

DMU P/FD and DMC U/FD portal series

DMU 210 / 270 / 340 P

DMU 210 / 270 / 340 FD

DMC 210 / 270 / 340 U

DMC 210 / 270 / 340 FD





Mechanical engineering

1: Crossbeam

2: Machine bed

DMU P/FD and DMC U/FD portal series

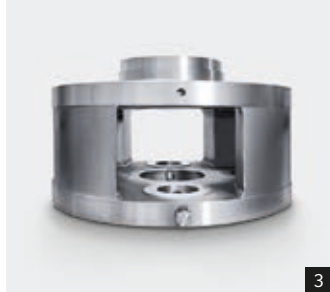
The portal series from DECKEL MAHO – more than 1,000 installed machines.

These 5-axis machines with a highly stable portal design offer maximum precision and highest dynamics. In addition to drilling and milling, the turn-mill machines can also carry out turning operations in the same set-up. Long travels up to 3,400 mm and high maximum table load capacities up to 16 tonnes provide exceptional machining flexibility. A pallet changer for the DMC machines facilitates set-up during machining for maximum productivity.



1: Landing gear support beam

2: V16 diesel engine crankcase



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Gear manufacturing

- 3: Planetary gear carrier
4: Spiral bevel gear

Tool and mould making

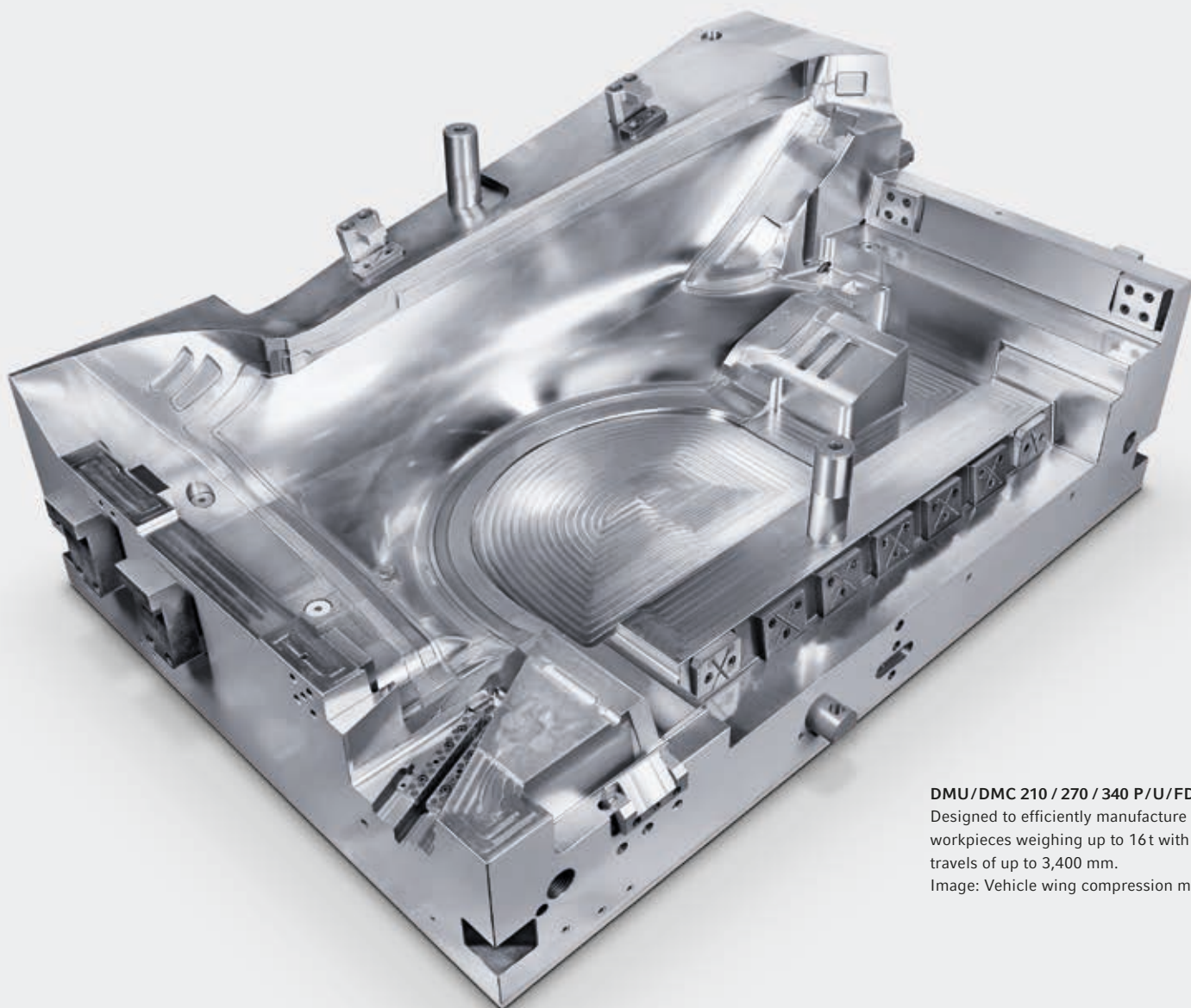
- 5: Bumper press tool
6: Bumper mould insert

Energy technology

- 7: Pelton wheel
8: Bearing housing

Aerospace

- 9: HP compressor housing
10: Integral component



DMU/DMC 210 / 270 / 340 P/U/FD:

Designed to efficiently manufacture workpieces weighing up to 16t with travels of up to 3,400 mm.

Image: Vehicle wing compression mould

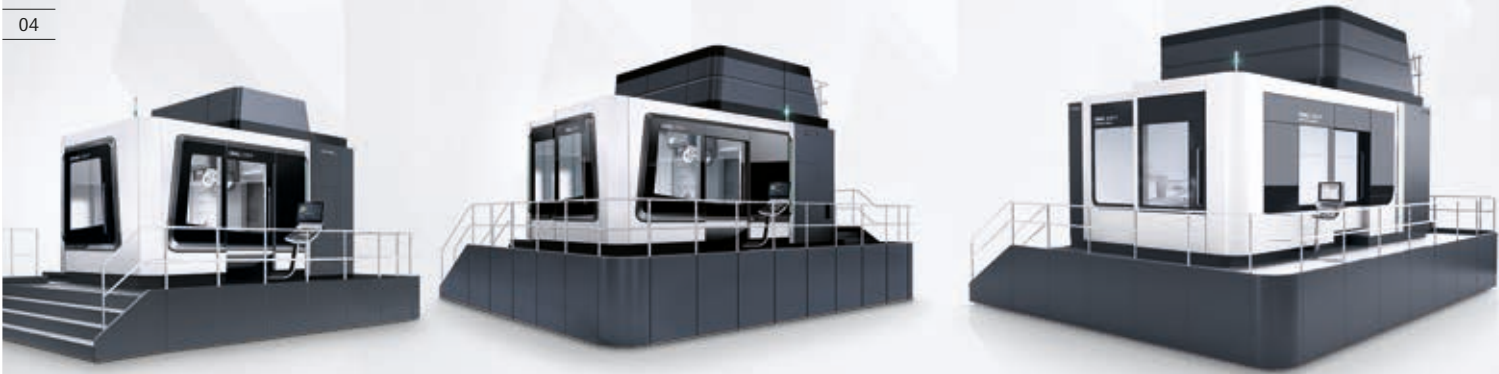
Note: The results of machining and performance trials listed in this catalogue are to be taken as examples. The results may vary slightly depending on the environment and cutting conditions.

DMU P portal range

Large components weighing up to 16t,
large working area, minimal footprint.

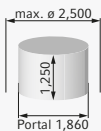
Large travels ranging from 2,100 × 2,100 × 1,250 mm up to 3,400 × 3,400 × 1,600 mm, a high maximum table load of up to 16 tonnes and innovative machining options such as 5-sided / 5-axis milling and turning in one set-up are just some of the factors behind efficient operation. This concept is rounded off by the optimal accessibility of the working area, a wide range of spindle variants and other process-optimising options.

04

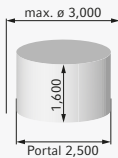


Travel X / Y / Z	mm
Table size	mm
Maximum load	kg
Maximum workpiece dimensions	mm

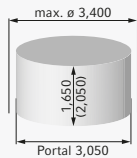
DMU 210 P
2,100 / 2,100 / 1,250
ø 1,700
8,000 (10,000)*



DMU 270 P
2,700 / 2,700 / 1,600
ø 2,200
12,000



DMU 340 P
3,400 / 3,400 / 1,600 (2,000)*
ø 2,600 × 2,200
16,000 (20,000)*



* Optional

1: Even higher productivity
with the automatic pallet changer,
up to five pallets in the overall system with
RS 5 rotary storage on the DMC 210 U/FD



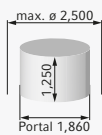
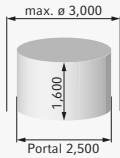
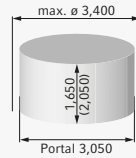
DMC U portal range

For machining large components with maximum flexibility and productivity.

A rapid and compact pallet changer in combination with the high flexibility of 5-axis universal machines deliver efficient production. Additional features promoting cost-effectiveness include a maximum pallet load of 10,000 kg, set-up during machining, more extensive automation options and optimal accessibility to the working area, a set-up station and maintenance equipment.



