

The duoBLOCK® Series modular design with B-axis as standard equipment.

Smaller building blocks – Two guide ways in the X-axis (Size: 60)

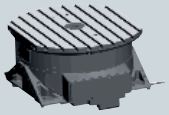
B-axis

Larger building blocks – Three guide ways in the X-axis (Size: 80 / 100 / 125 / 160)

A-axis

B-axis

5X torqueMASTER® – B-axis with a drive

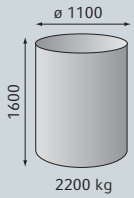
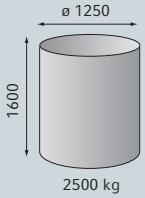
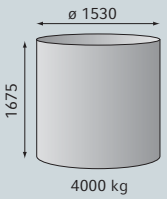


Rotary table

Milling / Turning table

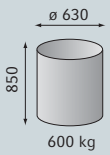
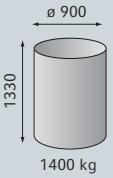
Pallet table

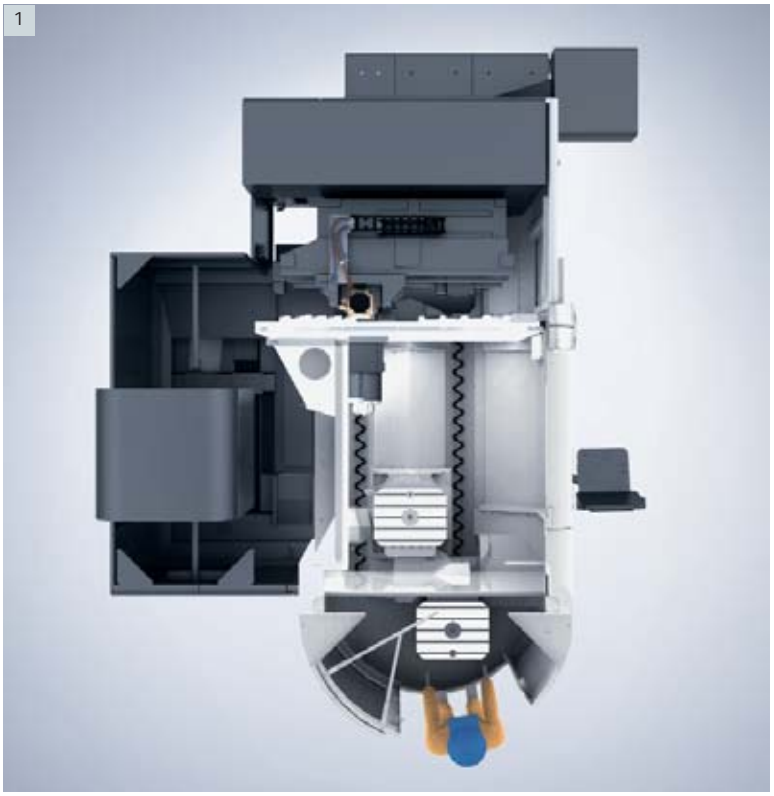
Pallet changer

DMU 100 P duoBLOCK®	DMU 125 P duoBLOCK®	DMU 160 P duoBLOCK®
1,000 / 1,250 / 1,000 mm	1,250 / 1,250 / 1,000 mm	1,600 / 1,250 / 1,100 mm
ø 1,100 × 900 mm	ø 1,250 × 1,100 mm	ø 1,500 × 1,250 mm
2,200 kg	2,500 kg	4,000 kg
		

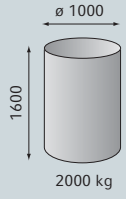
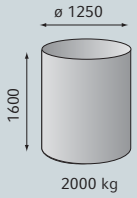
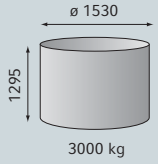
DMC U duoBLOCK® – Fast pallet changer for maximum productivity.

_Optimised pallet changer location results in a **smaller footprint**
_NC axis changer technology leads to **shorter pallet change times**
_Sturdy construction and the inherently rigid machine bed allows **heavy workpiece weights**
_duoBLOCK® design provides for **optimal accessibility to the work space and setup station**
_Tool magazine technology used in high-volume serial production allows for **short chip-to-chip times** down to 3.7 sec.

	DMC 60 U duoBLOCK®	DMC 80 U duoBLOCK®
Traverse paths X / Y / Z	600 / 700 / 600 mm	800 / 1,050 / 800 mm
Pallet size	630 × 500 mm	800 × 630 mm
Load weight	600 kg	1,400 kg
Pallet change time	9.5 sec.	14 sec.
Work piece measurements		



|1| Faster and more space-saving pallet changer for set-up of work pieces up to 3,000 kg parallel to production time
|2| Vertical chain magazine with a fast curve-controlled double gripper for short chip-to-chip-times of up to 3.7 seconds

DMC 100 U duoBLOCK®	DMC 125 U duoBLOCK®	DMC 160 U duoBLOCK®
1,000 / 1,250 / 1,000 mm	1,250 / 1,250 / 1,000 mm	1,600 / 1,400 / 1,100 mm
1,000 × 800	1,000 × 800	1,250 × 1,000
2,000 kg	2,000 kg	3,000 kg
16 sec.	16 sec.	22 sec.
		

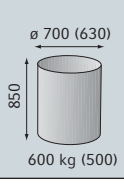
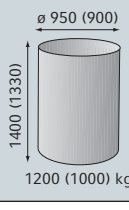
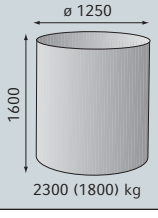
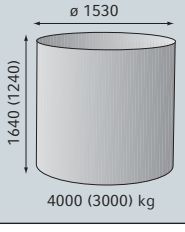
DMU FD and DMC FD duoBLOCK® – Maximum productivity with complete machining on one machine.

_ Milling and turning on one machine (FD) allows for **complete machining** in one operation

_ YRT bearings at the setup station **gives precise set up during machining** for 0.02 mm run-out accuracy (for DMC 125 FD)

5 axis CHAMPION

Over 11 years of FD:
700 machines installed worldwide – 80 % with pallet changers.

		DMU 60 FD (DMC 60 FD)	DMU 80 FD (DMC 80 FD)	DMU 125 FD (DMC 125 FD)	DMU 160 FD (DMC 160 FD)
Traverse paths (X / Y / Z)	mm	600 / 700 / 600	800 / 1,050 / 800	1,250 / 1,250 / 1,000	1,600 / 1,400 / 1,100
Milling / Turning table	rpm	1,200	800	500	400
Table / Pallet size	mm	ø 700 (630)	ø 800 (ø 800 × 630)	ø 1,250 (ø 1,100)	ø 1,500 (ø 1,400)
Load weight	kg	600 (500)	1,200 (1,000)	2,300 (2,000)	4,000 (3,000)
Pallet change time	sec.	9.5	14	16	22
Work piece measurements					

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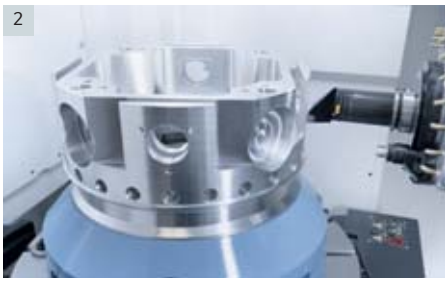

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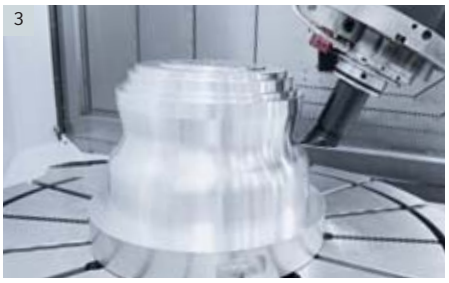

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|**1**| Vertical turning with A- and B-axis |**2**| Horizontal turning with A- and B-axis |**3**| Utilised turning with A- and B-axis* |**4**| Measurement of turning tools* |**5**| Measurement of milling tools* |**6**| Measuring cycles for in-process workpiece measurement* |**7**| Use of multi-bladed tools (up to nine cuts) |**8**| Grinding package

Milling / turning cycles for every requirement

Exclusive milling / turning cycles by DECKEL MAHO

_ **Imbalance** determination, control and monitoring
_ **Automatic speed adjustment** in case of part vibration
_ **Measuring cycles for the (L-) measuring probe:** Calibrate measuring probe in the work area, punctures, heels, etc. measurement
_ **Store measurement data,** distribute and pass on
_ **Utilised turning** with A-axis
_ **Swing in of long tools** in the work piece
_ **Grinding cycles,** example: Calibrating the dressing station and dressing of the grinding disc

Standard milling / turning cycles

_ **Puncture, undercutting, metal removal, threading, etc.**
_ **Use of multi-bladed tools** (up to nine cuts)
_ **Milling and turning tool measurement**

8

Technology integration loops*

_ Grinding cycles for internal, external and surface grinding
_ Universal turning unit in the work area
_ Grinding package with additional options, example: Wiper

* optional

|1| Claw box
|2| Manual integrated power chuck
|3| Hydraulic integrated power chuck
|4| Mill / turn machining of a compressor housing


1


2


3


4

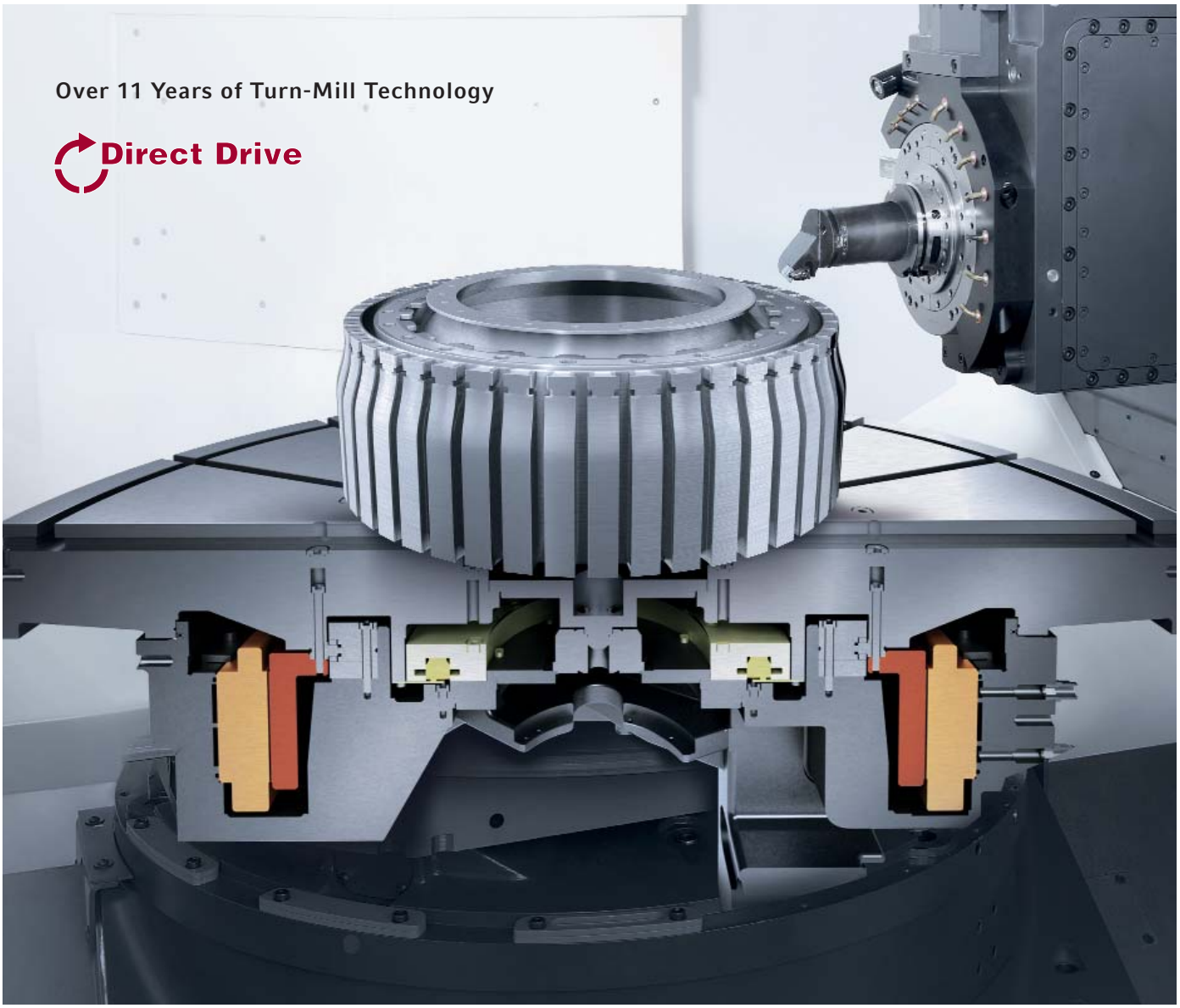
Highlights mill-turning (FD)

