

# HELLER



5-axis machining centres  
5-axis milling/turning machining centres

# F/C

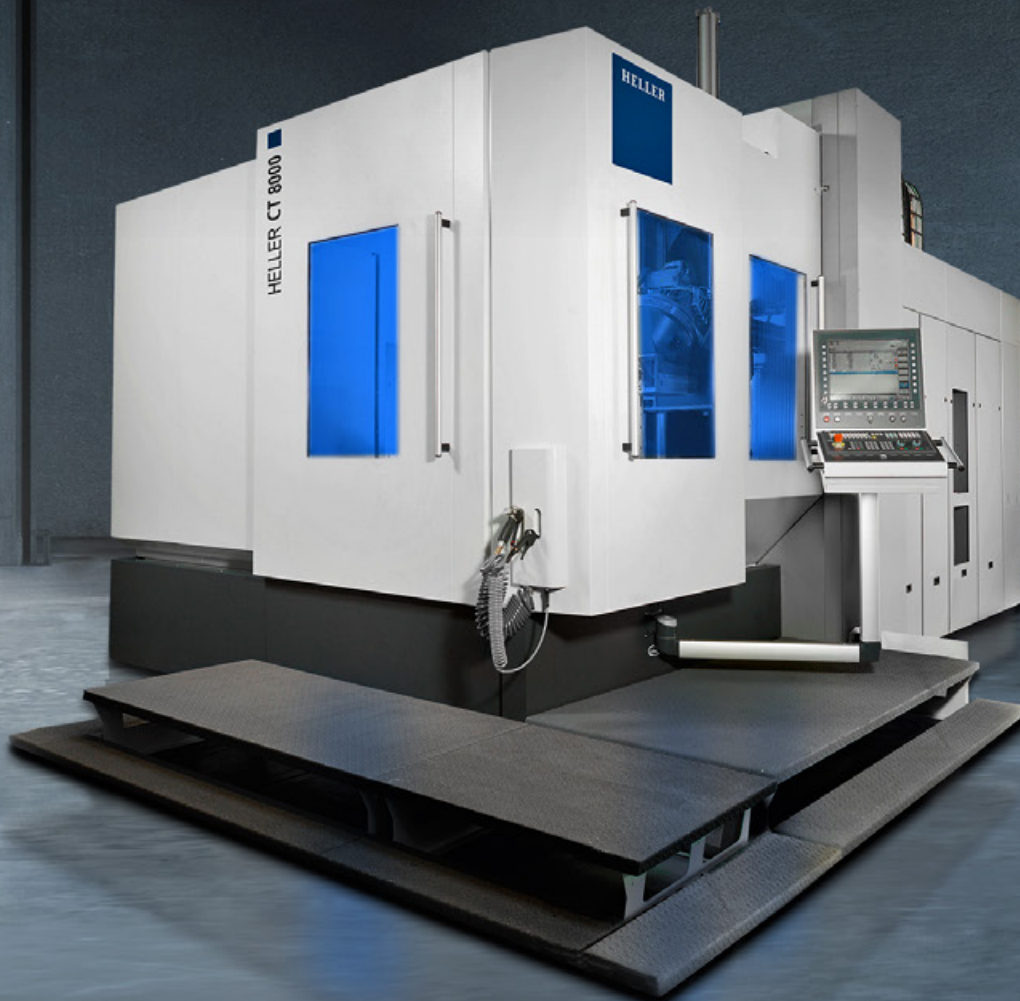
F/C series

# Complete machining in HELLER quality

F/C series	02
Machine concept	04
Machining units	06
Tool management	08
Workpiece management	10
Supply and disposal	12
Control technology	14
Operation and maintenance	16
Automation solutions	18
Technical data	20



Robust machine design, in-depth process experience, comprehensive milling expertise – these are the basic ingredients of our F and C series 5-axis machining centres. With obvious benefits to you: 5-axis machining with maximum output and optimum quality, even in continuous operation. In addition, our C series 5-axis milling/turning machining centres allow you to combine milling and turning operations on a single machine – for even more flexible complete machining of your workpieces.



### Key facts

- \_F series: universal 5-axis machining centres with 5th axis provided by the tool, flexible in use for powerful 5-sided and simultaneous 5-axis machining
- \_C series: universal 5-axis milling/turning machining centres with 5th axis provided by the tool and DDT (Direct Drive Turning) rotary table, powerful combination of milling and turning operations on a single machine for maximum flexibility
- \_machining units with swivel head or tilting head kinematics
- \_robust machine design, combined with powerful, high-torque spindle technology
- \_optimised per-piece costs due to reduced number of clamping positions and machining in a single set-up
- \_suitable for a wide range of parts and materials
- \_machines with pallet changer (FP/CP) optimal for series production
- \_machines with table loading (FT/CT) for workshop-oriented manufacturing and small batch sizes
- \_easy to automate with workpiece or pallet automation

More information at:  
[www.heller.biz/en/f](http://www.heller.biz/en/f)