05

		DMC 210 U	DMC 270 U	DMC 340 U
Travel X / Y / Z	mm	2,100 / 2,100 / 1,250	2,700 / 2,700 / 1,600	3,400 / 3,400 / 1,600 (2,000)*
Table size	mm	ø 1,600 × 1,400	ø 2,000 × 2,000	ø 2,500 × 2,000
Maximum load	kg	5,000	9,000	10,000
Maximum workpiece dimensions	mm			

* Optional

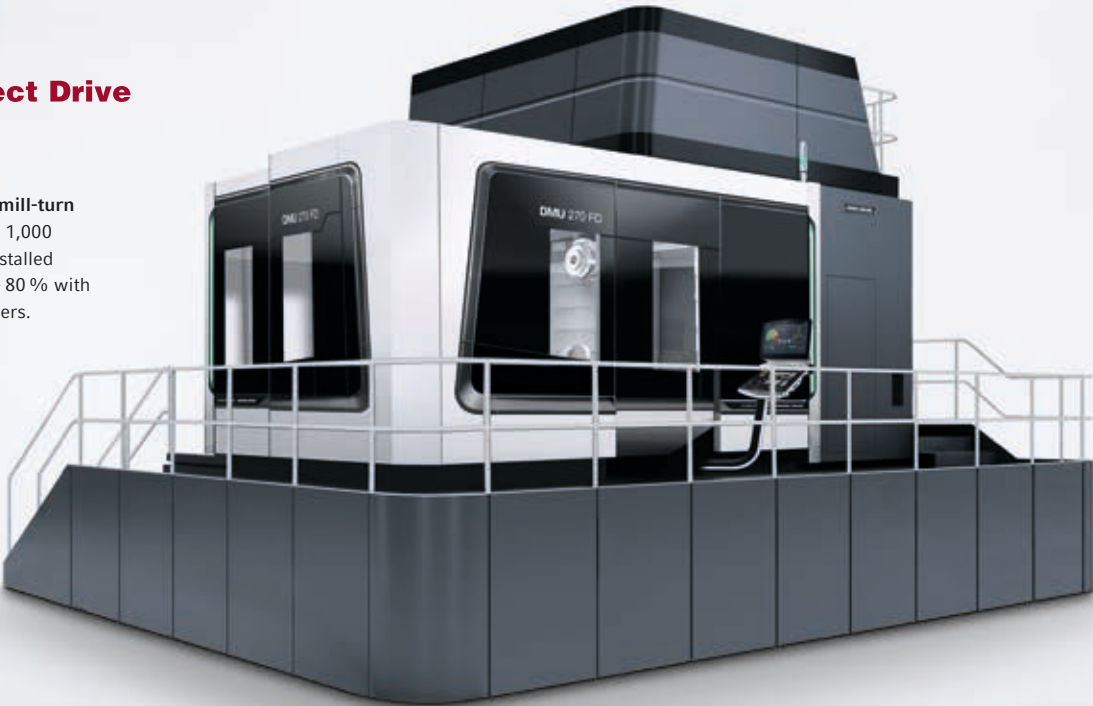
DMU FD and DMC FD portal series

Complete machining of large components.

5-sided and / or 5-axis simultaneous machining, including turning, in one set-up.
The combination of milling and turning guarantees maximum precision and shorter machining times. The innovative applications are supported by numerous helpful options and features in both the software and hardware.

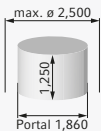


17 years of mill-turn technology: 1,000 machines installed worldwide – 80 % with pallet changers.

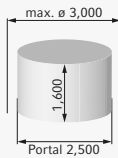


Travel X / Y / Z	mm
Table size	mm
Maximum load	kg
Maximum workpiece dimensions	mm

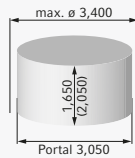
DMU / DMC 210 FD
2,100 / 2,100 / 1,250
ø 1,850
5,000 / 4,000



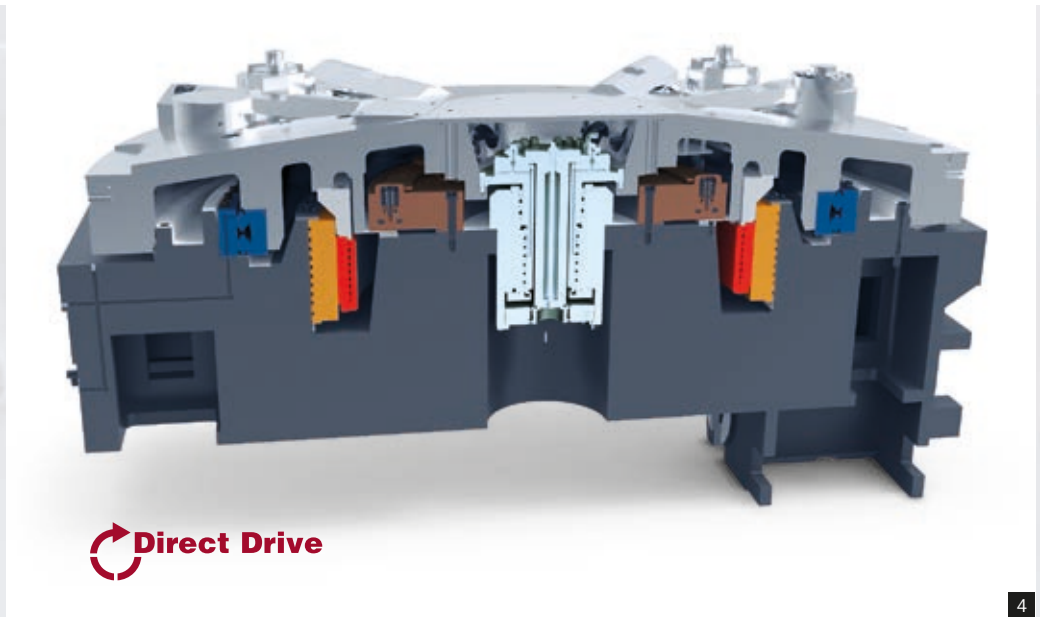
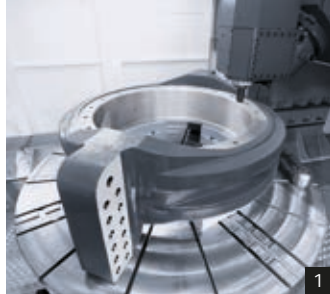
DMU / DMC 270 FD
2,700 / 2,700 / 1,600
ø 2,200
7,000 / 6,000



DMU / DMC 340 FD
3,400 / 3,400 / 1,600 (2,000)*
ø 2,500
7,000 / 6,000



* Optional



1–2: Horizontal or vertical milling head positioning, even during turning
3: Easy electronic balancing with SIEMENS 840D solutionline FD
4: Mill-turn table with direct drive (image: DMU 340 FD)

Exclusive mill-turn cycles

- + Detect, control and monitor **imbalances**
- + **Automatic speed adjustment** based on component vibration
- + **Measurement cycles for (laser) measuring sensors:** Calibrate the measuring sensor in the working area, measure recesses etc.; store, display and transfer measurement data
- + **Tilted turning** with A and B axes
- + **Pivoting of long tools** into the workpiece
- + **Grinding cycles**, e.g. for calibrating the dressing station and dressing the grinding wheel
- + **Standard mill-turn cycles** such as grooving / undercutting, chip breaking and thread cutting, use of multi-edged tools (up to nine) and milling / turning tool measurement

DMU mill-turn / DMC mill-turn machines – complete machining process

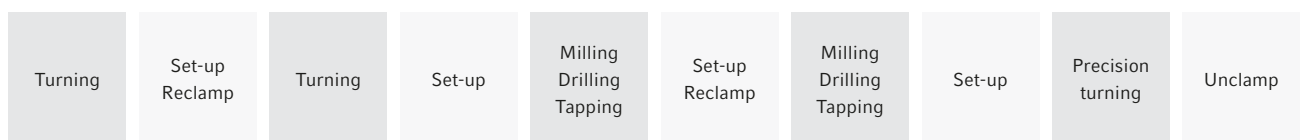


Machine 1

Complete machining process:
1 machine
4 production steps
300 % higher productivity

Conventional machining process:
3 machines
10 production steps

Single-purpose machines – conventional machining process

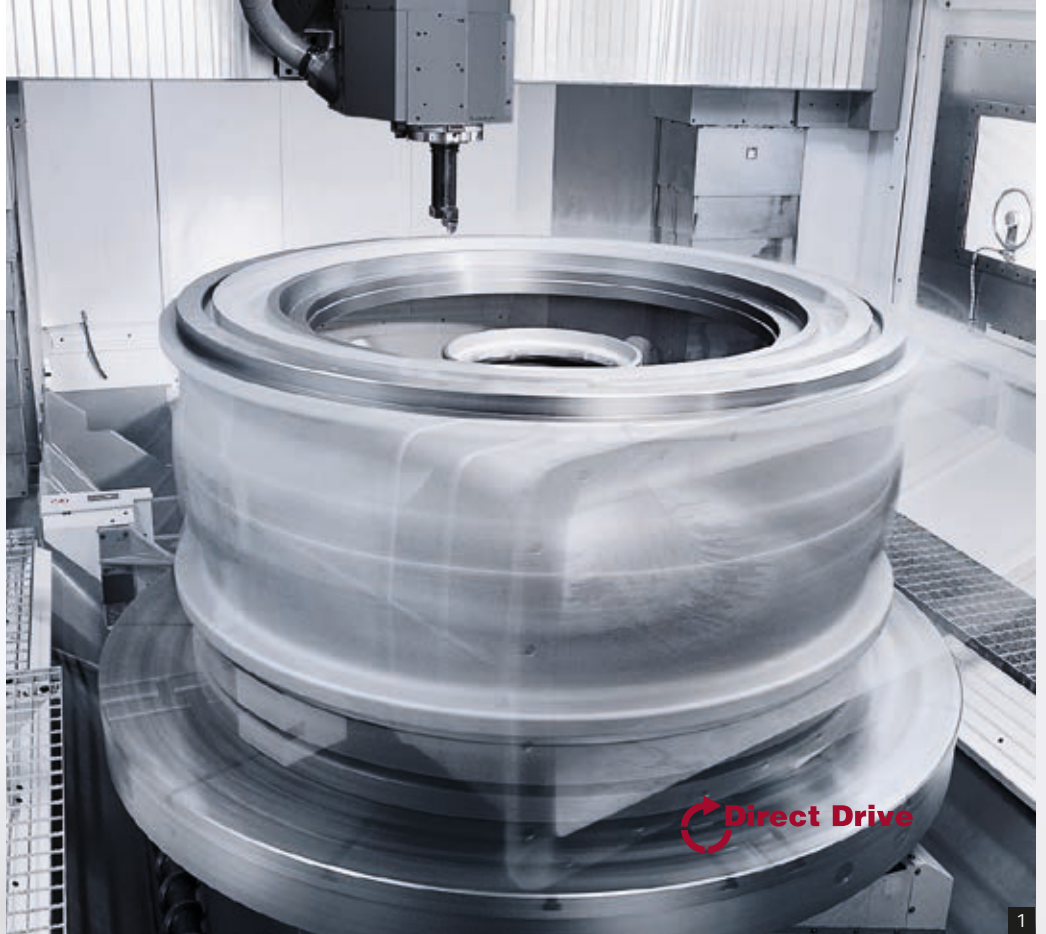


Machine 1

Machine 2

Machine 3

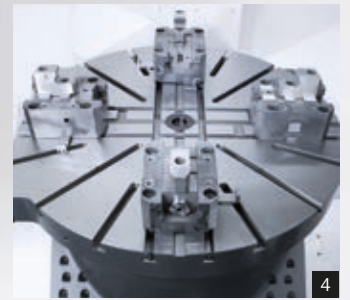




1: Turning of a turbocharger housing for a ship's engine on a DMU 340 FD

2–3: Combined tool measurement: Laser measurement of rotating milling tools, probe measurement of turning tools

4: Box jaws



Unique technology

- + Mill-turn drives featuring Direct Drive technology – for speeds up to 250 rpm, power up to 68 kW, torque up to 20,000 Nm and a maximum table load of 7,000 kg
- + NC-controlled swivelling milling head as a B-axis (speed up to 30 rpm) for 5-sided machining and simultaneous 5-axis milling
- + 5X torqueMASTER® as a B axis rated at 8,000 rpm, max. 52 kW and 1,800 Nm
- + Oil mist separator and shatter-proof safety glass

Advantages of mill-turn (FD) technology

- + Complete machining with milling and turning on one machine in one set-up
- + Faster and more precise thanks to the absence of additional set-ups
- + Lower investment and smaller footprint by using only one machine
- + Quicker machining and lower logistics costs by eliminating idle times and process steps – lower unit production costs and higher precision

* Optional

Mill-turn table with Direct Drive technology
for speeds up to 250 rpm // Turning a marine
gear coupling.



