

DMU 210/270/340 P

DMU 210/270/340 FD

DMC 210/270/340 U

DMC 210/270/340 FD

DMU P/FD | DMC U/FD portal series



Applications and Parts

Machine and Technology

Control Technology

Technical Data



1



2

MECHANICAL ENGINEERING

1: Crossbeam

2: Machine bed

DMU P/FD | DMC U/FD PORTAL SERIES

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

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 3,400mm 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.

02



1



2

1: Landing gear support beam 2: V16 diesel engine crankcase



3



5



7



9



4



6



8



10

GEAR MANUFACTURING

- 3: Planetary gear carrier
- 4: Spiral bevel gear

TOOL AND MOULD MAKING

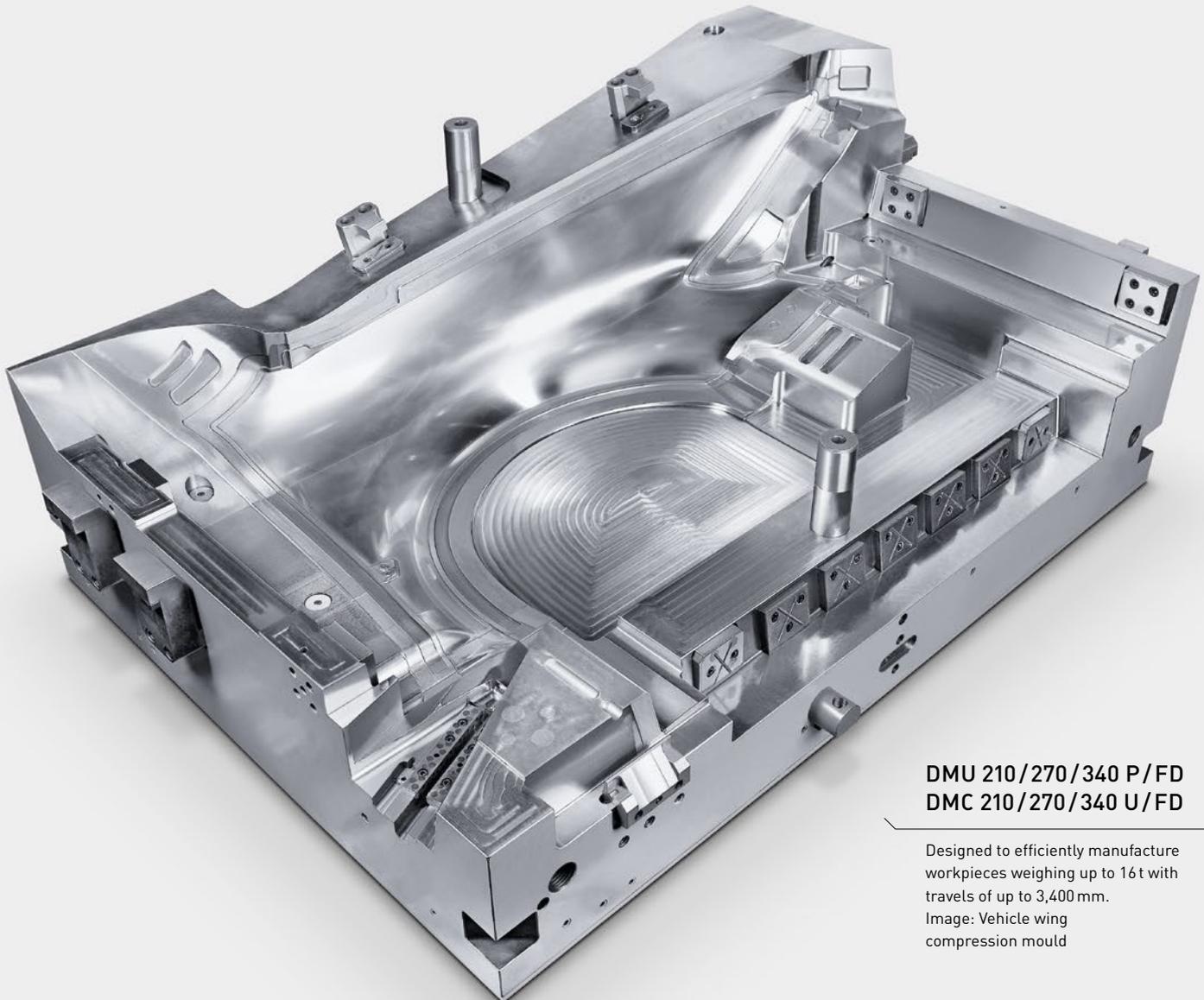
- 5: Bumper press tool
- 6: Bumper mould insert

ENERGY TECHNOLOGY

- 7: Pelton wheel
- 8: Bearing housing

AEROSPACE

- 9: HP compressor housing
- 10: Integral component



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

Designed to efficiently manufacture workpieces weighing up to 16 t 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 16 t, 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.



		DMU 210 P	DMU 270 P	DMU 340 P
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)*
Maximum workpiece dimensions	mm	ø 1,700	ø 2,200	ø 2,600 × 2,200
Maximum load	kg	8,000 (10,000)*	12,000	16,000
Maximum workpiece dimensions	mm			

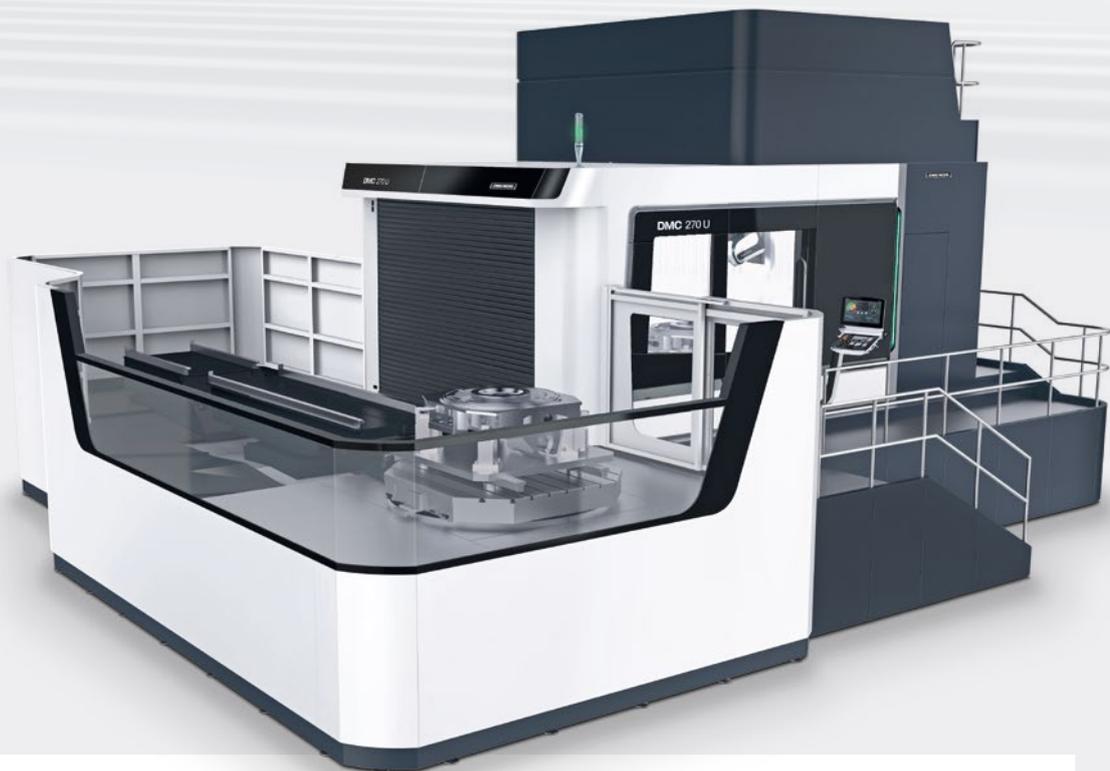
Even higher productivity with the automatic pallet changer, up to five pallets in the system with RS 5 rotary storage on the DMC 210U/FD



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, optimal accessibility to the working area, a set-up station and maintenance equipment.



