

DMG MORI

HIGH-SPEED-CUTTING –
HIGHLY DYNAMIC FIVE-AXIS PRECISION CENTRES

HSC 55



Applications and parts

Machine and technology

Control technology

Technical data

HSC 55

Top class!

Top class high-speed machining.

Optimum production solutions with at the same time top quality requirements.



1



2



3



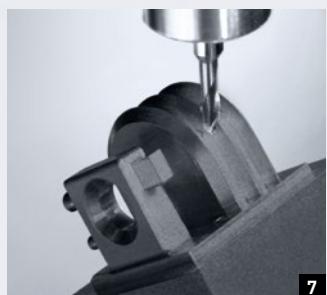
4



5



6



7



8

MEDICAL

More application examples:

Knee (chromium-cobalt), bone nail (1.2347), bone plates (titanium), prostheses (titanium), implants (titanium), cutting devices (titanium)

1: Bone plate (titanium)

2: Femoral component (CrCo)

DENTAL

More application examples:

Crowns, bridges, inlays, onlays, bars & abutments (CrCo, titanium, ZrO₂), Implantate (titanium, ZrO₂)

3: CrCo blanks with dental crowns/bridges

4: Abutment made of titanium

FINE MECHANICS

More application examples:

Watch boards, bearing components, clockwork components, dials, other high-precision components (light metal, steel, gold)

5: ø0,4 mm – Holes in light metal watch board

6: Milling of a watch board made of brass

ELECTRODES

More application examples:

Graphite electrodes, copper electrodes

7+8: Complete machining of graphite electrodes with thin bridges < 1 mm



9



10

IMPELLER

More application examples:

Impeller for turbocharger (titanium, aluminium)

9 + 10: 5-axis simultaneous machining of
Compressor wheels made of aluminium and titanium



11



12

AEROSPACE

More application examples:

Impellers (titanium), blisks (Inconel), blades (INCONEL 718), integral components (Al), high-precision components (Al)

11: Blade machining in INCONEL 718

12: Blade machining in titanium

03



13



14

AUTOMOTIVE

More application examples:

Moulds for headlights (1.2347), bearing components, other high-precision components (light metal, steel)

13: 5-axis complete machining of a car rim mould made of tool steel **14:** Tyre forming tool



15



16

TOOL AND MOULD MAKING

More application examples:

Bottle moulds (aluminium), forming dies (1.2379), forging dies (1.2714), injection moulds (aluminium/1.2312)

15: Highest contour accuracy: Injection mould in tool steel

16: Forging die (1.2312)

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5-axis simultaneous machining with NC swivel/rotary table with gantry drive in the Y-axis

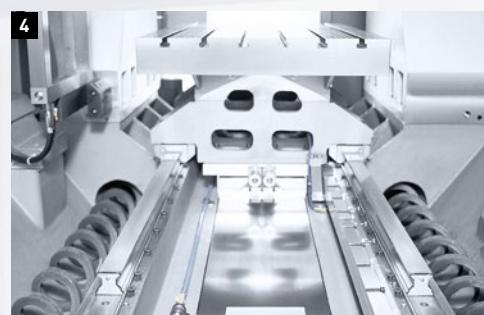
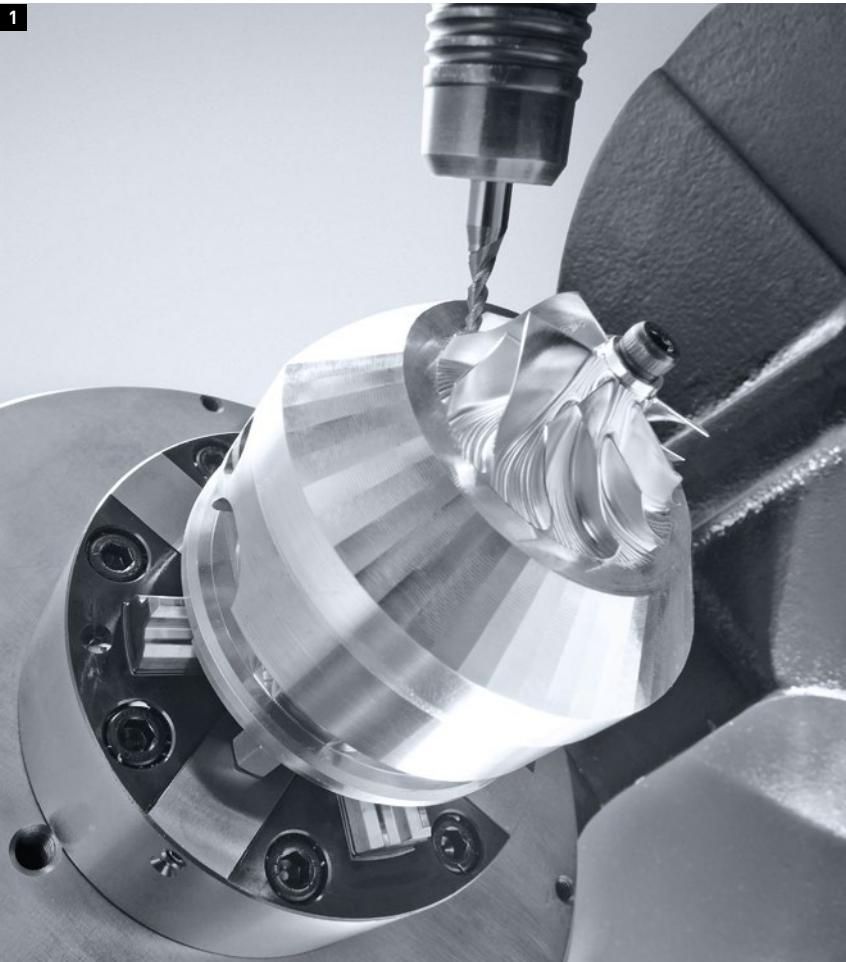
The combination of extremely stable design, state-of-the-art drive technology and high-end spindle technology gives the HSC 55 unrivaled performance in fine machining. The base for the outstanding dynamics and precision of the HSC 55 is the machine bed made of hybrid mineral casting in portal design. The thermo-symmetrical design ensures high long-term accuracy. Linear drives in all axes enable rapid traverse speeds of up to 80 m/min and 2g acceleration. Even in the standard version, the 28,000 rpm HSC spindle in conjunction with HSK-A 63 holders not only guarantees better tool life, but also improved surface finish with the highest chip removal rate in this accuracy class.


