Machining centres

HELLER

5-axis complete machining

THE F/C SERIES

HELLER solutions:
Knowing how it's done.

HELLER solutions: Knowing how it works.

CONTENTS

H series

Flexibly configurable 4-axis machining centres

HFseries

Horizontal 5-axis machining centres with fifth axis in the workpiece

Our quality pledge

MADE BY HELLER

F series

**5-axis production machines
with and without pallet changer**

C series

**5-axis milling/turning centres
for complete machining**

The basis for quality and precision for each HELLER solution is a simple principle: HELLER machines produce HELLER machines.

Our machining centres evolve within a worldwide production network that manufactures to the high HELLER quality standards. We develop and produce ourselves all components that ensure the reliability, accuracy and quality of a HELLER machine. Especially when it comes to the daily availability of your HELLER, we consider the deepest vertical integration paramount. Therefore: Made by HELLER – a quality seal on which you can rely.

SUSTAINABLE PRODUCTION

Powerful machining centres for 5-axis complete machining.

F series for 5-side machining and simultaneous 5-axis machining

C series for milling/turning jobs (Combined Processing) with a 5th axis in the tool and a fast rotating NC table

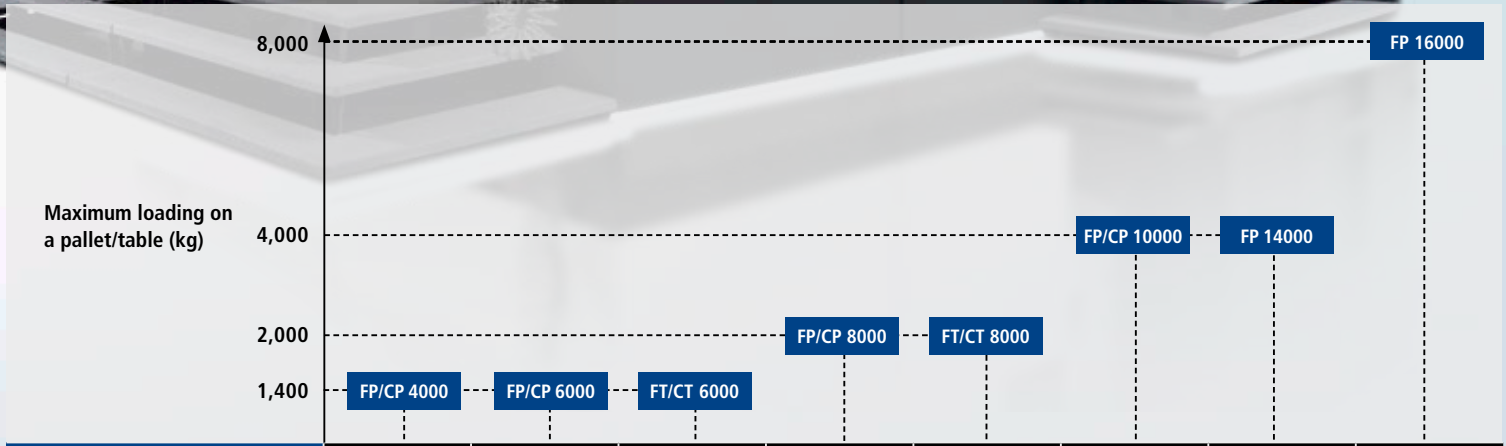
Pallet changer concept for productive high-volume machining, connection to pallet automation systems possible

Table concept for optimally accessible table loading – suitable for a large part and product range with small batch quantities

Sound HELLER process experience ensures maximum output with optimised quality

Robust machine design, combined with powerful spindle technology

Increases productivity, time and cost savings due to complete machining in one setup