_ Complete machining: milling and turning in one operation on one machine
_ Elimination of retooling means time savings and higher precision
_ Multiple operations on a single machine mean lower investment costs and smaller space requirements
_ Elimination of idle time and processing steps mean faster machining with fewer logistical costs, which translates into lower per-piece costs and higher precision

Standard equipment: 5-axis milling and turning in one operation
_ FD drives with Direct Drive technology – up to 1,200 rpm, power to 69 kW, torque up to 7,300 Nm, max. loading to 4,000 kg
_ Oil mist separator and laminated glass security viewing window

Options

_ Clamping claws as simple and inexpensive chip solution for interfacing standard jaws available starting with the DMU / DMC 125 FD; pallet preparation on the DMU / DMC 160 FD comes as standard
_ Integrated manual power chuck for simple centric clamping and short tooling times starting with DMU / DMC 60 FD
_ Integrated hydraulic power chuck for efficient and precise clamping (exterior and interior) and programmable clamping pressure starting with DMU / DMC 60 FD



DMU FD- / DMC FD-machines – the complete machining process

Machine 1: Milling Turning Drilling Threading | Tooling Reclamping | Milling Turning Drilling Threading | Unclamping

1 machine =
4 processing steps
300 % greater productivity

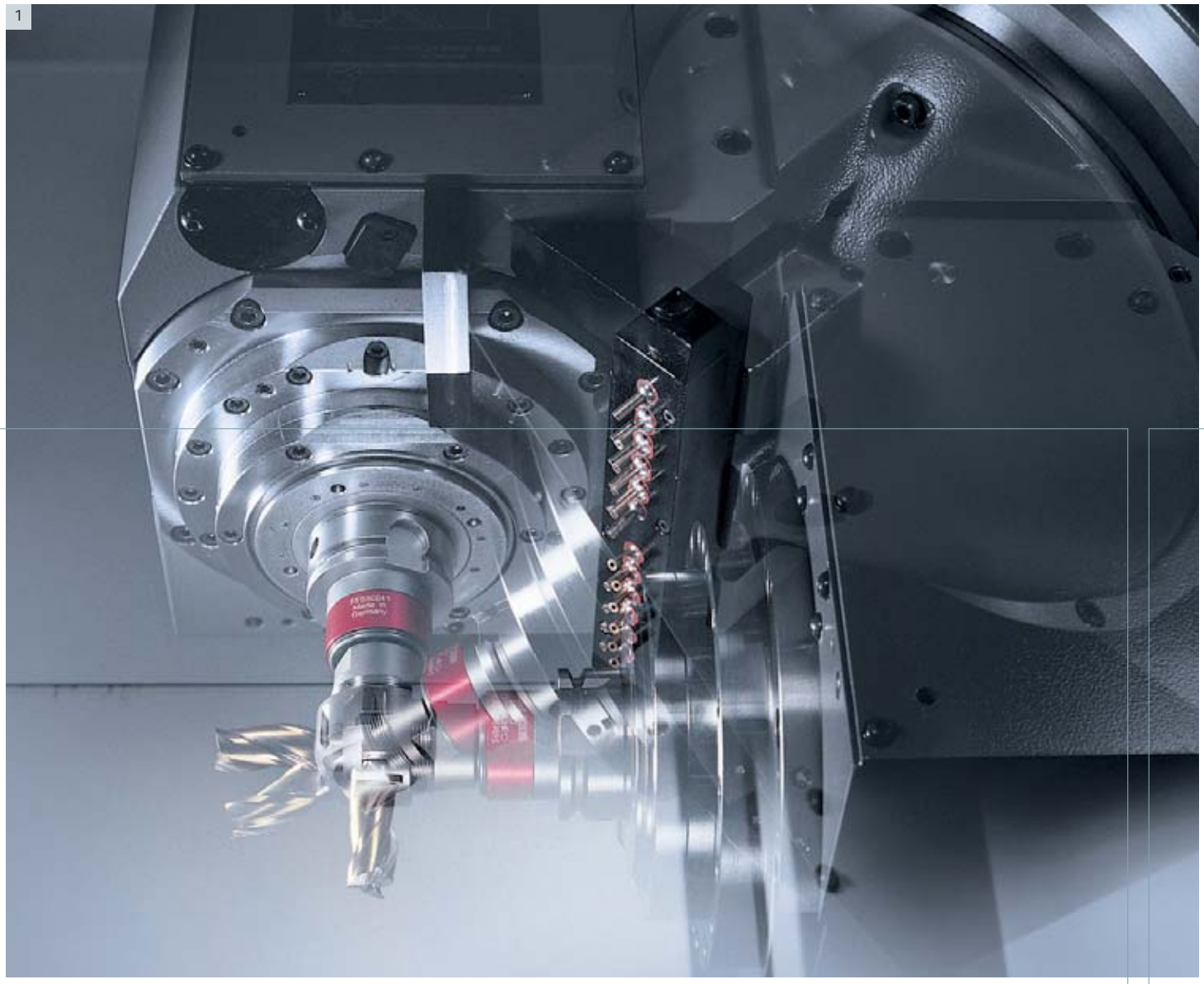
Single-purpose machines – conventional machining process

3 machines =
10 machining steps

Machine 1: Turning | Tooling Reclamping | Turning | Tooling
Machine 2: Milling Drilling Threading | Tooling Reclamping | Milling Drilling Threading | Tooling
Machine 3: Fine turning | Final check

1 2 3 4 5 6 7 8 9 10

1



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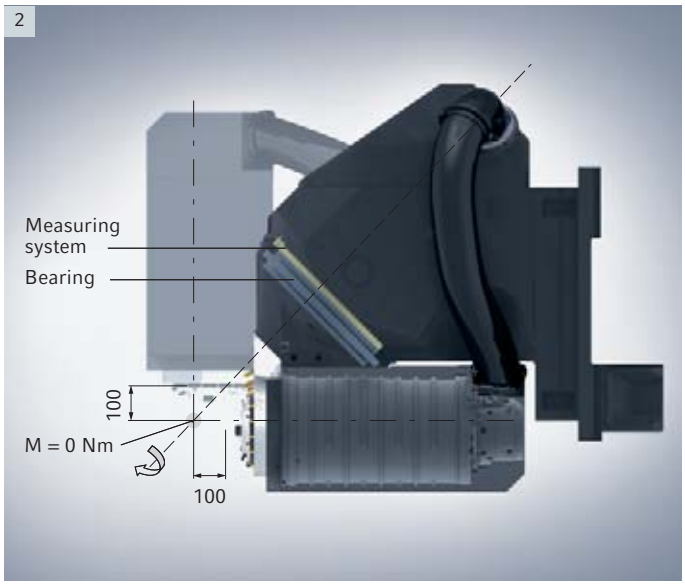

5-axis machining in a nutshell – high stability by machining at the intersection of multiple axes

Maximum rigidity via 45° B-axis kinematics

_ For 100 mm tool lengths, no torque on the B-axis, for any swivel angle

High precision through

_ High-resolution measurement system directly on the bearing

_ Little force exerted through the 45° B-axis kinematics

DMU / DMC duoBLOCK® – 5-axis milling of the highest dimension.

_ **Patented B-axis as standard equipment,** NC-controlled swivel milling head with high stability and high precision by machining at the intersection of multiple axes
_ **High-precision NC rotary table,** with direct position sensor
_ **Space-saving and fast turning pallet changer** for make-ready during machining for DMC machines

	A-axis	B-axis	B-axis with a gear	Milling / Turning	Pallet changer
60	–	•	–	•	•
80	–	•	•	•	•
100	•	•	•	–	•
125	•	•	•	•	•
160	•	•	•	•	•

5-axis simultaneous machining (options)
_ NC-controlled A-axis for machining negative angles up to –30°
_ 5X torqueMASTER®, NC-controlled B-axis with gear-driven spindle for 5-axis simultaneous machining with up to 1,100 Nm
_ Customized solutions, such as a dividing device

3

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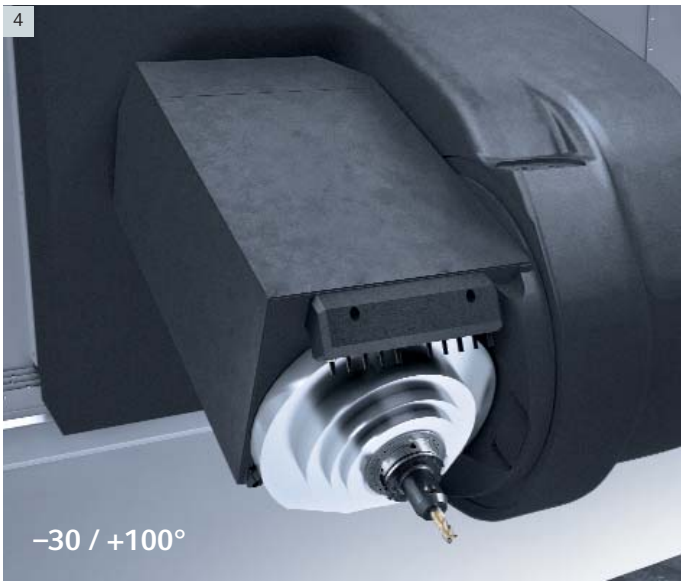


|1–2| NC-controlled swivel milling head as B-axis for simultaneous 5-axis milling with high precision by machining at the intersection of multiple axes **|3|** Dividing device and B-axis as customized solution in toolmaking, for example **|4|** NC-controlled A-axis – for simultaneous 5-axis milling with negative angles up to –30°

1

2

3

|1| 5X torqueMASTER® – B-axis with a drive for up to 1,100 Nm torque
|2| Pump end housing made from GGG60
|3| Cylinder head for a diesel vessel made from GGG50

5X torqueMASTER® – B-axis with a drive for up to 1,100 Nm torque.

The 5X torqueMASTER® is predestined for machining difficult to clamp materials, large drilling operations (solid material), and deployment of disc milling cutters and form tools.

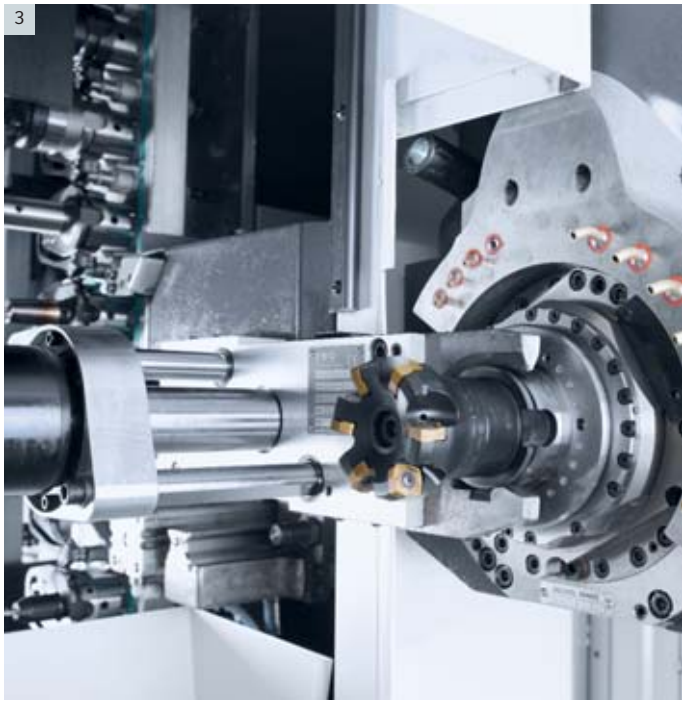
5X torqueMASTER®

_ Patented B-Axis, NC-controlled swivel milling head as a B-axis for simultaneous 5-axis milling with the highest stability through operations in the axis turning point
_ SK50 / HSK-A100 tool holders
_ Drive of the B-axis with the planetary drive
_ Continuous positioning over the entire swivel range
_ Very rigid milling head with good clamping through the swivel level that is below 45°
_ Maximum cutting data can be driven in any direction and swivel position
_ **Gear spindle with up to 1,100 Nm torque and max. 32 kW**

|4| Fan disc made from Ti 6Al 4V (Titanium) **|5|** Chassis carrier made from Ti 6Al 4V (Titanium)

5X torqueMASTER®	Machine			
Speed **Power / Torque**	**DMU 80 P / FD** **DMC 80 U / FD**	**DMU 100 P / FD** **DMC 100 U / FD**	**DMU 125 P / FD** **DMC 125 U / FD**	**DMU 160 P / FD** **DMC 160 U / FD**
8,000 rpm 28 kW / 727 Nm	•	•	•	–
6,300 rpm 32 kW / 1,100 Nm	–	–	–	•

• available option



|1–2| Vertical chain magazine for up to 120 tools (SK40 / HSK-A63) and 650 mm max. tool length **|3|** Fast cam-controlled double gripper for short chip-to-chip times (3.7 sec. for HSK-A63) **|4|** Horizontal chain magazine for up to 120 tools with SK50 / HSK-A100 (not with DMU 160 P / FD)

DMU P / FD duoBLOCK® – machines without pallet changers: innovative tool handling.