linear^{■■■■■}**DRIVE**


HSC 55 linear			
	3-axis version	5-axis version	
Travel			
X-axis	mm	450	450
Y-axis	mm	580	650
Z-axis	mm	460	460
Work table			
Dimensions	mm	460×600	ø 400×400
Workpiece weight	kg	600	200

HSC 55

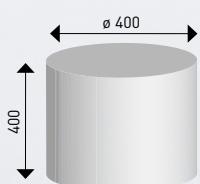
5-axis simultaneous
machining with NC swivel/
rotary table with gantry
drive in the Y-axis.



1: 5-axis option packages **2:** 5-axis simultaneous machining **3:** 28,000 rpm motor spindle
4: Linear drives and direct measuring systems in all axes



WORKPIECE DIMENSION



HIGHLIGHTS

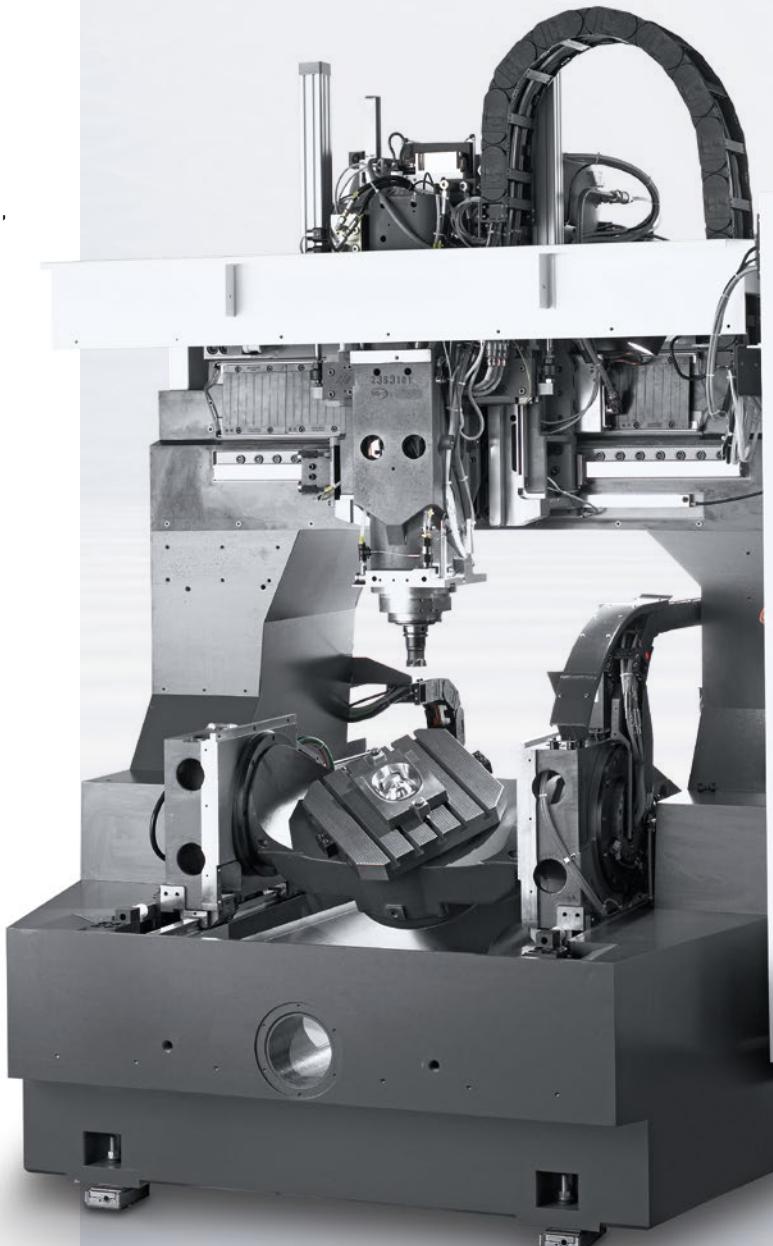
- + **Thermo-symmetric gantry design** as desktop version: highest stability and long-term accuracy
- + Maximum flexibility: **5-axis precision machine** with integrated swivel/rotary axis (A-/C-axis)
- + Maximum dynamics and precision: **Linear technology in X/Y/Z mit > 1.3 g**; water-cooled torque motors in the rotary axes for optimum surface qualities <0.2 µm and highest positioning accuracy
- + **Water-cooled HSC high power spindle** with and without shaft cooling for maximum accuracy
- + **Special software features:** MPC (Machine Protection Control) and MVC (Machine Vibration Control) as standard, 3D quickSET, Application Tuning Cycle