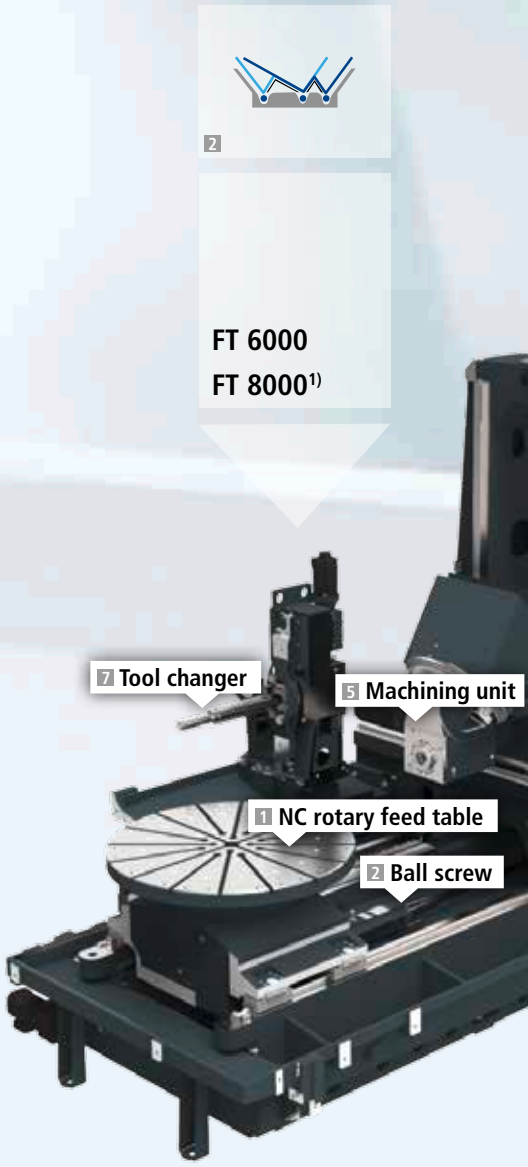


Pallet (mm x mm)/Table (mm)	500 x 630	630 x 630	ø 1,000	800 x 800	ø 1,100	1,000 x 1,000	1,000 x 1,000	1,250 x 1,600
X (mm)	800	1,000	1,000	1,250	1,250	1,600	2,400	2,400
Y (mm)	800(900[1)])	1,000	1,000	1,200	1,200	1,400	1,600	1,600
Z (mm)	1,045	1,300	1,300	1,400	1,400	1,600	1,600	1,600
V (m^3)	0.67	1.30	1.30	2.10	2.10	3.58	6.14	6.14

[1)] Tilting head

Machine concept

STRUCTURE AND



Every HELLER machine essentially comprises main components developed using FEM methodology. These include a machine bed optimised for stiffness and a mass-reduced column for high dynamics. At the same time, the vibration-optimised machine structure ensures the best surface quality during machining and long tool life.

1 F/C 4000: NC rotary feed table traverses in the Z-axis driven by two ball screws.
F/C 6000 – 16000: NC rotary feed table traverses in the Z-axis driven by a central ball screw.
For all machine sizes: Optimised force flow and thermo-symmetrical design

2 F/C 4000: Unrestricted chip evacuation below the tool spindle.
F/C 6000 – 16000: Optimum chip removal by 3 spiral conveyors

D BASIC LAYOUT

3 Extremely rigid cast iron machine bed bears the X and Z axes

4 X-axis designed as a topology-optimised cast iron column

5 Powerful and precise machining units in the Y-axis – essentially with spindle growth compensation as standard

6 Pallet changer: Highly-accurate even at high loads for maximum productivity

7 Tool changer: Fast and precise even at high tool weights and tool moment of weight

8 Use of highly-accurate linear guides and absolute coded measuring system (glass measuring scales, rotary encoders)

[1)] shown here

INNOVATIVE SPINDLE TECHNOLOGY

F series

Broad range of between 4 swivel heads and and 4 tilting head units available

High cutting performance thanks to extremely rigid machining units

Speeds of up to 16,000 rpm

Torques to 822 Nm with tilting head and to 1,146 Nm with swivel head

Ideally suited for heavy-duty cutting of cast iron, steel and titanium and the volume cutting of light alloys

Tilting head

Compact tilting head geometry with rigid spindle mounting

A swivel range from +30° sub-equatorial to -120°

Optional A-swivel range extension from +55° to -120°

A-axis driven by 2 swing motors and a braced power train

Energy and media routing through the tilting head jaws

Spindle growth compensation as standard

C series

Turning and milling with the 5th axis in the tool

Vertical, horizontal and positioned turning with A/C and B axes

Producing precise outer and inner contours

Repeatability and precise positioning of the tool thanks to HSK-T tool shank

Torsionally rigid and repeatability due to spindle lock

Swivel head

Thermally stable and compact design with 45° swivel head geometry with water cooling

Short distance between swivel head mounting and tool holding fixture for high stability and rigidity

