

# HORI ZONTAL MACHIN ING CENTERS

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**NBH 5**

ZUSE **HÜLLER HILLE**  
WERKZEUGMASCHINEN



# EVEN MORE COMPACT AND DYNAMIC

**The further development of the NBH 5 also extends the application area to the automotive and tier supplier industry. The NBH 5 basic version without pallet changer is designed for manual, semi-automatic or fully automated direct loading from above or the front..**

Combined with the smallest version of the new chain tool magazine (32 tool locations) a machine width of only approx. 2500 mm can now be realized. The compact, spacesaving chip evacuation to the rear and the tilting/rotary table [option B- on A-axis] is a further sign for the predestined application of this machine in flexible and agile production systems for the automotive industry.

With 65 m/min rapid traverse and 8 m/s<sup>2</sup> acceleration the NBH 5 basic

version is a highly dynamic machine. Furthermore, the optional speed package with 90 m/min rapid traverse and 10 m/s<sup>2</sup> acceleration brings even more momentum and dynamic to the machine.

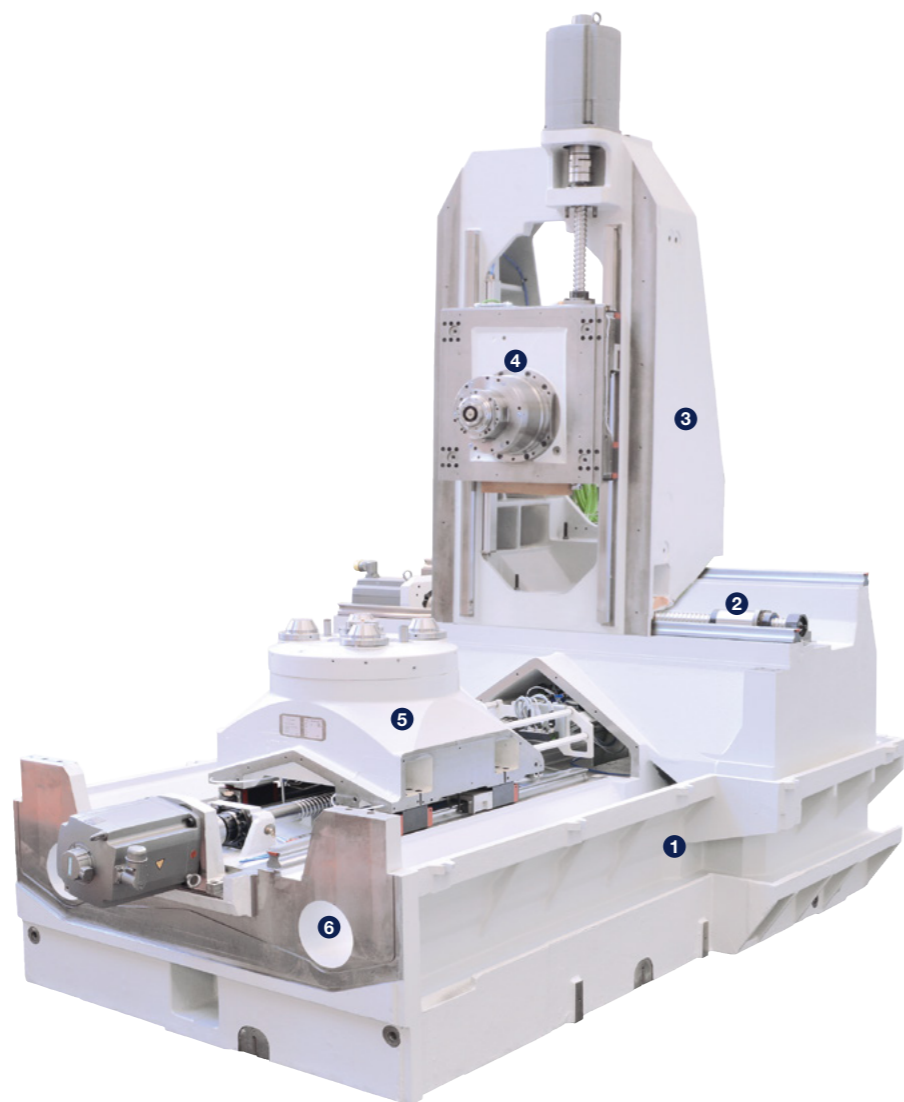
All proven and reliable NBH components, for example the machine bed with vertical offset of X-axis guideways, the robust guidance system and the rotary table with direct driven rotary axis (torque table) are installed. Of course, the NBH 5 can additionally be supplied with an optional 180 for set-up during machining cycle and flexible production of small and mid-range series.