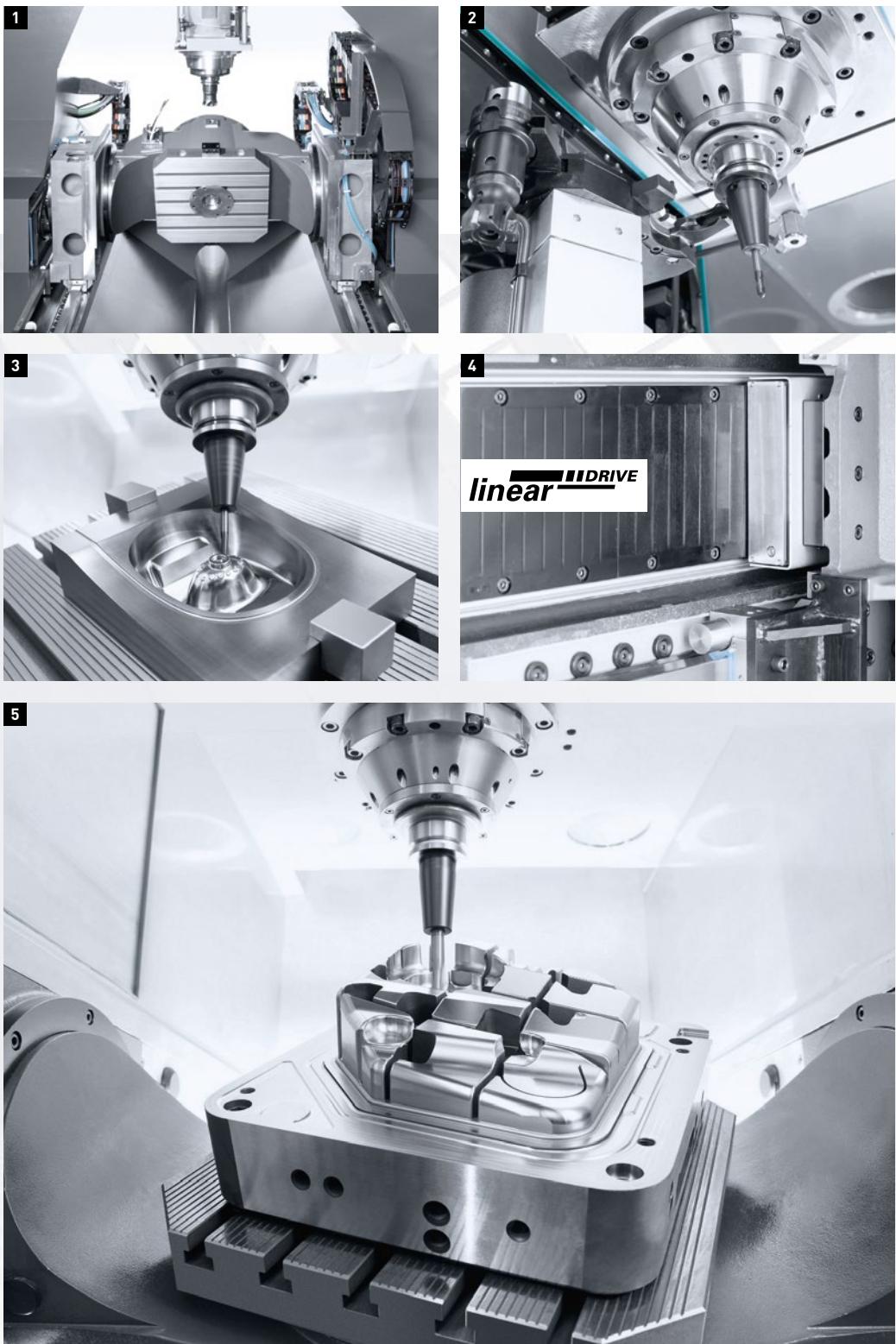
HSC 55

Machine bed made of hybrid mineral casting in thermo-symmetrical portal design

HIGHLIGHTS HSC 55

- + **Highest dynamics and precision** due to linear drives in all axes
- + **28,000 rpm HSC spindle** with HSK as standard: high stability during machining, improved service life of tools/lower tool costs, optimised surfaces
- + **Water-cooled high-performance spindle with 40,000 rpm** and HSK-E50 (optional)
- + **Optimum work area design for HSC and graphite machining** – complete drives and guides outside the work area
- + **Thermo-symmetric design** for highest long-term accuracy
- + **Optional 5-axis machining** with water-cooled torque drives
- + **30-station tool changer** as standard (option: 60/120)
- + **CELOS X with ERGOline X Panel** and **HEIDENHAIN TNC 7**
- + Special control features for fine machining:
 - **Application Tuning Cycle**
 - **AFC** (Automatic Feedrate Control)