Rigid cast iron guide slides

C swivel range from +15° to -190°

Optional C-swivel range extension
from +140° to -200° (tool shank 40/63) or
from +155° to -190° (tool shank 50/100)

Energy and media routing through centre of swivel head

Spindle growth compensation as standard

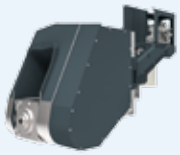
Options

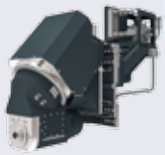
Attachment head support (MSK) offers a larger support basis for supporting attachment heads and improves rigidity

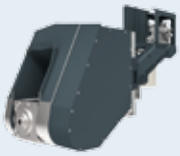
Facing slide as a full axis, integrated into the NC-controller, for contour and facing work (HSK A-100)

Spindle units

Ideally equipped for the most demanding tasks





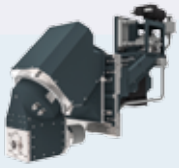
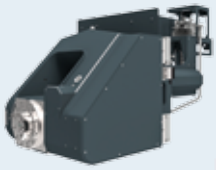
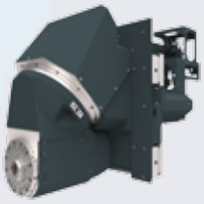


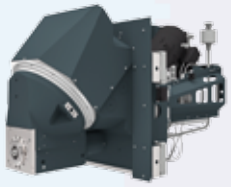
Machining centre	SCT 63 (Speed Cutting Tilt)	SCU 63 (Speed Cutting Universal)	PCT 63 (Power Cutting Tilt)
FP 4000	☐	■	☐
CP 4000	☐	■	–
FP/FT 6000 & CP/CT 6000	–	–	–
FP/FT 8000 & CP/CT 8000	–	–	–
FP/CP 10000	–	–	–
FP 14000	–	–	–
FP 16000	–	–	–

Technical data				
Speed range	rpm	5 – 16,000	5 – 16,000	5 – 10,000
Torque[1] (F/C)	Nm	80/68	80/68	116/-
Power[1] (F/C)	kW	40/34	40/34	46/-
Tool holding fixture	SK/HSK-A/BT	-/63[2]/-	-/63[2]/-	-/63[2]/-
Facing slide[4]		–	–	–
HELLER attachment head support (MSK)		☐	☐	☐

[1] S6 40 %, duty cycle 10 minutes
[2] for C series with HSK-T holder and spindle lock
[3] not for C series
[4] for D'Andrea tools

■ Standard
- unavailable
☐ Optional



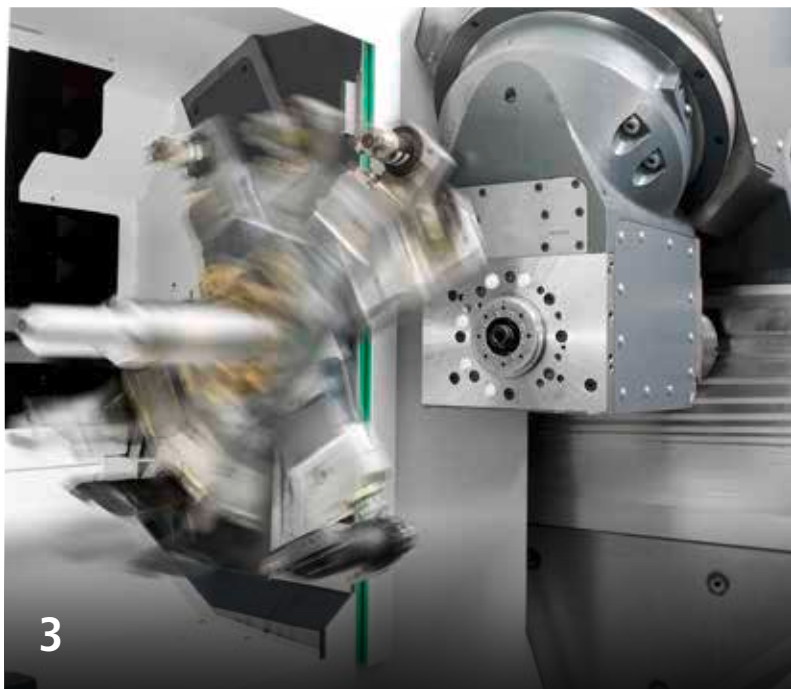
PCU 63 (Power Cutting Universal)	SCT 100 (Speed Cutting Tilt)	SCU 100 (Speed Cutting Universal)	PCT 100 (Power Cutting Tilt)	PCU 100 (Power Cutting Universal)
☐	–	–	–	–
☐	–	–	–	–
–	☐	☐	☐	■
–	☐	☐	☐	■
–	☐	☐	☐	■
–	☐	☐	☐	■
–	☐	☐	☐	■
5 – 10,000	5 – 12,500	5 – 12,500	5 – 6,000	5 – 8,000
242/242	350/350	350/350	822/822	1,146/1,146
44/44	80/80	80/80	43/43	60/60
40[3]/63[2]/40[3]	-/100[2]/-	-/100[2]/-	50[3]/100[2]/50[3]	50[3]/100[2]/50[3]
–	–	–	–	☐
☐	☐	☐	☐	☐