## MACHINE DESIGN

### DIRECT LOADING VERSION

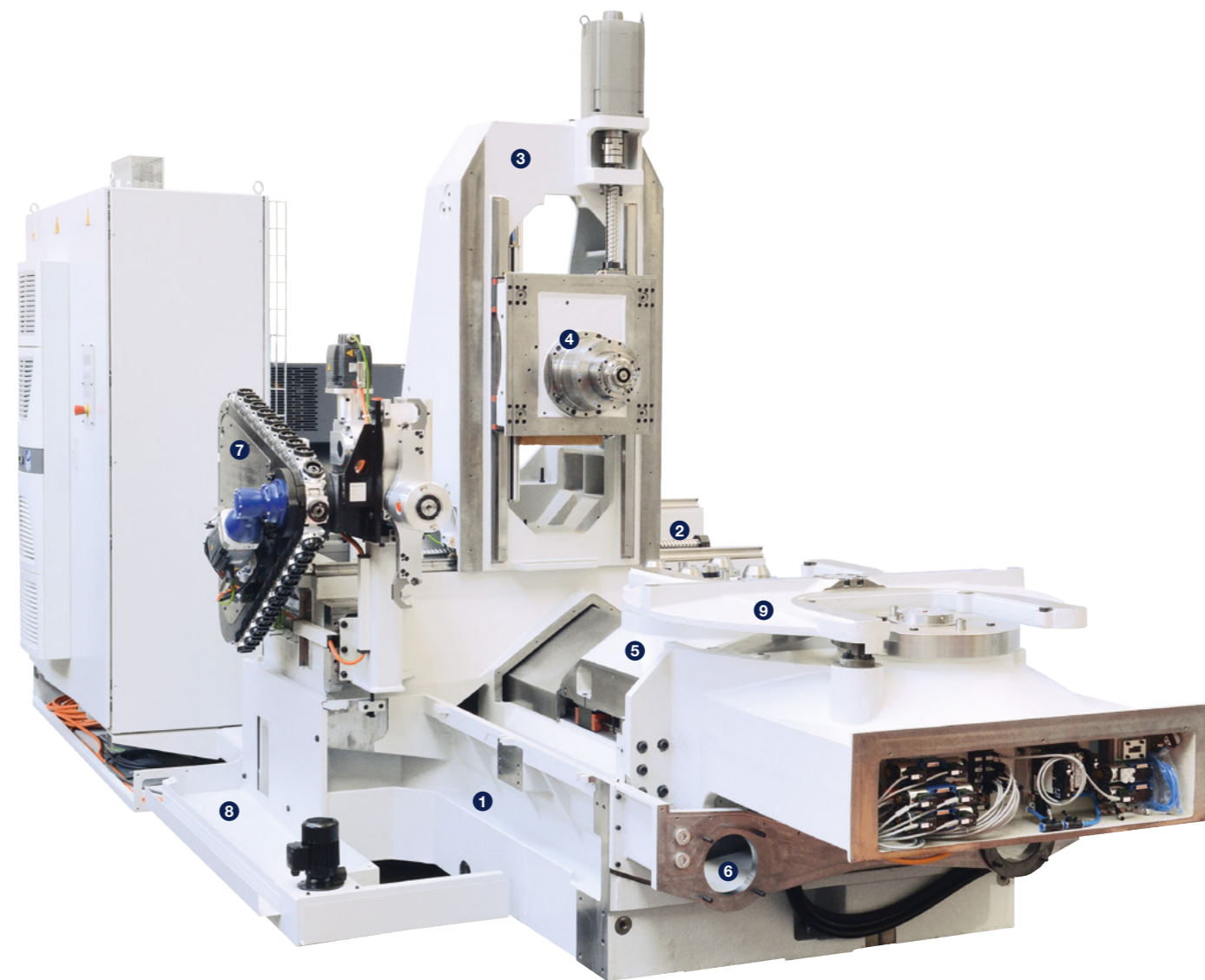
#### THE HIGHLIGHTS OF THE NEW NBH 5 AT A GLANCE