1: Thermo-symmetric gantry design **2:** Tool magazine with double gripper **3:** 5-axis simultaneous machining of an injection mould made of hardened steel **4:** Linear drives in X/Y/Z with > 1.3 g **5:** 5-axis machining: integrated NC swivelling rotary table with torque drives

HSC 55

Machine bed made of hybrid mineral casting in thermo-symmetrical portal design.

TECHNOLOGIEZYKLEN

Exclusive, optionally available **DMG MORI** technology cycles

DMG MORI exclusive technology cycles are true assistants for shopfloor-oriented programming to increase productivity and safety as well as to expand machine capability.



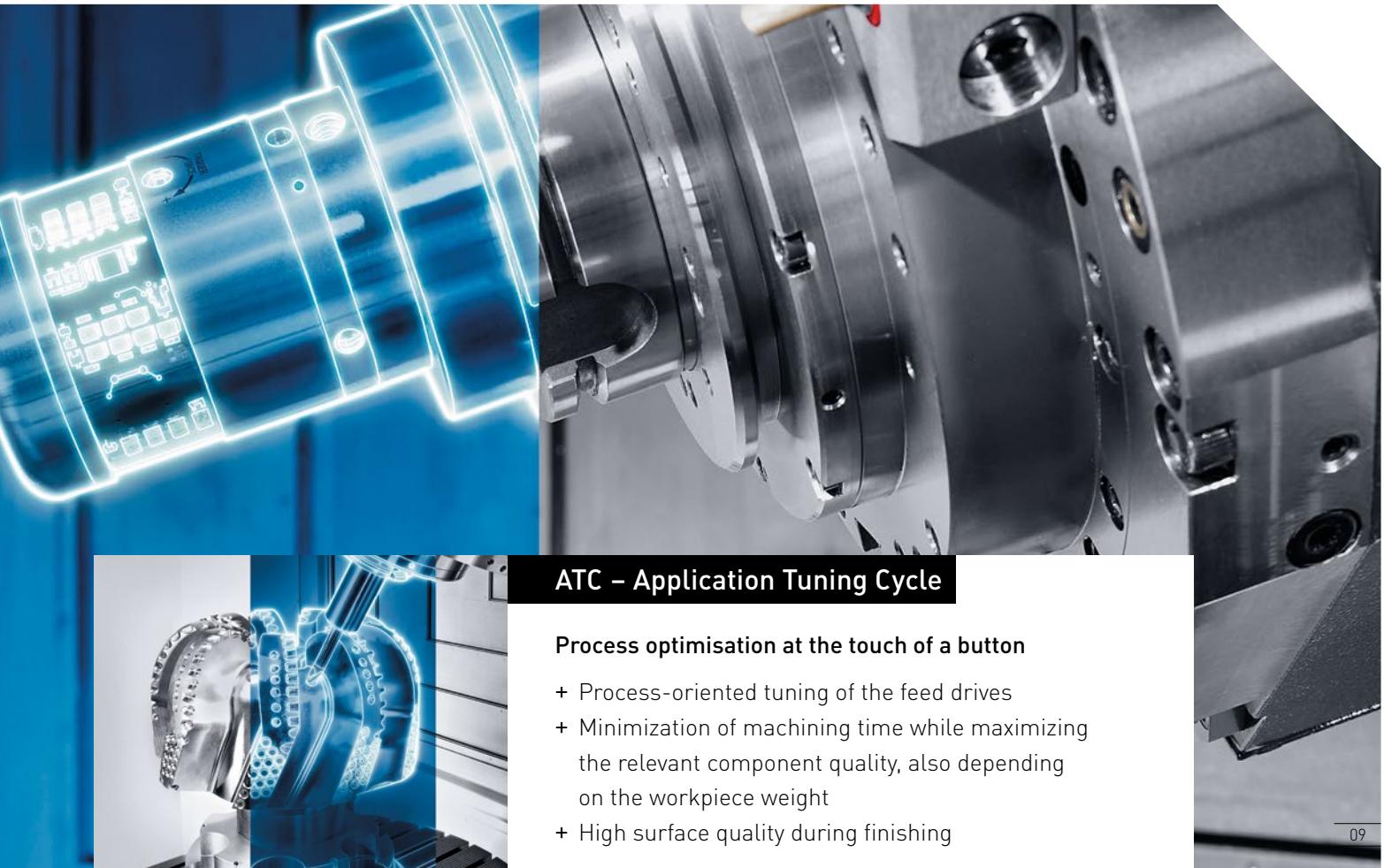
If your mobile phone has QR code recognition software, you will be taken straight to all informations about DMG MORI technology cycles.