DMU: Maximum tool measurements and tool magazine specifications

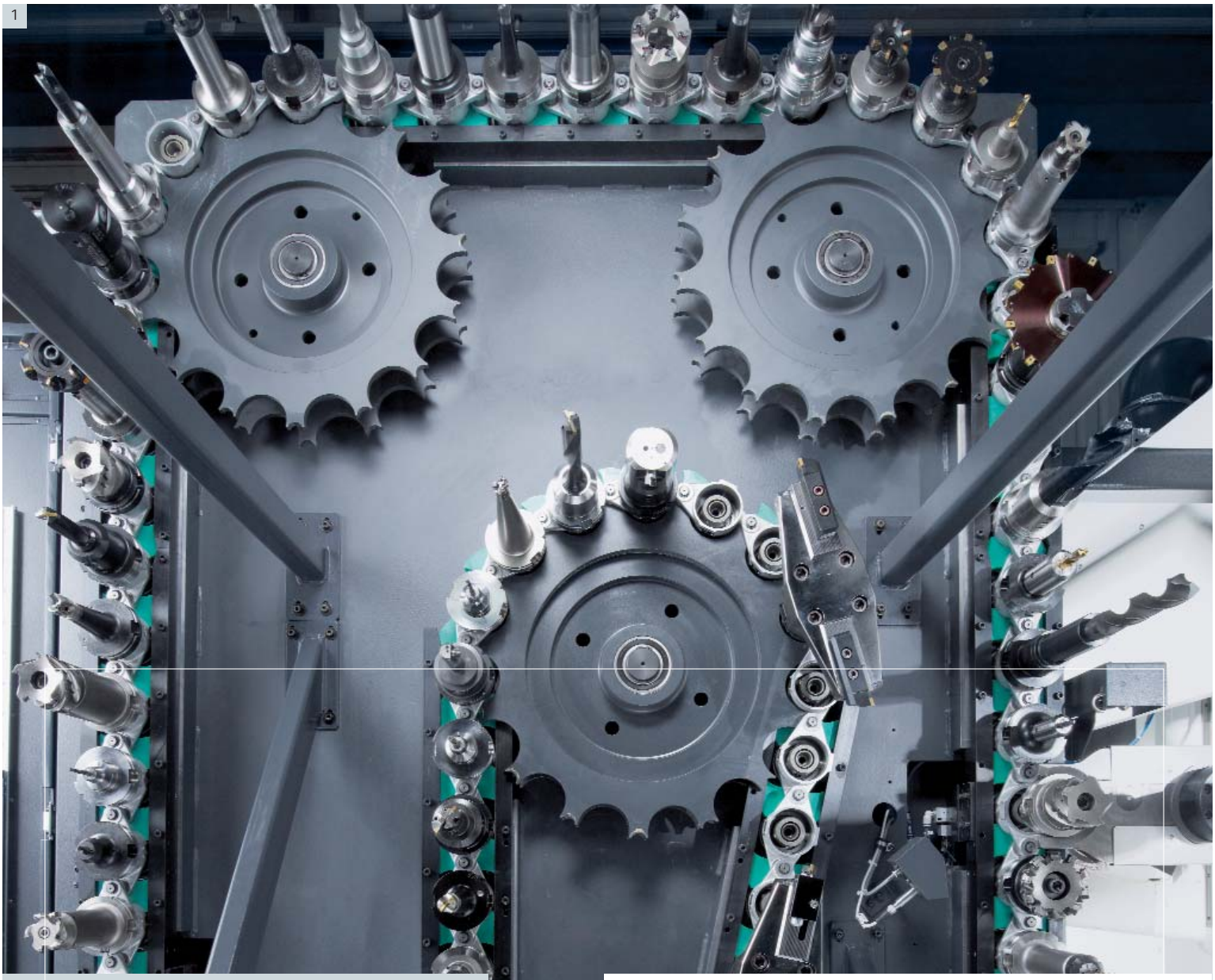
SK40 / CAT40 / HSK-A63	DMU 60 P / FD	DMU 80 P / FD dB	DMU 100 / 125 P dB	DMU 160 P dB
Tool holder	SK40 (HSK-A63)	SK40 (HSK-A63)	SK40 (HSK-A63)	SK40 (HSK-A63)
Magazine type / pockets up to max.	120 pockets	120 pockets	120 pockets	120 pockets
Measurements (occupied neighbouring spaces), mm	ø 80 // Length 400	ø 80 // Length 550	ø 80 // Length 650	ø 80 // Length 650
Measurements (free adjacent spaces), mm	ø 120 // Length 550 ø 160 // Length 350 (400)	ø 120 // Length 550 ø 160 // Length 350 (400*)	ø 120 // Length 650 ø 160 // Length 350 (400*)	ø 120 // Length 650 ø 160 // Length 350 (400)
Measurements Drilling bridges, mm	ø 280 × 160 // Length 350 (400)	ø 280 × 160 // Length 350 (400*)	ø 280 × 160 // Length 350 (400*)	ø 280 × 160 // Length 350 (400)
Weight, kg	15 (Chain basic 12)	15 (Chain basic 12)	15 (Chain basic 12)	15
Pull-out torque, Nm	25 (Chain basic 12)	25 (Chain basic 12)	25 (Chain basic 12)	25
Chip-to-chip time (HSK), sec.	3.7	3.8	4.1 / 4.3	4.7
SK50 / CAT50 / HSK-A100		**DMU 80 P / FD dB**	**DMU 100 / 125 P / FD dB**	**DMU 160 P / FD dB**
Tool holder		SK50 (HSK-A100)	SK50 (HSK-A100)	SK50 (HSK-A100)
Magazine type / pockets up to max.		120 pockets	120 pockets	120 pockets
Measurements (occupied neighbouring spaces), mm		ø 110 // Length 550	ø 110 // Length 650	ø 110 // Length 650
Measurements (free adjacent spaces), mm		ø 230 // Length 550	ø 230 // Length 650	ø 200 // Length 650
Measurements Drilling bridges, mm		ø 400 × 230 // Length 550	ø 400 × 230 // Length 650	ø 400 × 280 // Length 400 (470)
Weight, kg		30	30	30
Pull-out torque, Nm		70	70	70
Chip-to-chip time (HSK), sec.		5.4	5.6 / 5.9	4.8

Tool magazine specifications	DMU 60 / 80 / 100 / 125 P (SK40 / CAT40 / HSK-A63)	DMU 80 / 100 / 125 P (SK50 / CAT50 / HSK-A100)	DMU 160 P (SK40 / CAT40 / HSK-A63)	DMU 160 P (SK50 / CAT50 / HSK-A100)
Vertical basic chain, 40 pockets	Standard	–	–	–
Vertical basic chain, 60 pockets	•	–	–	–
Vertical chain, 40 pockets	–	–	Standard	Standard
Vertical chain, 60 pockets	–	–	•	•
Vertical chain, 120 pockets	•	–	•	•
Horizontal chain, 40 pockets	–	•	–	–
Horizontal chain, 60 pockets	–	•	–	–
Horizontal chain, 120 pockets	–	•	–	–

Tool magazine specifications	DMU 60 / 80 FD (HSK-A63)	DMU 80 FD (HSK- A100)	DMU 125 FD (HSK-A100)	DMU 160 FD (HSK-A100)
Vertical basic chain, 40 pockets	Standard	–	–	–
Vertical basic chain, 60 pockets	•	–	–	–
Vertical chain, 40 pockets	–	–	–	Standard
Vertical chain, 60 pockets	–	–	–	•
Vertical chain, 120 pockets	•	–	–	•
Horizontal chain, 40 pockets	–	•	Standard	–
Horizontal chain, 60 pockets	–	•	•	–
Horizontal chain, 120 pockets	–	•	•	–

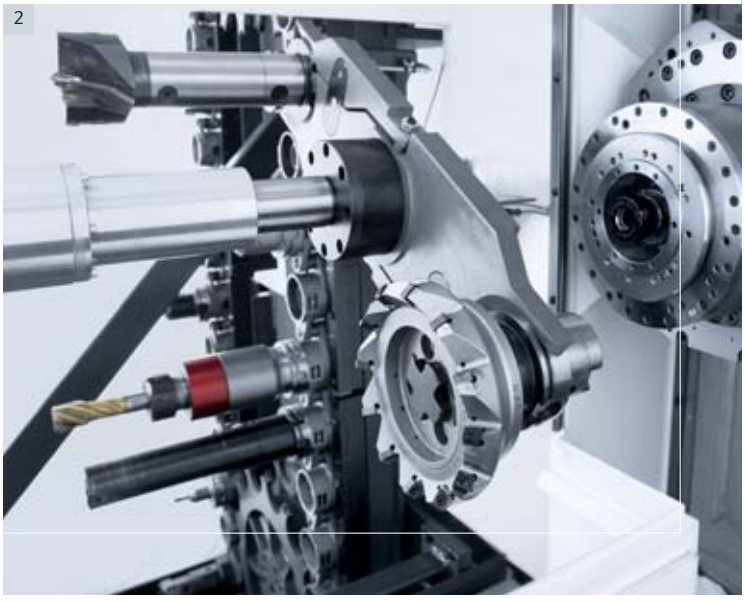
* 400 mm tool length for basic chain for SK40 / CAT40 and HSK-A63

1



|1| Highly dynamic vertical chain magazine for up to 480 tools and short preparation times
|2| Fast curve-controlled double gripper for short chip-to-chip times (3.7 seconds with the HSK-A63 and 3.9 seconds with the HSK-A100)

2



DMC U / FD duoBLOCK® – machines with pallet changers: innovative tool handling.

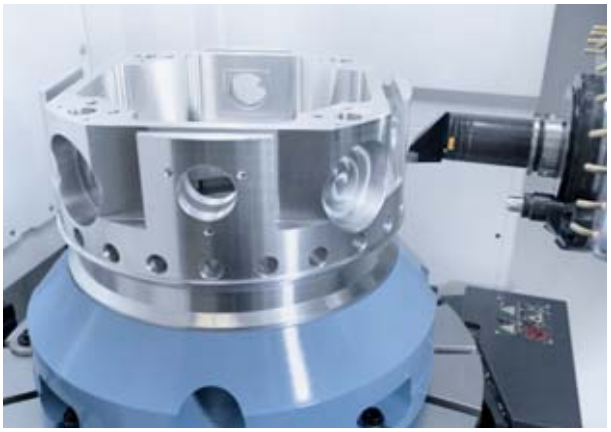
DMC: Maximum tool measurements and tool magazine specifications

SK40 / CAT40 / HSK-A63	**DMC 60 U / FD dB**	**DMC 80 U / FD dB**	**DMC 100 / 125 U dB**	**DMC 160 U dB**
Tool holder	SK40 (HSK-A63)	SK40 (HSK-A63)	SK40 (HSK-A63)	SK40 (HSK-A63)
Magazine type / pockets up to max.	480 pockets	480 pockets	480 pockets	480 pockets
Measurements (occupied neighbouring spaces), mm	ø 80 // Length 450	ø 80 // Length 550	ø 80 // Length 650	ø 80 // Length 650
Measurements (free adjacent spaces), mm	ø 120 // Length 450 ø 160 // Length 350 (400)	ø 120 // Length 550 ø 160 // Length 350 (400)	ø 120 // Length 650 ø 160 // Length 350 (400)	ø 120 // Length 650 ø 160 // Length 350 (400)
Measurements Drilling bridges, mm	ø 280 × 160 // Length 350 (400)	ø 280 × 160 // Length 350 (400)	ø 280 × 160 // Length 350 (400)	ø 280 × 160 // Length 350 (400)
Weight, kg	15	15	15	15
Pull-out torque, Nm	25	25	25	25
Chip-to-chip time (HSK), sec.	3.7	3.8	4.1 / 4.3	4.7
SK50 / CAT50 / HSK-A100		**DMC 80 U / FD dB**	**DMC 100 / 125 U / FD dB**	**DMC 160 U / FD dB**
Tool holder		SK50 (HSK-A100)	SK50 (HSK-A100)	SK50 (HSK-A100)
Magazine type / pockets up to max.		240 pockets	240 pockets	240 pockets
Measurements (occupied neighbouring spaces), mm		ø 110 // Length 550	ø 110 // Length 650	ø 110 // Length 650
Measurements (free adjacent spaces), mm		ø 200 // Length 550 ø 280 // Length 400 (470)	ø 200 // Length 650 ø 280 // Length 400 (470)	ø 200 // Length 650 ø 280 // Length 400 (470)
Measurements Drilling bridges, mm		ø 400 × 200 // Length 550 ø 400 × 280 // Length 400 (470)	ø 400 × 200 // Length 650 ø 400 × 280 // Length 400 (470)	ø 400 × 200 // Length 650 ø 400 × 280 // Length 400 (470)
Weight, kg		30	30	30
Pull-out torque, Nm		70	70	70
Chip-to-chip time (HSK), sec.		3.9	4.2 / 4.4	4.8

Tool magazine specifications	**DMC 60 / 80 / 100 / 125 U (SK40 / CAT40 / HSK-A63)**	**DMC 80 / 100 / 125 U (SK50 / CAT50 / HSK-A100)**	**DMC 160 U (SK40 / CAT40 / HSK-A63)**	**DMC 160 U (SK50 / CAT50 / HSK-A100)**
Vertical basic chain, 60 pockets	Standard	•	Standard	•
Vertical basic chain, 120 pockets	•	•	•	•
Vertical basic chain, 180 / 240 pockets	•	–	•	–
Vertical dual chain, 180 / 240 pockets	–	•	–	•
Vertical dual chain, 360 / 480 pockets	•	–	•	–

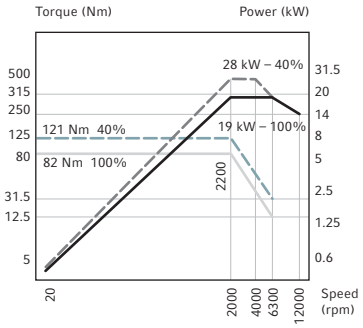
Tool magazine specifications	**DMC 60 / 80 FD (HSK-A63)**	**DMC 80 FD (HSK-A100)**	**DMC 125 FD (HSK-A100)**	**DMC 160 FD (HSK-A100)**
Vertical basic chain, 60 pockets	Standard	•	Standard	Standard
Vertical basic chain, 120 pockets	•	•	•	•
Vertical basic chain, 180 / 240 pockets	•	–	–	–
Vertical dual chain, 180 / 240 pockets	–	•	•	•
Vertical dual chain, 360 / 480 pockets	•	–	–	–

Largest Selection of Up-to-date Spindles.