- Basic design of new NBH 5 without pallet changer for manual, semi-automatic or fully automated direct loading also with optional B- on A-axis
- Especially low space requirements. A total width of only 2500 mm can be realized with the new chain-type tool magazine
- Compact chip evacuation to the rear
- Even the basic version with 65 m/min rapid traverse, 8 m/s<sup>2</sup> acceleration and approx. 3.0 s chip-to-chip time is a highly dynamic machine
- Even more momentum and dynamic through the optional speed package: 90 m/min rapid traverse, 10 m/s<sup>2</sup> acceleration and approx. 2.1 s chip-to-chip time
- Option: 180° pallet changer, approx. 9 s changing time
- Maximal tool length 450 mm (500 mm when direct loading)
- Newest SIEMENS Control SINUMERIK 840D sl Operate
- Alternatively, newest Fanuc Control: Fanuc 0i-F



## MACHINE DESIGN

### WITH OPTION 180° PALLET CHANGER



- 1 Single cast, self-supporting machine bed
- 2 Robust guidance system with backlash-free form guideways in all linear axes
- 3 Thick-walled and optimally ribbed machine column in cast design
- 4 Motor spindle 10 000 rpm or 16 000 rpm
- 5 Torque table, direct driven rotary axis with 80 rpm rapid traverse
- 6 Optimized chip disposal via two chip grooves integrated in machine bed
- 7 Modular tool magazine  
Pick-up disc-type magazine, 40 tool locations HSK 63  
Pick-up disc-type magazine, 24 tool locations HSK 100 [option]  
Chain magazine, 32 or 60 or 90 tool locations HSK 63 [option]
- 8 Screwed-on consoles for service-friendly access to additional aggregates (electric, hydraulic and pneumatic)
- 9 Fast 180° swivel-type changer, changing time (VDI 2852) approx. 9 s

# MACHINE DESIGN

## ADDED VALUE FROM OVER 40 YEARS NBH SERIES

Two levels of X-axis guideways for maximum absorption of cutting forces



### SINGLE CAST, SELF-SUPPORTING MACHINE BED

- Heavily ribbed, one-piece casting with high damping characteristics
- Optimized with FEA (finite element analysis) optimized
- High rigidity
- Three-point location
- Vertical offset of X-axis guideways for optimal absorption of the cutting forces

### ROBUST GUIDANCE SYSTEM

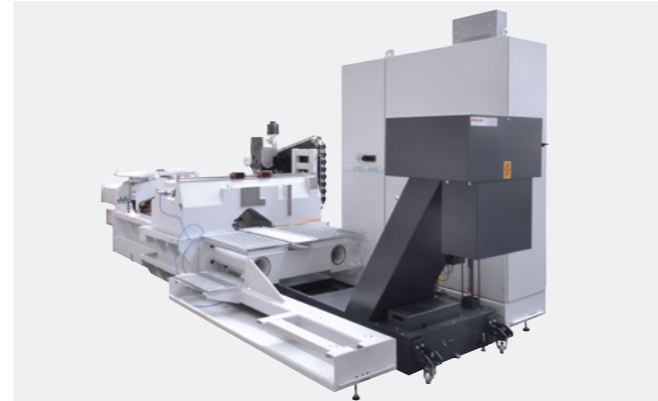
- Backlash-free form rail guidance and distance-coded, direct position measuring systems in all linear axes
- Option: absolute glass scales, direct loading version glass scales are standard
- High positioning accuracy
- High circularity accuracy

- High carrying capacity for a long working life due to the largely dimensioned roller bearing units

### SAFE AND EASY CHIP REMOVAL

- Free chip fall
- Optimized chip disposal via two chip grooves integrated in machine bed
- Especially space-saving chip evacuation to the rear

Especially space-saving chip evacuation to the rear

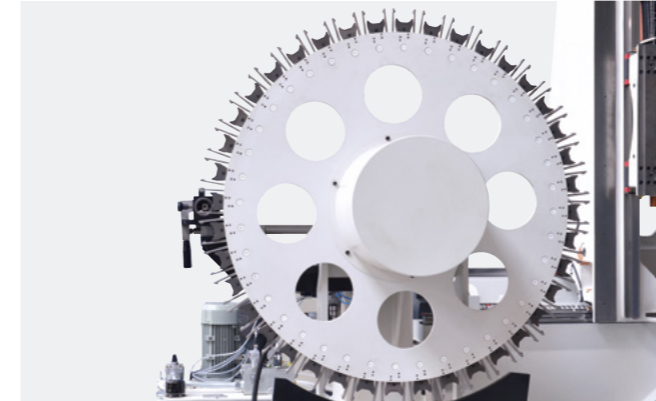


### TABLE ASSEMBLY

- Torque table (B-axis), direct driven rotary axis
- High dynamic, high rapid traverse rates 80 rpm
- High positioning accuracy
- 4-cone pallet location with integrated pallet clamping
- Air purge blocks coolant and chips
- Pallet location monitoring for process security
- Hydraulic clamping [option]
- Direct loading without pallet changer and with fixed clamping surface
- 8-line hydraulic clamping, standard for direct loading version

option tilting/rotary table?