3D quickSET

Achieving highest accuracy
quickly and simply

- + Toolkit for checking and correcting the kinematic accuracy of 4 and 5-axis machine configurations
- + All head variants and each table axis





ATC – Application Tuning Cycle



Process optimisation at the touch of a button

- + Process-oriented tuning of the feed drives
- + Minimization of machining time while maximizing the relevant component quality, also depending on the workpiece weight
- + High surface quality during finishing



Maintenance Package i4.0

Reduced maintenance without manual intervention

- + Automatic detection of tool clamping force for consistently high process stability
- + Leakage detection and consumption measurement of the pneumatic system

MPC – Machine Protection Control

Machine protection achieved by fast switch-off

- + Rapid shutdown in case of a crash
- + Torque monitoring for drilling and thread-cutting
- + Analysis of imbalance for tools
- + State of bearing diagnostics of the milling spindle
- + Automatic sister tool change in dependence on tool life and MPC reaction in the process



DX – DIGITAL TRANSFORMATION

CELOS X – The future-proof solution for manufacturing

CELOS X platform offers a holistic solution for the digital transformation. Combined with the ERGOline X control panel, manufacturing companies will increase their competitiveness worldwide.

CELOS X consists of the two components **CELOS Xchange**, the open, secure and scalable data platform, and **CELOS Xperience**, which gives access to all applications and systems within the CELOS X ecosystem. This enables a comprehensive and seamless digital experience for the user with the goal of easy machine operation, extended spindle hours while maximizing energy efficiency. CELOS X is therefore the centerpiece of the digital transformation (DX) and a significant contribution to DMG MORI's Machining Transformation (MX) strategy.



Further information on
CELOS X can be found at:
<https://celos.dmgmori.com>

HIGHLIGHT APPS



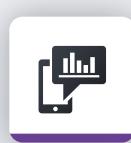
Operator Workbook

Optimal order processing in the office and throughout the shopfloor.



Application Connector

Operate IT-systems directly on the control panel.



Monitoring

Increase planning reliability and productivity through digital transparency.



Tool Master

Manage tools directly on the machine.



Energy Saving

Optimize the machine's carbon footprint by managing and reducing energy consumption.



Energy Monitoring

Track and monitor the energy consumption of the machine.

3
GOALS

>30
APPS

>300
FEATURES



ALL YOUR DATA IN

CELOS Xchange

POWERED BY DMG MORI CONNECTIVITY

ALL APPS IN

CELOS Xperience

11



EASY OPERATION

In the manufacturing industry, the userfriendliness and ease of operation of machine tools plays a decisive role for the efficiency and productivity.

ADDED VALUE

- + Faster programming
- + Reduction of errors
- + Increased efficiency



EXTENDED SPINDLE HOURS

In addition to easy operation, productivity is another crucial parameter, which requires a holistic view across all production processes.

ADDED VALUE

- + Optimization of set-up processes & capacity planning
- + Shorter processing times and order changes
- + Increased machine availability



ENERGY EFFICIENCY

The energy efficiency of machine tools is of utmost importance to DMG MORI and CELOS X makes a valuable contribution to this, adding direct value to the customer.

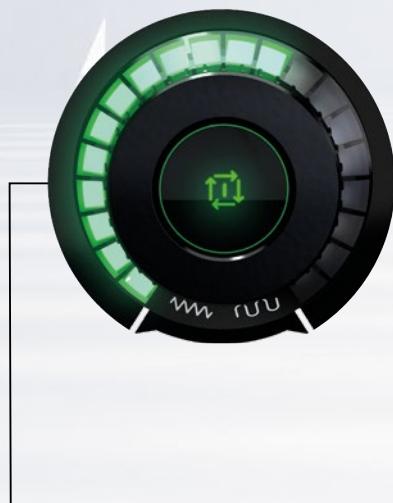
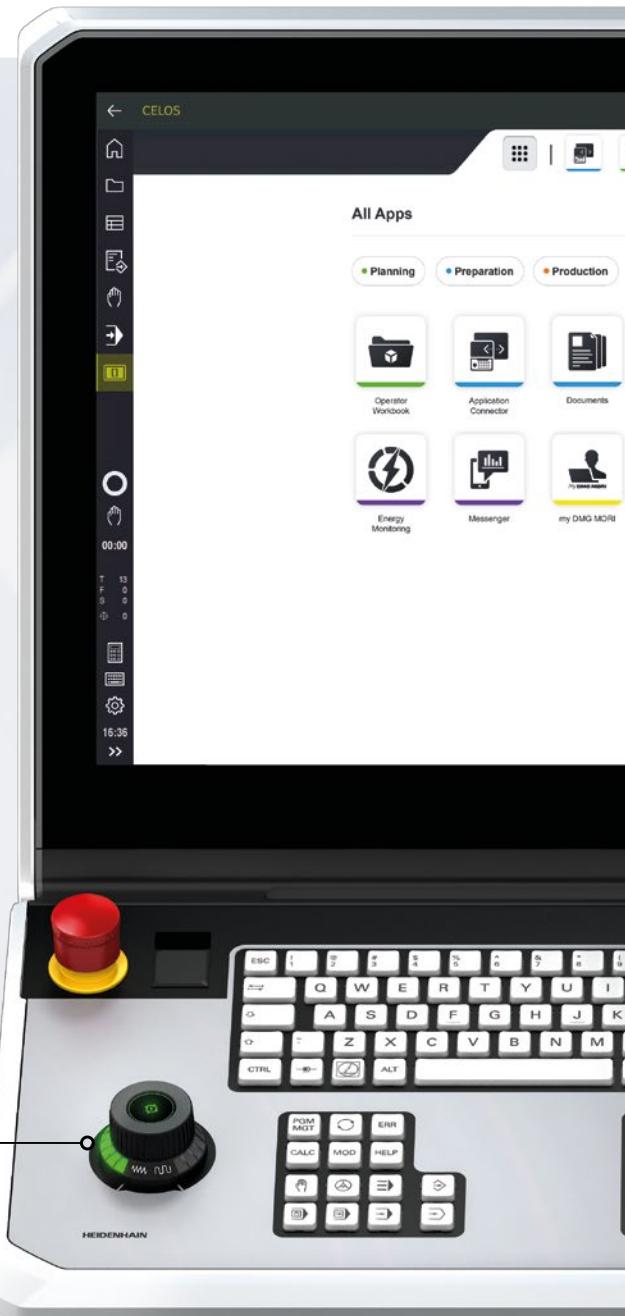
ADDED VALUE