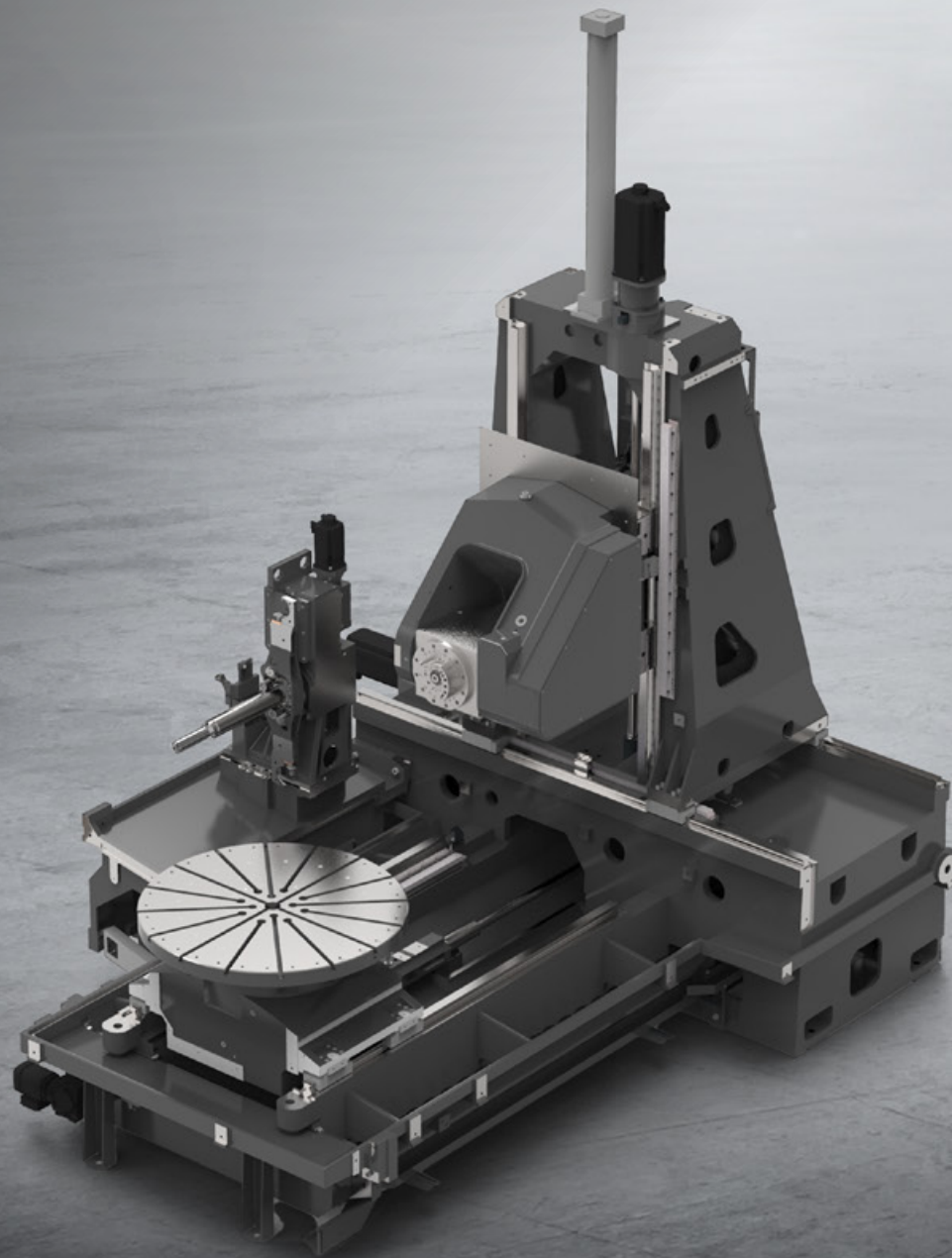
More information at:  
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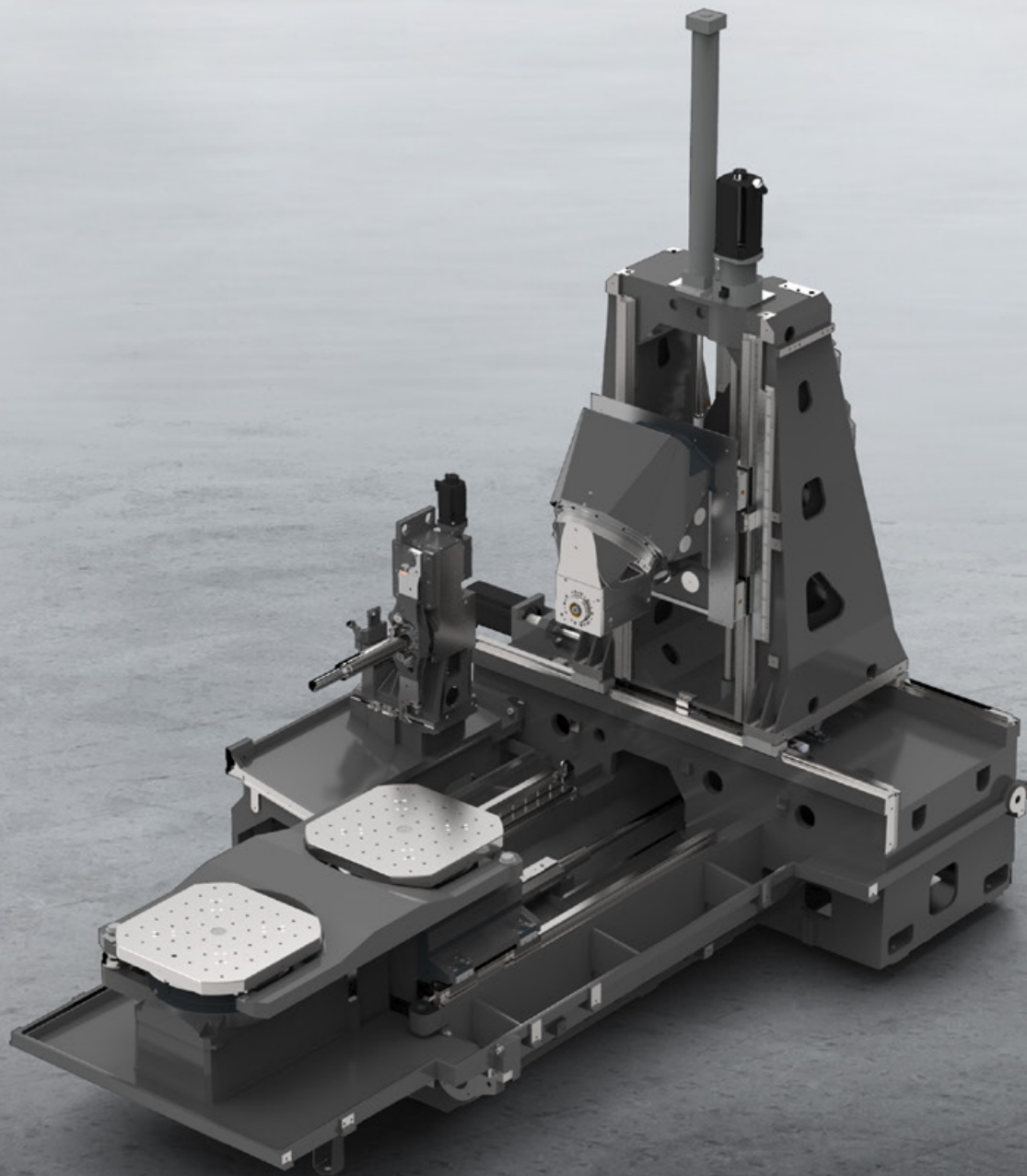
Machine concept

# Foundation for maximum productivity

Only the perfect combination of rigidity and lightweight construction results in a machine design that ensures optimum surface finish and a long tool life. As with all HELLER machines, the main components of our F and C series machining centres have been designed using FEA. The result is a machine bed optimised for rigidity and a mass-reduced column that ensures reliable productivity and high dynamics combined with perfect precision.



Machine with table loading (FT/CT)  
and tilting head kinematics



**Machine with pallet changer [FP/CP]  
and swivel head kinematics**

## Basic structure

- \_ high stability and damping in the force flow through topology-optimised cast iron structural components
- \_ thermo-symmetric design and optimum distribution of forces
- \_ wide range of machining units in a robust design available
- \_ tool changer with two NC axes for fast automatic tool change
- \_ wide range of tool magazines, in chain-type or rack-type design available
- \_ machines with integrated pallet changer [FP/CP] and high payload for fast automatic pallet change
- \_ machine variant with table loading [FT/CT] available for selected sizes

## Kinematics

- \_ machine bed supporting the X and Z axes in cross bed design
- \_ machine column moves in X-direction and supports the machining unit
- \_ machining unit moves in Y-direction, compact and robustly integrated into the machine column
- \_ rotary table moves in Z-direction and performs the feed motion
- \_ NC rotary table [rotary axis B] rotates the workpiece continuously [360,000 x 0.001°]
- \_ swivel head [C] or tilting head [A] – the 5th axis is provided by the tool [max. C 345,000 x 0.001° / A 175,000 x 0.001°] [swivel range with optional swivel range expansion]

## Drive concept

- \_ linear axes with roller guides driven by ball screws for high feed forces
- \_ direct absolute measurement systems [glass scales in linear axes] for highest precision and low positional tolerance
- \_ rotary tables with large YRT bearing and automatic clamping for maximum stability and high tilting moments
- \_ F series: NC rotary table with gear drive and clamping for high circular milling torque and damping [FP/FT 16000 with direct drive]
- \_ C series: DDT [Direct Drive Turning] rotary table for high speeds and dynamics

# Innovative spindle technology

Optimum process stability in 5-axis machining is also a question of having the right spindle. With our F and C series you can choose from a range of swivel head and tilting head designs. Whether it is heavy-duty cutting of cast iron or steel, high-volume machining of light metals or vertical, horizontal and tilted turning with the C series – we have the right solution to suit your requirements.