Standard disc tool magazine with 40 HSK 63 tool locations



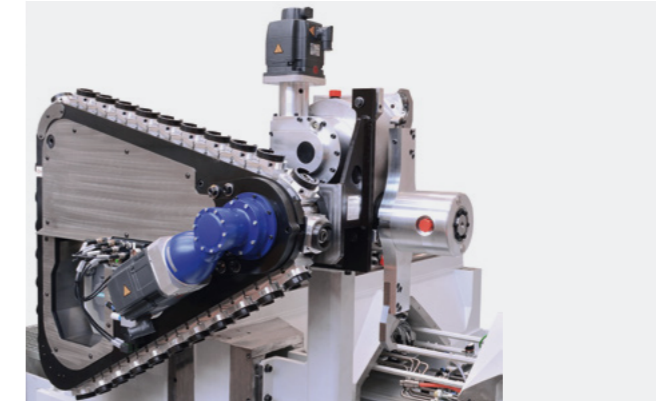
### WORKING SPINDLE

- Motor spindle 10 000 rpm, spindle power 28/39 kW, torque 126/180 Nm 100%/40% duty (standard)
- High-speed motor spindle for light metal machining, speed 16 000 rpm, spindle power 40/52 kW, torque 95/125 Nm 100%/40% duty [option]
- Working spindle as complete unit, for service work the unit can be replaced within a very short time
- Thermostable design
- Air purge blocks coolant and dirt
- With internal coolant supply

### MODULAR TOOL MAGAZINE

- Individual tool magazine solutions to match your production requirements. Hüller Hille offers a variety of tool magazines optimally adapted to your production.
- Pick-up disc-type magazine, 40 tool locations HSK 63 (standard)
  - Pick-up disc-type magazine, 24 tool locations HSK 100

Chain tool magazine with 32 HSK 63 tool locations



- [option]
- Chain magazine, 32 or 60 or 90 tool locations HSK 63 [option]

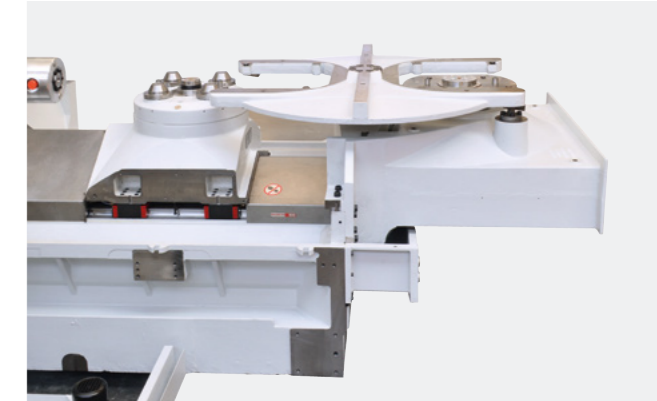
### DISC MAGAZINE

- Proven, reliable and cost-effective
- Fast pick-up tool change into the spindle
- Steel tool holder brackets
- Chip-to-chip time approx. 3.9 s

### CHAIN MAGAZINE (32 TOOL LOCATIONS)

- Fast electromechanical tool changer with automatic mechanical locking when swiveling
- Chip-to-chip time approx. 3.2 s (approx. 2.1 s with speed package)

Option 180° pallet changer



### OPTION 180° PALLET CHANGER

- Fast 180° pallet changer, changing time acc. to VDI 2852 approx. 9 s
- Rotary loading station
- Set-up during machining cycle

### MODERN, POWERFUL CNC CONTROL

- Siemens Sinumerik 840D sl Operate
- Fanuc control 0i-F

### SHORT INSTALLATION AND COMMISSIONING TIMES

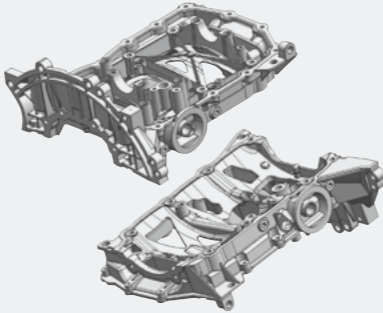
- Compact design allows easy transport and set-up by crane
- Single transport unit

# OPTIONAL SPEED PACKAGE

## EVEN MORE MOMENTUM AND DYNAMIC

The optional speed package does not only extend the already numerous options available but extends also the operating range of the NBH 5 machining center especially for Alu-, HSC- and light metal machining, a segment which is getting more and more dominant not only in the automotive industry and suppliers to the automotive industry.