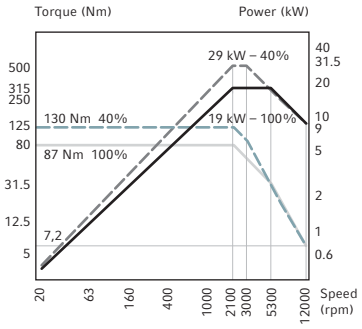
Motor spindle SK40 / HSK-A63*

12,000 rpm / 28 kW / 121 Nm



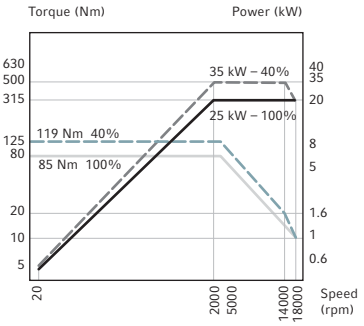
Motor spindle HSK-A63

12,000 rpm / 29 kW / 130 Nm



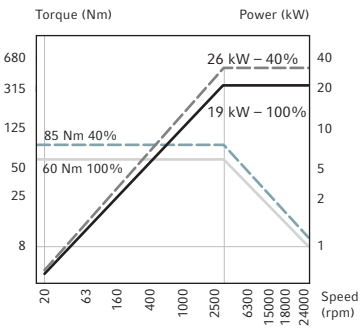
Motor spindle SK40 / HSK-A63*

18,000 rpm / 35 kW / 119 Nm



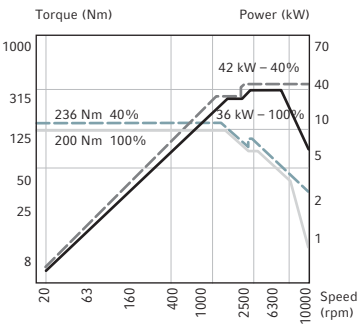
Motor spindle HSK-A63

24,000 rpm / 26 kW / 85 Nm



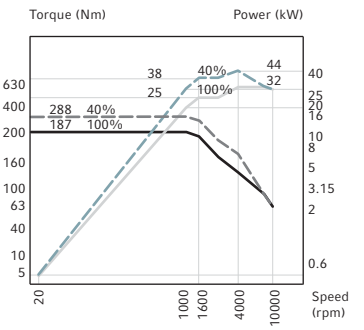
Motor spindle SK40 / HSK-A63*

10,000 rpm / 42 kW / 236 Nm



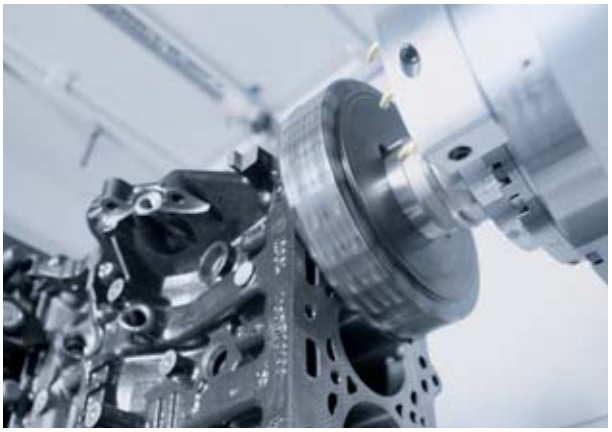
Motor spindle SK40 / HSK-A63* / SK50* / HSK-A100*

10,000 rpm / 44 kW / 288 Nm



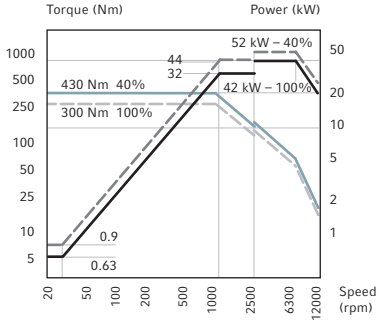
*optional

Largest Selection of Up-to-date Spindles.



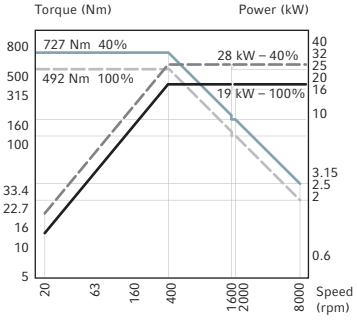
Motor spindle SK50 / HSK-A100*

12,000 rpm / 52 kW / 430 Nm



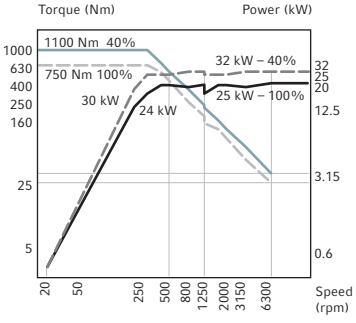
Gear spindle SK50 / HSK-A100*

8,000 rpm / 28 kW / 727 Nm



Gear spindle SK50 / HSK-A100*

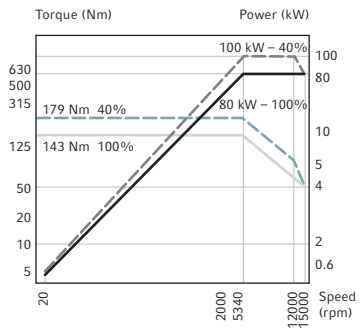
6,300 rpm / 32 kW / 1,100 Nm



Aerospace Spindles

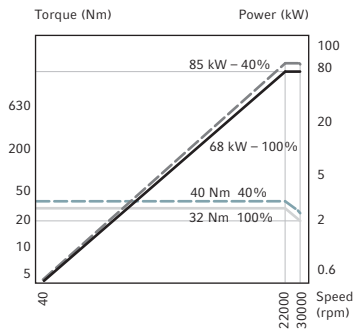
Motor spindle HSK-A100

15,000 rpm / 100 kW / 179 Nm



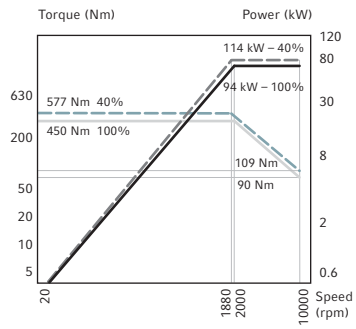
Motor spindle HSK-A63

30,000 rpm / 85 kW / 40 Nm



Motor spindle HSK-A100

10,000 rpm / 114 kW / 577 Nm



Largest Selection of Up-to-date Spindles.

DMU P / DMC U-machines: Spindle selection	Machine			
Rotational speed // Tool holders Power, torque (40 / 100 % DC) // Start-up time	**DMU 60 P DMC 60 U**	**DMU 80 P DMC 80 U**	**DMU 100 / 125 P DMC 100 / 125 U**	**DMU 160 P DMC 160 U**
12,000 rpm // SK40 / HSK-A63* 28 / 19 kW, 121 / 82 Nm // 0–12,000 rpm: 2.0 sec.	Standard	Standard	Standard	Standard
18,000 rpm // SK40 / HSK-A63* 35 / 25 kW, 119 / 85 Nm // 0–18,000 rpm: 2.2 sec.	•	•	•	•
24,000 rpm // HSK-A63 26 / 19 kW, 85 / 60 Nm // 0–24,000 rpm: 3.5 sec.	•	Special option	Special option	Special option
10,000 rpm // SK40 / HSK-A63* 42 / 36 kW, 236 / 200 Nm // 0–10,000 rpm: 1.4 sec.	•	–	–	–
10,000 rpm // SK40 / HSK-A63* / SK50* / HSK-A100* 44 / 32 kW, 288 / 187 Nm // 0–10,000 rpm: 3.5 sec.	–	•	•	•
12,000 rpm // SK50 / HSK-A100* 52 / 42 kW, 430 / 300 Nm // 0–12,000 rpm: 4.5 sec.	–	•	•	•
8,000 rpm // SK50 / HSK-A100* 28 / 19 kW, 727 / 492 Nm // 0–8,000 rpm: 1.8 sec.	–	•	•	–
6,300 rpm // SK50 / HSK-A100* 32 / 25 kW, 1,100 / 750 Nm // 0–6,300 rpm: 3.0 sec.	–	–	–	•
Aerospace Spindles				
15,000 rpm // HSK-A100 100 / 80 kW, 179 / 143 Nm // 0–15,000 rpm: 1.3 sec.	–	Special option	Special option	Special option
30,000 rpm // HSK-A63 85 / 68 kW, 40 / 32 Nm // 0–30,000 rpm: 2.8 sec.	–	Special option	Special option	Special option
10,000 rpm // HSK-A100** 114 / 94 kW, 577 / 450 Nm // 0–10,000 rpm: 1.2 sec.	–	Special option	Special option	Special option

FD – Turn-mill machines: Spindle selection	Machine			
Rotational speed // Tool holders Power, torque (40 / 100 % DC) // Start-up time	**DMU 60 FD DMC 60 FD**	**DMU 80 FD DMC 80 FD**	**DMU 125 FD DMC 125 FD**	**DMU 160 FD DMC 160 FD**
12,000 rpm // HSK-A63 29 / 19 kW, 130 / 87 Nm // 0–12,000 rpm: 2.0 sec.	Standard	Standard	–	–
10,000 rpm // HSK-A100 44 / 32 kW, 288 / 187 Nm // 0–10,000 rpm: 3.5 sec.	–	•	Standard	Standard
12,000 rpm // HSK-A100 52 / 42 kW, 430 / 300 Nm // 0–12,000 rpm: 4.5 sec.	–	•	•	•
8,000 rpm // HSK-A100 28 / 19 kW, 727 / 492 Nm // 0–8,000 rpm: 1.8 sec.	–	•	•	–
6,300 rpm // HSK-A100 32 / 25 kW, 1,100 / 750 Nm // 0–8,000 rpm: 3.0 sec.	–	–	–	•

• available as option * option ** only available with Siemens 840D

Safe and efficient production, easy and fast maintenance.

The machines of the duoBLOCK® series allow safe and efficient production due to their comprehensive process-optimising features. Special optimised coolant and production packages, as well as expansion options are available for automated production. With regard to maintenance and service, the new duoBLOCK® generation will impress you with easily accessible maintenance doors and control cabinets, clear equipment identification and the service-friendly Fluidbox.