Mill-turn tables

Torque	Nm
Detent torque	Nm
Maximum speed	rpm
Maximum load	kg
Maximum turning diameter	mm
Mass moment of inertia	kg/m²

DMU/DMC 210 FD
8,600
13,500
250
5,000 / 4,000
2,500
2,900 / 2,300

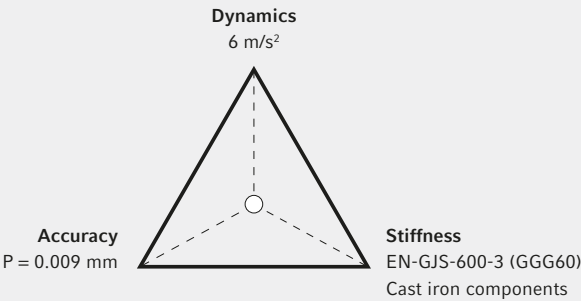
DMU/DMC 270 FD
11,000
15,000
200
7,000 / 6,000
3,000
9,000 / 7,000

DMU / DMC 340 FD
10,200
26,000
120
7,000 / 6,000
3,400
8,800 / 6,800

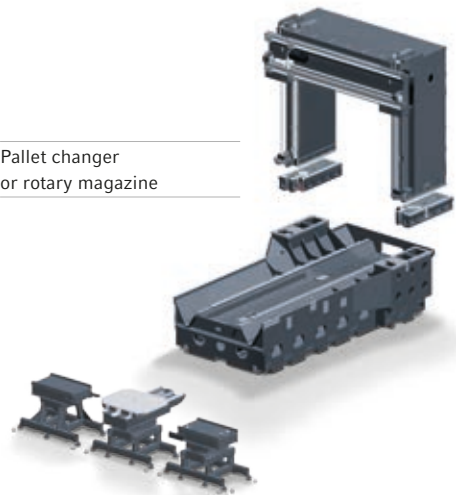
Highlights of the 210 and 340 series

Unrivalled rigidity and dynamics up to 6 m/s².

- + Superior dynamics: up to 6 m/s² and 60 m/min
- + **Extreme precision:** P = 0.009 mm
- + A high degree of stiffness for maximum milling power, **EN-GJS-600-3 (GGG60)** cast iron components
- + High-performance motor spindles (1,000 Nm – 100 kW)
- + Powerful gear-driven spindle (1,800 Nm – 8,000 rpm)
- + **Three-point support** with an inherently stiff machine bed made of EN-GJS-600-3 (GGG60), no foundation required



Modules of the 210, 270 and 340 series

Portal, crossbeam, X-slide		Milling heads			
 Pallet changer or rotary magazine					
		A axis	B axis	Gear-driven B axis	B axis*/**
210 / 270 / 340 tool magazine					
Tables			Direct Drive		
					
NC rotary table*	NC rotary table**	Turn/mill table	Wheel magazine with changer and up to 243 tools	Chain magazine with up to 180 tools	Multi-level magazine with up to 240 tools
					
			Tool arena with 313 tools		

* Image: 210

** Image: 270

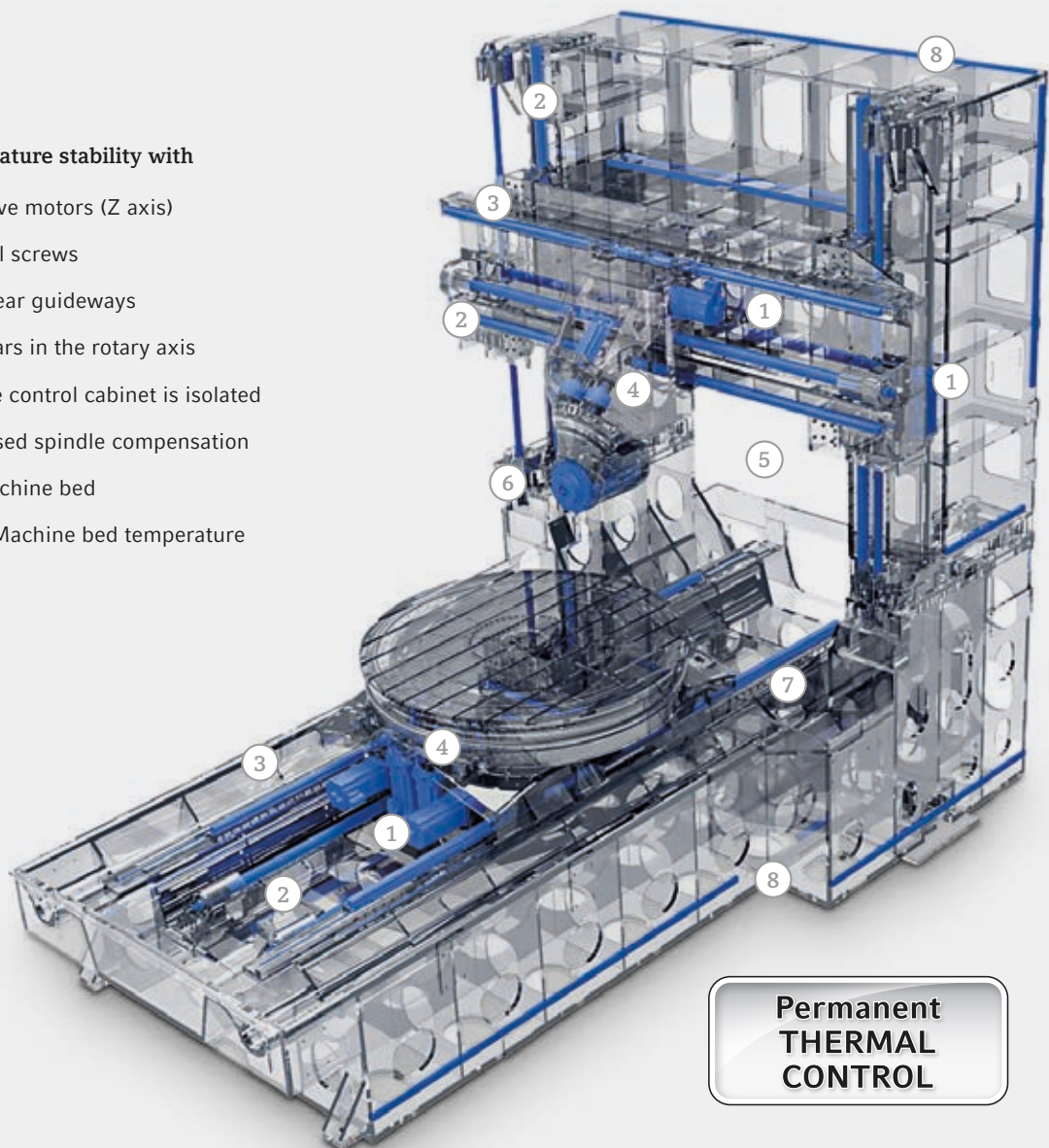
DMU P/FD and DMC U/FD portal series

Maximum precision with temperature stability.

Comprehensive cooling produces long-term precision. The entire feed drive is cooled, which guarantees higher component precision.

High temperature stability with

- 1: Cooled drive motors (Z axis)
- 2: Cooled ball screws
- 3: Cooled linear guideways
- 4: Cooled gears in the rotary axis
- 5: Rear of the control cabinet is isolated
- 6: Sensor-based spindle compensation
- 7: Cooled machine bed
- 8: Optional: Machine bed temperature control



DMU P/FD and DMC U/FD portal series

5X torqueMASTER® – B axis with gear-driven spindle, 8,000 rpm, 52 kW and 1,800 Nm torque.

5-axis simultaneous machining and torque of up to 1,800 Nm – the 5X torqueMASTER® combines all the advantages of a B axis with the power and torque of a gear-driven spindle without any limitations. With the latest, most precise technology, the portal machines are setting new standards in 5-sided and 5-axis simultaneous machining. The patented and optimised 5-axis concepts have overcome every challenge and are in use in all sectors around the world.

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1: 5X torqueMASTER® – gear-driven spindle with 1,800 Nm torque integrated into the B axis
2: A axis – for simultaneous 5-axis milling of negative angles up to -30° 3: NC-controlled swivelling B-axis milling head for simultaneous 5-axis milling with maximum stability due to machining at the centre of rotation 4: Finishing with exchangeable 30,000 rpm HSC pick-up spindle 5: Roughing a mould for a dashboard with the 5X torqueMASTER®

The latest spindle technology.