F series

C series



			F series				C series			
			PCU 100 G	PCT 100 G	SCU 100 M	SCT 100 M	PCU 100 G	PCT 100 G	SCU 100 M	SCT 100 M
<b>Tool shank</b> SK/BT available as an option for selected units		Size	HSK-A 100	HSK-A 100	HSK-A 100	HSK-A 100	HSK-T 100	HSK-T 100	HSK-T 100	HSK-T 100
<b>Speed</b>		min <sup>-1</sup>	8,000	6,000	12,500	12,500	8,000	6,000	12,500	12,500
<b>Power</b>	S6 40%	kW	60	43	80	80	60	43	80	80
<b>Torque</b>	S6 40%	Nm	1,146	822	350	350	1,146	822	350	350

## Powerful machining units

- \_ machining units in two kinematic designs with the 5th axis provided by the tool: swivel head or tilting head
- \_ sturdy cast iron guide slide with high dynamic rigidity and damping
- \_ thermal stability and precision thanks to permanent cooling: precision cooling unit and thermal growth compensation of the spindle
- \_ automatic clamping of the 5th axis for machining operations with tilted rotary axes
- \_ F series: 4 machining units with HSK-A 100 tool shank for maximum productivity and stability, SK/BT 50 available as an alternative for PCU and PCT machining units
- \_ C series: 4 machining units with HSK-T 100 tool shank and integrated automatic spindle locking for maximum precision and stability during turning operations

## HELLER zero spindle system\*

- \_ easy replacement without time-consuming fine adjustment due to spindle set to zero dimension
- \_ short repair times ensure maximum machine availability
- \_ cost-effective solution for low TCO [Total Cost of Ownership]

## Options

### HELLER attachment head support (MSK) **1**

- \_ for the use of attachment heads, e.g. angular heads
- \_ enlarged support basis with three-point rest
- \_ integrated torque input and media transfer

### swivel range extension

- \_ swivel head range from 205° to 345°
- \_ tilting head range from 150° to 175°

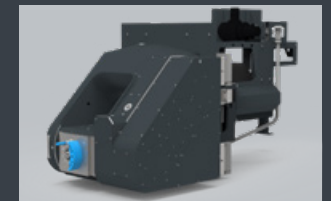
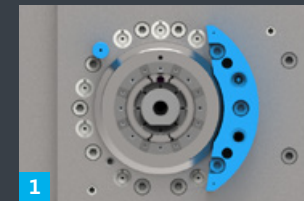
## 5th axis provided by the tool

### Swivel head kinematics

- \_ maximum performance in operation due to robust swivel head kinematics
- \_ 45° swivel head geometry for compact design
- \_ high rigidity due to short distance between swivel head bearing and tool holder
- \_ swivel range from C +15° to C -190° [with optional swivel range extension]
- \_ integrated power and media supply: no lines and cables in the work area

### Tilting head kinematics

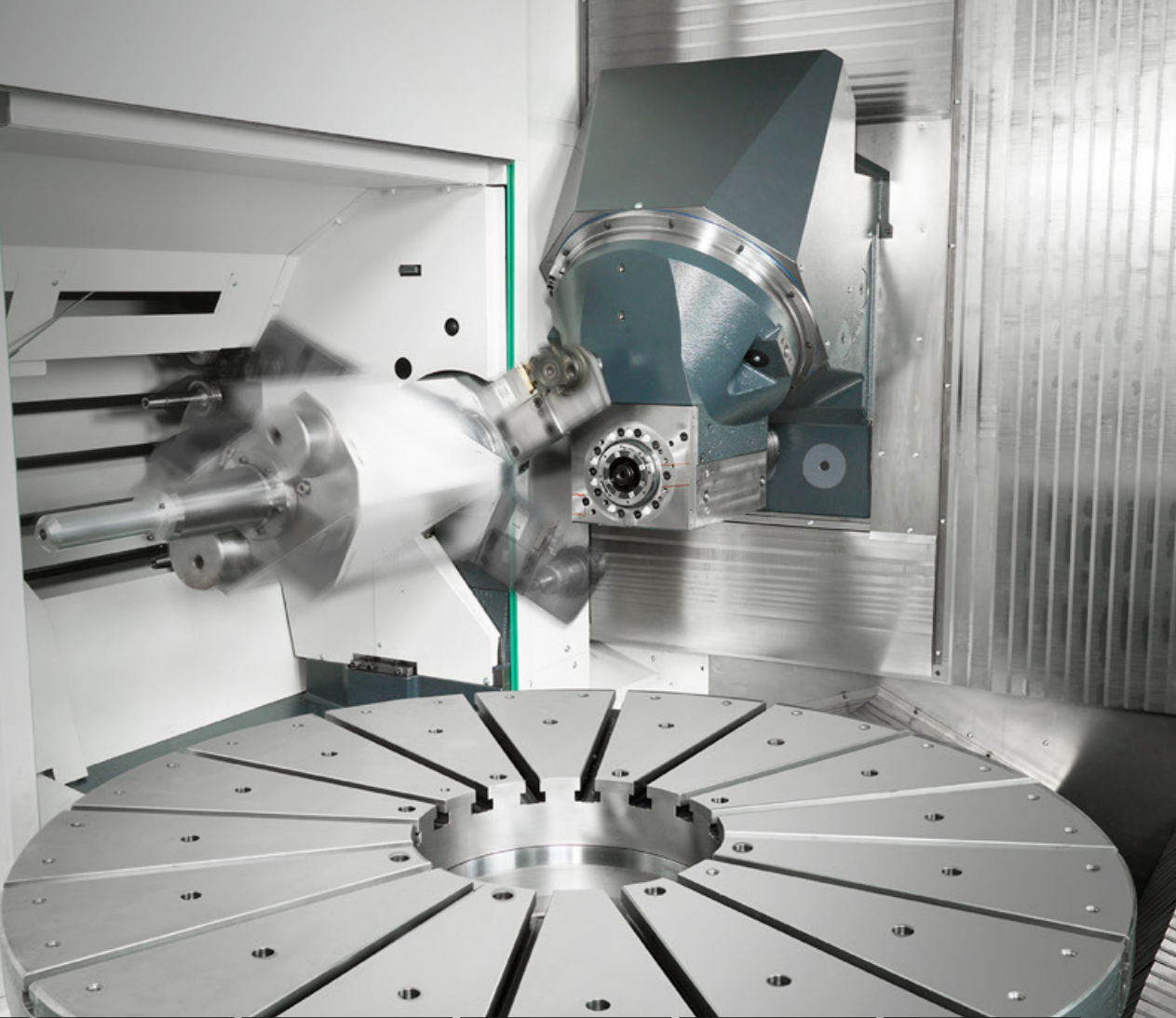
- \_ maximum flexibility for complex workpiece geometries
- \_ simple head geometry for easy programming and operation
- \_ A-axis driven by two swivel motors and a clamped gear train
- \_ swivel range from A +30° to A -120° [with optional swivel range extension]
- \_ integrated power and media supply: no lines and cables in the work area



\* not available for all machining units

# Fast, precise, flexible

Particularly in 5-axis and mill-turn machining, you work with a wide variety of tools and large tool geometries on a daily basis. No problem for our F and C series machining centres: they allow you to continue to use your tooling flexibly, while ensuring short tool loading times, short downtimes and short non-productive times.