- 3 Highly dynamic motor spindle  
Maximal speed: 16 000 rpm  
Spindle power (100%/40% duty): 40/52 kW  
Torque (100%/40% duty): 95/125 Nm
- Rapid traverse in X-, Y- and Z-axes: 90 m/min
- Acceleration in X-, Y- and Z-axes: 10 m/s<sup>2</sup>
- Chip-to-chip time: approx. 2.1 s

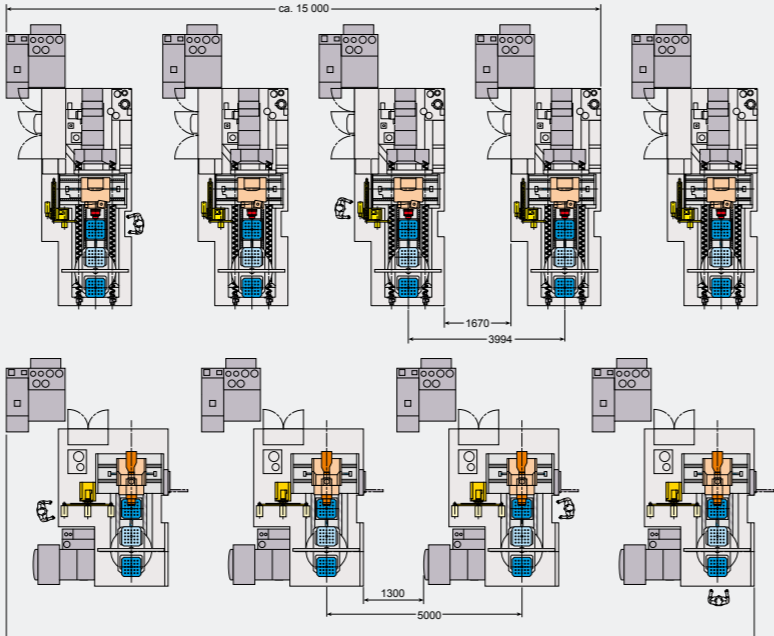


**CYCLE TIME COMPARISON FOR FINISH-MACHINING OF BEARING CAP (BEDPLATE)**

Machine type	magazine	chip-to-chip time	cycle time
NBH 5 (old)	disc	4,0 s	3,53 min
NBH 5 (Speed)	disc	3,9 s	3,26 min
NBH 5 (Speed)	chain	2,1 s	3,09 min



Instead of four NBH 5 now five machines of the new type NBH 5 can be installed without problems.



# AUTOMATION

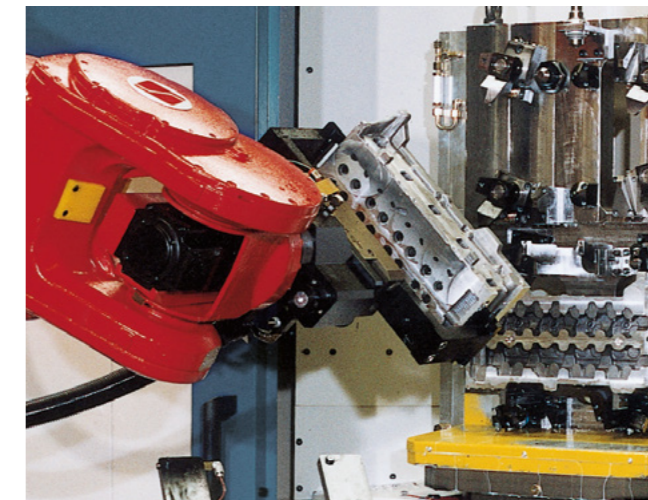
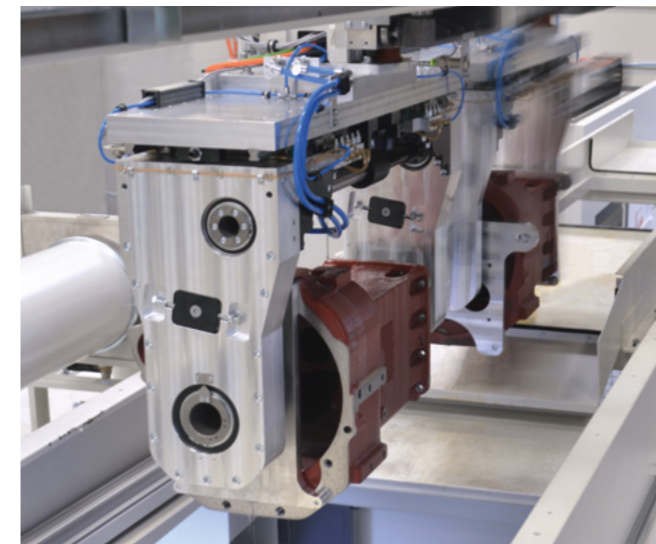
There are the following options for loading and unloading the NBH 5 (version direct loading):