DMU 210 / 270 / 340 P // DMC 210 / 270 / 340 U: Spindle selection					
Speed / Tool Carrier Power / Torque (40% DC)	DMU 210 P	DMC 210 U	DMC 270 P DMU 270 U	DMU 340 P DMC 340 U	DMU 340 P Unimould
Motor spindle rated at 10,000 rpm // SK50 / HSK-A100 44 kW / 288 Nm	–	–	–	Standard	Standard
Motor spindle rated at 12,000 rpm // SK50 / HSK-A100 44 kW / 288 Nm	Standard	Standard	Standard	•	•
Motor spindle rated at 12,000 rpm // HSK-A100 52 kW / 430 Nm	•	•	•	•	•
Motor spindle rated at 18,000 rpm // SK50 / HSK-A63 35 kW / 119 Nm	•	•	•	–	–
Motor spindle rated at 20,000 rpm // SK50 / HSK-A63 35 kW / 130 Nm	•	•	•	–	–
Gear-driven spindle rated at 6,300 rpm // SK50 / HSK-A100 44 kW / 1,550 Nm	•	•	•	•	•
Gear-driven spindle rated at 8,000 rpm // SK50 / HSK-A100 52 kW / 1,800 Nm	•	•	–	–	–
Pick-up motor spindle rated at 24,000 rpm // HSK-A63 20 kW / 33 Nm	–	–	–	–	•
Pick-up motor spindle rated at 30,000 rpm // HSK-E50 18 kW / 9.6 Nm	•	–	–	–	–
Aerospace motor spindle rated at 15,000 rpm // HSK-A100 100 kW / 179 Nm	•	•	•	•	•
Aerospace motor spindle rated at 30,000 rpm // HSK-A63 85 kW / 40 Nm	•	•	•	•	•
powerMASTER rated at 9,000 rpm // HSK-A100 54 kW / 700 Nm	•	•	•	•	•
Motor spindle rated at 15,000 rpm // HSK-100 52 kW / 404 Nm	•	•	•	•	•

DMU 210 / 270 / 340 FD // DMC 210 / 270 / 340 FD: Spindle selection			
Speed / Tool Carrier Power / Torque (40% DC)	DMU 210 FD DMC 210 FD	DMU 270 FD DMC 270 FD	DMU 340 FD DMC 340 FD
Motor spindle rated at 10,000 rpm // HSK-A100, 44 kW / 288 Nm	–	–	Standard
Motor spindle rated at 12,000 rpm // HSK-A100, 52 kW / 430 Nm	•	•	•
Gear-driven spindle rated at 6,300 rpm // HSK-A100 44 kW / 1,550 Nm	•	•	•
Gear-driven spindle rated at 8,000 rpm // HSK-A100 52 kW / 1,800 Nm	•	•	•
Motor spindle rated at 12,000 rpm // HSK-A100, 44 kW / 288 Nm	Standard	Standard	–

• Optional

1–2: Chain magazine for up to 180 tools (210 / 340)

3: Rack magazine for up to 240 tools (210 / 340)

4: Wheel magazine for up to 243 tools 5: Tool arena for up to 313 tools (340), tools weighing up to 80 kg 6: Pick-up spindle for the 210 and 340 series in combination with the chain magazine



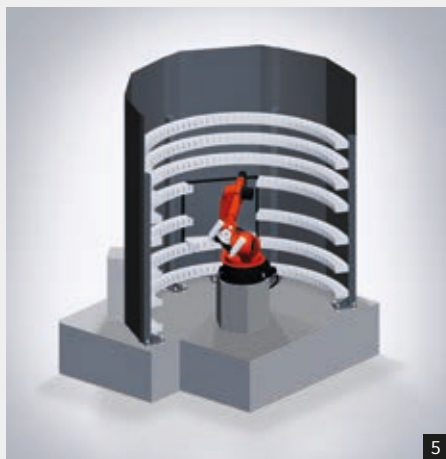
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2



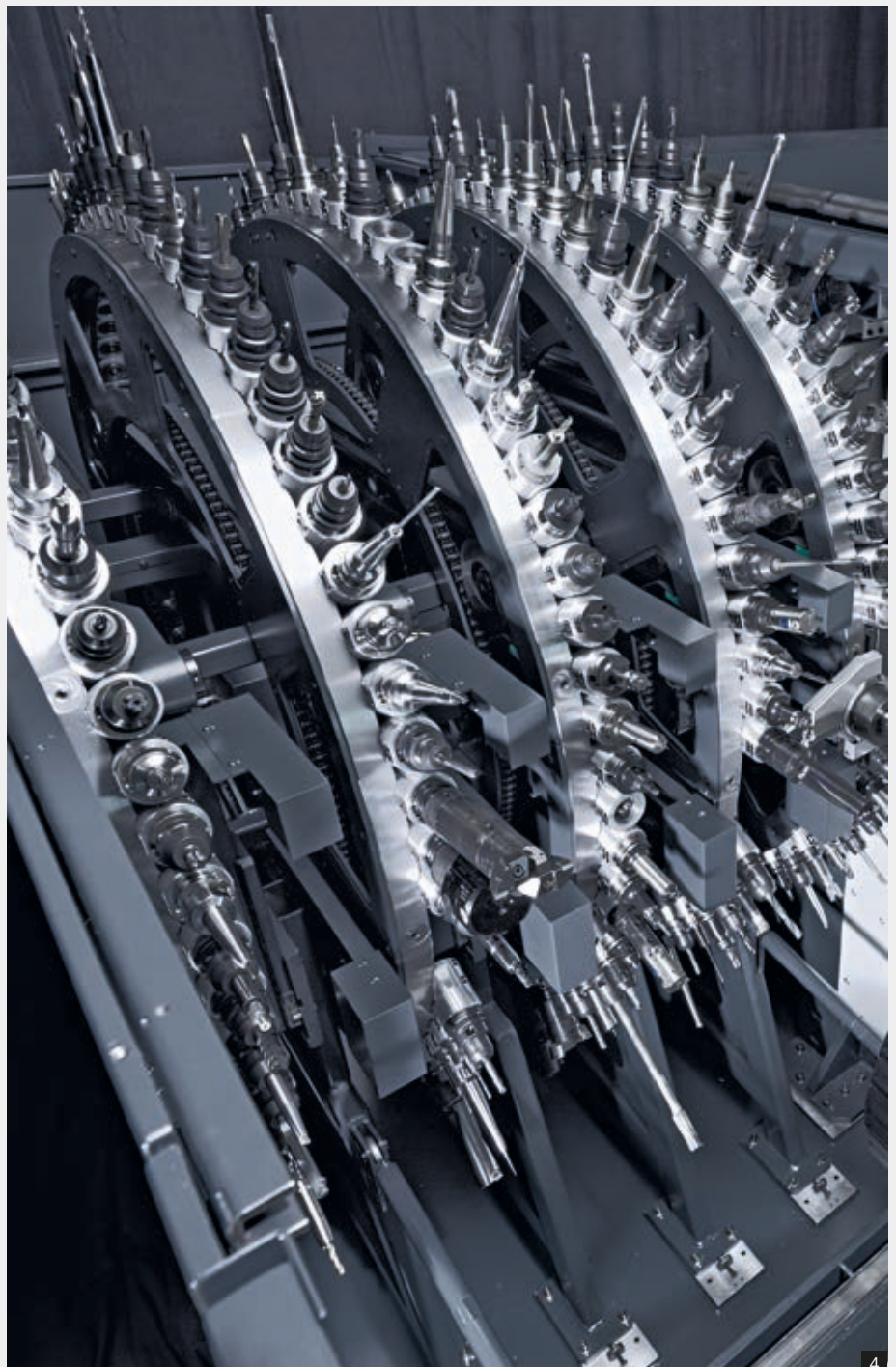
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5



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4

Innovative Tool Handling.

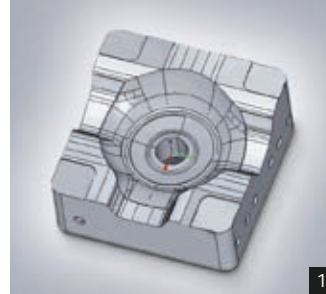
Magazine types	Wheel magazine	Chain magazine	Rack magazine	Tool arena
Tool carrier	SK40 (HSK-A63) / SK50 (HSK-A100)	SK40 (HSK-A63) / SK50 (HSK-A100)	SK50 (HSK-A100)	SK50 (HSK-A100)
Measurements (adjacent positions occupied), mm	ø 110	ø 110	ø 250	ø 140
Measurements (adjacent positions free), mm	ø 280	ø 250	–	ø 400
Boring bar diameters, mm	ø 280–ø 400	ø 250 × ø 400	ø 250 × ø 400	ø 150 × ø 600
Tool length, mm	900	650	650	900
Weight, kg	15 / 30 (45)	15 / 30	30	up to 80
Chip-to-chip time (HSK), seconds	7.5	10	15	15
Expansion stages	93 / 183 // 63 / 123 / 183 / 243	60 / 120 / 180	120 / 180 / 240	up to 313

Tool magazines	DMU 210 P DMC 210 U	DMU 210 FD* DMC 210 FD*	DMU 340 P DMC 340 U	DMU 340 FD* DMC 340 FD*
SK50 (HSK-A100)				
Chain magazine, 60 positions	Standard	Standard	Standard	Standard
Chain magazine, 120 positions	•	•	• (only DMU)	• (only DMU)
Chain magazine, 180 positions	–	–	–	–
Rack magazine, 120 / 180 / 240 positions	–	–	• (only DMC)	• (only DMC)
Tool arena, up to 313 positions	•	•	•	•

Tool magazines	DMU 210 P DMC 210 U	DMU 270 P DMC 270 U	DMU 210 FD* DMC 210 FD*	DMU 270 FD* DMC 270 FD*
SK50 (HSK-A100)				
Wheel magazine, 63	Standard	Standard	Standard	Standard
Wheel magazine, 123, 183	•	•	•	•
Wheel magazine, 243	• (only DMC)	• (only DMC)	• (only DMC)	• (only DMC)
SK40 (HSK-A63)				
Wheel magazine, 93, 183	•	•	–	–

Pick-up spindles and exchangeable milling heads**	Pick-up spindle DMU 210 P	Pick-up spindle DMU 340 P Unimould
Tool carrier	HSK-E50	HSK-A63
Dimensions, mm	42	50
Tool length, mm	150	200
Weight, kg	1.2	4

• Optional, * FD with HSK tool carrier as standard, ** Tools are all stored in the same magazine

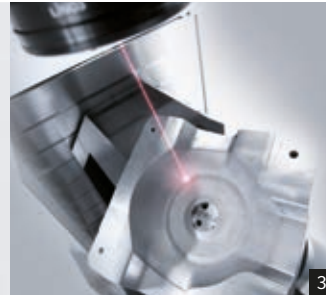


1

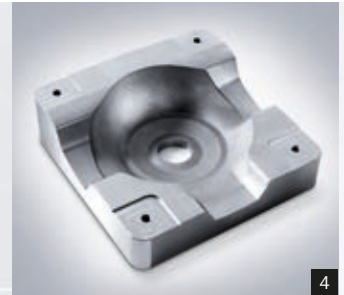


2

1: LASERSOFT 3D texturing software for generating the laser machining program 2: Geometrically defined honeycomb structure 3: Laser structuring of a steering wheel cover mould 4: Final injection-moulded steering wheel cover mould with honeycomb structure