			FP 8000	FT 8000	FP 10000	FP 14000	FP 16000	FT 16000
<b>Chip-to-chip time</b>	$t_{2,3}$   VDI 2852	s	6.3	6.3	7.1	8.5	8.5	8.5
<b>Tool weight<sup>1)</sup></b>		kg	25 [35]	25 [35]	25 [35]	25 [35]	25 [35]	25 [35]
<b>Chain-type magazines</b>	Magazine places	Number	50 [100/150]	50 [100/150]	50 [100/150]	50 [100/150]	50 [100/150]	50 [100/150]
	Tool length/diameter <sup>2)</sup>	mm	600 [800]/Ø 280	600 [800]/Ø 280	600 [800]/Ø 280	600 [800]/Ø 280	600 [800]/Ø 280	600 [800]/Ø 280
	Tool shank	Size	HSK-A 100/SK 50/ BT 50	HSK-A 100/SK 50/ BT 50	HSK-A 100/SK 50/ BT 50	HSK-A 100/SK 50/ BT 50	HSK-A 100/SK 50/ BT 50	HSK-A 100/SK 50/ BT 50
<b>Rack-type magazines</b>	Magazine places	Number	[265/425]	[265/425]	[265/425]	[265/425]	[265/425]	[265/425]
	Tool length/diameter <sup>2)</sup>	mm	600 [1,000] <sup>3)</sup> / Ø 280	600 [1,000] <sup>3)</sup> / Ø 280	600 [1,000] <sup>3)</sup> / Ø 280	600 [1,000] <sup>3)</sup> / Ø 280	600 [1,000]/ Ø 280	600 [1,000]/ Ø 280
	Tool shank	Size	HSK-A 100/SK 50	HSK-A 100/SK 50	HSK-A 100/SK 50	HSK-A 100/SK 50	HSK-A 100/SK 50	HSK-A 100/SK 50

[ ] = Optional values 1) Consider total load capacity 2) With free adjacent places 3) In conjunction with swivel head





1

### Chain-type magazines 1

- \_ choice of 3 chain-type magazines with up to 150 positions
- \_ sturdy tool holders mounted on both sides of a double chain for optimised traversing dynamics of the chain
- \_ workpiece loading station with optimum accessibility for ergonomic and rapid loading of tools
- \_ integrated tool provisioning place for provision of the next tool during machining and short tool-to-tool times
- \_ tool shank in enclosed holders: protection against contamination and optimum hold during positioning
- \_ tool provisioning during machining for short tool-to-tool times



2

### Rack-type magazines 2

- \_ choice of 2 rack-type magazines with up to 425 positions
- \_ tool handling with highly dynamic loader for rapid tool provisioning
- \_ tool loading station with integrated rotary station with multiple tool positions for loading during machining 3
- \_ convenient operating panel at the tool loading station



3

### Tool changer


- \_ rapid tool change for short chip-to-chip times
- \_ two NC axes with lift/swivel principle for high dynamics and long-term precision
- \_ sturdy double gripper for a secure hold with heavy tool weights and moments of weight

CP 8000	CT 8000	CP 10000
6.3	6.3	7.1
25 (35)	25 (35)	25 (35)
50 (100/150)	50 (100/150)	50 (100/150)
600 (800)/Ø 280	600 (800)/Ø 280	600 (800)/Ø 280
HSK-T 100	HSK-T 100	HSK-T 100
(265/425)	(265/425)	(265/425)
600 (1,000) <sup>3)</sup> /Ø 280	600 (1,000) <sup>3)</sup> /Ø 280	600 (1,000) <sup>3)</sup> /Ø 280
HSK-T 100	HSK-T 100	HSK-T 100

Workpiece management

# Workshop or production machine

It goes without saying that you can configure the F and C series machining centres to suit your specific requirements: as a workshop machine with a large work area – ideal for single part production – or as a production machine with pallet changer and the appropriate automation solution for series production.



			FP 8000	FT 8000	FP 10000	FP 14000	FP 16000	FT 16000
<b>Type</b>			Pallet changer	Table loading	Pallet changer	Pallet changer	Pallet changer	Table loading
<b>Clamping surface</b>	Nominal size	mm	800 x 800	Ø1,100	1,000 x 1,000	1,000 x 1,000	1,250 x 1,600	Ø1,300
<b>Workpiece dimension</b>	Diameter D / Depth T x Width W	mm	Ø1,250/ 1,250 x 1,810	Ø1,810	Ø1,400/ 1,400 x 2,160	Ø1,400/ 1,650 x 2,900	Ø2,000/ 2,000 x 2,900	Ø2,500
	Height H	mm	1,400	1,400	1,600	1,800	1,725	1,725
<b>Clamping load</b>		kg	2,000	2,000	4,000	4,000	8,000	8,000
<b>Load pallet changer</b>	Total/load difference	kg	4,000/1,500	-	8,000/2,500	8,000/2,500	16,000/8,000	-
<b>Pallet change time</b>		s	21	-	35	35	75	-

## Pallet changer

- \_automatic pallet changer with lift/swivel principle (FP 16000 with slide/swivel principle)
- \_high maximum load with robust, hydraulic drive
- \_optimum application of force to machine pallets due to the fork shape of the lift-and-swivel bridge
- \_consistently high tool change accuracy due to robust alignment elements and extensive blow-off of functional surfaces
- \_hydraulic pallet clamping for secure hold, even under high process forces
- \_machine pallets with DIN hole pattern and standardised alignment elements for rapid mounting of clamping fixtures

## Table loading **1**

- \_workpiece loading directly onto the machine table in the work area
- \_optimum access to the workpiece due to integrated platforms and low 'loading sill'
- \_large, double-leaf work area door opens wide for easy loading and crane loading of large components into the work area
- \_round machine table with large clamping surface and DIN hole pattern
- \_main operating unit designed as a console with 24" multi-touch screen, swivels between operating station and workpiece loading station
- \_media guns integrated into machine enclosure for easy access

## Rotary table

- \_F series: rotary tables with gear drive for high circular milling torque and damping (FP/FT 16000 with direct drive)
- \_C series: direct drive rotary table for high speeds in turning operation and high milling dynamics
- \_large YRT bearing for maximum stability and high tilting moments
- \_automatic hydraulic rotary table clamping for high tangential moments
- \_compact design for optimum force flow and cutting force absorption
- \_C series: automatic imbalance detection during machining and HELLER balancing cycle for easy balancing of the clamped workpiece and imbalance checking

### Options

- \_integrated media interface for hydraulic workpiece clamping (F: 60/200 bar, C: 60 bar)
- \_additional pneumatic functions: location check and unclamping check via media interface
- \_automatic setting station door

CP 8000	CT 8000	CP 10000
Pallet changer	Table loading	Pallet changer
800 x 800	Ø1,100	1,000 x 1,000
Ø1,250/ 1,250 x 1,810	Ø1,810	Ø1,400/ 1,400 x 2,160
1,400	1,400	1,600
2,000	2,000	4,000
4,000/1,500	-	8,000/2,500
21	-	35



Supply and disposal

# Perfect solutions to suit your requirements

Fast and effective chip removal is a top priority with our machining centres. The design of the work area prevents the accumulation of chips and ensures that they are quickly removed from the machine. You can select the most suitable conveyor design and coolant unit for your individual work processes. Precision and process are assured!