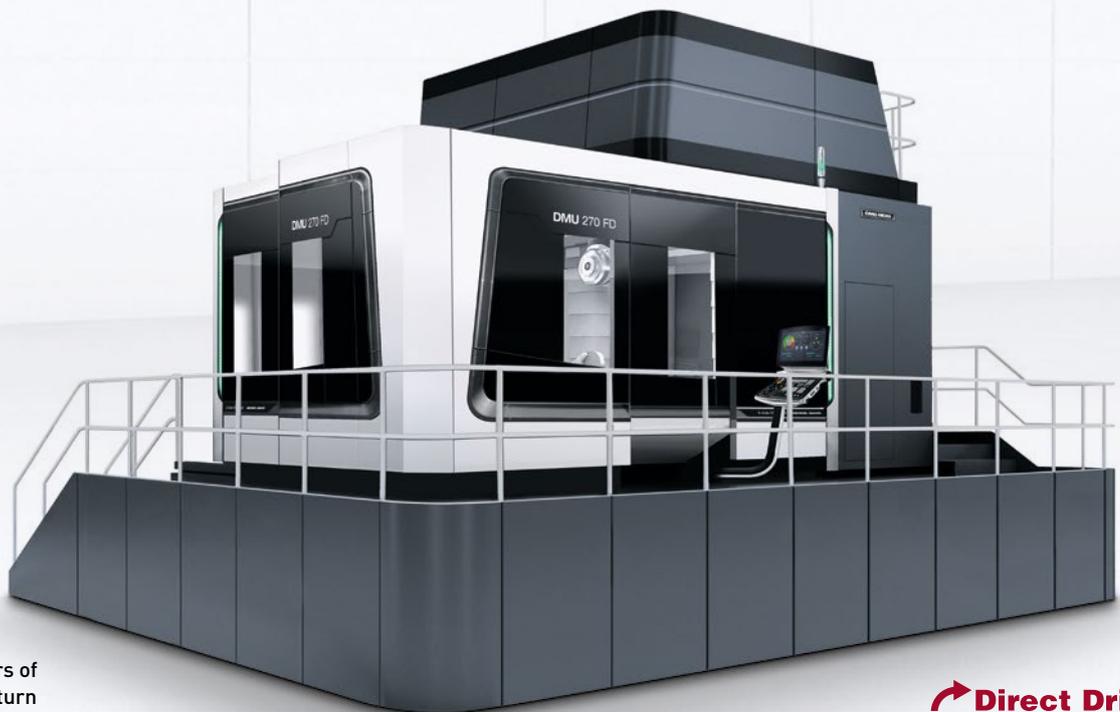
		DMC 210 U	DMC 270 U	DMC 340 U
Travel X/Y/Z	mm	2,100 / 2,100 / 1,250	2,700 / 2,700 / 1,600	3,400 / 3,400 / 1,600 (2,000)*
Maximum workpiece dimensions	mm	ø 1,600 × 1,400	ø 2,000 × 2,000	ø 2,500 × 2,000
Maximum load	kg	6,000	9,000	10,000
Maximum workpiece dimensions	mm			

* option

DMU FD | DMC FD PORTAL SERIES

Complete machining of large components

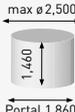
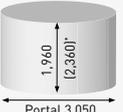
5-sided and/or 5-axis simultaneous machining, including turning, in one set-up. The combination of milling and turning guarantees maximum precision and shorter machining times. The innovative applications are supported by numerous helpful options and features in both the software and hardware.



**18 years of
mill-turn
technology:**

1,000 machines
installed worldwide –
80 % with pallet
changers.



		DMU DMC 210 FD	DMU DMC 270 FD	DMU DMC 340 FD
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] ¹
Maximum workpiece dimensions	mm	ø 1,850	ø 2,200	ø 2,500
Maximum load	kg	5,000 / 4,000	7,000 / 6,000	7,000 / 6,000
Maximum workpiece dimensions	mm			

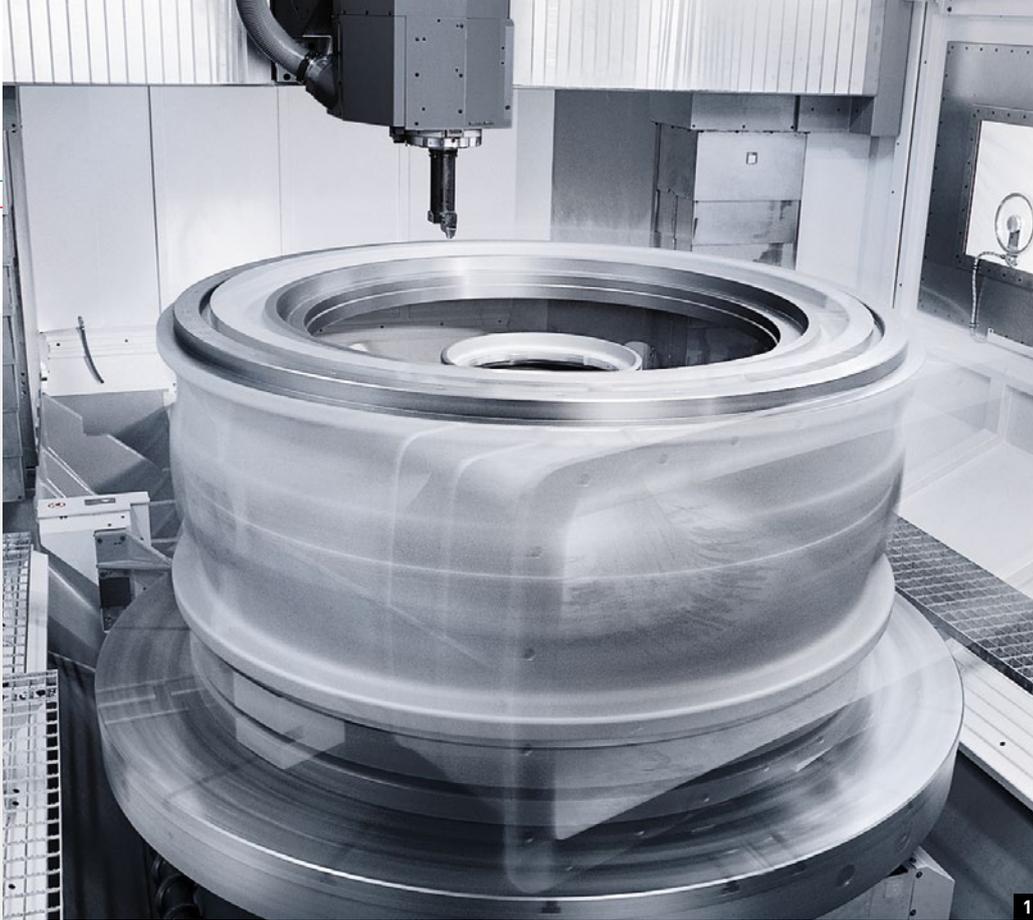
¹option **DMC 270 U / FD



MILL-TURN TABLES

		DMC 210 U	DMC 270 U	DMC 340 U
Torque	Nm	8,600	11,000	10,200
Detent torque	Nm	13,500	15,000	20,000
Maximum speed	rpm	250	200	120
Mass moment of inertia	kg/m ²	6,000	9,000	10,000

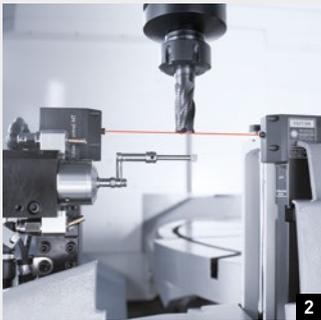
*option



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

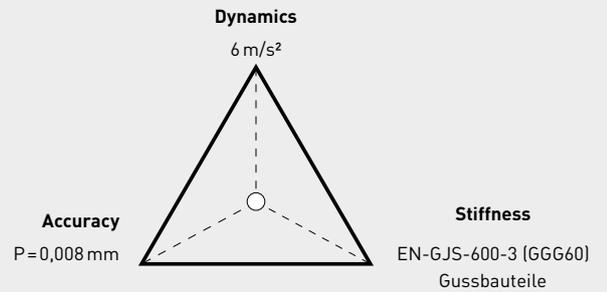
- + Complete machining with milling and turning on one machine in one set-up
- + Faster and more precise thanks to the absence of additional set-ups
- + Lower investment and smaller footprint by using only one machine
- + Quicker machining and lower logistics costs by eliminating idle times and process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

*Option

HIGHLIGHTS OF THE P/FD | DMC U/FD PORTAL SERIES

Unrivalled rigidity and dynamics up to 6 m/s²

- + Superior dynamics: up to **6 m/s²** and **60 m/min**
- + Highest precision: **P = 0.008 mm** (210 series with precision package)
- + A high degree of stiffness for maximum milling power, **EN-GJS-600-3 (GGG60) cast iron components**
- + High-performance motor spindles (**1,000 Nm or 100 kW**)
- + Powerful gear-driven spindle (**1,800 Nm – 8,000 min⁻¹**)
- + **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