1

2

3

4

5

Optimal process safety

Chip removal and cooling units (Options)

_ Internal coolant supply 40 bar through the spindle centre, chip conveyor, Rotoclear in the standard version
DMU: Compact coolant tank 500 l, metal band filter
DMC: Coolant tank 980 l, paper band filter
_ Production package with internal coolant supply up to 80 bar
_ Coolant tempering

Measuring and testing (Options)

_ Mechanical tool breakage control parallel to production time
_ Tool measurement and tool breakage control with a laser
_ Infrared measuring probe

Maintenance and Service

_ Large and easily-accessible service and control cabinet doors
_ Single conductor indicator and equipment identification in the control cabinet
_ Maintenance-friendly Fluidbox (lubrication, hydraulics and pneumatics)
_ Coloured labelling of the lines in different mediums

Options for automation

_ Multi-channel clamping hydraulics through the table centre up to 240 bar
_ Motor-driven set-up space and automatic set-up space doors
_ Rotary magazine for up to 12 pallets in the system
_ Individual automation interfaces for work piece and pallet handling systems

|1| Compact filter device with 500 l, metal band filter and internal coolant supply 40 bar
|2| Tool breakage control parallel to production time (mechanical) |3| HSK tool cone cleaning (mechanical) |4| Control cabinet construction according to the Automotive Standard
|5| Maintenance-friendly Fluidbox

Performance milling, performance drilling and thread cutting.

|1| Face milling

|2| Drilling

|3| Thread cutting

Motor spindle 12,000 rpm / 28 kW / 121 Nm*	
|1| Performance milling	
Material work piece	**Steel (Ck45)**
Material removal rate	**224 cm³/min**
Tool	Milling head D = 80 (6 cutting)
Spindle speed	995 rpm (Vc = 250 m/min)
Feed	1,492 mm/min (Fz = 0.25 mm)
Cutting depth / width	2.5 / 60 mm
|2| Performance drilling	
Material work piece	**Steel (Ck45)**
Material removal rate	**205 cm³/min**
Tool	Cutting insert drill D = 44
Spindle speed	905 rpm (Vc = 125 m/min)
Feed	135 mm/min (Fz = 0.15 mm)
Cutting depth	70 mm
|3| Threading	
Material work piece	**Steel (CK45)**
Tool	Thread drill M20
Spindle speed	240 rpm (Vc = 15 m/min)
Feed	597 mm/min (Fz = 2.5 mm)
Thread depth	20 mm

Motor spindle 18,000 rpm / 35 kW / 119 Nm	
|1| Performance milling	
Material work piece	**Steel (Ck45)**
Material removal rate	**242 cm³/min**
Tool	Milling head D = 80 (6 cutting)
Spindle speed	995 rpm (Vc = 250 m/min)
Feed	1,611 mm/min (Fz = 0.27 mm)
Cutting depth / width	2.5 / 60 mm
|2| Performance drilling	
Material work piece	**Steel (Ck45)**
Material removal rate	**214 cm³/min**
Tool	Cutting insert drill D = 44
Spindle speed	905 rpm (Vc = 125 m/min)
Feed	141 mm/min (Fz = 0.16 mm)
Cutting depth	70 mm
|3| Threading	
Material work piece	**Steel (Ck45)**
Tool	Thread drill M24
Spindle speed	80 rpm (Vc = 6 m/min)
Feed	240 mm/min (Fz = 3.0 mm)
Thread depth	20 mm

* comparable values for the 12,000 rpm (29 kW, 130 Nm) and 24,000 rpm (26 kW, 85 Nm) motor spindle

|1| Face milling

|2| Drilling

|3| Thread cutting

Motor spindle 10,000 rpm / 44 kW / 288 Nm

|1| Performance milling	
Material work piece	**Steel (Ck45)**
Material removal rate	**812 cm³/min**
Tool	Milling head D = 100 (7 cutting)
Spindle speed	1,255 rpm (Vc = 394 m/min)
Feed	2,900 mm/min (Fz = 0.33 mm)
Cutting depth / width	3.5 / 80 mm
|2| Performance milling	
Material work piece	**Steel (Ck45)**
Material removal rate	**708 cm³/min**
Tool	Cutting insert drill D = 70
Spindle speed	1,023 rpm (Vc = 225 m/min)
Feed	186 mm/min (Fz = 0.18 mm)
Cutting depth	100 mm
|3| Threading	
Material work piece	**Steel (Ck45)**
Tool	Thread drill M30
Spindle speed	106 rpm (Vc = 10 m/min)
Feed	371 mm/min (Fz = 3.5 mm)
Thread depth	30 mm

Motor spindle 12,000 rpm / 52 kW / 430 Nm

|1| Performance milling	
Material work piece	**Steel (Ck45)**
Material removal rate	**1,000 cm³/min**
Tool	Milling head D = 160 (9 cutting)
Spindle speed	1,000 rpm (Vc = 500 m/min)
Feed	1,800 mm/min (Fz = 0.2 mm)
Cutting depth / width	4.5 / 120 mm
|2| Performance drilling	
Material work piece	**Steel (Ck45)**
Material removal rate	**830 cm³/min**
Tool	Cutting insert drill D = 80
Spindle speed	900 rpm (Vc = 225 m/min)
Feed	165 mm/min (Fz = 0.183 mm)
Cutting depth	120 mm
|3| Threading	
Material work piece	**Steel (Ck45)**
Tool	Thread drill M42
Spindle speed	46 rpm (Vc = 6 m/min)
Feed	207 mm/min (Fz = 4.5 mm)
Thread depth	40 mm

* comparable values for the 12,000 rpm (29 kW, 130 Nm) and 24,000 rpm motor spindle

Performance milling, performance drilling and thread cutting.

|1| Face milling

|2| Drilling

|3| Thread cutting

Gear spindle 8,000 rpm / 28 kW / 727 Nm	
|1| Performance Milling	
Material work piece	**Steel (Ck45)**
Material removal rate	**570 cm³/min**
Tool	Milling head D = 125 (10 cutting)
Spindle speed	400 rpm (Vc = 160 m/min)
Feed	1,140 mm/min (Fz = 0.29 mm)
Cutting depth / width	5.0 / 100 mm
|2| Performance drilling	
Material work piece	**Steel (Ck45)**
Material removal rate	**422 cm³/min**
Tool	Cutting insert drill D = 80
Spindle speed	400 rpm (Vc = 100 m/min)
Feed	207 mm/min (Fz = 4.5 mm)
Cutting depth	80 mm
|3| Threading	
Material work piece	**Steel (Ck45)**
Tool	Thread drill M42
Spindle speed	46 rpm (Vc = 6 m/min)
Feed	207 mm/min (Fz = 4.5 mm)
Thread depth	40 mm

Gear spindle 6,300 rpm / 32 kW / 1,100 Nm	
|1| Performance Milling	
Material work piece	**Steel (Ck45)**
Material removal rate	**695 cm³/min**
Tool	Milling head D = 160 (12 cutting)
Spindle speed	268 rpm (Vc = 135 m/min)
Feed	965 mm/min (Fz = 0.3 mm)
Cutting depth / width	6.0 / 120 mm
|2| Performance drilling	
Material work piece	**Steel (Ck45)**
Material removal rate	**472 cm³/min**
Tool	Cutting insert drill D = 100
Spindle speed	400 rpm (Vc = 125 m/min)
Feed	60 mm/min (Fz = 0.15 mm)
Cutting depth	100 mm
|3| Threading	
Material work piece	**Steel (Ck45)**
Tool	Thread drill M48
Spindle speed	100 rpm (Vc = 15 m/min)
Feed	500 mm/min (Fz = 5.0 mm)
Thread depth	50 mm

Milling / Turning: DMU / DMC 60 / 80 / 125 / 160 FD duoBLOCK® Performance Turning.

DMU / DMC 60 FD – 37 kW power / 1,000 Nm torque
1,200* rpm max. speed / 3,300 Nm holding torque

Material	**Ck45**
Material removal rate	**405 cm³/min**
Cutting depth	4.5 mm
Feed	0.45 mm / revolution
Cutting diameter	500 mm
Cutting speed	200 m/min
Speed	127 rpm

DMU / DMC 80 FD – 36 kW power / 2,050 Nm torque
800 rpm max. speed / 3,400 Nm holding torque

Material	**Ck45**
Material removal rate	**720 cm³/min**
Cutting depth	6 mm
Feed	0.6 mm / revolution
Cutting diameter	500 mm
Cutting speed	200 m/min
Speed	128 rpm

DMU / DMC 125 FD – 35 kW power / 5,400 Nm torque
500 rpm max. speed / 6,200 Nm holding torque

Material	**Ck45**
Material removal rate	**1,000 cm³/min**
Cutting depth	10 mm
Feed	0.5 mm / Rotation
Cutting diameter	900 mm
Cutting speed	200 m/min
Speed	70 rpm

DMU / DMC 160 FD – 69 kW power / 7,300 Nm torque
400* rpm max. speed / 13,500 Nm holding torque

Material	**Ck45**
Material removal rate	**1,440 cm³/min**
Cutting depth	12 mm
Feed	0.6 mm / revolution
Cutting diameter	900 mm
Cutting speed	200 m/min
Speed	71 rpm

* specification for DC 10 min, cooling of the bearing is required

Spindles for Special Materials and Applications // Example Applications.

Aerospace spindle – Cutting of aluminium up to 13 l/min
Power milling with a 15,000 rpm motor spindle (179 Nm, 100 kW)

Material work piece	**AlMgSi**
Material removal rate	**13,650 cm³/min**
Tool	Milling head D = 80 (5 cutting)
Spindle speed	8,000 rpm (Vc = 2,009 m/min)
Feed	19,500 mm/min (Fz = 0.49 mm)
Cutting depth / width	10.0 / 70 mm

5X torqueMASTER® – Cutting of titanium
Power milling with an 8,000 rpm gear spindle (727 Nm, 28 kW)

Material work piece	**Titan – Ti 6Al 4V**
Material removal rate	**349 cm³/min**
Tool	Insert mill D = 50 (4 cutting)
Spindle speed	363 rpm (Vc = 60 m/min)
Feed	203 mm/min (Fz = 0.14 mm)
Cutting depth / width	43.0 / 40 mm

Performance milling with 6,300 motor spindle
(1,100 Nm, 32 kW)

Material work piece	**Titan – Ti 6Al 4V**
Material removal rate	**516 cm³/min**
Tool	Insert mill D = 80 (4 cutting)
Spindle speed	239 rpm (Vc = 60 m/min)
Feed	172 mm/min (Fz = 0.18 mm)
Cutting depth / width	60.0 / 50 mm

Angle cutter for internal machining of notches, holes, etc.

_ Simplest retooling directly via the standard tool magazine
_ Available for all tool holders, including SK40, HSK-A63, SK50, HSK-A100
_ Maximum stability provided by torque supports
_ Swivel range depends on whether tool is fixed or flexible
_ Internal coolant supply is tool-dependant

U-axis for any contour and turning

_ Simplest retooling directly via the standard tool magazine
_ Deployment of the U-axis via actuator system
_ Programming and control as full-blown NC axis
_ Ideal for machining grooves, contours and deep reliefs
_ Max. 22 mm hub for SK40 / CAT40 / HSK-A63
_ Max. 50 mm hub for SK50 / CAT50 / HSK-A100

Finishing of a segment for a tyre mould
Complete machining on a DMU 60 P duoBLOCK®

Industry	**Mould making**	**Machining focus**
Material	40CrMnMo7	5-axis simultaneous machining with an NC-controlled B-axis and NC-rotary table; roughing depth Ra < 0.2 µm – Application of a multi-clamping device
Tools	Ball mill ø 6 mm	
Spindle	18,000 rpm	
Power / Torque	35 kW / 119 Nm	

Hard machining of a bevel pinion (60 HRC) – ø 640 mm
Complete machining on a DMC 80 FD duoBLOCK®

Industry	**Machine construction**	**Machining focus**
Material	18CrNiMo-6	5-axis simultaneous finishing of the tooth flank; machining with standard tools; soft milling and hard turning on the same machine
Tools	End mill ø 12 mm	
Spindle	10,000 rpm	
Power / Torque	44 kW / 288 Nm	

Finishing of a Pelton wheel from one part – ø 750 mm
Complete machining on a DMU 125 FD duoBLOCK®

Industry	**Energy technology**	**Machining focus**
Material	1.4313 forged	Turning operations of the outer contour; 5-axis simultaneous roughing and finishing of the interior and exterior side of the blade; no subsequent machining is necessary
Tools	Ball mill ø 16 mm	
Spindle	10,000 rpm	
Power / Torque	44 kW / 288 Nm	

Finishing of a drum made of titanium – ø 880 mm
Complete machining on DMU 125 FD duoBLOCK®

Industry	**Aerospace**	**Machining focus**
Material	Titanium – Ti 6Al 4V	Heavy roughing with 727 Nm In 5-axis simultaneous operations; turning operations of the exterior and interior side; complete machining in two settings
Tools	End mill ø 12 mm	
Spindle	8,000 rpm	
Power / Torque	28 kW / 727 Nm	

Finishing of a chassis carrier made of titanium
Complete machining on DMC 160 FD duoBLOCK®

Industry	**Aerospace**	**Machining focus**
Material	Titanium – Ti 6Al 4V	Heavy roughing with 1,100 Nm in activated 5-axis operations; Finishing in 5-axis simultaneous operations; complete machining in two settings
Tools	End mill ø 12 mm	
Spindle	6,300 rpm	
Power / Torque	32 kW / 1,100 Nm	

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|1| DMC U as a pallet magazine with a container solution **|2|** Production system with three machining centres, 2-level linear magazine with 52 pockets and a central tool magazine with 400 pockets
|3| Production cell for hydraulic components
|4| Fully-automated production of gearboxes
|5| DMC 80 U duoBLOCK® with an RS10 rotary magazine **|6|** RS5 rotary magazine

duoBLOCK® – the foundation for individual automation solutions.