## Cooling lubricant supply

- \_ coolant units: paper band filter or vacuum rotation filter with high tank volumes available as options
- \_ internal coolant supply (IKZ) through the tool with high pressure 50 bar [option: 70 bar]
- \_ internal coolant supply with up to 7 pressure steps freely programmable via NC program
- \_ external tool cooling with integrated spindle flushing nozzles
- \_ integrated work area shower with adjustable nozzles for optimum flushing of the work area and cooling of the workpiece

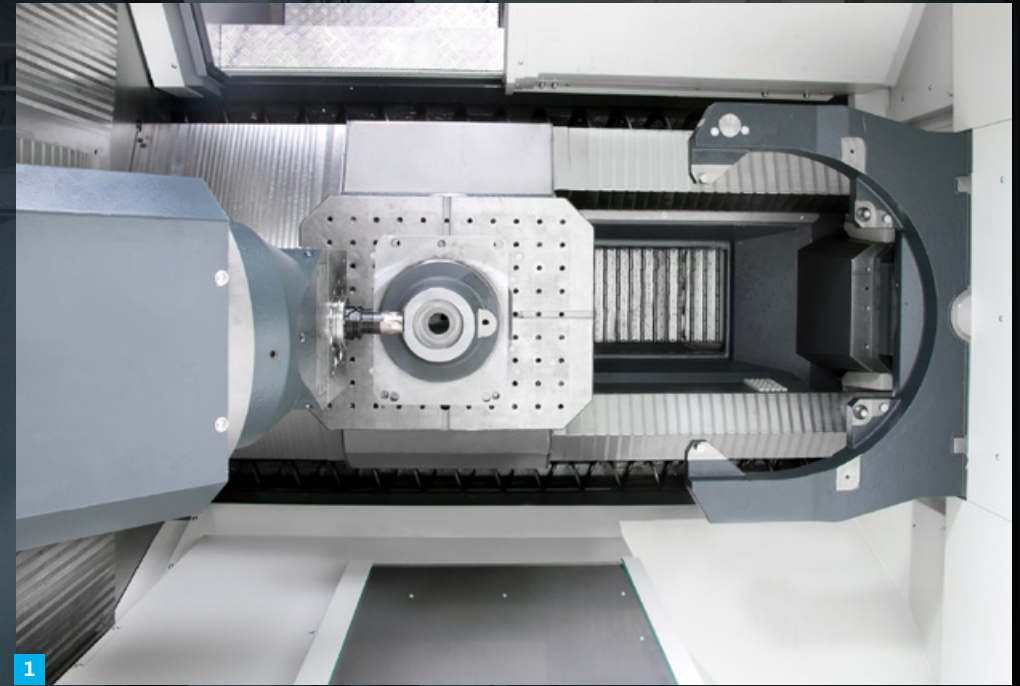
## Options

- \_ coolant cooler for high thermal stability and precision
- \_ coolant temperature control unit
- \_ automatic filling of the coolant unit
- \_ oil skimmer for separation of foreign oil from the cooling lubricant tank



## Chip disposal

- \_ chip disposal using spiral conveyors and a cross-conveyor
- \_ chip conveyor either as scraper belt or hinged conveyor, depending on the application [option]
- \_ steep side panels and concertina covers with self-cleaning effect to prevent chip deposits **1**
- \_ work area flushing and shower to support rapid chip removal in machines with coolant units
- \_ option: extraction unit for the removal of coolant mist from the work area



## Media supply

- \_ easy maintenance with optimum accessibility, all supply units at a glance **2**
- \_ compressed air and water gun integrated into the machine housing at the workpiece loading station
- \_ central oil-air lubrication for key components
- \_ sealing air and selective blow-off of interfaces for continuous, smooth machine operation
- \_ media interface for hydraulic workpiece clamping with 60 bar or 200 bar [option]



Control technology

# Perfect performance for complete machining

In everyday working life, speed is of the essence. The modern, high-performance Siemens SINUMERIK 840D sl control with HELLER Operation Interface makes things easy for you and provides perfect support for your tasks: with intuitive operation, easy programming, cycle support and key information always at your fingertips.





## Machine control

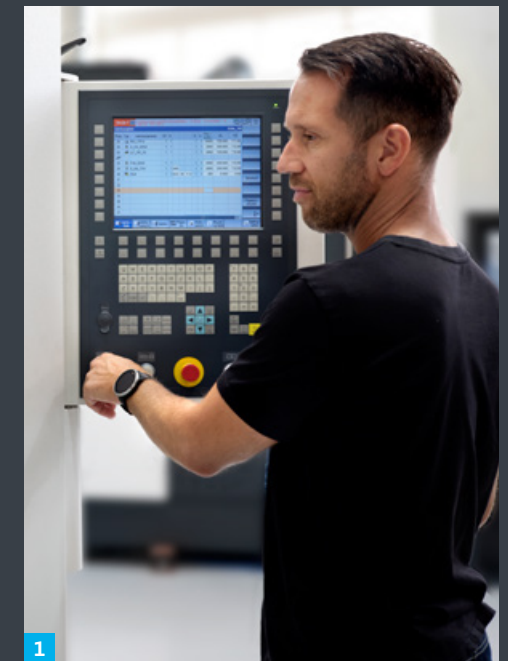
- \_ high-performance control Siemens SINUMERIK 840D sl to meet the highest standards of performance and machining precision
- \_ digital drive technology and modern system architecture
- \_ SINUMERIK Operate user interface for efficient machine operation
- \_ HELLER Operation Interface for enhanced ease of use [standard on machines with table loading, optional on machines with pallet changer]
- \_ optimally integrated and tailored to the requirements of HELLER machining centres with MDynamics 5-Axis technology package
- \_ C series: integrated HELLER balancing function

## HELLER Operation Interface

- \_ as standard for machines with table loading [optional for machines with pallet changer]
- \_ main operating unit in console design for optimum ease of operation
- \_ 24" screen and multi-touch function, ideal for displaying documents and drawings
- \_ HELLER Operation Interface with 4 function areas for extra information at a glance
- \_ practice-oriented Xtends: HELLER extensions with additional functions
- \_ machine control panel with pushbuttons and 3 overrides for optimum control in all operating situations

## Options

- \_ handheld operating unit
- \_ convenient operating panel at the tool loading station **1**
- \_ HELLER remote diagnostics service RDS
- \_ pallet management system for multiple set-ups
- \_ alternative strategy
- \_ job management
- \_ automatic loading and unloading sequence



Operation and maintenance

# Optimal access to all work areas

Working with HELLER machines, you can feel every day how much engineering experience has gone into these machining centres. Whether at the workpiece setting station, during tool loading, programming or maintenance – your comfort, safety and, above all, the productivity of your manufacturing operations are always in the foreground.







## Operating station 1

- \_ergonomically arranged operating elements and control screens
- \_swivelling main operating unit with clamping function integrated into the machine enclosure to save space
- \_good view into the work area thanks to large safety window
- \_smooth-running, linear-guided work area door opens the work area roof in the operating area
- \_operating modes 2 and 3 included in the standard scope of supply

### Options

- \_handheld operating unit
- \_screen blow-off device for a clear view when machining with coolant
- \_main operating unit in console design with 24" screen, multi-touch function and HELLER Operation Interface

## Workpiece setting station

- \_large smooth-running doors for optimum access during loading and set-up using a crane or other handling equipment
- \_workpiece setting station, lockable at 90° indexing positions, with foot release, unlimited manual rotation
- \_easy-to-reach operating elements and media guns, integrated into the machine enclosure

### Options

- \_automatically operated setting station door
- \_automatically rotating NC setting station
- \_software options: automatic loading and unloading sequence

## Tool setting station

- \_ergonomically arranged operating elements
- \_optimum-height insertion position with integrated unclamping function for easy handling
- \_tool loading at the magazine while the spindle is running

### Options

- \_convenient operating panel at the tool loading station
- \_tool loading during machining
- \_tool coding with RFID chip
- \_HELLER TRP (Tool Requirement Planning) for automatic generation of loading and unloading lists

## Easy maintenance

- \_all supply units at a glance with easy access
- \_smooth-running doors and easy-to-remove sheet metal panels
- \_easy and direct access to the control cabinet
- \_quick-response HELLER spare part service