Pallet changer or rotary magazine

Milling heads



B-axis

A-axis

Gear-driven B-axis

Table



NC rotary table

NC rotary table

Turn/mill table

210/270/340 tool magazine



Wheel magazine with changer and up to 243 tools

Chain magazine with up to 120 tools

DMU P/FD | DMC U/FD PORTAL SERIES

Maximum precision with temperature stability

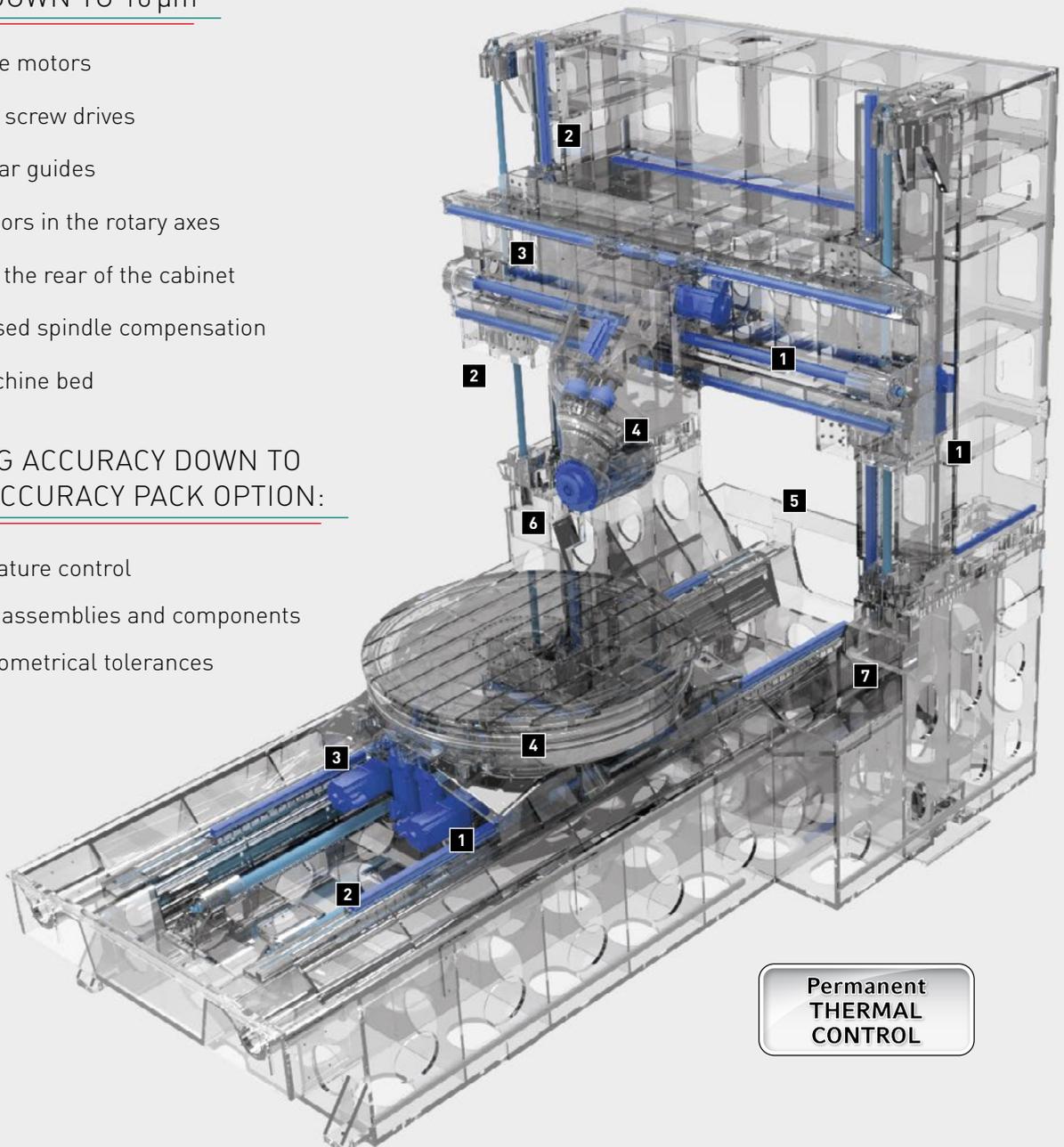
Comprehensive cooling produces long-term precision. The entire feed drive is cooled, which guarantees higher component precision.

HIGH TEMPERATURE STABILITY
STANDARD POSITIONING
ACCURACY DOWN TO 10 μm

- 1 Cooled drive motors
- 2 Cooled ball screw drives
- 3 Cooled linear guides
- 4 Cooled motors in the rotary axes
- 5 Isolation of the rear of the cabinet
- 6 Sensor based spindle compensation
- 7 Cooled machine bed

POSITIONING ACCURACY DOWN TO
8 μm WITH ACCURACY PACK OPTION:

- + Coolant temperature control
- + Use of selected assemblies and components
- + Reduction of geometrical tolerances of up to 50 %

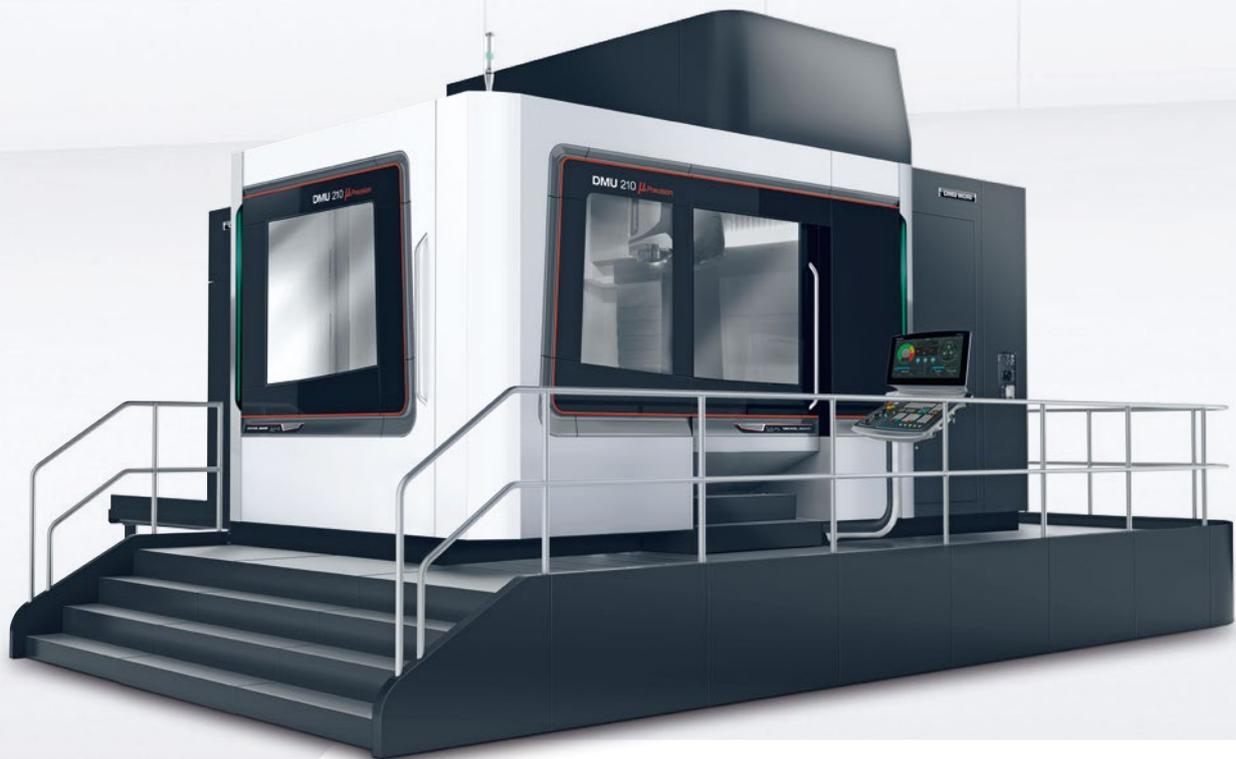


Permanent
THERMAL
CONTROL

μPRECISION

Maximum precision: +80 % increase in volumetric accuracy

The high precision variant *μPRECISION* of the DMU | DMC 210/270 with a volumetric accuracy of down to 20 μm (DMU | DMC 210 *μPRECISION*) is unique worldwide. In order to achieve the required accuracy, the guideways undergo over 500 hours of hand scraping. To achieve perfect machining results over the entire working area, high precision flatness, squareness and straightness of all axes is required.