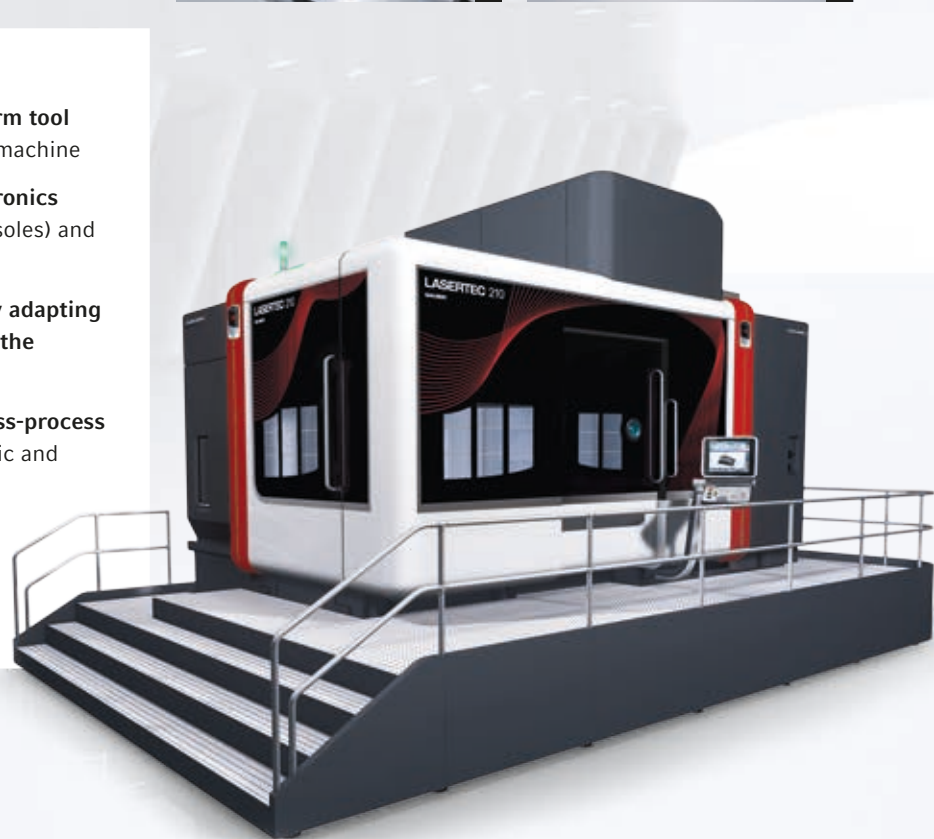
3



4

Advantages of LASERTEC

- + **5-axis milling and laser structuring of freeform tool and mould surfaces** in a single set-up on one machine
- + Moulds for **automotive** (e.g. armatures), **electronics** (e.g. mobile phone cases), **lifestyle** (e.g. shoe soles) and general **tool and mould making**
- + **Can be integrated into all portal machines by adapting a fibre laser source via the HSK interface on the spindle head**
- + **SIEMENS 840D solutionline with special cross-process LASERSOFT 3D texturing software** for organic and technical surface structures



LASERTEC Shape

5-axis milling and laser surface structuring – a design advantage in mould making.

For the first time, flexible integration of a fibre laser in the spindle head via the HSK interface enables laser surface structuring as well as 5-axis milling of mould components on one machine in a single set-up. Moulds for automotive armatures, household appliances, mobile phone and camera casings, shoe soles and other plastic injection mould tools can be pre-milled and then tailored by laser structuring to customers' specific requirements.



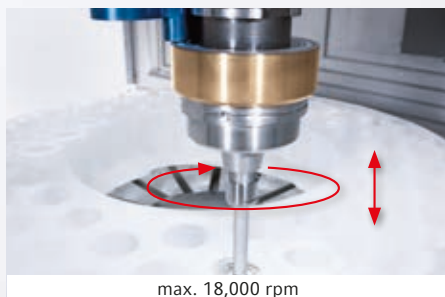
5: Thin-walled, lightweight Zerodur structures 6: Si-quartz pump housing
7: Silicon nitride camera housing 8: Silicon carbide mounting plate

ULTRASONIC

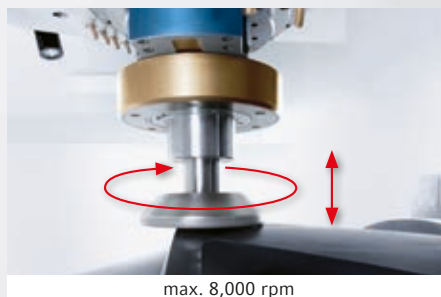
Unbeatable range of materials thanks to ULTRASONIC and milling on one machine.

The latest generation of the ULTRASONIC HSK actuator system combines ULTRASONIC hard machining of advanced materials (e.g. Zerodur lightweight structures, carbide embossing tools and ceramic wear parts for the pump, textile and armature industries) with conventional 5-axis milling via an HSK-A63 / HSK-A100 interface. The conventional tool rotation is inductively overlaid with an additional ULTRASONIC oscillation in the axial direction.

The operating principle – flexible ULTRASONIC integration via HSK



max. 18,000 rpm



max. 8,000 rpm

Advantages of ULTRASONIC

- + Reduced process forces for outstanding surface quality of $Ra < 0.2 \mu m$, minimised micro-cracks in the material, longer tool service life
- + Up to double the material removal rate compared to conventional grinding
- + The cutting edge sharpens itself thanks to micro-splinters in the diamond grains
- + Optimised particle flushing in the active zone

		HSK-A63	HSK-A100
Maximum milling speed	rpm	24,000	10,000
Maximum ULTRASONIC speed	rpm	18,000	8,000
Tool interface		ER 20 H7 Shrink	ER 20 H7 Shrink
easySONIC control (automatic ULTRASONIC frequency recognition)		◦	◦

◦ Optional

DMU P/FD and DMC U/FD portal series

Gear milling – with standard tools on standard machines.

DMG MORI gearMILL® gear cutting software facilitates complete machining of a wide range of gear types on portal machines. Gear wheels up to 3,400 mm in diameter and racks over 3,400 mm in length can be produced efficiently.



Highlights

Exceptional flexibility and short machining times with:

- + Standard tools
- + Standard machines
- + No complex retrofitting
- + Soft and hard machining on one machine
- + Complete machining on one platform with milling, drilling and turning in a single set-up
- + Electronic balancing on the machine (FD range)
- + Gear wheels up to $\varnothing$ 5,000 mm

DMG MORI gearMILL® gearing software – the software package for various gearing operations

Spur gear package

External teeth: straight, angular, double, helical

Bevel spur gear package

Angle = $\leq$ 90°:
Spiral, straight

Worm gear package
ZA/ZN/ZI flank profile



Highlights of DMG MORI gearMILL®

- + Enter the gear-cutting parameters
- + Calculate the tooth space geometry
- + Optimise the tooth root geometry
- + Customised contact pattern modelling
- + Generation of 5-axis milling programs
- + Machine simulation

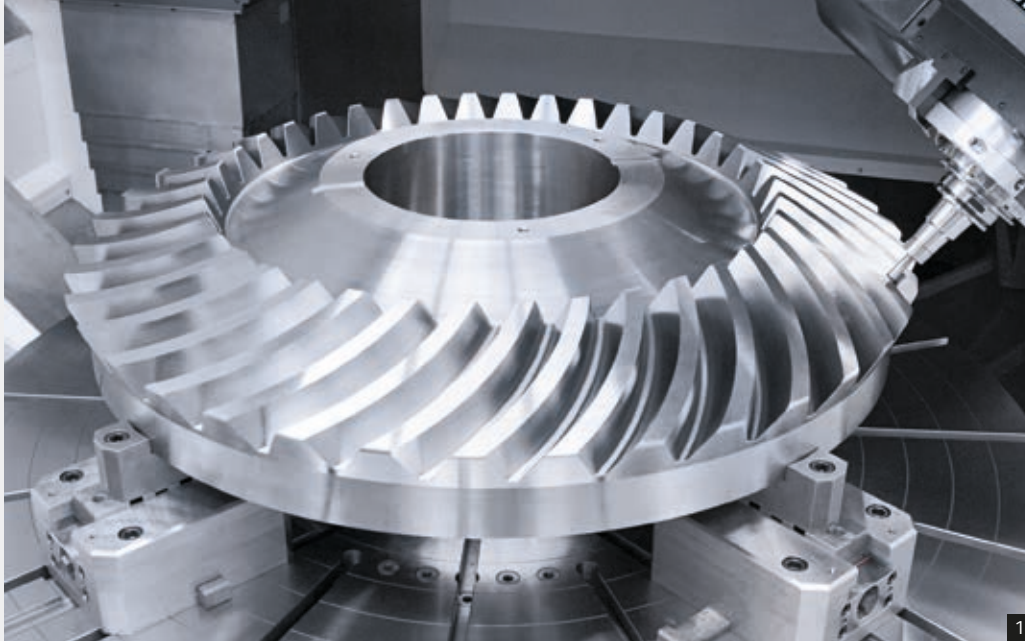
Design module: Tooth space geometry calculation program

Measurement module: Measurement data generator

CAM module: Semi-automatic CNC program generation

Training module: Basic courses, individual courses, on-site training, start-up support

- 1: Complete machining of a spiral bevel spur gear on a DMC 210 FD
 2: NC indexing head for machining bevel gear pinions up to 1,100 mm in length and 1,500 kg in weight

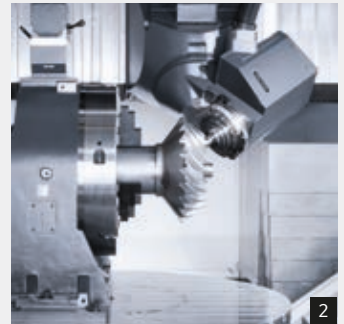


Attainable gear quality

Bevel spur gear DIN < / = 5

Spur gear DIN < / = 6

depending on the pitch circle diameter



Milling and mill-turning

Grinding

- + For internal, external and face grinding

Highlights

- + Positioning cycle: Positioning dressing station
- + Dressing cycle: Dressing the grinding wheel
- + Face grinding cycle: Re-grinding flat surfaces on round, centrally clamped workpieces
- + Longitudinal grinding cycle: Re-grinding of cylindrical surfaces on centrally clamped workpieces

Grinding package measures

- + Linear guideways and ball screws with additional strippers
- + Sealing air for all linear scales
- + Reduction of lubrication intervals
- + Observation of additional maintenance notes
- + Dressing station
- + Centrifugal filter
- + Sensors for dressing, tool measurement and process-oriented contact



DMU P/FD and DMC U/FD portal series

Spindles for special materials and applications.