- + Real-time monitoring of energy consumption
- + Automated adaptation of energy requirements to machining processes
- + Optimized & demand-driven air and cooling lubricant supply

CONTROL TECHNOLOGY

ERGOline X – user-oriented platform for all DMG MORI machines

The ERGOline X control panel provides the machine operator with an even more intuitive user experience, whereby the ergonomics and the functionality in particular have been optimized. The ERGOline X control panel gives the user access to CELOS Xperience and the native NC controller.



SMARTride

- + Integrated panic function to instantly reduce the feed rate/rapid traverse to 0
- + Integrated haptic feedback to recognize 0 % & 100 %
- + Feed rate, rapid traverse & NC-start combined in one control element

CONNECTIVITY by DMG MORI

- + Standard connectivity thanks to integrated IoT connector
- + MDE (Machine Data Recording) possible
- + Automatic output of at least 17 standardized production status signals
- + Openness to third-party products
- + Communication in accordance with standard protocols:



SMARTkey

- + Compact credit card format
- + Personalized access rights depending on user level
- + Independently customizable SMARTkeys

CELOS X

Uniform user interface,
independent of the CNC control.

HEIDENHAIN TNC 7

- + Increase maximum flexibility and efficiency
- + Select and arrange work spaces in a task-oriented way
- + 3D simulation, accurate to the last detail
- + Tabs for opening up to 9 programs in parallel
- + Compatibility with previous TNC 640 controller
- + Graphically assisted measurement of both clamping materials and components

24" ERGOline X Panel
with HEIDENHAIN
and CELOS X

MACHINE SIGNALS VIA OPC-UA, MTCONNECT AND MQTT

MACHINE DATA

1. Serial number of the machine
2. Operating hours
3. Machine on hours

MACHINE STATUS

4. Status display
5. Number of alarms
6. Messages, alarms, warnings
7. Control mode
8. Machine version status

PRODUCTIVITY

9. Workpiece counter, current
10. Workpiece counter, total
11. Target quantity
12. Current program runtime

PROCESS DATA

13. Spindle speed correction
14. Fast speed correction
15. Infeed correction
16. Active tool
17. Name of the current NC program

ADDITIONAL MACHINE SIGNALS

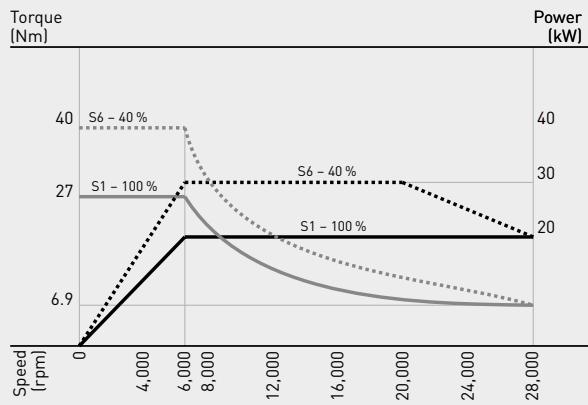
Machine-specific signals, e.g. spindle speed, coolant status etc.