### Options

- \_maintenance manager for maintenance planning and operator support at the machine
- \_HELLER TPS (Total Productive Services): service agreements for inspection, maintenance and servicing



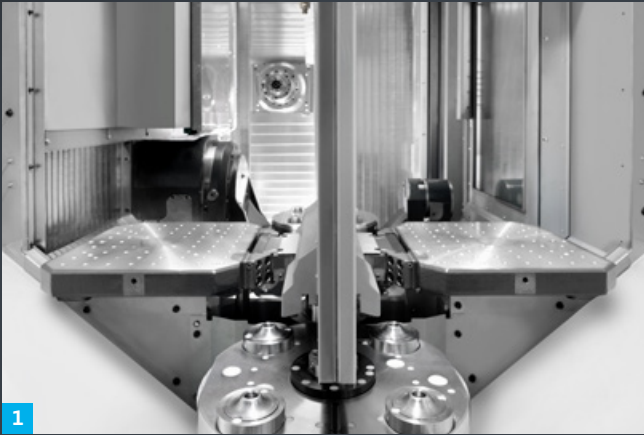
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Automation solutions

# Open to standards – flexible for customised solutions

The main objective of automated manufacturing and production centres is to reduce downtime and optimise system availability. For this purpose, HELLER has developed its own automation solutions that work perfectly with HELLER's highly productive machining centres. To meet the diverse needs of the market, this portfolio is complemented by a range of specialised solutions that HELLER is able to offer through best-in-class partnerships.





## Pallet automation

### Pallet changer 1

First automation level, integrated into the machine. Perfect for serial production with medium and large lot sizes.

### Linear pallet storage 2

Automatic handling of pallets for optimised flexibility. Perfect for serial production with medium and large lot sizes.

### Rotary pallet storage 3

Automatic handling of pallets for optimised flexibility with low space requirement. Perfect for serial production with medium and large lot sizes.



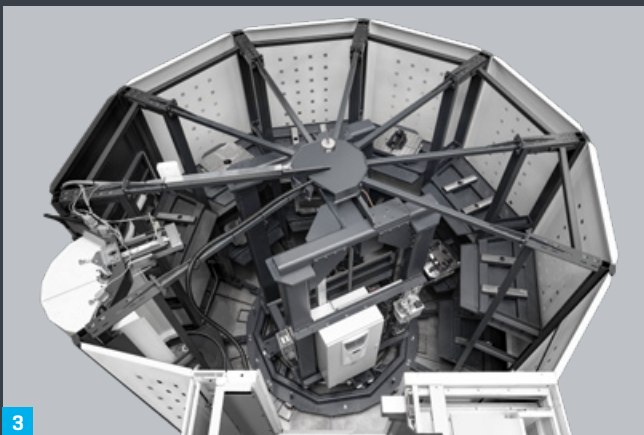
## Workpiece automation

### Robot 4

Automatic loading and unloading of workpieces, fixtures and pallets as well as automation of additional handling jobs. Perfect for serial production with medium and large lot sizes.

### Linear gantry loader 5

Linking of plant components in production lines with maximum output. Perfect for serial production with short durations and highest production volume.

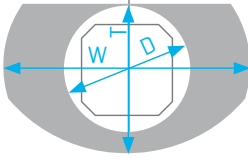

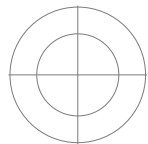

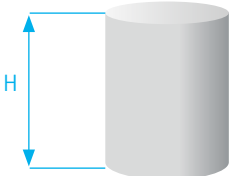








## Tool automation

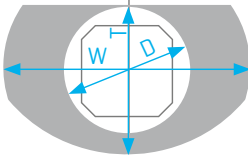
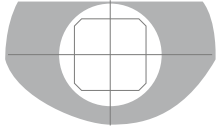
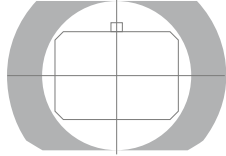
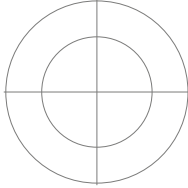




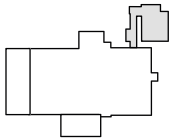
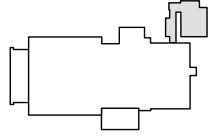
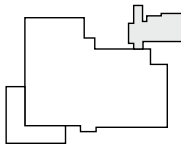
### Background tool magazine 6

Central tool provision for several machines. Perfect for production systems with maximum of flexibility and automation.

Technical data			FP 8000	FT 8000	FP 10000
<b>LINEAR AXES</b>					
Positioning range	X/Y/Z	mm	1,250/1,200/1,400		1,600/1,400/1,600
Rapid traverse speed	X/Y/Z	m/min	50		45
Acceleration	X/Y/Z	m/s <sup>2</sup>	4		4/4[3] <sup>1)</sup> /4
Feed forces	X/Y/Z   S3 40%	kN	15/15/20		15/15/20
Positioning tolerance Tp / At <sup>5)</sup>	X/Y/Z   VDI/DGQ 3441 / ISO 230	mm	0.008		0.008
<b>ROTARY AXES</b>					
NC rotary feed table	B   Speed/Torque S3 40%	min <sup>-1</sup> /Nm	10/2,900		10/3,000
NC rotary feed table: Mill-Turn	B   Speed S3 40%/Torque	min <sup>-1</sup> /Nm	-		-
Positioning tolerance Tp / At <sup>5)</sup>	B   VDI/DGQ 3441 / ISO 230	arcsec	9 [8] <sup>1)</sup>		9 [8] <sup>1)</sup>
5th axis		Type	Swivel head [Tilting head]		Swivel head [Tilting head]
<b>MACHINING UNITS</b>					
Tool shank	SK/BT for selected units available as alternative	Size	HSK-A 100		HSK-A 100
Variants	Type: Speed/Power S6 40%/ Torque S6 40%	min <sup>-1</sup> /kW/ Nm	PCU: 8,000/60/1,146		PCU: 8,000/60/1,146
			[PCT: 6,000/43/822]		[PCT: 6,000/43/822]
			[SCU: 12,500/80/350]		[SCU: 12,500/80/350]
			[SCT: 12,500/80/350]		[SCT: 12,500/80/350]
<b>TOOL MANAGEMENT</b>					
Chip-to-chip time	t <sub>2,3</sub>   VDI 2852	s	6.3		7.1
Tool weight <sup>2)</sup>		kg	25 [35]		25 [35]
Chain-type magazines	Magazine places	Number	50 [100/150]		50 [100/150]
	Tool length/diameter <sup>4)</sup>	mm	600 [800]/Ø 280		600 [800]/Ø 280
	Tool shank	Size	HSK-A 100/SK 50/BT 50		HSK-A 100/SK 50/BT 50
Rack-type magazines	Magazine places	Number	[265/425]		[265/425]
	Tool length/diameter <sup>4)</sup>	mm	600 [1,000] <sup>3)</sup> /Ø 280		600 [1,000] <sup>3)</sup> /Ø 280
	Tool shank	Size	HSK-A 100/SK 50		HSK-A 100/SK 50

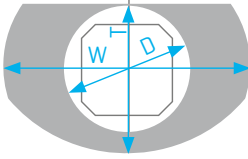

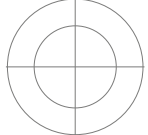
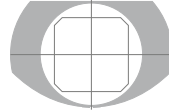