Tool management

Fast, precise, flexible

1

2



3

Chain-type magazine

1 Chain-type magazine with tool holders mounted on both sides in the double chain for optimised traversing dynamics

Compact dimensions with high packing density for your tools

Rack-type magazine

2 Rack-type magazine with highly-dynamic loader for tool provisioning

Short loading times thanks to optimised operating strategy

Tool changer

3 For short chip-to-chip times and follow-on tool provisioning during machining

Tools always precisely positioned for the tool change due to the traverse attachment acting as a link between the chain-type magazine and the tool changer; with the rack-type magazine, this function is performed by the loader

Tool changer essentially with NC drive for lifting and swivelling

Options

Tool break monitoring during machining for effective process reliability

Setting during machining for selected magazines

Tool shank cleaning

Tool coding

Measuring probe with radio or infrared technology

Tool measurement

Machining centre	Chain-type magazines							Rack-type magazines				
	C 54	C 80	C 160	C 240	C 50	C 100	C 150	R 409	R 265	R 425	R 191 HD	R 324 HD
FP/CP 4000	■	□	□	□	–	–	–	□	–	–	–	–
FP/CP 6000	–	–	–	–	■	□	□	–	□	□	–	–
FT/CT 6000	–	–	–	–	■	□	□	–	□	□	–	–
FP/CP 8000	–	–	–	–	■	□	□	–	□	□	□	□
FT/CT 8000	–	–	–	–	■	□	□	–	□	□	□	□
FP/CP 10000	–	–	–	–	■	□	□	–	□	□	□	□
FP 14000	–	–	–	–	■	□	□	–	□	□	□	□
FP 16000	–	–	–	–	■	□	□	–	□	□	□	□

Technical data

Tool holding fixture (SK/HSK/BT)	40/63/40	40/63/40	40/63/40	40/63/40	50/100/50	50/100/50	50/100/50	–/63/–	50/100/–	50/100/–	50/100/–	50/100/–
Tool Ø[1] (mm)	160/72	160/72	160/72	160/72	280/112	280/112	280/112	188/72	280/112	280/112	400/112	400/112
Bridge mounted tool (mm)	Ø 260 x 160	Ø 260 x 160	Ø 260 x 160	Ø 260 x 160	Ø 460 x 280	Ø 460 x 280	Ø 460 x 280	Ø 300 x 188	Ø 550 x 280	Ø 550 x 280	Ø 850 x 280	Ø 850 x 280
Length (mm)	450	450	450	450	600 (800[4])	600 (800[4])	600 (800[4])	-/450/-	600	600	1,000[6]	1,000[6]
Weight[5] (kg)	12	12	12	12	25 (35)	25 (35)	25 (35)	12	25 (35)	25 (35)	50	50
Moment of weight[2] (Nm)	10	10	10	10	30 (50)	30 (50)	30 (50)	10	30 (50)	30 (50)	70	70
Loading during machining[3]	–	–	□	■	□	□	■	■	■	■	■	■

[1] Adjacent places free/all spaces occupied

[2] relative to the tool gripper groove

[3] HZP= During machining

[4] For F/C 6000 only in combination with swivel head units

[5] Observe overall load capacity

[6] 800 mm in combination with tilting head units

■ Standard

□ Option

– unavailable

( ) optional values

Workshop or production machine

Table concept

1 Optimised access to the work area via the three-part work door for optimal tool handling

Table with large clamping surface

With mechanical or hydraulic workpiece clamping

Ideal for workshops with small batch quantities and frequently changing machining tasks