- Manual loading aid (drawer)
- Semi-automatic
- Robot loading
- Gantry loader

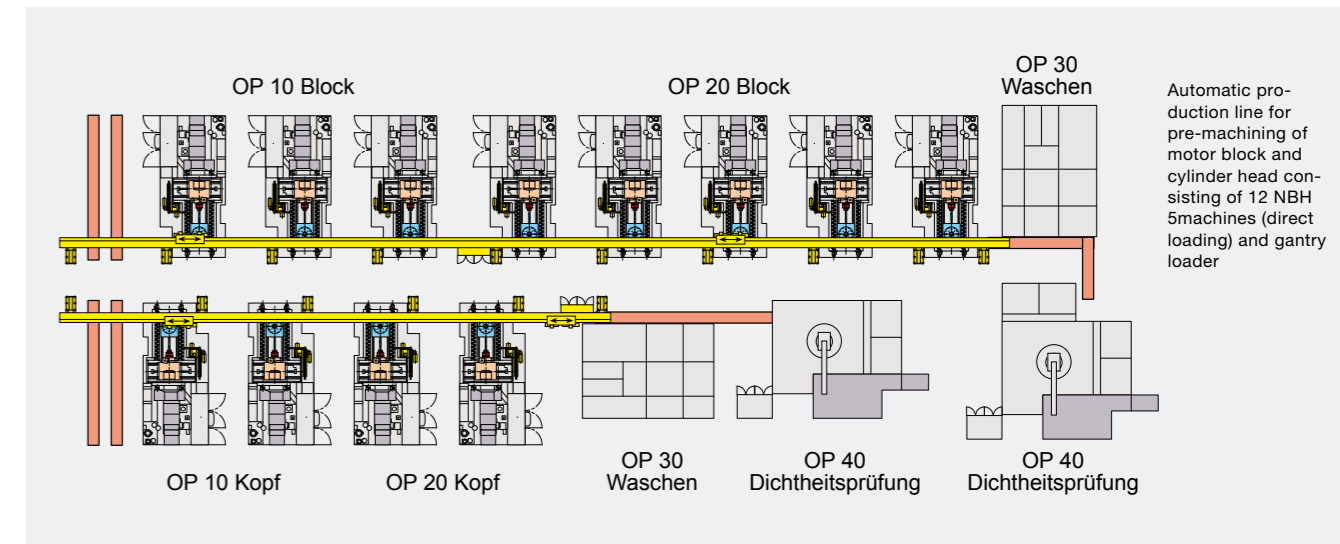
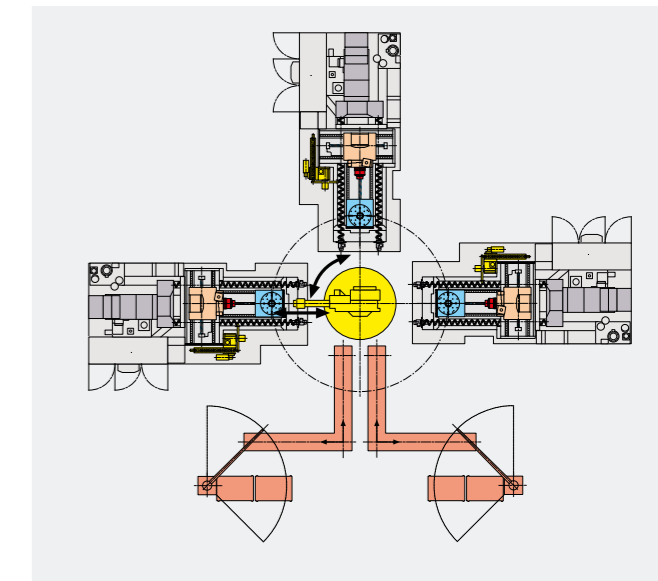
For the purpose of multiple machine assignment, continuation of production during breaks or unmanned production, the NBH 5 with pallet changer can also be equipped with the following systems as is the case with all NBH centers