HIGHLIGHTS

- + Maximum precision thanks to 500 hours of hand scraping of the guideways (flatness and straightness $\leq 4 \mu\text{m}$)
- + Positioning accuracy down to $4 \mu\text{m}$
- + Volumetric precision down to $\leq 20 \mu\text{m}$
- + Individual optimisation on the user's premises – Compensation of thermal expansion and volumetric compensation under individual on-site conditions
- + Unbeatable dynamics up to 6m/s^2 and 60m/min
- + Temperature control of all relevant heat-generating machine components



500 HOURS OF MANUAL SCRAPING

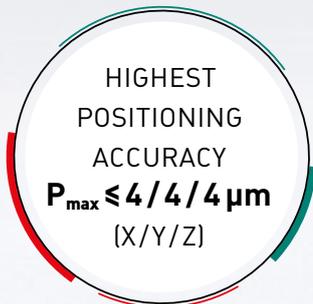
Scraping process: Up to 80% increase in precision

		DMU DMC 210 μ PRECISION	DMU DMC 270 μ PRECISION	DMU DMC 340 μ PRECISION
Positioning accuracy of the linear axes X/Y/Z	μm	4/4/4	6/6/6	7/7/7
Positioning accuracy of the rotational axes A/B/C	arcsec	5/4/4	5/4/4	5/4/4
Straightness and flatness of the linear axes	μm	4	7	8
Volumetric accuracy*	μm	20	25	30

*Only the linear axes were considered for compensation

Package μ PRECISION includes:

- + All features of the increased accuracy package
- + Hand scraped guideways
- + Coolant temperature control
- + Volumetric Compensation System (VCS) – Compensation of thermal expansion and volumetric compensation under individual on-site conditions
- + Spindle Growth Sensor (SGS)
- + Machine Protection Control (MPC)
- + Tool measuring in machining area BLUM
- + Increased number of compensation base points in all axes
- + Tolerance reduced up to 80% compared to standard



		DMU DMC 210 μ PRECISION	DMU DMC 270 μ PRECISION	DMU DMC 340 μ PRECISION
Travel ranges X/Y/Z	mm	2,100/2,100/1,250	2,700/2,700/1,600	3,400/3,400/1,600 (2,000)
Maximum table load	mm	8,000 (10,000*)/6,000	12,000/9,000	16,000/10,000
Maximum table load FD	kg	5,000/4,000	7,000/6,000	7,000/6,000
Workpiece dimensions	mm			

*option **DMC 270 μ PRECISION

DMU P/FD | 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.

SPINDLE SELECTION

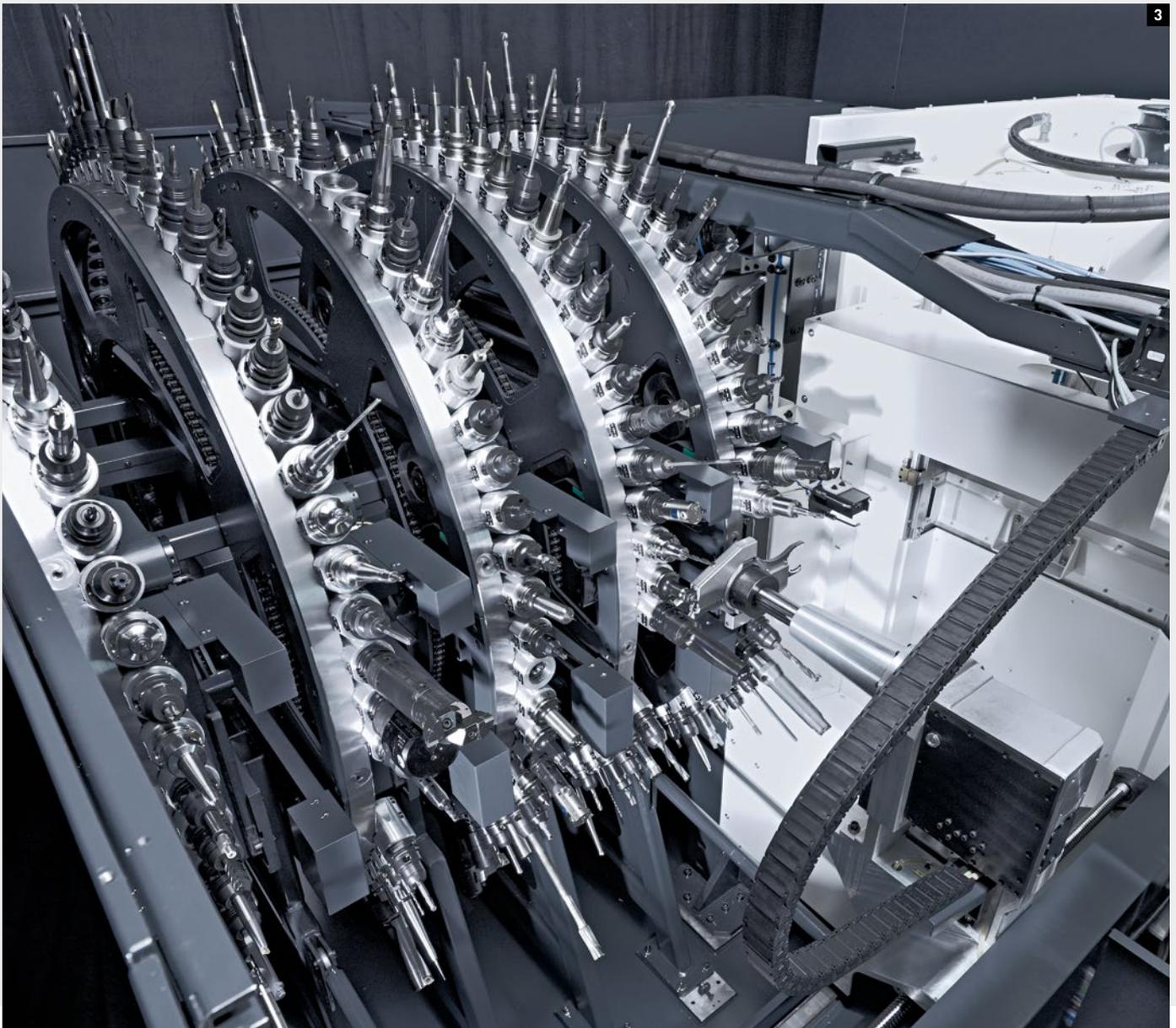
<i>Spindle, Speed</i> <i>Tool Carrier</i> <i>Peistung/Torque (40% DC)</i>	DMU 210 P DMC 210 U	DMU 210 FD DMC 210 FD	DMU 270 P DMC 270 P	DMU 270 FD DMC 270 FD	DMU 340 P DMC 340 U	DMU 340 FD DMC 340 FD
Motor spindle rated at 12,000 rpm SK50/HSK-A100 44 kW/288 Nm	•	•	•	•	•	•
Motor spindle rated at 12,000 rpm HSK-A100 52 kW/430 Nm	◦	◦	◦	◦	◦	◦
Motor spindle rated at 15,000 rpm HSK-A100 52 kW/404 Nm	◦	–	◦	–	◦	–
Motor spindle rated at 20,000 rpm SK40/HSK-A63 35 kW/130 Nm	◦	–	◦	–	–	–
powerMASTER 9,000 rpm HSK-A100 54 kW/700 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	◦	–	◦	–	◦	–

• standard ◦ option – not available

- 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 -40°
- 3: Finishing with exchangeable 24,000 rpm HSC pick-up spindle
- 4: NC-controlled swivelling B-axis milling head for simultaneous 5-axis milling with maximum stability due to machining at the centre of rotation
- 5: Roughing a mould for a dashboard with the 5X torqueMASTER



- 1: Chain magazine for up to 180 tools
- 2: Pick-up spindle 24,000 rpm or 30,000 rpm
- 3: Rack magazine for up to 303 tools



Innovative Tool Handling

Machine	SK50/HSK-A100 Chain magazine		SK50/HSK-A100 Wheel magazine					SK40/HSK-A63 Wheel magazine	
	60	120	63	123	183	243	303	93	183
DMU 210 P	Standard	•	•	•	•	-	-	•	•
DMU 210 FD	Standard	-	•	•	•	-	-	-	-
DMC 210 U	Standard	•	•	•	•	•	•	•	•
DMC 210 FD	Standard	-	•	•	•	•	•	-	-
DMU 270 P	Standard	•	•	•	•	-	-	•	•
DMU 270 FD	Standard	-	•	•	•	-	-	-	-
DMC 270 U	Standard	•	•	•	•	•	•	•	•
DMC 270 FD	Standard	-	•	•	•	•	•	-	-
DMU 340 P	Standard	•	•	•	•	-	-	-	-
DMU 340 FD	Standard	-	•	•	•	-	-	-	-
DMC 340 U	Standard	•	•	•	•	•	•	-	-
DMC 340 FD	Standard	-	•	•	•	•	•	-	-