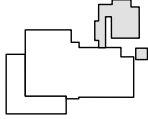
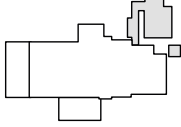
Technical data			FP 8000	FT 8000	FP 10000
<b>WORKPIECE MANAGEMENT</b>					
Type			Pallet changer	Table loading	Pallet changer
Clamping surface	Nominal size	mm	800 x 800	Ø1,100	1,000 x 1,000
Workpiece dimension					
	Diameter D / Depth T x Width W	mm	Ø1,250 / 1,250 x 1,810	Ø1,810	Ø1,400 / 1,400 x 2,160
					
	Height H	mm	1,400	1,400	1,600
Clamping load		kg	2,000	2,000	4,000
Load pallet changer	Total/load difference	kg	4,000/1,500	-	8,000/2,500
Pallet change time		s	21	-	35
<b>MACHINE</b>					
Dimensions	approx. L x W x H   Basic machine with standard chain-type magazine, coolant unit with paper band filter and platforms, if required.	mm	8,000 x 5,850 x 4,850	7,950 x 6,750 x 4,850	9,900 x 7,300 x 4,750
	approx. L x W x H   Basic machine with standard chain-type magazine, coolant unit with backflush filter and platforms, if required.	mm	8,400 x 5,700 x 4,850	8,300 x 6,600 x 4,850	10,300 x 7,150 x 4,750
					
Weight	approx.   Basic machine with standard chain-type magazine, without coolant unit	t	27	25	35
<b>CONTROL TECHNOLOGY</b>					
Machine control			Siemens SINUMERIK 840D sl		

Technical data			FP 14000	FP 16000	FT 16000
<b>LINEAR AXES</b>					
Positioning range	X/Y/Z	mm	2,400/1,600/1,600	2,400/1,600/1,600	
Rapid traverse speed	X/Y/Z	m/min	41/45/45	41/45/45	
Acceleration	X/Y/Z	m/s <sup>2</sup>	3	3/3/2	
Feed forces	X/Y/Z   S3 40%	kN	15/15/20	15/15/20	
Positioning tolerance Tp / At <sup>5)</sup>	X/Y/Z   VDI/DGQ 3441 / ISO 230	mm	0.008	0.008	
<b>ROTARY AXES</b>					
NC rotary feed table	B   Speed/Torque S3 40%	min <sup>-1</sup> /Nm	10/3,000	8/3,000	40/5,000 <sup>6)</sup>
NC rotary feed table: Mill-Turn	B   Speed S3 40%/Torque	min <sup>-1</sup> /Nm	-	-	-
Positioning tolerance Tp / At <sup>5)</sup>	B   VDI/DGQ 3441 / ISO 230	arcsec	9 [8] <sup>1)</sup>	9	
5th axis		Type	Swivel head [Tilting head]	Swivel head	
<b>MACHINING UNITS</b>					
Tool shank	SK/BT for selected units available as alternative	Size	HSK-A 100	HSK-A 100	
Variants	Type: Speed/Power S6 40%/ Torque S6 40%	min <sup>-1</sup> /kW/ Nm	PCU: 8,000/60/1,146	PCU: 8,000/60/1,146	
			[PCT: 6,000/43/822]		
			[SCU: 12,500/80/350]	[SCU: 12,500/80/350]	
			[SCT: 12,500/80/350]		
<b>TOOL MANAGEMENT</b>					
Chip-to-chip time	t <sub>2,3</sub>   VDI 2852	s	8.5	8.5	
Tool weight <sup>2)</sup>		kg	25 [35]	25 [35]	
Chain-type magazines	Magazine places	Number	50 [100/150]	50 [100/150]	
	Tool length/diameter <sup>4)</sup>	mm	600 [800]/Ø 280	600 [800]/Ø 280	
	Tool shank	Size	HSK-A 100/SK 50/BT 50	HSK-A 100/SK 50/BT 50	
Rack-type magazines	Magazine places	Number	[265/425]	[265/425]	
	Tool length/diameter <sup>4)</sup>	mm	600 [1,000] <sup>3)</sup> /Ø 280	600 [1,000]/Ø 280	
	Tool shank	Size	HSK-A 100/SK 50	HSK-A 100/SK 50	

Technical data			FP 14000	FP 16000	FT 16000
<b>WORKPIECE MANAGEMENT</b>					
<b>Type</b>			Pallet changer	Pallet changer	Table loading
<b>Clamping surface</b>	Nominal size	mm	1,000 x 1,000	1,250 x 1,600	Ø1,300
<b>Workpiece dimension</b>					
					
	Diameter D / Depth T x Width W	mm	Ø1,400 / 1,650 x 2,900	Ø2,000 / 2,000 x 2,900	Ø2,500
					
	Height H	mm	1,800	1,725	1,725
<b>Clamping load</b>		kg	4,000	8,000	8,000
<b>Load pallet changer</b>	Total/load difference	kg	8,000/2,500	16,000/8,000	-
<b>Pallet change time</b>		s	35	75	-
<b>MACHINE</b>					
<b>Dimensions</b>	approx. L x W x H   Basic machine with standard chain-type magazine, coolant unit with paper band filter and platforms, if required.	mm	10,150 x 8,350 x 5,300	12,600 x 8,350 x 5,400	8,150 x 9,050 x 5,400
	approx. L x W x H   Basic machine with standard chain-type magazine, coolant unit with backflush filter and platforms, if required.	mm	10,550 x 8,150 x 5,300	13,000 x 8,150 x 5,400	8,150 x 8,350 x 5,400
					
<b>Weight</b>	approx.   Basic machine with standard chain-type magazine, without coolant unit	t	36	55	34
<b>CONTROL TECHNOLOGY</b>					
<b>Machine control</b>			Siemens SINUMERIK 840D sl		

Technical data			CP 8000	CT 8000	CP 10000
<b>LINEAR AXES</b>					
Positioning range	X/Y/Z	mm	1,250/1,200/1,400		1,600/1,400/1,600
Rapid traverse speed	X/Y/Z	m/min	50		45
Acceleration	X/Y/Z	m/s <sup>2</sup>	4		4/4[3] <sup>1)</sup> /4
Feed forces	X/Y/Z   S3 40%	kN	15/15/20		15/15/20
Positioning tolerance Tp / At <sup>5)</sup>	X/Y/Z   VDI/DGQ 3441 / ISO 230	mm	0.008		0.008
<b>ROTARY AXES</b>					
NC rotary feed table	B   Speed/Torque S3 40%	min <sup>-1</sup> /Nm	-		-
NC rotary feed table: Mill-Turn	B   Speed S3 40%/Torque	min <sup>-1</sup> /Nm	500/4,270		360/6,560
Positioning tolerance Tp / At <sup>5)</sup>	B   VDI/DGQ 3441 / ISO 230	arcsec	9 [8] <sup>1)</sup>		9 [8] <sup>1)</sup>
5th axis		Type	Swivel head [Tilting head]		Swivel head [Tilting head]
<b>MACHINING UNITS</b>					
Tool shank	SK/BT for selected units available as alternative	Size	HSK-T 100		HSK-T 100
Variants	Type: Speed/Power S6 40%/ Torque S6 40%	min <sup>-1</sup> /kW/ Nm	PCU: 8,000/60/1,146		PCU: 8,000/60/1,146
			[PCT: 6,000/43/822]		[PCT: 6,000/43/822]
			[SCU: 12,500/80/350]		[SCU: 12,500/80/350]
			[SCT: 12,500/80/350]		[SCT: 12,500/80/350]
<b>TOOL MANAGEMENT</b>					
Chip-to-chip time	t <sub>2,3</sub>   VDI 2852	s	6.3		7.1
Tool weight <sup>2)</sup>		kg	25 [35]		25 [35]
Chain-type magazines	Magazine places	Number	50 [100/150]		50 [100/150]
	Tool length/diameter <sup>4)</sup>	mm	600 [800]/Ø 280		600 [800]/Ø 280
	Tool shank	Size	HSK-T 100		HSK-T 100
Rack-type magazines	Magazine places	Number	[265/425]		[265/425]
	Tool length/diameter <sup>4)</sup>	mm	600 [1,000] <sup>3)</sup> /Ø 280		600 [1,000] <sup>3)</sup> /Ø 280
	Tool shank	Size	HSK-T 100		HSK-T 100