Aerospace spindle – for machining aluminium at up to 13 l/min
Motor spindle rated at 15,000 rpm (100 kW, 179 Nm) –
for high-performance milling

Workpiece material	AlMgSi
Material removal rate	13,650 cm ³ /min
Tool	Milling head D = 80 (five cutting edges)
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

20



5X torqueMASTER® – Machining titanium
Gear-driven spindle rated at 6,300 rpm (44 kW, 1,550 Nm) –
for high-performance milling

Workpiece material	Titanium – Ti 6Al 4V
Material removal rate	578 cm ³ /min
Tool	Insert mill D = 80 (four cutting edges)
Spindle speed	239 rpm (Vc = 60 m/min)
Feed	172 mm/min (Fz = 0.18 mm)
Cutting depth / width	60 / 56 mm

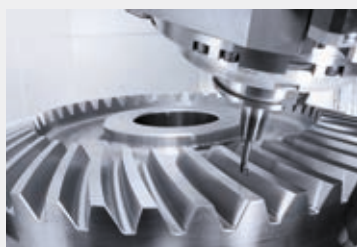


powerMASTER® – Machining steel
Motor spindle rated at 9,000 rpm (77.5 kW*, 1,000 Nm*) –
for high-performance milling

Workpiece material	Steel (Ck45)
Material removal rate	1,680 cm ³ /min
Tool	Milling head D = 100 (11 cutting edges)
Spindle speed	900 rpm (Vc = 280 m/min)
Feed	14,000 mm/min (Fz = 1.42 mm)
Cutting depth / width	2 / 60 mm

* 15 % DC (2 min)

Example applications.



Hard machining of a bevel spur gear (60 HRC) – ø 1,320 mm
Complete machining on a DMU 210 FD

Sector	Mechanical engineering	Spindle	12,000 rpm
Tool	End mill ø 12 mm	Power	44 kW
Material	18CrNiMo-6	Torque	288 Nm

Machining focus: 5-axis simultaneous finishing of the tooth flanks;
Machining with standard tools; soft milling and hard turning on the same machine



Finishing of a Pelton wheel from a single piece – ø 1,600 mm
Complete machining on a DMU 210 FD

Sector	Energy technology	Spindle	20,000 rpm
Tool	Spherical milling cutter ø 16 mm	Power	44 kW
Material	1.4317 steel casting	Torque	288 Nm

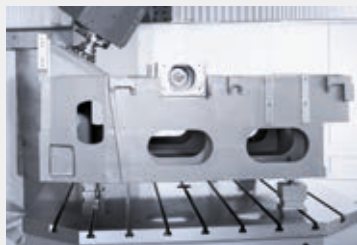
Machining focus: Turning of the outer contour; 5-axis simultaneous roughing and finishing of the buckets;
no post-processing required



Pre-finishing of a bumper mould
Complete machining on a DMU 340 P

Sector	Automotive	Spindle	6,300 rpm
Tool	Milling cutter ø 100 mm	Power	44 kW
Material	40CrMnNiMo8-6-4	Torque	1,550 Nm

Machining focus: 5-axis simultaneous machining with 5X torqueMASTER® – NC-controlled B axis with counter spindle; finishing with an exchangeable pick-up motor spindle rated at 24,000 rpm; complete machining in one set-up



Roughing of a machine column
Complete finish machining on a DMC 340 U

Sector	Mechanical engineering	Spindle	6,300 rpm
Tool	Milling cutter ø 280 mm	Power	44 kW
Material	GGG60	Torque	1,550 Nm

Machining focus: 5-axis simultaneous machining with 5X torqueMASTER® –
NC-controlled B axis with gear-driven spindle; minimally attended production with integrated rotary storage



Turning of a bearing housing (wind energy)
Complete machining on a DMC 340 FD

Sector	Energy technology	Spindle	6,300 rpm
Tool	Turning tool	Power	44 kW
Material	GGG40	Torque	1,550 Nm

Machining focus: Turning of the inner contour; machining of the horizontal recess with spindle tools (540 mm length); complete machining in two set-ups

Simplified machine operation.
The holistic integration of machines
within a manufacturing organisation.

Like on a smartphone, the operator has direct access to all available applications through the **APP MENU**.

ERGoline® Control with 21.5" multi-touch- display and SIEMENS control

Simple

User-friendly machine operation for all new high-tech machines from DMG MORI.

Continuous

Consistent administration, documentation and visualisation of order, process and machine data.

Compatible

Compatible with PPS and ERP systems.
Can be networked with CAD / CAM products.
Open to trendsetting CELOS® apps extensions.



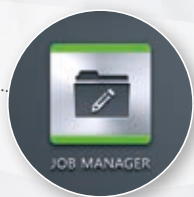
SMARTkey®

Personalised user authorisation: Individually adapted access privileges to the control system and the machine.

CELOS® – from the idea to the finished product.

CELOS® features a standard user interface for all new high-tech machines from DMG MORI. CELOS® apps enable the consistent administration, documentation and visualisation of order, process and machine data. They also simplify, standardise and automate the operation of the machine. 16 standard apps help the machine operator prepare, optimise and systematically process production jobs.

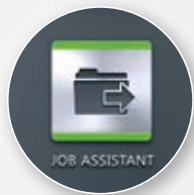
CELOS® APPs – 3 examples:



JOB MANAGER

Systematic planning, administration and preparation of orders.

- + Machine-specific setup and management of new orders
- + Organised storage of all production-related data and documents
- + Easy visualisation of orders, including NC program, resource allocation etc.



JOB ASSISTANT

Process-defined orders.

- + Menu-guided set-up of the machine and menu-driven processing of production orders
- + Reliable error prevention through specific screen instructions with mandatory confirmation function



TOOL HANDLING

Shorter tool set-up times through assessment of the magazine configuration for subsequent orders.

- + Displays all tools required for a job, including automatically generating a loading list
- + Generation of an unloading list by automatically detecting all tools not required for subsequent jobs



DMU P/FD and DMC U/FD portal series

High-end CNCs for reliable processes and maximum precision.

Together with SIEMENS 840D solutionline, the portal series is equipped with the new ERGOline® Control with a 21.5" monitor and CELOS®. The 19" ERGOline® panel is available for the HEIDENHAIN TNC 640. Optionally, various exclusive software cycles such as ATC, MPC, 3D quickSET® and DMG MORI Virtual Machine are available, which are able to optimise workpiece quality and productivity.

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Exclusive, optionally available DMG MORI technology cycles



3D quickSET®

Quick and easy for maximum precision

Tool kit for checking and correcting the kinematic precision of 4- and 5-axis machine configurations

All head variants and all table axes



Laser measuring sensor package

Enhanced measuring options with a laser measuring sensor

Measurement of slots and grooves

Measurement in hard-to-reach areas

Measurement of individual points

Package with manual and automatic calibration



Interpolation turning

Production of seal faces and recesses without a turn-mill table

The machining process takes place in a circular movement around or within the workpiece

The spindle is perpendicular to the direction of movement



Efficient production package

Safe and efficient production – optimisation of production potential

Extended milling strategies

Simple programming of recurring machining steps

Safe recovery from all collision situations

Reduced programming times

Fewer errors from program aborts



HEIDENHAIN TNC 640

- + Unique, highly detailed 3D simulation display
- + New optimised TNC user interface
- + HSCI – HEIDENHAIN Serial Controller Interface
- + Rapid program generation with plain-text programming
- + Collision monitoring (DCM)
- + ATC*, 3D quickSET®*
- + Powerful processor (Intel i7-3, two cores)
- + New optimised ADP movement guide for improved surfaces and quicker machining (block processing time of just 0.5 ms)

* Optional

SIEMENS 840D solutionline

- + Easy interactive programming with identical 'look and feel' for turning and milling
- + SINUMERIK Operate user interface
- + Quick-view simulation of complex program elements
- + Efficient tool management
- + Wide range of 5-axis functions with numerous correction and intervention options
- + Advanced Surface – the option for excellent surface quality*, ideal for tool and mould making

* Optional

HEIDENHAIN iTNC 530

- + Shop floor or DIN-ISO programming
- + Rapid plain-text programming
- + Graphical programming
- + Upwardly compatible
- + 3D workpiece simulation
- + smarT.NC – user-friendly interface
- + Wide range of cycles as standard
- + Efficient tool management
- + DXF converter*
- + AFC – Adaptive Feed Control*

* Optional



MPC – Machine Protection Control

Protecting machines with an emergency shut-off function

Vibration sensors on the milling spindle

Emergency shut-off function with teach function

Process monitoring by means of a bar graph

Milling spindle bearing diagnostics



SGS – Spindle Growth Sensor

Improved precision by measuring spindle displacement

Measurement of the axial displacement of the rotor compared to the stator in real time

The control system compensates for the actual displacement



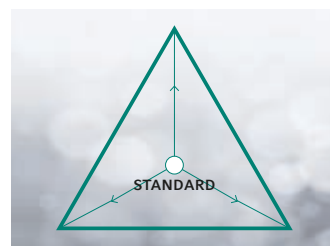
Grinding

Machining with the highest surface precision

Grinding on a universal milling machine

For internal, external and face grinding

Cycles for dressing the grinding wheel



ATC – Application Tuning Cycle

Process optimisation at the push of a button

Process-oriented feed drive tuning

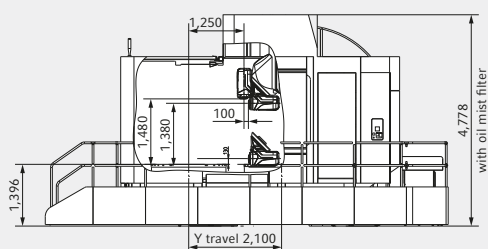
Minimised machining time with maximised component quality, regardless of work-piece weight