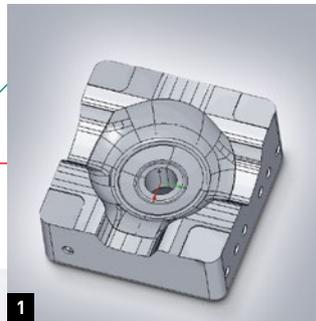
MAGAZINE TYPES

	Chain magazine	Wheel magazine
Tool carrier	SK50 (HSK-A100)	SK40 (HSK-A63)/SK50 (HSK-A100)
Measurements (adjacent positions occupied), mm	ø 110	ø 110/ø 80
Measurements (adjacent positions free), mm	ø 250	ø 280/ø 160
Boring bar dimensions, mm	ø 250 × 400	ø 200 to ø 400
Tool length, mm	650	900
Weight, kg	15/30	15/30
Chip-to-chip time (HSK), seconds	from 10	from 7,5

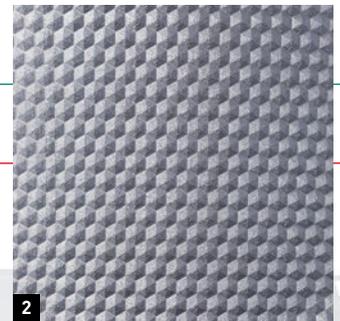
PICK-UP SPINDLES*

	Pick-up-Spindel 24,000 rpm
Tool carrier	HSK-A63
Dimensions, mm	50
Tool length, mm	200
Weight, kg	4

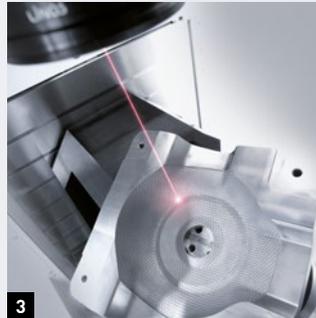
* Tools are all stored in the same magazine



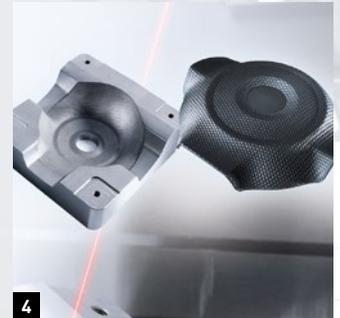
1



2



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 crossprocess LASERSOFT 3D texturing software** for organic and technical surface structures

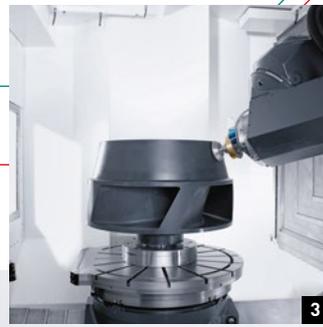
1: LASERSOFT 3D texturing software for generating the laser machining program 2: Geometrically defined honeycomb structure 3: Laser structuring of a steering wheel cover mould 4: Final injection-moulded steering wheel cover mould with honeycomb structure



DMU P/FD | DMC U/FD PORTAL SERIES

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.

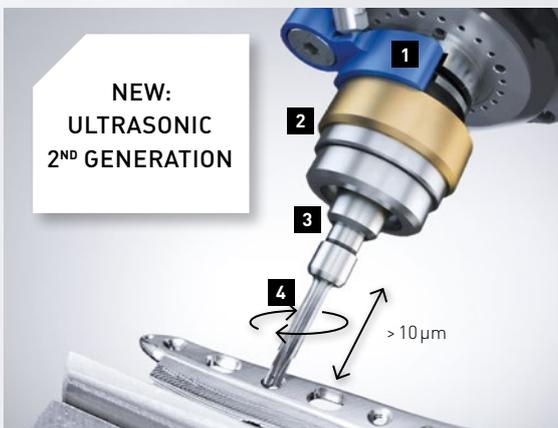


1: Machining a diffuser case from Inconel 718 with an ULTRASONIC 125 FD 2: ULTRASONIC 60 FD duoBLOCK: Thin-walled, lightweight structures of a Zerodur mirror carrier 3: External/internal cylindrical grinding of a mineral cast pump housing on an ULTRASONIC 125 FD

ULTRASONIC TECHNOLOGY INTEGRATION

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

ULTRASONIC machining is a pioneering technology for the production of complex geometries in high-tech materials which is finding its way into almost every sector with unbelievable speed. Thanks to the kinematic overlapping of tool rotation with additional axial oscillation, high-performance materials which are normally difficult to machine can be economically processed to the highest quality. The low process forces allow the production of thin walls and result in longer tool service life and significantly reduced micro-cracks in the material. Depending on the material properties, outstanding surface finishes of $Ra < 0.1\mu m$ can be achieved.



NEW:
ULTRASONIC
2ND GENERATION

- 1 **Powerful ULTRASONIC**
with optimised inductive transmission
- 2 **Stronger ULTRASONIC booster**
for up to 3 times higher amplitudes
- 3 **Shorter actuator**
for higher stiffness
- 4 **Tools**
with undefined and defined cutting edge

FUNCTIONAL PRINCIPLE

The tool rotation is superimposed via the HSK-E32/HSK-E40/HSK-E50/HSK-A63/HSK-A100 interface of the ULTRASONIC actuator tool holder with an additional oscillation in the axial direction (piezoelectric effect).

HIGHLIGHTS

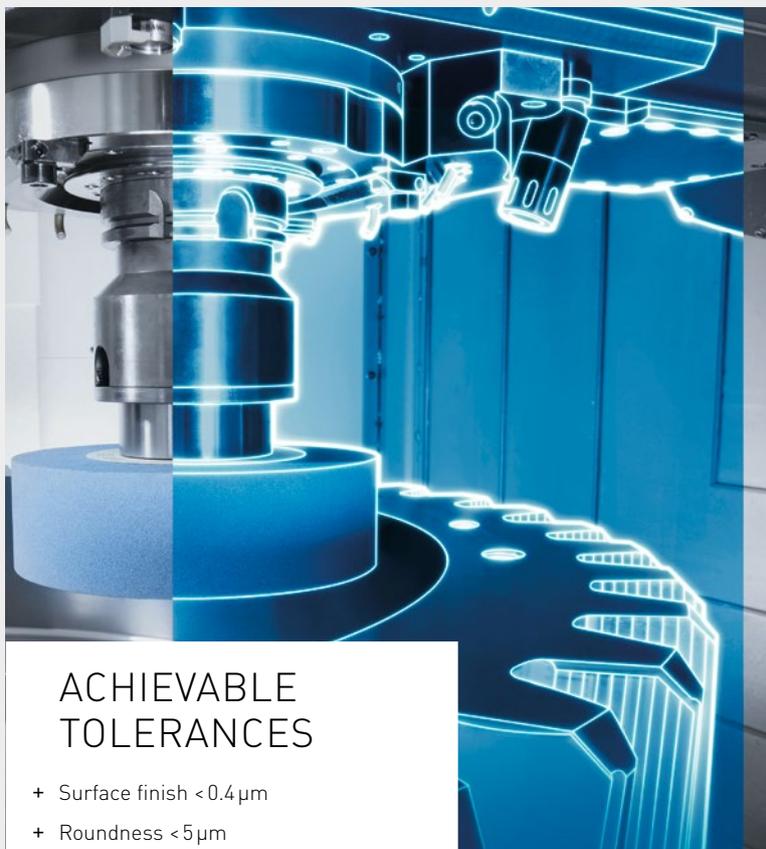
- + Economical grinding, milling and drilling of hard and brittle as well as hard-to-machine advanced materials
- + New, stiffer ULTRASONIC HSK actuating tool holder with increased amplitude power for a powerful ULTRASONIC performance
- + Up to 40% reduced process forces for high productivity, excellent surface quality and precision and longer tool life
- + Automatic detection and tracking of ULTRASONIC frequency and amplitude



1: Detecting of components via spindle load
2: Acoustic emission sensor for dressing

DMU P/FD | DMC U/FD PORTAL SERIES

Grinding



ACHIEVABLE TOLERANCES

- + Surface finish <math>< 0.4 \mu\text{m}</math>
- + Roundness <math>< 5 \mu\text{m}</math>
- + Quality 5 with diameter <math>< 120 \text{ mm}</math>
- + Quality 4 with diameter >math>120 \text{ mm}</math>