HSC 55

Performance diagrams

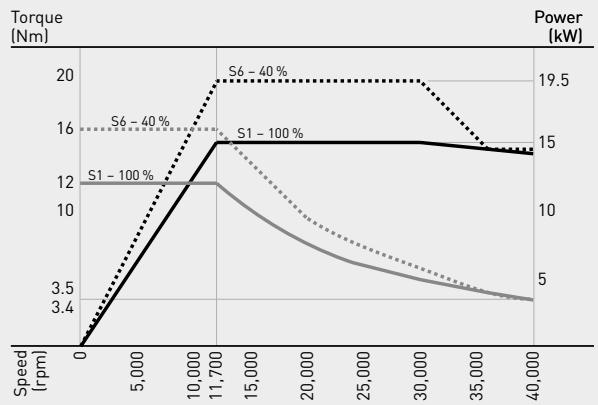
28,000 rpm HSC spindle

28,000 rpm/30 kW/40 Nm



Water-cooled high-performance spindle with 40,000 rpm

40,000 rpm/19.5 kW/16 Nm



HSC 55

Workspaces

Table position A-Achse 0°

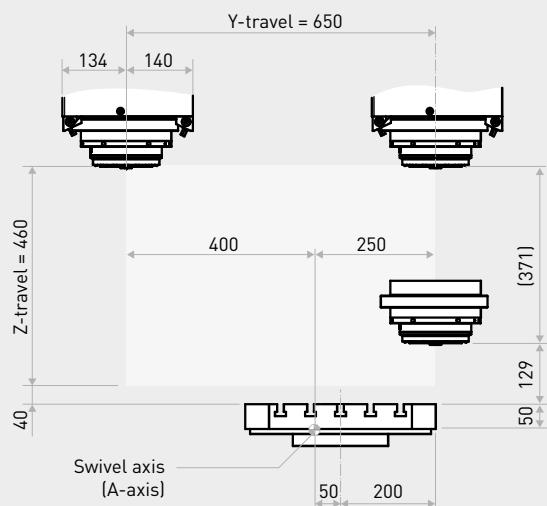
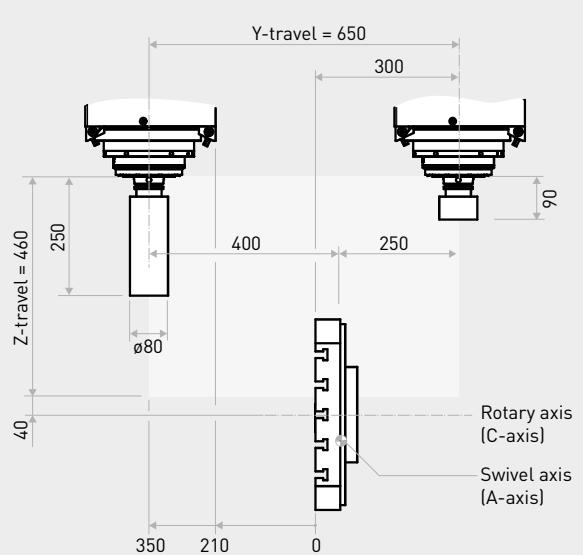


Table position A-axis 90°

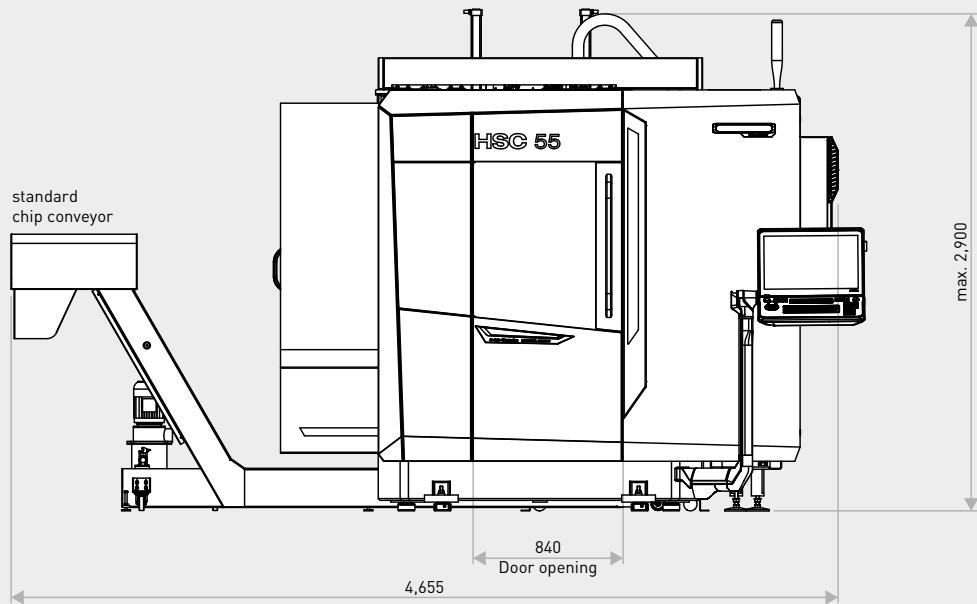


HSC 55

Floor plans

HSC 55 30 / 60 tools with standard chip conveyor (option)