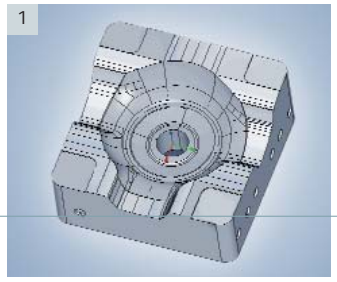
Solutions for Automation	**Workpiece handling** Machines with and without pallet changers	**Pallet handling, DMU P / FD** Machines without pallet changers	**Pallet handling, DMC U / FD** Machines with pallet changers
Articulating arm robot	•	•	–
Portal loaders	•	•	–
Linear systems	–	•	–
RS5: 5-fold multi-pallet APC (7 pallets in the system)*	–	–	•
RS10: 10-fold multi-pallet APC (12 pallets in the system)*	–	–	•
Container solutions	–	–	•
Flexible pallet systems (linear multi-pallet)	–	–	•
Upgrades / Peripheral equipment	**Workpiece handling** Machines with and without pallet changers	**Pallet handling, DMU P / FD** Machines without pallet changers	**Pallet handling, DMC U / FD** Machines with pallet changers
Central tool magazine	•	•	•
Washing	•	•	•
Deburring	•	•	•
Measurement	•	•	•
Workpiece labelling	•	•	•

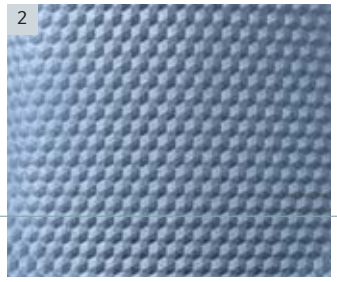
* DMC 160 U / FD with RS4 multi-pallet APC (6 pallets in the system)

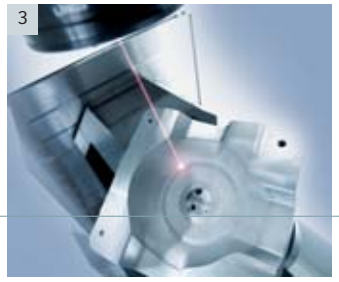
Combined pallet and tool handling on the DMU 80 P duoBLOCK®.

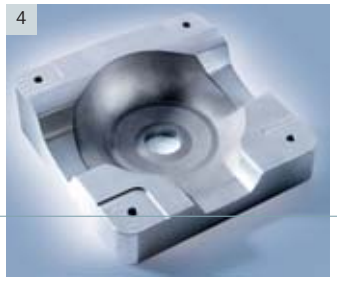
LASERTEC Shape – 5-axis milling and laser surface structuring – Advantage in mould making.

For the first time, the flexible integration of a fibre laser scanning head in the spindle head (by means of an HSK interface) allows for 5-axis milling of mould components via laser surface texturing on the machine, in one setup. Moulds for automotive fittings, household appliances, mobile phones / camera bodies, shoe soles and other plastic injection moulds are pre-milled prior to laser-structuring for a geometrically defined, customer-specific technical surface overview.









|1| LASERSOFT 3D texture to generate the laser machining programme **|2|** Geometrically-defined honeycomb structure **|3|** Laser structuring of a steering wheel cap form **|4|** Final steering wheel cap injection mould part with a honeycomb structure

LASERTEC Highlights

_ **5-axis milling & laser surface structuring in free-form shapes for tool and mould making** in one setup and on one machine

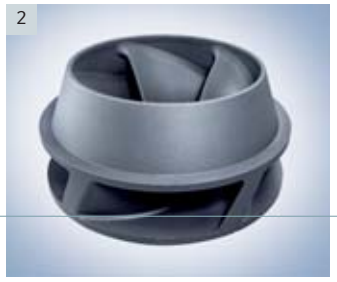
_ Moulds for **Automotive** (example: valves), **Electronics** (example: mobile phone casings), **Lifestyle** (example: shoe soles) and general **tool / mould making**

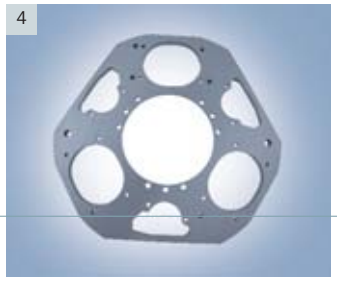
_ **Integrated in all duoBLOCK® machines through the adaptation of a fibre laser source via an HSK interface on the spindle head**

_ **Siemens 840D solutionline with special comprehensive LASERSOFT 3D texture software** for organic and technical surface structuring

ULTRASONIC – Unrivalled material range and milling on one machine.

The latest generation of ULTRASONIC HSK actuator systems combined ULTRASONIC hard machining of advanced materials (example: Light weight structures made of Zerodur, stamping tools made of hard metal, wear parts made of ceramic for the pump, textile and valve industries) with conventional 5-axis milling based on a HSK-63 / 100 interface. Here, the conventional tool rotation is inductively overlaid with an additional ULTRASONIC oscillation in the axial direction.



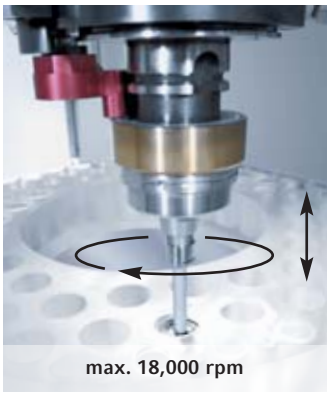


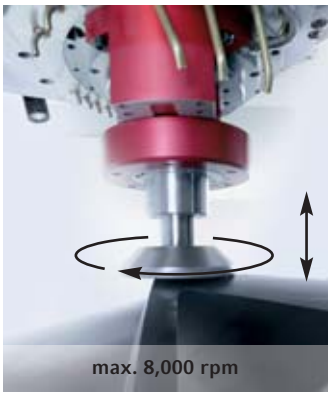
|1| Thin-walled lightweight Zerodur structures
|2| Si-Quarz pump housing **|3|** Silicon nitride camera housing
|4| Silicon carbide mounting plate

ULTRASONIC Advantages

_ Reduced process forces for excellent surface finishes (Ra < 0.2 µm), minimised microcracks in the material, longer tool life
_ Up to 2 times higher removal rates compared to conventional grinding
_ Self-sharpening of the cutting edge with micro-fragments in the diamond grains
_ Optimised particle rinsing in the active zone

Working principle – Flexible ULTRASONIC integration via HSK





	HSK-63	HSK-100
Max. milling speed	24,000 rpm	12,000 min^{-1}
Max. ULTRASONIC speed	18,000 rpm	8,000 min^{-1}
Tool interface	ER, 20 H7, shrink	ER, 20 H7, shrink
easySONIC-Control (automatic ULTRASONIC frequency recognition)	available	available

Gear wheel production on a universal milling machine with standard tools.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Highlights

_ **Complete machining on one machine for reduced overall investment and floorspace requirements:**
|1| Turning |2| Drilling |3| Gear milling
|4| Grinding
_ **Use of standard tools**
_ **Soft and hard machining**
_ **Toothing quality up to 3 DIN**

DMG gearMILL® Toothing Software

_ **Calculation of the tooth spacing geometry for spur,** helical, double helical (herringbone) gears and also couplings
_ **Calculation of the tooth spacing geometry for bevel gears** with straight or zero-bevel toothing, spiral toothing (Klingelnberg Zyklo-Palloid®), equal or unequal 90° axis angles, with or without offset (hypoid)
_ **Fabrication of individual contact pattern**
_ **Individual flank and profile modifications**
_ **Generation of 4 and 5-axis tool paths**
_ **Generator for 3D measurement data**
_ **Machine simulation**
_ **Designed for individual training with technology transfer**

DMG Energy Save

Intelligent technology saves up to 20 % of the energy costs over the entire life cycle of your DMG machine tool

DMG AUTO*shutdown*:
Intelligent standby control system to avoid unnecessary energy use during idle state

DMG GREEN*mode*:
Increased process speed and energy savings using intelligent feed control system

DMG Virtual Machine

Unique – Your DMG Machine 1:1 with the PC

- Efficient production start-up using optimal preparation
- Real-time display of per-piece time using PLC integration
- Complete availability of all cycles and NC functions
- High reliability using collision and work space verification
- Authentic machine model with exact work space representation
- Up to 80 % reduction of set-up retooling times

DMG Netservice

Green light for your machine as standard equipment

- Immediate analysis and technical support for your DMG machine
- Considerable increase in machine availability
- Reduced service, personnel and travel costs
- Faster, bidirectional data exchange
- High data security using ISDN or Internet VPN access

DMG ERGO*line*® Control – High-end CNCs for reliable processing and high precision.

Today, intelligent control systems transform engineering performance into maximum process efficiency, high workpiece precision, and optimal user-friendliness. To this end, DECKEL MAHO trusts in the high quality products of the worldwide market leaders Siemens and Heidenhain and raises that performance level through its own software solutions such as DMG Virtual Machine and DMG Process Chain.

Siemens 840D solutionline

_ Simplest interactive programming using "look and feel" for turning and milling
_ New user interface SINUMERIK Operate
_ ATC*, 3D quickSET®*
_ High performance processor (1.85 GHz) and control unit, 1 GB working memory
_ High batch processing times of about 2.5 ms
_ Look-ahead function for 99 batches
_ Graphic simulation of the machining workflow with plan view, 3-level and 3D presentation; Synchronous graphics during the machining
_ 3D machining, optional 3D tool correction using surface normal vectors
_ MDynamics, optional optimisation of surface quality and speed, and for the smoothing of surface transitions

* optional

Heidenhain iTNC 530

_ **HSCI – HEIDENHAIN Serial Controller Interface**
_ Shop floor or DIN-ISO programming
_ Fastest program creation using plain language programming
_ Graphical programming
_ Collision monitoring
_ ATC*, 3D quickSET®*
_ High-performance processor (1.8 GHz) and control unit
_ Significantly faster program execution for very good surfaces, with batch processing time of about 0.5 ms
_ Look-ahead function for 1024 batches
_ higher simulation speed and better presentation of graphical test run
_ Higher performance of Collision-Monitoring and 5-axis functions (ex. TCPM Tool Centre Point Management)

* optional

Heidenhain MillPlus iT V600

_ New future-oriented functions with "look and feel" of familiar Heidenhain MillPlus iT
_ Simple, clear and intuitive use
_ Clear program structure
_ Cycle expansion in standard version (ex. plane, cylinder jacket interpolation, etc.)
_ Fast loading and editing of memory-intensive programs
_ High-level language programming with SQL table access
_ New die-making functions
_ Expanded diagnosis capabilities

ATC – Application Tuning Cycle

Easy tuning of the feed drives at the press of a button

This means: Preparation of three settings (surface, speed, precision) that can be freely selectable within a work piece programme. **Your benefit:** Minimisation of the machining time while maximising the relevant quality, also in connection to the work piece weight.

For all controls.

ATC Application Tuning Cycle

3D quickSET®

For inspection and correction of the axis precision in the work area

This means: A correction function for the precision of the delivery status. **Your benefit:** Easy operator handling and programming, always the highest precision, even during 5-axis machining.

For all controls.

3D quickSET

MPC – Machine Protection Control

Preventive protection of the machine and tools,

through the vibration sensors on the milling spindle: Machine protection through fast shut-off, process monitoring by teach function and graph display, spindle bearing condition diagnosis and planning of maintenance and repair.

MPC Machine Protection Control

Advanced Surface

for Siemens SINUMERIK 840D solutionline

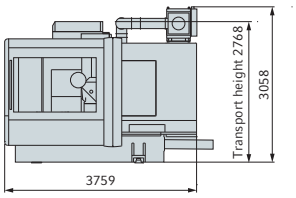
Option for the highest surface qualities through optimal movement guide.