HIGHLIGHTS

- + Milling, turning and grinding in one set-up
- + Unrivalled surface quality
- + Grinding cycles for internal cylindrical, external cylindrical and surface grinding as well as dressing cycles
- + **NEW:** External, automatically interchangeable nozzle unit to deliver coolant directly between the grinding wheel and the workpiece
- + **NEW:** AE-sensor (Acoustic Emission) integrated into the dressing unit, to detect the initial contact between the grinding wheel and the dressing unit
- + **NEW:** Detection of the initial contact between the grinding wheel and the workpiece via spindle load

Grinding package

- + Linear guideways and ball screws with additional wipers
- + Sealing air for all linear encoders
- + Extended lubrication intervals
- + Observation of additional maintenance notes
- + Coolant supply 1,300 l incl. centrifugal filter for particles down to



1: Turning 2: Tapping
3: Gear milling with standard tools

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DMG MORI gearMILL

ACHIEVABLE GEAR QUALITIES

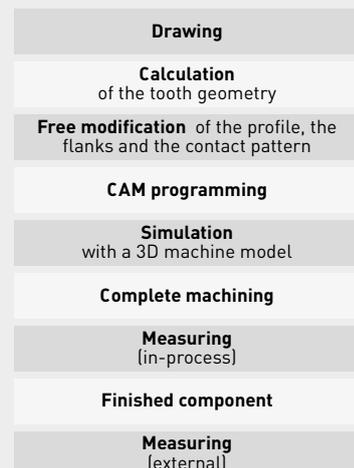
- + Bevel gear DIN ≤ 5
- + Spur gear DIN ≤ 6 (depending on the pitch circle diameter)

HIGHLIGHTS

- + Gears up to $\varnothing 5,000$ mm or gear segments
- + Complete machining with turning, drilling and gear cutting
- + Highest flexibility due to machining with standard tools on a standard machine
- + Unrestricted modifications of profiles, flanks and contact patterns with verification
- + Flexible for different gear types
- + Soft and hard machining on one machine
- + Quality control on the process with output log



Process chain



SPUR GEAR

- + Complex profile and flank modifications
- + Straight spur gear
- + Helical spur gear
- + Double helical spur gear with or without middle gap



BEVEL GEAR

- + Straight bevel gear
- + Helical bevel gear
- + Hypoid
- + Shaft angle $\neq 90^\circ$
- + Klingelnberg Cyclo-Paloid®
- + Gleason type,
- + FORMATE & SGT

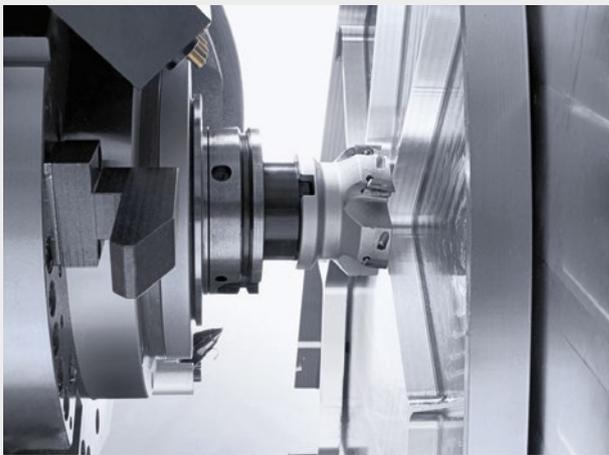


WORM GEAR

- + Free modification of contact pattern
- + Profile ZA
- + Profile ZN
- + Profile ZI

DMU P/FD | DMC U/FD PORTAL SERIES

Spindles for special materials and applications



Machining of tool steel Motor spindle rated at 15,000 rpm (52 kW, 404 Nm) – for high-performance milling

Workpiece material	50CrV4
Material removal rate	460 cm ³ /min
Tool	D = 80 mm (7 cutting edges)
Spindle speed	477 min ⁻¹ (V _c = 120 m/min)
Feed	1,282 mm/min (F _z = 0,385 mm)
Cutting depth/width	6/60 mm



5X torqueMASTER – Machining of tool steel Gear-driven spindle rated at 8,000 rpm (52 kW, 1,800 Nm) – for high-performance milling

Workpiece material	50CrV4
Material removal rate	792 cm ³ /min
Tool	Milling head D = 160 mm (12 cutting edges)
Spindle speed	238 min ⁻¹ (V _c = 120 m/min)
Feed	1,100 mm/min (F _z = 0,385 mm)
Cutting depth/width	6/120 mm



powerMASTER – Machining steel Motor spindle rated at 9,000 rpm (77,5 kW*, 1,000 Nm*) – for high-performance milling

Workpiece material	Stahl (Ck45)
Material removal rate	1,680 cm ³ /min
Tool	Milling head D = 100 (11 cutting edges)
Spindle speed	900 min ⁻¹ (V _c = 280 m/min)
Feed	14,000 mm/min (F _z = 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

5-axis simultaneous finishing of the tooth flanks;

Machining with standard tools; soft milling and hard turning on the same machine

Sector	Mechanical engineering	Spindle	12,000 rpm
Tool	Solid carbide end mill ø 12 mm	Power	43 kW
Material	18CrNiMo-6	Torque	288 Nm



Finishing of a Pelton wheel from a single piece – ø 1,600 mm

Complete machining on a DMU 210 FD

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

Sector	Energy technology	Spindle	12,000 rpm
Tool	Ball nose end mill ø 16 mm	Power	44 kW
Material	1.4317 steel casting	Torque	288 Nm



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

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

Sector	Automotive	Spindle	8,000 rpm
Tool	Indexable insert end mill ø 100 mm	Power	52 kW
Material	40CrMnNiMo8-6-4	Torque	1,800 Nm



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

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

Sector	Mechanical engineering	Spindle	8,000 rpm
Tool	Indexable insert end mill ø 280 mm	Power	52 kW
Material	GGG60	Torque	1,800 Nm



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

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

Sector	Energy technology	Spindle	8,000 rpm
Tool	Turning tool	Power	52 kW
Material	GGG40	Torque	1,800 Nm

CELOS

Simplified machine operation.
Seamless integration of machine
and company.

APP MENU

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



ERGOline CONTROL WITH 21,5" MULTI- TOUCH SCREEN AND SIEMENS

Simple

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

Consistent

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 APP extensions.

SMARTkey

Customised 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 facilitate the consistent management, documentation and visualisation of order, process and machine data on a unique 21.5" multi-touch monitor. 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 work orders.

- + Machine related creation and configuration of new work orders
- + Structured storage of all production related data and documents
- + Easy visualisation of orders, including NC program, equipment, etc.



JOB ASSISTANT

Process-defined orders.

- + Menu guided set-up of the machine and conversational processing of production orders
- + Reliable error prevention thanks to windows-based assistance instructions with a mandatory acknowledgement function



TOOL HANDLING

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

- + Display of all tools required for a job, including the automatic generation of a loading list
- + Generation of an unloading list through the automatic detection of all tools not required for subsequent jobs



Exclusive, optionally available DMG MORI technology cycles



MPC 2.0 – 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



3D quickSET

Quick and easy for maximum precision

- + Tool kit for checking and correcting the kinematic precision of 5-axis machine configurations
- + All head variants and all table axes



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 workpiece weight



GRINDING

Machining with the highest surface precision

- + Grinding on a universal milling machine
- + For internal, external and surface grinding
- + Cycles for dressing the grinding wheel



MULTI-TOOL

Save time by efficiently using tools

- + Several "sister tools" on one tool holder
- + Save tool change times and magazine pockets



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



CELOS WITH SIEMENS 840D SL OPERATE

- + Highly simplified interactive programming with identical "look and feel" for turning and milling
- + SINUMERIK Operate new user interface
- + ATC*, 3D quickSET*
- + Powerful 32-bit multiprocessor system and controller, 1GB RAM
- + Fast block processing time of approx. 0.6ms
- + Look-ahead function for up to 150 NC blocks (capable of parameterisation)
- + Graphical simulation of the machining process with overhead view, triple-plane display and 3D display; synchronised display during the machining process
- + 3D machining, optional 3D tool correction via the surface normal vector
- + DECKEL MAHO Package MDynamics, optional optimisation of surface finish and speed for smoothing surface transitions

*option



CELOS WITH HEIDENHAIN TNC 640

- + Unique, highly detailed 3D simulation display
- + New optimised TNC user interface
- + HSCI – HEIDENHAIN Serial Controller Interface
- + Conversational or ISO programming
- + Rapid program generation with plain text programming
- + Graphical programming
- + Collision monitoring (DCM)
- + ATC*, 3D quickSET*
- + Powerful dual-core processor (Intel i7-3)
- + New optimised ADP (Advanced Dynamic Prediction) movement guide for improved surfaces and quicker machining (block processing time of just 0.5ms)
- + Dynamic look-ahead function with no path restrictions
- + Dynamic Efficiency with adaptive feed control AFC and trochoidal milling as standard (Active Chatter Control ACC optional)

*option

DMU P/FD | 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 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 or 3D quickSET are available, which are able to optimise workpiece quality and productivity.