DMU P/FD and DMC U/FD portal series

Floor Plans

DMU 210 P/FD

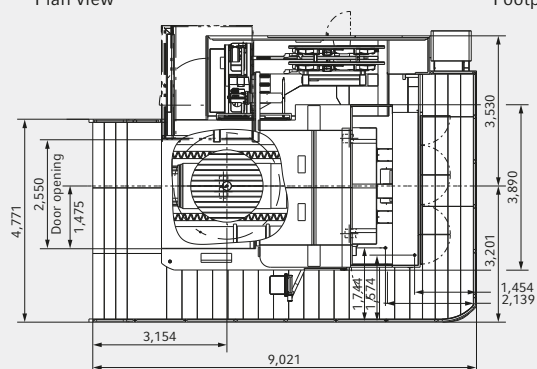
Side view



DMU 210 P/FD with wheel magazine with 123 positions

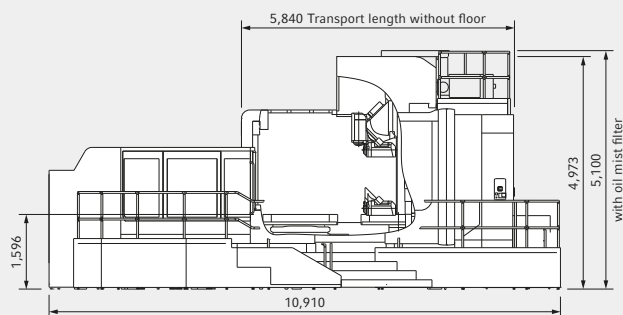
Plan view

Footprint 60.7 m²



DMC 210 U/FD

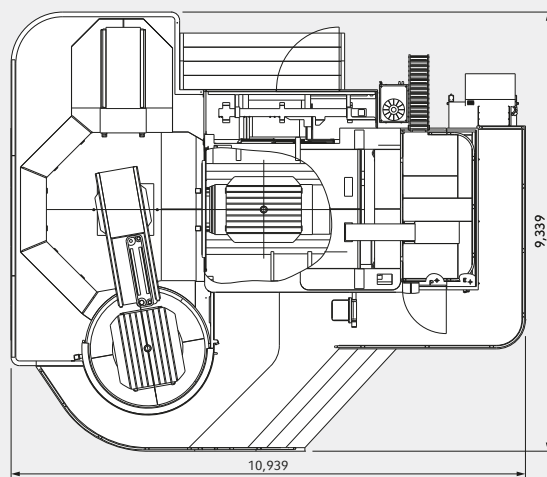
Side view



DMC 210 U/FD with chain magazine with 60 positions

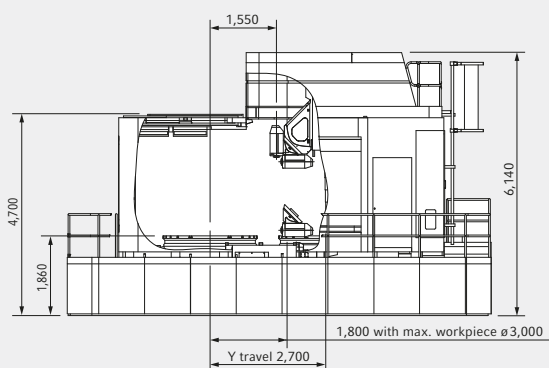
Plan view

Footprint 102.2 m²



DMU 270 P/FD

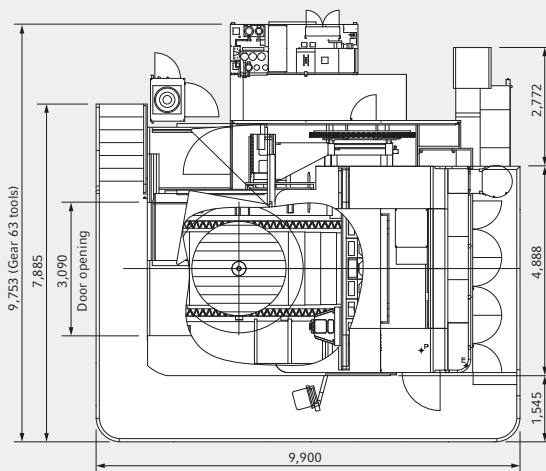
Side view



DMU 270 P/FD with wheel magazine with 63 positions

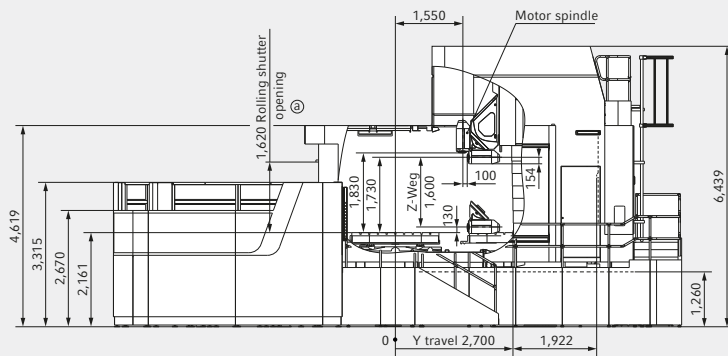
Plan view

Footprint 96.6 m²



DMC 270 U/FD

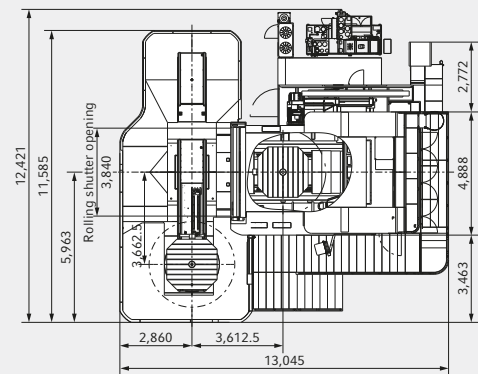
Side view



DMC 270 U/FD with wheel magazine with 63 positions

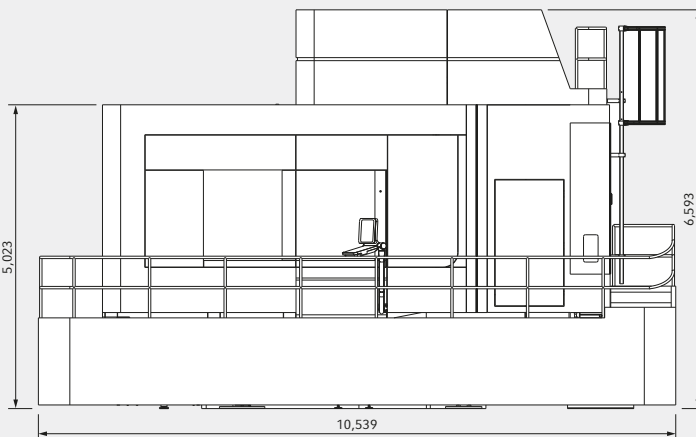
Plan view

Footprint 151.1 m²



DMU 340 P/FD

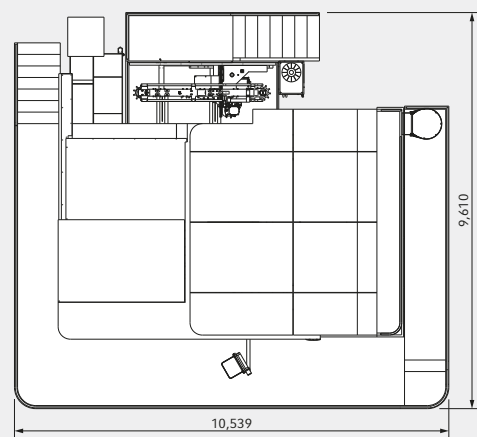
Side view



DMU 340 P/FD with chain magazine with 60 positions

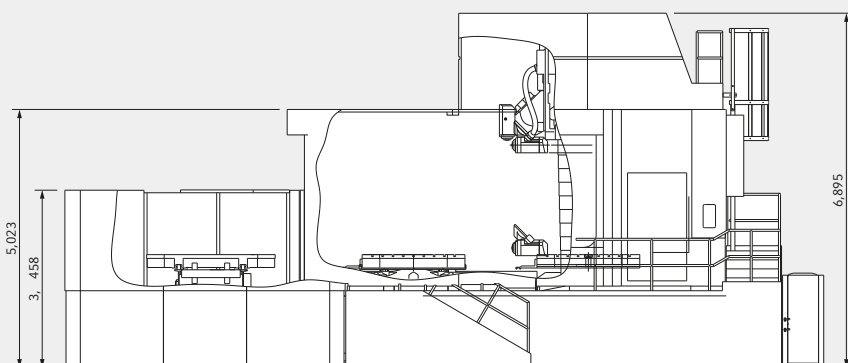
Plan view

Footprint 99.2 m²



DMC 340 U/FD

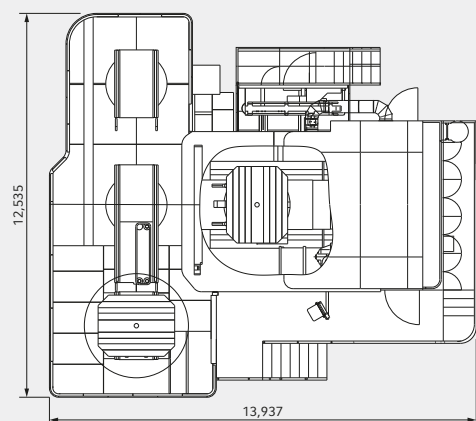
Side view



DMC 340 U/FD with rack magazine with 60 positions

Plan view

Footprint 174.7 m²



DMU P/FD and DMC U/FD portal series

Technical Data

			DMU 210 P	
Working area				
X / Y / Z axis	mm		2,100 × 2,100 × 1,250	
Distance from spindle centre to table surface				
Horizontal milling head	mm		130 – 1,380:	
Vertical milling head	mm		230 – 1,480:	
Distance from spindle nose to table centre				
Horizontal milling head	mm		–750 to 1,350	
Vertical milling head	mm		–850 to 1,250	
Tables				
NC rotary table			Standard	
Speed	rpm		12	
Mill-turn table (milling / turning)	rpm		–	
Table size	mm		ø 1,700	
Maximum table load	kg		8,000 (10,000)*	
5-axis options				
NC-controlled swivelling milling head (B axis)			Standard	
Swivel range (0 = vertical / 180 = horizontal)	Degrees		–30 / +180	
Rapid traverse and feed	rpm		30	
NC-controlled swivelling milling head (A axis)			◦	
Swivel range (0 = vertical / –90 = horizontal)	Degrees		–120 / +10	
Rapid traverse and feed	rpm		25	
5X torqueMASTER® – NC-controlled B axis with gear-driven spindle			◦	
Swivel range (0 = vertical / 180 = horizontal)	Degrees		–10 / +180	
Rapid traverse and feed	rpm		23	
Main drive				
Integrated SK50 motor spindle	rpm		12,000	
Integrated HSK-A100 motor spindle	rpm		–	
Power (40 / 100 % DC) // Torque (40 / 100 % DC)	kW // Nm		44 / 32 // 288 / 187	
Integrated gear-driven spindle for holding exchangeable milling heads	rpm		–	
Power (100 % DC) // Torque (100 % DC)	kW // Nm		–	
SK50 tool magazine – tool magazine	Positions		60 / chain	
Linear axes (X / Y / Z / W)	m/min		60 / 40 / 40 / –	
Machine weight	kg		41,000	
P max. (X / Y / Z) – VDI DGQ 3441 / ISO 230-2	µm		12	
P smax. (X / Y / Z) – VDI DGQ 3441 / ISO 230-2	µm		8	
Control system				
DMG MORI ERGOline® Control with 19" monitor and 3D control system				
CELOS® from DMG MORI with 21.5" ERGOline® and SIEMENS				