Technical data			CP 8000	CT 8000	CP 10000
<b>WORKPIECE MANAGEMENT</b>					
Type			Pallet changer	Table loading	Pallet changer
Clamping surface	Nominal size	mm	800 x 800	Ø1,100	1,000 x 1,000
Workpiece dimension		mm			
	Diameter D / Depth T x Width W	mm	Ø1,250/ 1,250 x 1,810	Ø1,810	Ø1,400/ 1,400 x 2,160
Clamping load		mm			
	Height H	mm	1,400	1,400	1,600
Clamping load		kg	2,000	2,000	4,000
Load pallet changer	Total/load difference	kg	4,000/1,500	-	8,000/2,500
Pallet change time		s	21	-	35
<b>MACHINE</b>					
Dimensions	approx. L x W x H   Basic machine with standard chain-type magazine, coolant unit with paper band filter and platforms, if required.	mm	8,400 x 5,850 x 4,850	8,350 x 6,750 x 4,850	10,350 x 7,300 x 4,750
	approx. L x W x H   Basic machine with standard chain-type magazine, coolant unit with backflush filter and platforms, if required.	mm	8,400 x 5,700 x 4,850	8,350 x 6,600 x 4,850	10,350 x 7,150 x 4,750
Weight	approx.   Basic machine with standard chain-type magazine, without coolant unit	t			
			27	25	35
<b>CONTROL TECHNOLOGY</b>					
Machine control			Siemens SINUMERIK 840D sl		

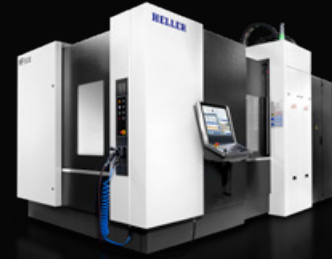
# Productivity over the full spectrum



## 4-axis machining centres

# H

Tailor-made off the peg:  
Flexibly configurable 4-axis machining centres with unbeatable productivity and unparalleled resilience



## 5-axis machining centres

# HF

Productivity in 5 axes:  
5-axis machining centres with the 5th axis in the workpiece for dynamic and productive machining



## 5-axis machining centres

# F

The benchmark in 5 axes:  
5-axis machining centres with the 5th axis in the tool for high-performance 5-sided and simultaneous 5-axis machining



## 5-axis milling/turning machining centres

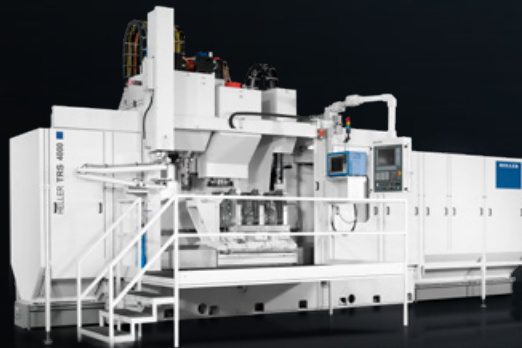
# C

Powerful complete machining:  
5-axis milling/turning machining centres for combined milling and turning on one machine

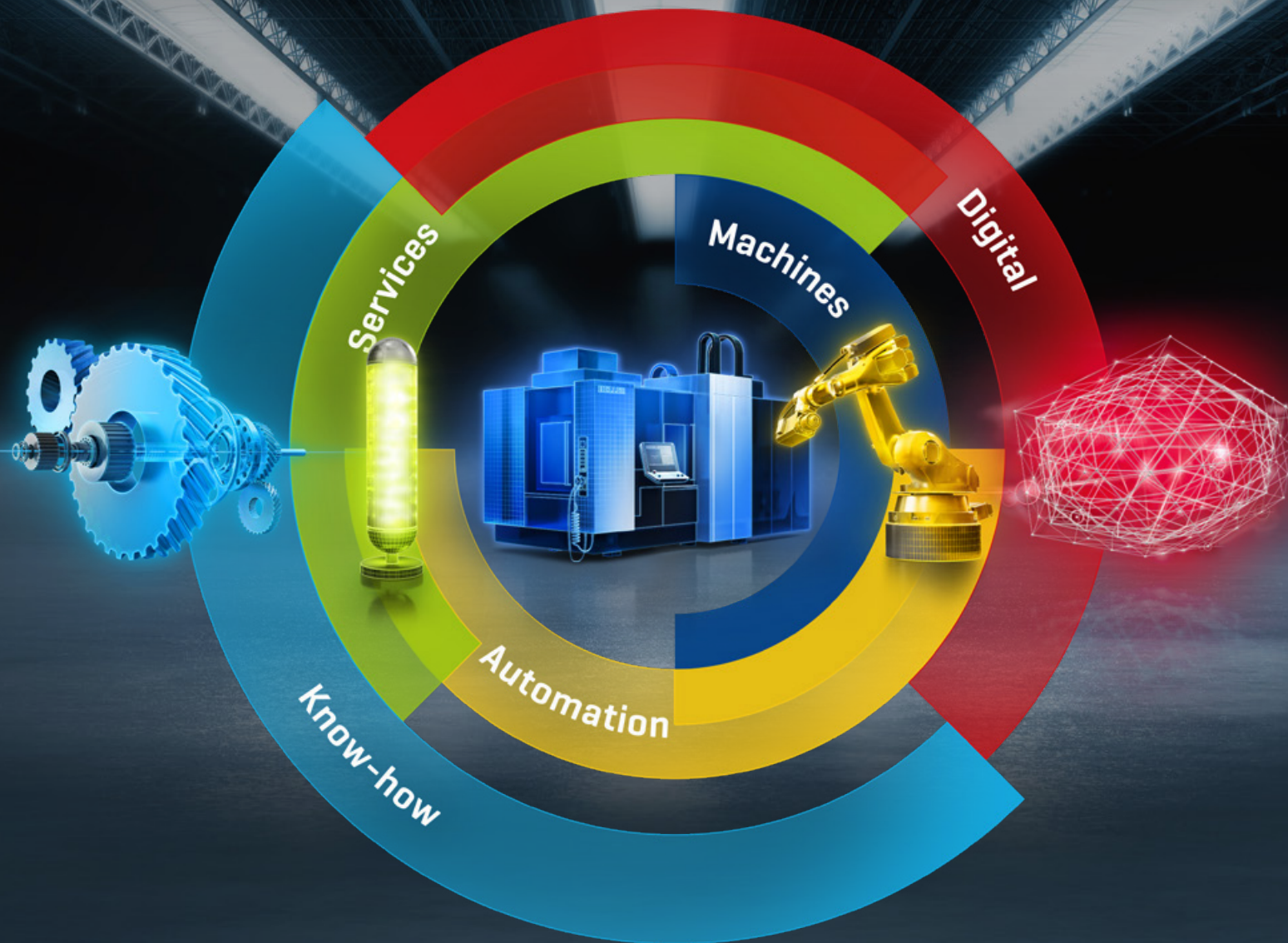


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