- Multi-pallet storage system (MPS)
- Linear pallet container (LPC)
- Linear/multi-level pallet storage system (LPS)

These optimized modules for flexible production cells and systems are tailored to fit specific production needs and can be equipped with a wide range of processing technology.



Automatic production cell for machining of cylinder heads consisting of three NBH 5 (direct loading), one 5-axle robot and conveyor belts for feeding the raw parts and transporting the finished parts.



# TECHNICAL DATA

## NBH 5

Horizontal machining center	type	NBH 5	
<b>Working range</b>			
Travel X-axis	mm	700	
Travel Y-axis	mm	630	
Travel Z-axis	mm	700	
Swing circle diameter	mm	700 (800) <sup>1)</sup>	
Fixture height	mm	1000	
<b>Position measuring system</b> , integrated in rail			
Optional glass scales (at direct loading standard)	type	direct	
Positioning error A (DIN ISO 230-2)	mm	0,007	
<b>Rotary table/pallet</b>			
Table clamping surface, direct loading	mm	ø 500	
Pallet clamping surface DIN 55201	mm	500 x 500	
Maximal pallet load / maximal table load	approx. kg	500 / 800	
NC rotary table (torque motor), smallest fraction	deg	0,001	
Rotary speed B-axis	1/min	80	
Pallet change time VDI 2852	approx. s	9	
<b>Motor spindle</b>			
Diameter in front bearing	mm	80	80
Maximal speed	rpm	10 000	[16 000]
Spindle power 100%/40% duty	kW	28 / 39	40 / 52
Torque 100%/40% duty	Nm	126 / 180	95 / 125
Tool taper (DIN 69893)	HSK	63	63
<b>Feed/rapid traverse</b>			
Feed force X- / Y- / Z-axis [Speed package]	approx. kN	15 / 9 / 15 [12 / 9 / 15]	
Feed range X- / Y- / Z-axis [Speed package]	mm/min	0 – 65 000 [0 – 90 000]	
Rapid traverse X- / Y- / Z-axis [Speed package]	m/min	65 / 65 / 65 [90 / 90 / 90]	
Acceleration X- / Y- / Z-axis [Speed package]	m/s <sup>2</sup>	8 / 8 / 8 [10 / 10 / 10]	
<b>Tool disc magazine</b> , locations			
number		40 (HSK 63) or [24 (HSK 100)]	
Max. tool diameter	mm	80	
... adjacent tool locations empty	mm	150	
Max. tool length	mm	450 / 500 <sup>1)</sup>	
Max. tool weight	kg	10 [12]	
Max. tilting moment	Nm	8	
Chip-to-chip time (VDI 2852)	s	3,9	
<b>Tool chain magazine</b> , locations			
Anzahl		[32] oder [60] oder [90]	
Max. tool diameter	mm	80	
... adjacent tool locations empty	mm	165	
Max. tool length	mm	450 / 500 <sup>1)</sup>	
Max. tool weight	kg	12	
Max. tilting moment	Nm	12	
Chip-to-chip time (VDI 2852) [Speed package, 32 tool locations]	s	3,0 [2,1]	
<b>Coolant system</b>			
Tank capacity	approx. l	980 [1500]	
Pump capacity at 3 bar	approx. l/min	230	
High pressure at 40 / 70 bar	approx. l/min	23 / [19]	
<b>Machine installation</b>			
Space requirement basic machine, L x W x H <sup>2</sup>	approx. m	5,5 x 2,5 x 2,9	
Weight	approx. kg	13 500 <sup>1)</sup> / 14 500	