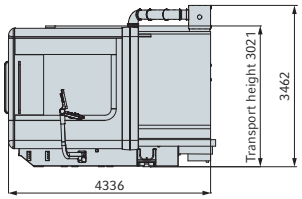
_ Highest machining speed through optimised speed guides
_ Perfect surface quality through an optimal speed profile and through the integrated “Advanced Look-ahead” feature
_ Exact contour precision through the optimised compressor

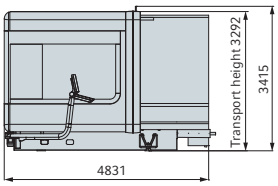
Floor Plans

DMU 60 P / FD duoBLOCK® **DMU 80 P / FD duoBLOCK®** **DMU 100 P duoBLOCK®**

Side view

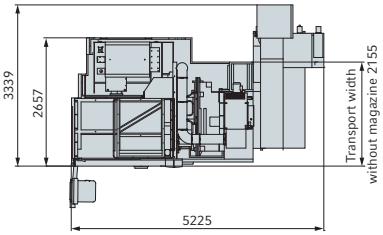




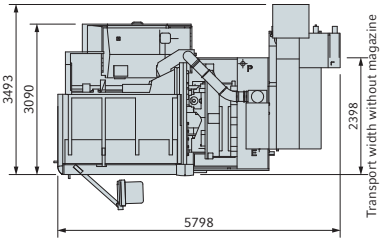


DMU 60 P duoBLOCK® **DMU 80 P duoBLOCK®** **DMU 100 P duoBLOCK®**

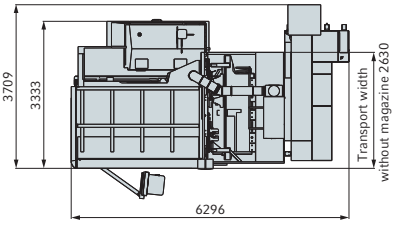
Top view with a chain magazine 40 pockets



Footprint 17.4 m²



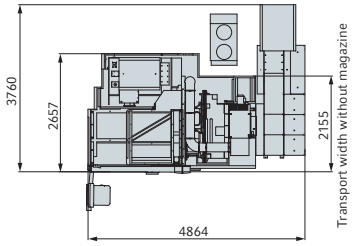
Footprint 16.6 m²



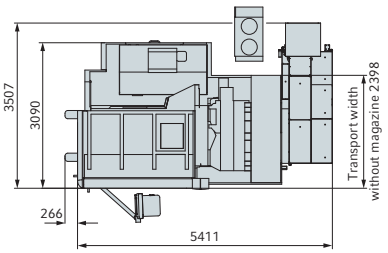
Footprint 23.4 m²

DMU 60 FD duoBLOCK® **DMU 80 FD duoBLOCK®**

Top view with a chain magazine 40 pockets



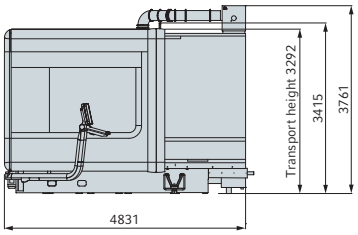
Footprint 18.3 m²



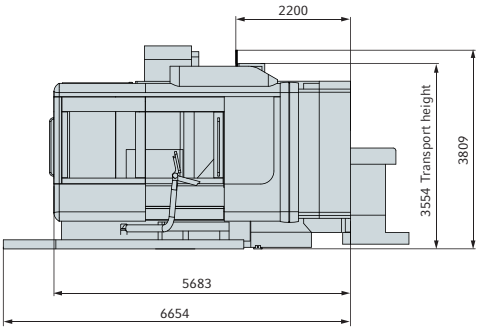
Footprint 19.0 m²

DMU 125 P / FD duoBLOCK®

Side view

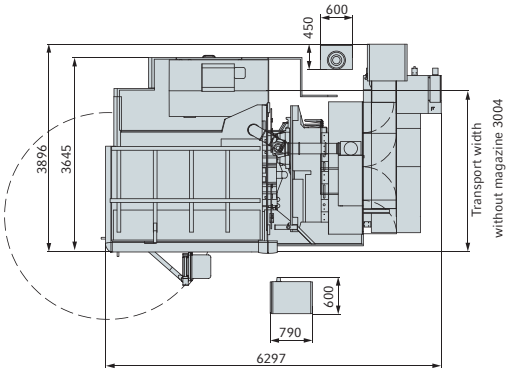


DMU 160 P / FD duoBLOCK®



DMU 125 P duoBLOCK®

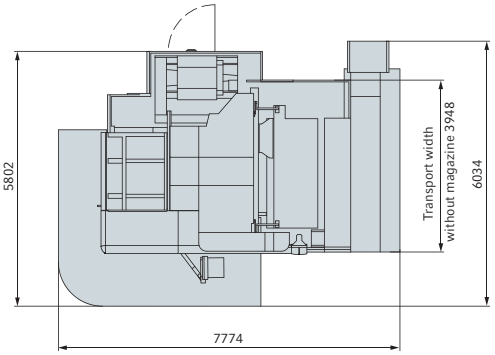
Top view with a chain magazine 40 pockets



Footprint 24.5 m²

DMU 160 P duoBLOCK®

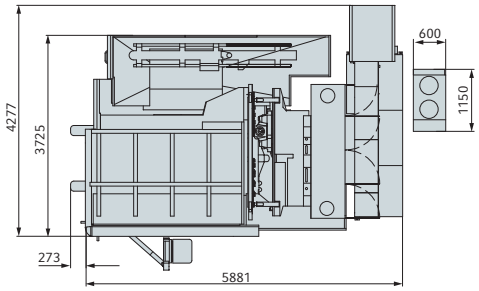
Top view with a chain magazine 60 pockets



Footprint 46.9 m²

DMU 125 FD duoBLOCK®

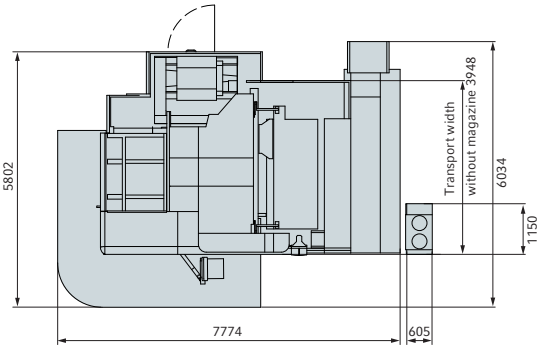
Top view with a chain magazine 40 pockets



Footprint 26.3 m²

DMU 160 FD duoBLOCK®

Top view with a chain magazine 60 pockets

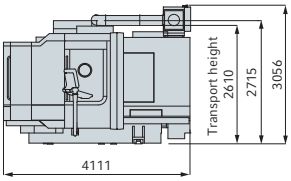


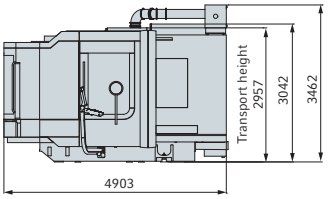
Footprint 46.9 m²

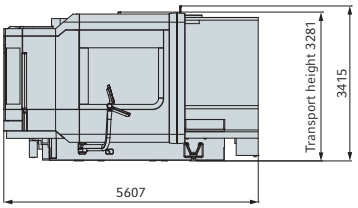
Floor Plans

DMC 60 U / FD duoBLOCK® **DMC 80 U / FD duoBLOCK®** **DMC 100 U duoBLOCK®**

Side view

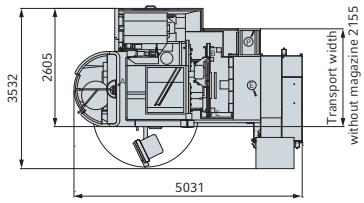


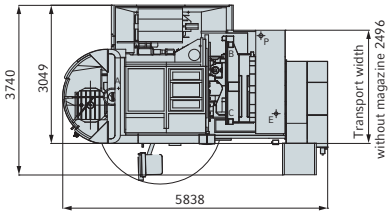


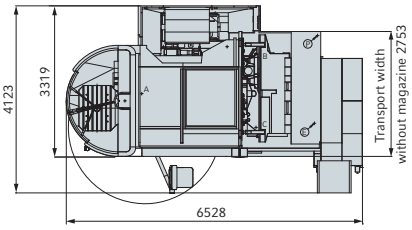


DMC 60 U duoBLOCK® **DMC 80 U duoBLOCK®** **DMC 100 U duoBLOCK®**

Top view with a chain magazine 40 pockets







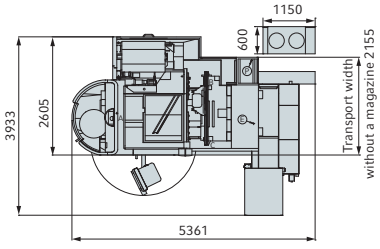
Footprint 17.8 m²

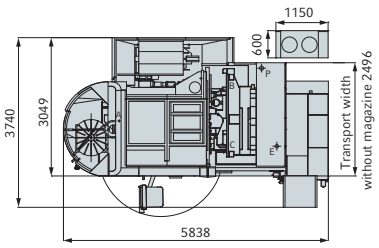
Footprint 21.8 m²

Footprint 26.9 m²

DMC 60 FD duoBLOCK® **DMC 80 FD duoBLOCK®**

Top view with a chain magazine 60 pockets



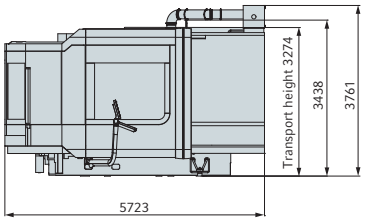


Footprint 21.1 m²

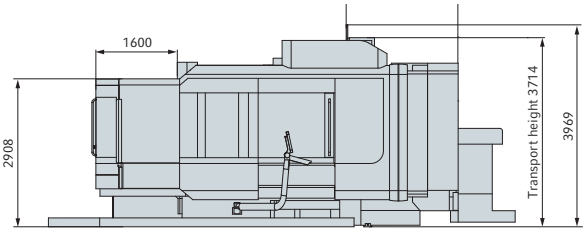
Footprint 21.8 m²

DMC 125 U / FD duoBLOCK®

Side view

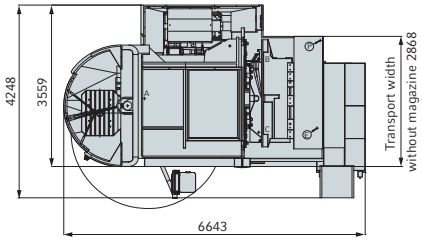


DMC 160 U / FD duoBLOCK®



DMC 125 U duoBLOCK®

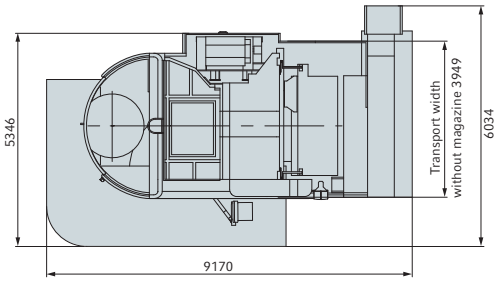
Top view with a chain magazine 60 pockets



Footprint 28.2 m²

DMC 160 U duoBLOCK®

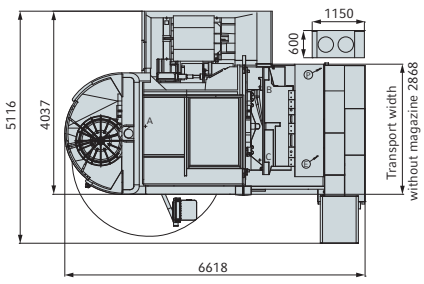
Top view with a chain magazine 60 pockets



Footprint 55.3 m²

DMC 125 FD duoBLOCK®

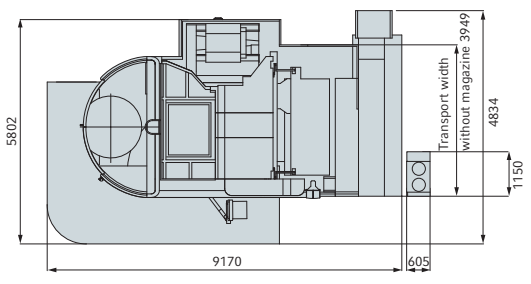
Top view with a chain magazine 60 pockets



Footprint 33.9 m²

DMC 160 FD duoBLOCK®

Top view with a chain magazine 60 pockets



Footprint 55.3 m²

Technical Data

Machine Type		DMU 60 P dB	DMU 80 P dB	DMU 100 P dB
Work area				
X / Y / Z-axis	mm	600 × 700 × 600	800 × 1,050 × 800	1,000 × 1,250 × 1,000
Spline centre clearance – pallet				
Milling head horizontal	mm	50–650	50–850	50–1,050
Milling head vertical	mm	150–750	150–950	150–1,150
Spindle nose clearance – pallet centre				
Milling head horizontal	mm	–150 up to 550	–200 up to 600	–200 up to 1,050
Milling head vertical	mm	–250 up to 450	–300 up to 500	300–950
Table / Clamping Surface / Work pieces				
NC rotary table	rpm	40	35	30
Milling / turning table (milling / turning)	rpm	–	–	–
Table size	mm	ø 630	ø 900 × 700	ø 1,100 × 900
Max. table load	kg	700	1,500	2,200
NC-controlled swivel milling head (B-axis)		Standard	Standard	Standard
Swivel range (0 = vert. / 180 = horiz.)	Degrees	–30 / +180	–30 / +180	–30 / +180
Rapid traverse and feed	rpm	30	30	30
5-axis Options				
NC-controlled swivel milling head (A-axis)		–	–	•
Swivel range (0 = vert. / –90 = horiz.)	Degrees			–120 / +10
Rapid traverse and feed	rpm			25
5X torqueMASTER® – NC-controlled B-axis with a gear spindle		–	•	•
Swivel range (0 = vert. / 180 = horiz.)	Degrees		–10 / +180	–10 / +180
Rapid traverse and feed	rpm		23	23
Main drive				
Integrated motor spindle SK40	rpm	12,000	12,000	12,000
Integrated motor spindle HSK-A63	rpm	–	–	–
Integrated motor spindle HSK-A100	rpm	–	–	–
Power (40 / 100 % DC)	kW	28 / 19	28 / 19	28 / 19
Torque (40 / 100 % DC)	Nm	121 / 82	121 / 82	121 / 82
Tool changer				
Tool holder		SK40	SK40	SK40
Tool magazine	Pockets	40 / Chain	40 / Chain	40 / Chain
Linear axes (X / Y / Z)				
Feed / rapid traverse speed	m/min	60	60	60
Acceleration	m/s²	6 / 6 / 5	7 / 6.5 / 6.5	6 / 5 / 6
Feed force	kN	10	13 / 13 / 09	12 / 16 / 16
Machine data				
Space requirement of the basic machine incl. a chip conveyor without internal coolant supply	approx. m²	17.4	20.3	23.4
Machine height (standard machine)	mm	2,768	3,021	3,415
Machine weight	kg	10,600	15,500	17,800