Technical Data

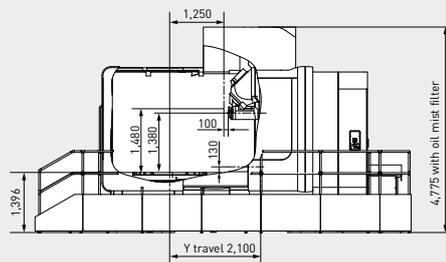
> Floor plans

DMU P/FD | DMC U/FD PORTAL SERIES

Floor plans

DMU 210 P/FD

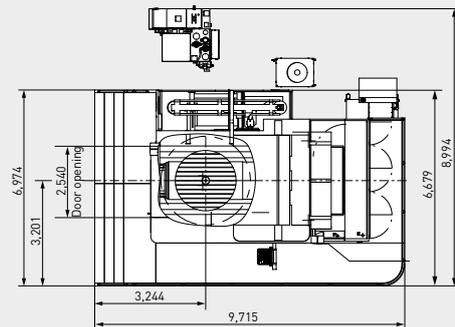
Side view



DMU 210 P/FD with chain magazine with 60 positions

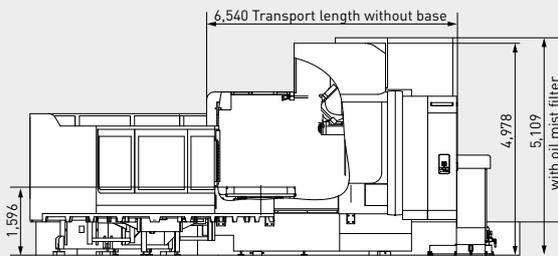
Plan view

Footprint 67.7 m²



DMC 210 U/FD

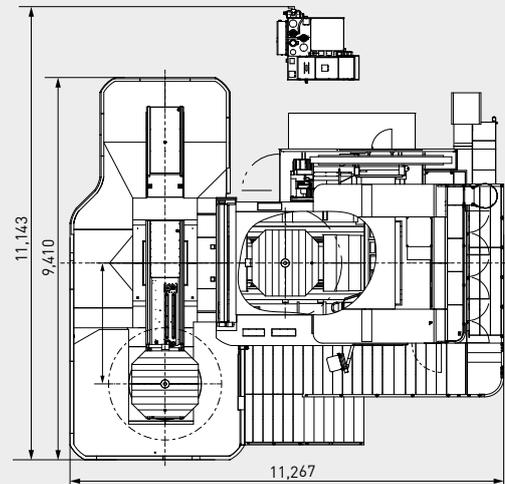
Side view



DMC 210 U/FD with chain magazine with 60 positions

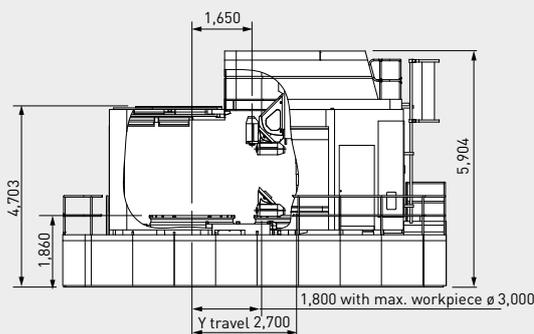
Plan view

Footprint 106.0 m²



DMU 270 P/FD

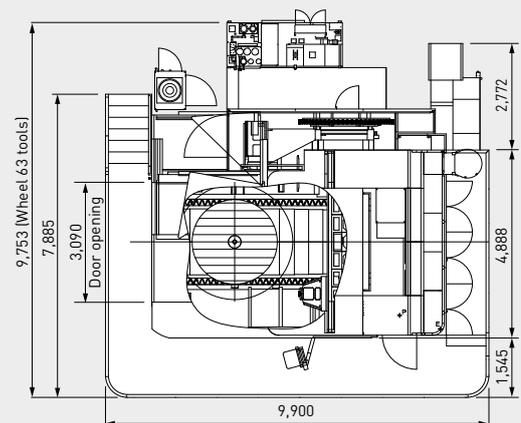
Side view



DMU 270 P/FD with wheel magazine with 63 positions

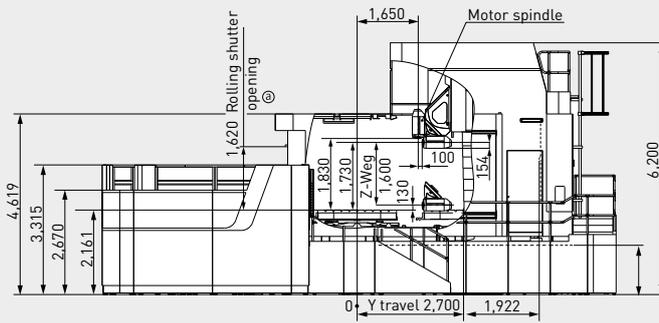
Plan view

Footprint 96.6 m²



DMC 270 U/FD

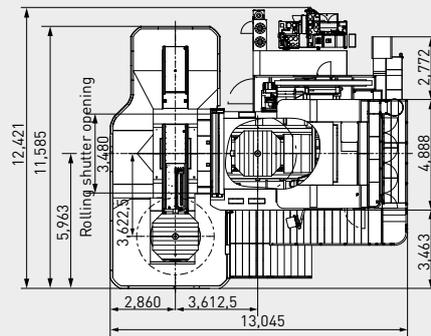
Side view



DMC 270 U/FD with chain magazine with 60 positions

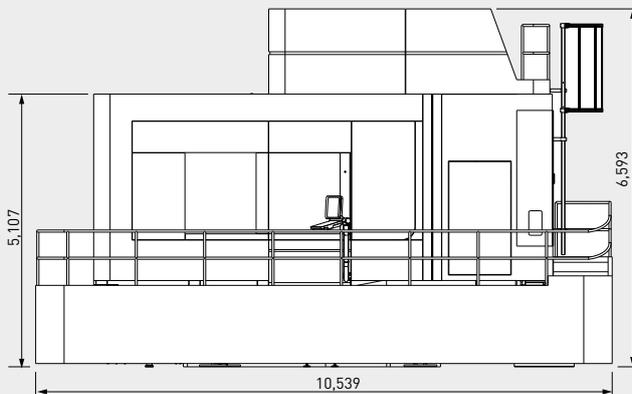
Plan view

Footprint 151.1 m²



DMU 340 P/FD

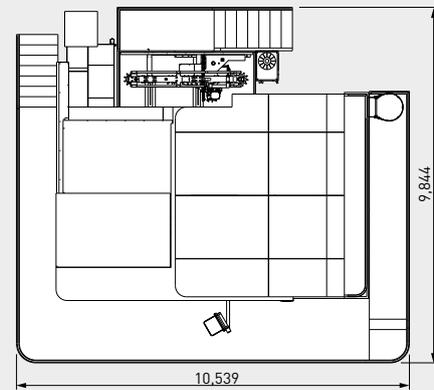
Side view



DMU 340 P/FD with chain magazine with 60 positions

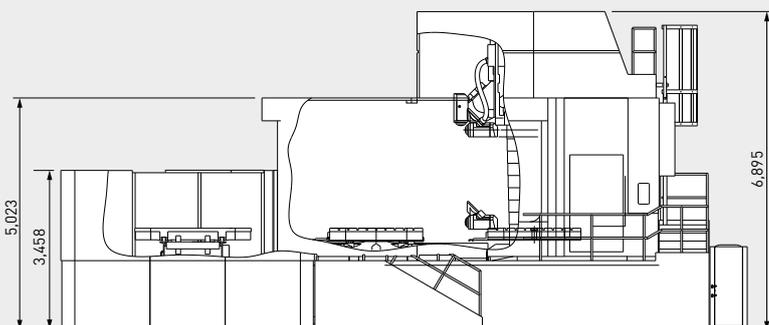
Plan view

Footprint 101.3 m²



DMC 340 U/FD

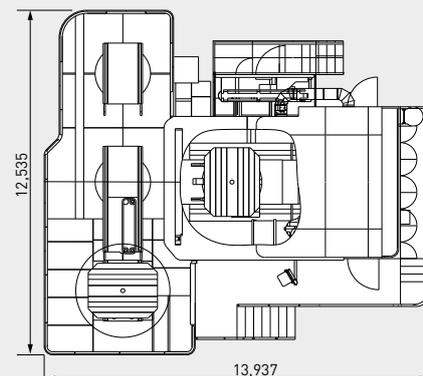
Side view



DMC 340 U/FD with chain magazine with 60 positions

Plan view

Footprint 174.7 m²



DMU P/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 – 1,350
Vertical milling head	mm	-850 – 1,250
Tables		
NC rotary table		Standard
Speed	rpm	12
Mill-turn table (milling/turning)	rpm	-
Table size	mm	∅ 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	-70/+180
Rapid traverse and feed	rpm	30
NC-controlled swivelling milling head (A-axis)		∅
Swivel range (0=vertical/-90=horizontal)	Degrees	-130/+45
Rapid traverse and feed	rpm	30
5X torqueMASTER – NC-controlled B-axis with gear-driven spindle		∅
Swivel range (0=vertical/180=horizontal)	Degrees	0/+180
Rapid traverse and feed	rpm	30
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
Linear axes (X/Y/Z)	m/min	60/40/40
Machine weight	kg	43,000
P _{max} (X/Y/Z) – VDI DGQ 3441/ISO 230-2	µm	10
P _{smax} (X/Y/Z) – VDI DGQ 3441/ISO 230-2	µm	6
Control System		
CELOS with SIEMENS 840D solutionline Operate		•
HEIDENHAIN TNC640		∅

• standard ∅ option

	DMU 270 P	DMU 340 P	DMU 210 FD	DMU 270 FD	DMU 340 FD
	2,700×2,700×1,600	3,400×3,400×1,600 (2,000)*	1,800×2,100×1,250	2,700×2,700×1,600	3,400×3,400×1,600 (2,000)*
	130 - 1,730	130 - 1,730 (2,130)*	130 - 1,380	130 - 1,730	130 - 1,730 (2,130)*
	230 - 1,830	230 - 1,830 (2,230)*	230 - 1,480	230 - 1,830	230 - 1,830 (2,230)*
	-1,050 - 1,650	-1,500 - 1,900	-750 - 1,350	-1,050 - 1,650	-1,500 - 1,900
	-1,150 - 1,550	-1,600 - 1,800	-850 - 1,250	-1,150 - 1,550	-1,600 - 1,800
	Standard	Standard	-	-	-
	9	5	-	-	-
	-	-	20/250	20/200	20/120
	ø2,200	ø2,600×2,200	ø1,850	ø2,200	ø2,500
	12,000	16,000	5,000	7,000	7,000
	Standard	Standard	Standard	Standard	Standard
	-70/+180	-70/+180	-70/+180	-70/+180	-70/+180
	30	30	30	30	30
	o	o	o	o	o
	-130/+45	-130/+45	-130/+45	-130/+45	-130/+45
	30	30	30	30	30
	o	o	o	o	o
	0/+180	0/+180	0/+180	0/+180	0/+180
	30	30	30	30	30
	12,000	12,000	-	-	-
	-	-	12,000	12,000	12,000
	44/32 288/187	44/32 288/187	44/32 288/187	44/32 288/187	44/32 288/187
	-	-	-	-	-
	-	-	-	-	-
	60/Chain	60/Chain	60/Chain	60/Chain	60/Chain
	60/30/40	60/30/40	60/30/40	60/30/40	60/30/40
	84,500	96,000	44,000	74,000	97,000
	12	15/20/15	10	12	15/20/15
	6	8/10/8	6	6	8/10/8
	•	•	•	•	•
	o	o	-	-	-

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 – 1,350
Vertical milling head	mm	-850 – 1,250
Tables/pallets		
NC rotary table		Standard
Speed	rpm	12
Mill-turn table (milling/turning)	rpm	-
Pallet size	mm	1,600 × 1,400
Maximum pallet load	kg	6,000
5-axis options		
NC-controlled swivelling milling head (B-axis)		Standard
Swivel range (0=vertical/180=horizontal)	Degrees	-70/+180
Rapid traverse and feed	rpm	30
NC-controlled swivelling milling head (A-axis)		◦