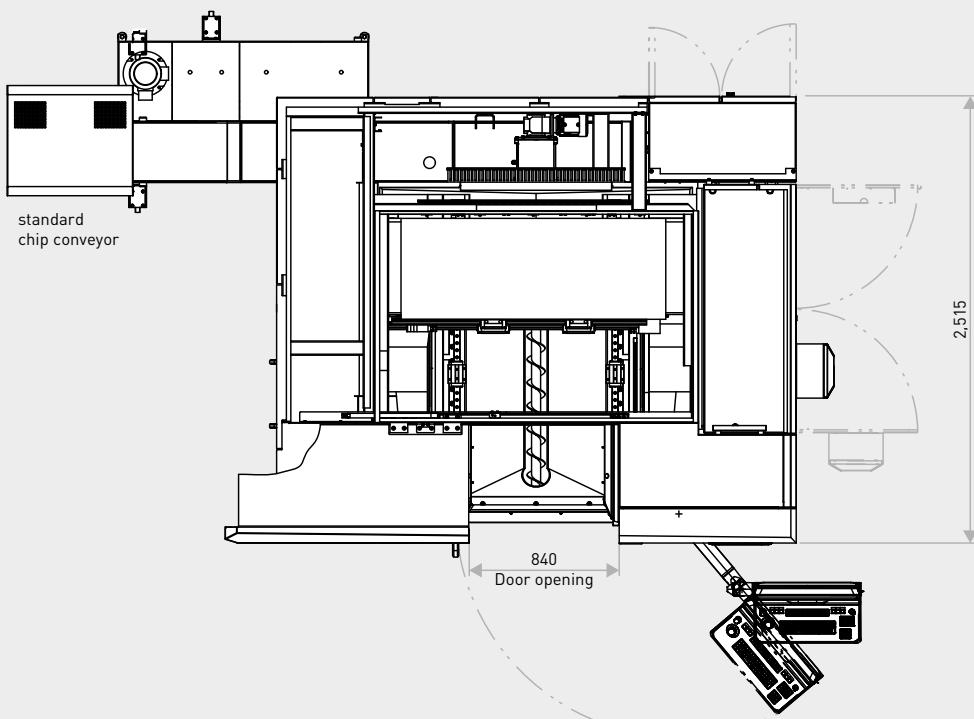
Front view (mm)



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HSC 55 30 / 60 tools with standard chip conveyor (option)

Plan view (mm)



HSC 55

Technical data

HSC 55		
Work area		
X-axis	mm	450
Y-axis	mm	580 (650)**
Z-axis	mm	460
Swivel axis (A/B)	Degrees	+10/-110
Rotary axis (C)	Degrees	360
Main drive		
Speed range (standard)	rpm	28,000
Drive power (40/100% DC)	kW	30/20
Torque (40/100% DC)	Nm	40/27
Tool holder	DIN 69893	HSK-A 63
Speed range (optional)	rpm	40,000*
Drive power (40/100% DC)	kW	19.5/15
Torque (40/100% DC)	Nm	16/12
Tool holder	DIN 69893	HSK-E 50
Feed		
Feed range up to	m/min	80
Rapid traverse X/Y/Z	m/min	80/80/80
Work table		
Fixed table mounting area	mm	460×600
Max. Workpiece weight	kg	600
NC table mounting area	mm	400×400
Rotary axis speed (C)	rpm	110
Max. Workpiece weight	kg	200
Acceleration		
Acceleration max.	g	>1.3
Tool		
Tool magazine	Stations	30 (60/120)*
Max. tool length	mm	250
Max. tool diameter	mm	80
Chip-to-chip time	s	8
Option packages		
Integration ULTRASONIC		○
Standardised 5-axis package		○
Automation		○
Control		
CELOS X with ERGoline X Panel and HEIDENHAIN TNC 7		•
Software options for HEIDENHAIN: ATC, 3D quickSET		

● standard ○ optional – not available * optional ** 5-axis version



YOUR ONLINE SERVICE MANAGER

my DMG MORI

The customer portal for service optimization

MORE SERVICE

Fast support and live status of your service requests

MORE KNOWLEDGE

All relevant documents can be called up digitally

MORE AVAILABILITY

The direct line to a service expert with guaranteed prioritized processing, registration in <3 minutes

Every customer benefits – at no extra charge!



YOUR HISTORY



YOUR MACHINES

myDMG MORI

CUSTOMER PORTAL



YOUR DOCUMENTS



YOUR SERVICE REQUESTS

All countries in which myDMG MORI is available can be found at: myDMGMORI.com



You too can benefit!
Register now for free:
myDMGMORI.com

CUSTOMER FIRST – OUR SERVICE PROMISE!

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%*.

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



Spindle service at best prices.

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

Export Control: Machines and products from DMG MORI may be subject to export restrictions. Therefore, prior export control authorization from competent authorities may be required. To prevent the illegal diversion of the equipment to individuals or nations that threaten international security, every DMG MORI machine is equipped with an RMS function (Relocation Machine Security). The RMS automatically deactivates the machine when the machine is moved or disassembled. Such deactivation does not take place during regular operation or maintenance. If the equipment is so-disabled, it can only be re-activated by DMG MORI or some authorized representatives. Reactivation can be ordered via DMG MORI Service. If the machine is deactivated due to a substantial repair activity, this service is free of charge. DMG MORI may refuse to re-activate the machine if it determines that doing so would be an unauthorized export of technology or otherwise violate applicable export restrictions. DMG MORI shall have no obligation to re-activate such a machine and shall have no liability as a result thereof.