Controls

DMG ERGO*line*® Control with a 19" screen

DMU P: Siemens 840D solutionline, Heidenhain iTNC 530, Heidenhain MillPlus iT V610

DMU FD: Siemens 840D solutionline FD

DMU 125 P dB	DMU 160 P dB	DMU 60 FD dB	DMU 80 FD dB	DMU 125 FD dB	DMU 160 FD dB
1,250 × 1,250 × 1,000	1,600 × 1,250 × 1,100	600 × 700 × 600	800 × 1,050 × 800	1,250 × 1,250 × 1,000	1,600 × 1,250 × 1,100
50–1,050	50–1,150	20–620	0–800	20–1,020	15–1,115
150–1,150	150–1,250	120–720	100–900	120–1,120	115–1,215
–200 up to 1,050	–200 up to 1,050	–150 up to 550	–200 up to 850	–200 up to 1,050	–200 up to 1,050
–300 up to 950	–300 up to 950	–250 up to 450	–300 up to 750	–300 up to 950	–300 up to 950
30	15	–	–	–	–
–	–	50 / 1,200	30 / 800	20 / 500	20 / 400
ø 1,250 × 1,100	ø 1,500 × 1,250	ø 700	ø 800	ø 1,250	ø 1,500
2,500	4,000	600	1,200	2,300	4,000
Standard	Standard	Standard	Standard	Standard	Standard
–30 / +180	–30 / +180	–30 / +180	–30 / +180	–30 / +180	–30 / +180
30	30	30	30	30	30
•	•	–	–	•	•
–120 / +10	–120 / +10			–120 / +10	–120 / +10
25	25			25	25
•	•	–	•	•	•
–10 / +180	–30 / +180		–10 / +180	–10 / +180	–30 / +180
23	23		23	23	23
12,000	12,000	–	–	–	–
–	–	12,000	12,000	–	–
–	–	–	–	10,000	10,000
28 / 19	28 / 19	29 / 19	29 / 19	44 / 32	44 / 32
121 / 82	121 / 82	130 / 87	130 / 87	288 / 187	288 / 187
SK40	SK40	HSK-A63	HSK-A63	HSK-A100	HSK-A100
40 / Chain	60 / Chain	40 / Chain	40 / Chain	40 / Chain	60 / Chain
60	60	60	60	60	60
6 / 5 / 6	5 / 4 / 5	6 / 6 / 5	7 / 6.5 / 6.5	6 / 5 / 6	6 / 4 / 5
12 / 16 / 16	15 / 15 / 10	10	13 / 13 / 09	12 / 16 / 16	15 / 15 / 10
24.5	46.9	18.3	19.0	26.3	46.9
3,415	3,782	3,058	3,462	3,761	3,782
18,800	35,000	12,000	16,500	18,900	35,000

Technical Data

Machine Type		DMC 60 U dB	DMC 80 U dB	DMC 100 U dB
Work area				
X / Y / Z-axis	mm	600 × 700 × 600	800 × 1,050 × 800	1,000 × 1,250 × 1,000
Spline centre clearance – pallet				
Milling head horizontal	mm	20–620	0–800	20–1,020
Milling head vertical	mm	120–720	100–900	120–1,120
Spindle nose clearance – pallet centre				
Milling head horizontal	mm	–150 up to 550	–200 up to 850	–200 up to 1,050
Milling head vertical	mm	–250 up to 450	–300 up to 750	–300 up to 950
Table / Clamping Surface / Work pieces				
NC rotary table	rpm	40	35	30
Milling / turning table (milling / turning)	rpm	–	–	–
Pallet size	mm	ø 630 × 500	ø 800 × 630	ø 1,000 × 800
Max. pallet load	kg	600	1,400	2,000
NC-controlled swivel milling head (B-axis)		Standard	Standard	Standard
Swivel range (0 = vert. / 180 = horiz.)	Degrees	–30 / +180	–30 / +180	–30 / +180
Rapid traverse and feed	rpm	30	30	30
5-axis Options				
NC-controlled swivel milling head (A-axis)		–	–	•
Swivel range (0 = vert. / –90 = horiz.)	Degrees			–120 / +10
Rapid traverse and feed	rpm			25
5X torqueMASTER® – NC-controlled B-axis with a gear spindle		–	•	•
Swivel range (0 = vert. / 180 = horiz.)	Degrees		–10 / +180	–10 / +180
Rapid traverse and feed	rpm		23	23
Main drive				
Integrated motor spindle SK40	rpm	12,000	12,000	12,000
Integrated motor spindle HSK-A63	rpm	–	–	–
Integrated motor spindle HSK-A100	rpm	–	–	–
Power (40 / 100 % DC)	kW	28 / 19	28 / 19	28 / 19
Torque (40 / 100 % DC)	Nm	121 / 82	121 / 82	121 / 82
Tool changer				
Tool holder		SK40	SK40	SK40
Tool magazine	Pockets	60 / Chain	60 / Chain	60 / Chain
Linear axes (X / Y / Z)				
Feed / rapid traverse speed	m/min	60	60	60
Acceleration	m/s²	6 / 6 / 5	7 / 6.5 / 6.5	6 / 5 / 6
Feed force	kN	10	13 / 13 / 09	12 / 16 / 16
Machine data				
Space requirement of the basic machine incl. a chip conveyor without internal coolant supply	approx. m²	17.8	21.8	26.9
Machine height (standard machine)	mm	2,715	3,042	3,415
Machine weight	kg	12,000	17,500	18,500

Controls

DMG ERGO*line*® Control with a 19" screen

DMC U: Siemens 840D solutionline, Heidenhain iTNC 530, Heidenhain MillPlus iT V610

DMC FD: Siemens 840D solutionline FD

DMG exclusively recommends

Castrol

DMC 125 U dB	DMC 160 U dB	DMC 60 FD dB	DMC 80 FD dB	DMC 125 FD dB	DMC 160 FD dB
1,250 × 1,250 × 1,000	1,600 × 1,400 × 1,100	600 × 700 × 600	800 × 1,050 × 800	1,250 × 1,250 × 1,000	1,600 × 1,400 × 1,100
20–1,020	50–1,150	20–620	0–800	20–1,020	10–1,110
120–1,120	150–1,250	120–720	100–900	120–1,120	110–1,210
–200 up to 1,050	–200 up to 1,050	–150 up to 550	–200 up to 850	–200 up to 1,050	–200 up to 1,050
–300 up to 950	–300 up to 950	–250 up to 450	–300 up to 750	–300 up to 950	–300 up to 950
30	15	–	–	–	–
–	–	50 / 1,200	30 / 800	20 / 500	20 / 400
ø 1,000 × 800	ø 1,250 × 1,000	ø 630	ø 800 × 630	ø 1,100	ø 1,400
2,000	3,000	500	1,000	2,000	3,000
Standard	Standard	Standard	Standard	Standard	Standard
–30 / +180	–30 / +180	–30 / +180	–30 / +180	–30 / +180	–30 / +180
30	30	30	30	30	30
•	•	–	–	•	•
–120 / +10	–120 / +10			–120 / +10	–120 / +10
25	25			25	25
•	•	–	•	•	•
–10 / +180	–30 / +180		–10 / +180	–10 / +180	–30 / +180
23	23		23	23	23
12,000	12,000	–	–	–	–
–	–	12,000	12,000	–	–
–	–	–	–	10,000	10,000
28 / 19	28 / 19	29 / 19	29 / 19	44 / 32	44 / 32
121 / 82	121 / 82	130 / 87	130 / 87	288 / 187	288 / 187
SK40	SK40	HSK-A63	HSK-A63	HSK-A100	HSK-A100
60 / Chain	60 / Chain	60 / Chain	60 / Chain	60 / Chain	60 / Chain
60	60	60	60	60	60
6 / 5 / 6	5 / 4 / 5	6 / 6 / 5	7 / 6,5 / 6.5	6 / 5 / 6	6 / 4 / 5
12 / 16 / 16	15 / 15 / 10	10	13 / 13 / 09	12 / 16 / 16	15 / 15 / 10
28.2	55.3	21.1	21.8	33.9	55.3
3,438	3,942	3,056	3,462	3,761	3,942
19,800	43,000	12,000	17,500	19,800	43,000

Options

Machine Type Options	DMU 60 P dB (DMC 60 U dB)	DMU 80 P dB (DMC 80 U dB)	DMU 100 P dB (DMC 100 P dB)
Table options			
Clamping hydraulics 2 / 4 for the work table and set-up space	•	•	•
RS5 / RS10 multi-pallet APC, incl. 5 / 10 additional pallets (only for DMC machines)	•	•	•
Tool holder			
HSK-A63 / BT40 / CAT40 (HSK with the milling / turning machines, FD, standard version)	•	•	•
HSK-A100 / BT50 / CAT50 (HSK with the milling / turning machines, FD, standard version)	–	•	•
Automation / Measuring / Monitoring			
3D quickSET®	•	•	•
Infrared measuring probe: Heidenhain TS640 / Renishaw PP60 (OMP 60)	•	•	•
Tool measurement in the work area Mfg. Blum Laser NT-Hybrid	•	•	•
Tool magazine has built-in mechanical tool breakage monitor	•	•	•
Combination tool measuring in the work area, Laser system for milling tools, 3D-calliper for turning tools	–	–	–
4-colour signal lamp	•	•	•
Coolant medium / chip removal			
Production package cooling unit 500 litres, fabric tape filter, internal coolant supply 40 bar	Standard	Standard	Standard
Production package cooling unit 600 litres, paper band filter, internal coolant supply 40 bar, (Option for the DMU machines)	•	•	•
Production package cooling device 980 litres, paper band filter, internal coolant supply 40 bar, (standard equipment with DMC machines / for DMU only with 80 bar through-spindle cooling)	–	–	–
Production package cooling unit 980 litres, paper band filter, internal coolant supply 40 / 80 bar, (2 pressure stages)	•	•	•
Coolant tempering for the internal coolant supply unit 980 litres	•	•	•
Rinsing pistol with a pump 1 bar / 40 l/min	•	•	•
External minimum quantity lubrication with the spindle centre positioned over the jets	•	•	•
Oil and emulsion-mist separator	•	•	•
Cooling unit air-blast throughout the spindle centre	•	•	•
Options controls iTNC 530 / MillPlus			
Application Tuning Cycle ATC	•	•	•
Electronic hand wheel iTNC 530	•	•	•
Control cabinet for the load station Tool magazine	•	•	•
2. processor card with Windows 2000	•	•	•
Options Siemens 840D solutionline			
Electronic hand wheel Siemens 840D	•	•	•
Control cabinet for the load station Tool magazine	•	•	•
3D-operation, 3D-tool correction with the surface-normal vector	•	•	•
TRANSMIT-Lateral surface transformation (Milling of cylinder tracks)	•	•	•
CompCad compressor function for high-speed machining	•	•	•
General options			
Shatterproof safety glass for the viewing glass	•	•	•
Operating mode 4 “Process supervision in production”	•	•	•
Package for increased precision	•	•	•

DMU 125 P dB (DMC 125 U dB)	DMU 160 P dB (DMC 160 U dB)	DMU 60 FD dB (DMC 60 FD dB)	DMU 80 FD dB (DMC 80 FD dB)	DMU 125 FD dB (DMC 125 FD dB)	DMU 160 FD dB (DMC 160 FD dB)
•	•	(DMU upon request) •	•	•	•
•	• (RS4)	•	•	•	• (RS4)
•	•	Standard	Standard	–	–
•	•	–	•	Standard	Standard
•	•	•	•	•	•
•	•	•	•	•	•
•	•	–	–	–	–
•	•	•	•	•	•
–	–	•	•	•	•
•	•	•	•	•	•
Standard	–	–	–	–	–
•	–	Standard	Standard	Standard	–
–	Standard	–	–	–	Standard
•	•	•	•	•	•
•	•	•	•	•	•
•	•	•	•	•	•
•	•	•	•	•	•
•	•	Standard	Standard	Standard	Standard
•	•	•	•	•	•
•	•	–	–	–	–
•	•	–	–	–	–
•	•	–	–	–	–
•	•	–	–	–	–
•	•	•	•	•	•
•	•	•	•	•	•
•	•	•	•	•	•
•	•	•	•	•	•
•	•	•	•	•	•
•	•	Standard	Standard	Standard	Standard
•	•	•	•	•	•
•	•	•	•	•	•

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