Swivel range (0=vertical/-90=horizontal)	Degrees	-130/+45
Rapid traverse and feed	rpm	30
5X torqueMASTER – NC-controlled B-axis with gear-driven spindle		◦
Swivel range (0=vertical/180=horizontal)	Degrees	0/+180
Rapid traverse and feed	rpm	30
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
Linear axes (X/Y/Z)	m/min	60/40/40
Machine weight	kg	45,000
P _{max} (X/Y/Z) – VDI DGQ 3441/ISO 230-2	µm	10
P _{smax} (X/Y/Z) – VDI DGQ 3441/ISO 230-2	µm	6
Control System		
CELOS with SIEMENS 840D solutionline Operate		•
HEIDENHAIN TNC640		◦

• standard ◦ option

	DMC 270 U	DMC 340 U	DMC 210 FD	DMC 270 FD	DMC 340 FD
	2,700×2,700×1,600	3,400×3,400×1,600 (2,000)*	1,800×2,100×1,250	2,700×2,700×1,600	3,400×3,400×1,600 (2,000)*
	130 - 1,730	130 - 1,730 (2,130)*	130 - 1,380	130 - 1,730	130 - 1,730 (2,130)*
	230 - 1,830	230 - 1,830 (2,230)*	230 - 1,480	230 - 1,830	230 - 1,830 (2,230)*
	-1,050 - 1,650	-1,500 - 1,900	-750 - 1,350	-1,050 - 1,650	-1,500 - 1,900
	-1,150 - 1,550	-1,600 - 1,800	-850 - 1,250	-1,150 - 1,550	-1,600 - 1,800
	Standard	Standard	-	-	-
	9	5	-	-	-
	-	-	20/250	20/200	20/120
	2,000×2,000	2,500×2,000	ø 1,850	ø 2,200	ø 2,500
	9,000	10,000	4,000	6,000	6,000
	Standard	Standard	Standard	Standard	Standard
	-70/+180	-70/+180	-70/+180	-70/+180	-70/+180
	30	30	30	30	30
	o	o	o	o	o
	-130/+45	-130/+45	-130/+45	-130/+45	-130/+45
	30	30	30	30	30
	o	o	o	o	o
	0/+180	0/+180	0/+180	0/+180	0/+180
	30	30	30	30	30
	12,000	12,000	-	-	-
	-	-	12,000	12,000	12,000
	44/32 288/187	44/32 288/187	44/32 288/187	44/32 288/187	44/32 288/187
	-	-	-	-	-
	-	-	-	-	-
	60/Chain	60/Chain	60/Chain	60/Chain	60/Chain
	60/30/40	60/30/40	60/40/40	60/30/40	60/30/40
	89,500	101,000	46,000	91,000	102,000
	12	15/20/15	10	12	15/20/15
	6	8/10/8	6	6	8/10/8
	•	•	•	•	•
	o	o	-	-	-

DMU P / FD | DMC U / FD PORTAL SERIES

Options

	DMU 210 P DMC 210 U
Table options	
NC rotary table	•
RS3/RS2 rotary pallet storage, including 3/2 additional pallets (only for DMC machines)	RS5
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	◦
Infrared measuring probe	◦
Wireless measuring probe (used with pick-up spindle or exchangeable milling head)	◦
Tool measuring in 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	◦
Internal coolant supply, 80 bar, frequency-controlled	◦
Coolant temperature control for internal coolant supply unit	◦
Spray gun with 2-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 TNC 640 control systems	
Application Tuning Cycle ATC	◦
Electronic handwheel TNC 640	•
Control panel for tool magazine loading station	•
ACC – Active Chatter Control	◦
Optionen SIEMENS 840D solutionline	
Electronic handwheel SIEMENS 840D	•
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 ◦ option - not available *only in combination with pick-up motor spindle



Available for you around the clock:
service-hotline.dmgmori.com

Customer First – Our service promise!

“We have good news for you: Our service and spare parts prices have been completely revised. With our service commitments, we want to meet your high demands with the highest service quality.”

Please contact us – your sales and service team is at your disposal!

Top quality at fair prices. **It's a promise!**



Best Price Guarantee for Original Spare Parts. Should you get a spare part offered by us at least 20% cheaper elsewhere, we will refund the price difference up to 100%*.



Spindle service at best prices. The highest level of competence from the manufacturer at new and attractive prices – DMG MORI spindle service!



Up to 50% lower service costs. New Flat Call-Out Rate – without travel expenses or any additional costs!



Our protective shield for your productivity. Reduced operating costs, highest machine availability and maximum precision – DMG MORI Service *Plus!*



* All information and price advantages for Customer First are available at: customer-first.dmgmori.com