* / ◦ Optional

	DMU 270 P	DMU 340 P	DMU 340 P Unimould
	2,700 × 2,700 × 1,600	3,400 × 3,400 × 1,600 (2,000)*	3,400 × 3,400 × 1,600 (2,000)*
	130–1,730:	130–1,730 (2,130)*	130–1,730 (2,130)*
	230–1,830:	230–1,830 (2,230)*	230–1,830 (2,230)*
	–1,050 to 1,650	–1,500 to 1,900	–1,500 to 1,900
	–1,150 to 1,550	–1,600 to 1,800	–1,600 to 1,800
	Standard	Standard	Standard
	9	5	5
	–	–	–
	ø 2,200	ø 2,600 × 2,200	ø 2,600 × 2,200
	12,000	16,000 (20,000)*	16,000 (20,000)*
	Standard	Standard	Standard
	–70 / +180	–30 / +180	–30 / +180
	30	30	30
	◦	◦	◦
	–120 / +180	–120 / +10	–120 / +10
	25	25	25
	◦	◦	◦
	–30 / +180	–10 / +180	–10 / +180
	23	14	14
	12,000	10,000	10,000
	–	–	–
	44 / 32 / 288 / 187	44 / 32 // 288 / 187	44 / 32 // 288 / 187
	–	–	–
	–	–	–
	63 wheel	60 / chain	60 / chain
	60 / 30 / 40	60 / 30 / 40 / –	60 / 30 / 40 / –
	74,000	96,000	96,000
	8	15	12
	8	10	8
	Operate on SIEMENS 840D solutionline, HEIDENHAIN 640		SIEMENS 840D solutionline, HEIDENHAIN iTNC 530
	Operate on SIEMENS 840D solutionline	–	–

	DMU 210 FD	DMU 270 FD	DMU 340 FD
	1,200 × 1,200 × 1,250	2,700 × 2,700 × 1,600	3,400 × 3,400 × 1,600 (2,000)
	130–1,380: 230–1,480:	130–1,730: 230–1,830:	130–1,730 (2,130)* 230–1,830 (2,230)*
	–750 to 1,350 –850 to 1,250	–1,050 to 1,650 –1,150 to 1,550	–1,500 to 1,900 –1,600 to 1,800
	– –	– –	– –
	20 / 250 ø 1,850 5,000	20 / 200 ø 2,200 7,000	20 / 120 ø 2,500 7,000
	Standard –30 / +180 30 ◦ –120 / +10 25 ◦ –10 / +180 23	Standard –70 / +180 30 ◦ –120 / +180 25 ◦ –30 / +180 23	Standard –30 / +180 30 ◦ –120 / +10 25 ◦ –10 / +180 14
	– 12,000 44 / 32 // 288 / 187 – –	– 12,000 44 / 32 / 288 / 187 – –	– 10,000 44 / 32 // 288 / 187 – –
	60 / chain 60 / 40 / 40 / – 42,000 12 8	63 wheel 60 / 30 / 40 74,000 8 8	60 / chain 60 / 30 / 40 / – 97,000 15 10
		Operate on SIEMENS 840D solutionline, HEIDENHAIN 640	SIEMENS 840D solutionline FD
		Operate on SIEMENS 840D solutionline	–

High-efficiency pumps and accumulators.

Frequency-controlled coolant pump

The high-pressure coolant pump typically requires 22 % of the energy used during the machining process. This energy heats the coolant which has to be cooled with additional energy.

Facts:

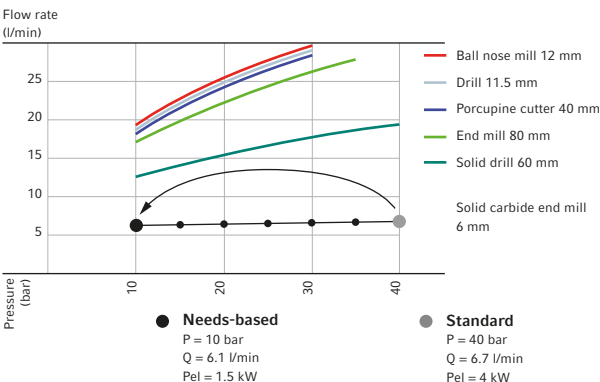
- + Adaptable pressure leads to the most efficient use of coolant
- + The pressure can be reduced for small tools, as high pressure does not increase the quantity of coolant

Conventional technology:

- + Pressure reduction with proportional valve technology does not save any energy as the pump continues to run at its nominal rating

Advantage of DMG MORI:

- + Variable speed, high-pressure pumps only use the required power



Savings with this tool: 28 pence per hour

Efficient machine cooling

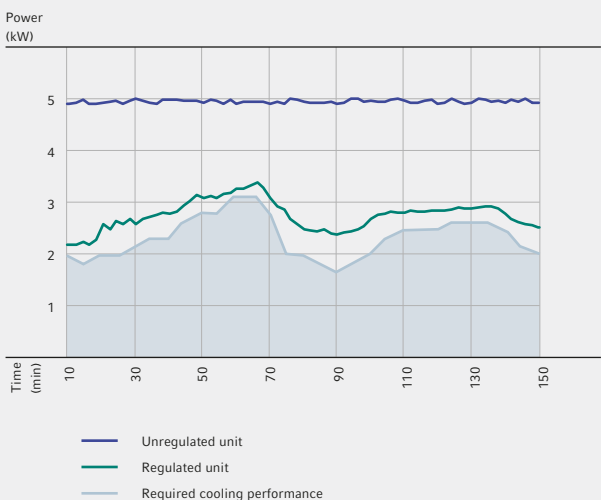
- + DMG MORI uses efficient cooling units which deliver only the necessary amount of coolant
- + The average power consumption falls by 30–50 %

This equates to a saving of approximately 2 kW in the case of a 10 kW cooling system

Typical saving

7,200 kWh*
or £ 1,478 per year

* 24 hours per day, 300 days per year,
10 pence per kWh



The higher the cooling power of a unit, the greater the energy savings.

KFW subsidy: Reinvestment: 30 % energy saving compared to existing systems

New investment: 15 % energy saving compared to the industry average.

DMU P/FD and DMC U/FD portal series

Technical Data

		DMC 210 U
Working area		
X / Y / Z axis	mm	2,100 × 2,100 × 1,250
Distance from spindle centre to pallet		
Horizontal milling head	mm	130–1,380:
Vertical milling head	mm	230–1,480:
Distance from spindle nose to pallet centre		
Horizontal milling head	mm	–750 to 1,350
Vertical milling head	mm	–850 to 1,250
Tables / pallets		
NC rotary table		Standard
Speed	rpm	12
Mill-turn table (milling / turning)	rpm	–
Pallet size	mm	1,600 x 1,400
Maximum pallet load	kg	5,000
5-axis options		
NC-controlled swivelling milling head (B axis)		Standard
Swivel range (0 = vertical / 180 = horizontal)	Degrees	–30 / +180
Rapid traverse and feed	rpm	30
NC-controlled swivelling milling head (A axis)		◦
Swivel range (0 = vertical / –90 = horizontal)	Degrees	–120 / +10
Rapid traverse and feed	rpm	25
5X torqueMASTER® – NC-controlled B axis with gear-driven spindle		◦
Swivel range (0 = vertical / 180 = horizontal)	Degrees	–10 / +180
Rapid traverse and feed	rpm	23
Main drive		
Integrated SK50 motor spindle	rpm	12,000
Integrated HSK-A100 motor spindle	rpm	–
Power (40 / 100 % DC) // Torque (40 / 100 % DC)	kW // Nm	44 / 32 // 288 / 187
Integrated gear-driven spindle for holding exchangeable milling heads	rpm	–
Power (100 % DC) // Torque (100 % DC)	kW // Nm	–
SK50 tool magazine – tool magazine	Positions	60 / chain
Linear axes (X / Y / Z / W)	m/min	60 / 40 / 40 / –
Machine weight	kg	43,000
P max. (X / Y / Z) – VDI DGQ 3441 / ISO 230-2	µm	12
P smax. (X / Y / Z) – VDI DGQ 3441 / ISO 230-2	µm	8
Control system		
DMG MORI ERGOline® Control with 19" monitor and 3D control system		
CELOS® from DMG MORI with 21.5" ERGOline® and SIEMENS		

* / ◦ Optional

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DMU P/FD and DMC U/FD portal series

Options

	DMU 210 P / DMC 210 U	DMU 270 P / DMC 270 U
Table options		
NC rotary table	•	Standard
RS 3 / RS 2 rotary pallet storage, including 3 / 2 additional pallets (only for DMC machines)	RS 5	RS 4
Tool carrier		
HSK-A63 / BT 40 / CAT 40 (HSK for turn-mill machines, FD, as standard)	◦	◦
HSK-A100 / BT 50 / CAT 50 (HSK for turn-mill machines, FD, as standard)	◦	◦
Automation / measurement / monitoring		
3D quickSET®	◦	◦
Infra-red measuring probe	◦	◦
Wireless measuring probe (used with pick-up spindle or exchangeable milling head)	◦	◦
Tool measuring working area, Blum Laser NT hybrid (standard with the pick-up spindle)	◦	◦
Mechanical tool breakage monitor	◦	◦
Combined tool measurement in the working area, laser system for milling tools, 3D scanner for turning tools	–	–
Quad-colour signal lights	◦	◦
Coolants / chip disposal		
Protective cabin	•	•
Production package with 980-litre coolant unit, paper band filter, 40-bar internal coolant supply	•	•
Production package with 2,500-litre coolant unit, paper band filter, 40-bar internal coolant supply	◦	◦
Coolant unit with 40 / 80-bar internal coolant supply (two pressure levels)	◦	◦
Internal coolant supply, 80 bar, frequency-controlled	–	◦
Coolant temperature control for internal coolant supply unit	◦	◦
Spray gun with 1-bar pump, 40 litres per minute	◦	◦
Minimum quantity lubrication through the spindle centre internally and through nozzles externally	◦	◦
Oil and emulsion mist separator	◦	–
Air blast cooling through the spindle centre	◦	◦
Optional iTNC 530 / TNC 640 control systems		
Application Tuning Cycle ATC	◦	◦
Electronic handwheel iTNC 530 / TNC 640	•	•
Control panel for tool magazine loading station	◦	–
ACC – Active Chatter Control	◦	◦
Optional SIEMENS 840D solutionline		
Electronic SIEMENS 840D handwheel	•	•
Control panel for tool magazine loading station	◦	◦
DECKEL MAHO MDynamics	◦	◦
General options		
Shatter-proof safety glass viewing window	◦	◦
Operating mode 4 "Processor monitoring in production"	◦	◦
Package for increased accuracy	◦	◦

• Standard, ◦ Optional, – not available

	DMU 340 P / DMC 340 U	DMU 340 P Unimould	DMU 210 FD / DMC 210 FD	DMU 270 FD / DMC 270 FD	DMU 340 FD / DMC 340 FD
	•	•	Mill-turn table	Mill-turn table	◦
	RS4	—	RS5	RS4	RS4
	◦	◦	—	—	—
	◦	◦	•	◦	•
	◦	◦	◦	◦	◦
	◦	—	◦	◦	◦
	—	◦	—	—	—
	◦	◦	◦	◦	◦
	◦	◦	◦	◦	◦
	—	—	◦	◦	◦
	◦	◦	◦	◦	◦
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	—	—	•	•	—
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