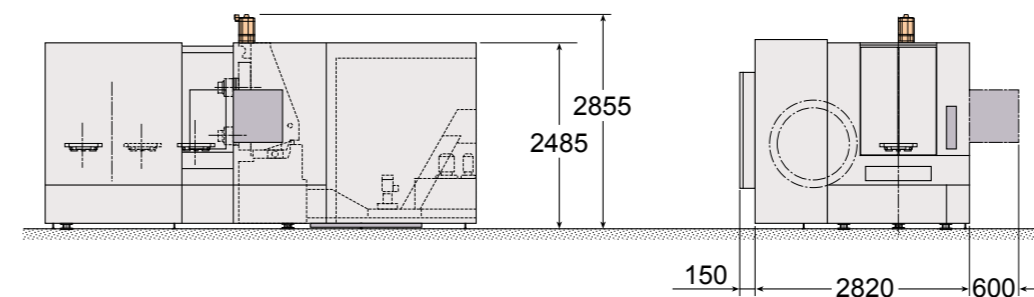
[...] = option,  
 1) = with direct loading  
 2) = version without 180° pallet changer and with chain magazine (32 tool locations)

Subject to change without notice

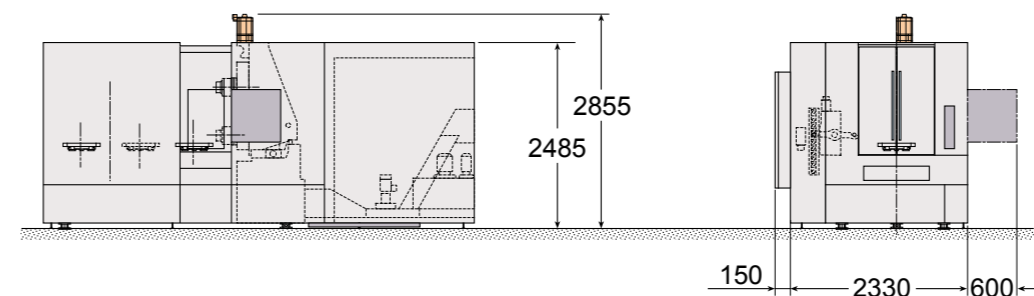
All illustrations are exemplary.  
 Actual form and version of machines  
 may differ, depending on ordered type.

## MACHINE MAIN DIMENSIONS

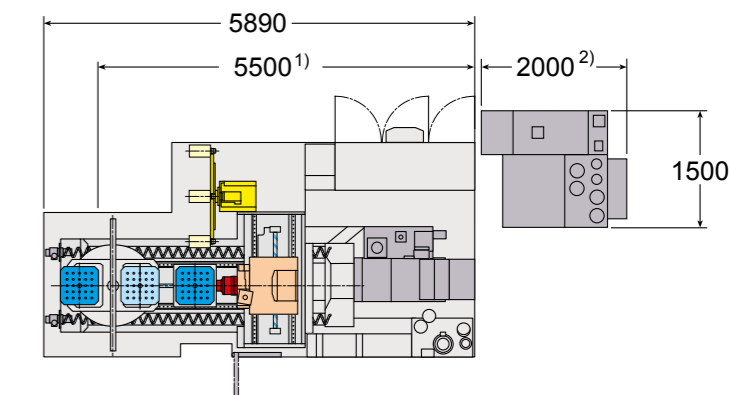
**NBH 5 with disc magazine (40 tool locations)**



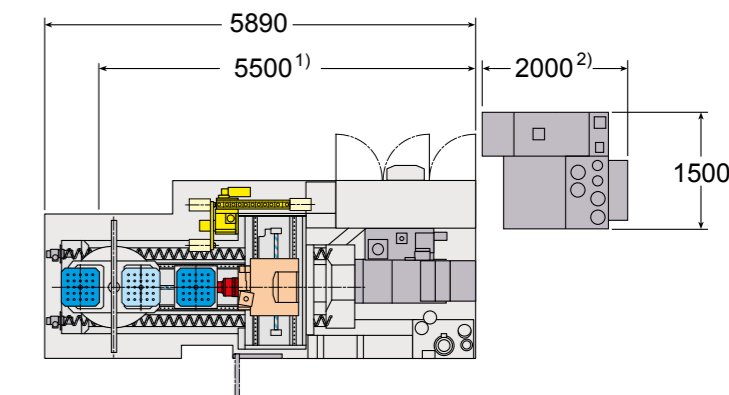
**NBH 5 with chain magazine (32 tool locations)**



Subject to change without notice



<sup>1)</sup> = NBH 5 with direct loading and without pallet changer  
<sup>2)</sup> = Coolant system, variable installation



<sup>1)</sup> = NBH 5 with direct loading and without pallet changer  
<sup>2)</sup> = Coolant system, variable installation

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