1

Pallet changer concept

Optimised for the workpiece automation of 4-axis and 5-axis machines combined with one other in productive machining

2 Optimised power grip due to fork shape of the swivel traverse for total loads of up to 8 t

Total load up to 16 t with slide/swivel pallet changer

Air nozzles on the swivel traverse for chip clearance

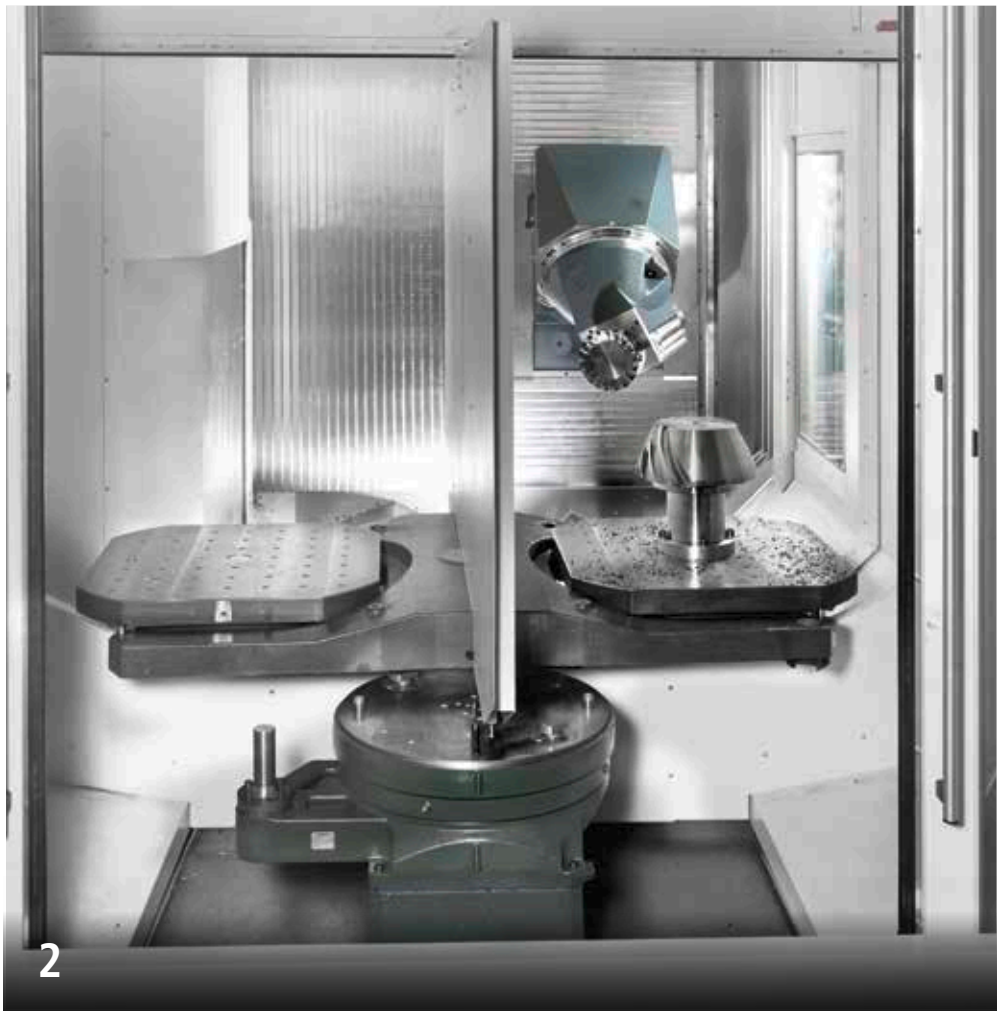
Protects the interfaces from mechanical damage caused by pallet indexing

Optional cleaning of functional surfaces at rotary table and setting station with maintenance function

Friction-locked 4 x 90° indexing at the setting station with foot release

3 Optional automatically rotating NC setting station with automatically actuated setting station doors

Optional pneumatic location check, unclamp or positioning check



2

NC rotary feed table variants

Worm gear drive for optimised damping, without compromising rigidity

As directly driven rotary table at up to 1,000 rpm (CP 4000)

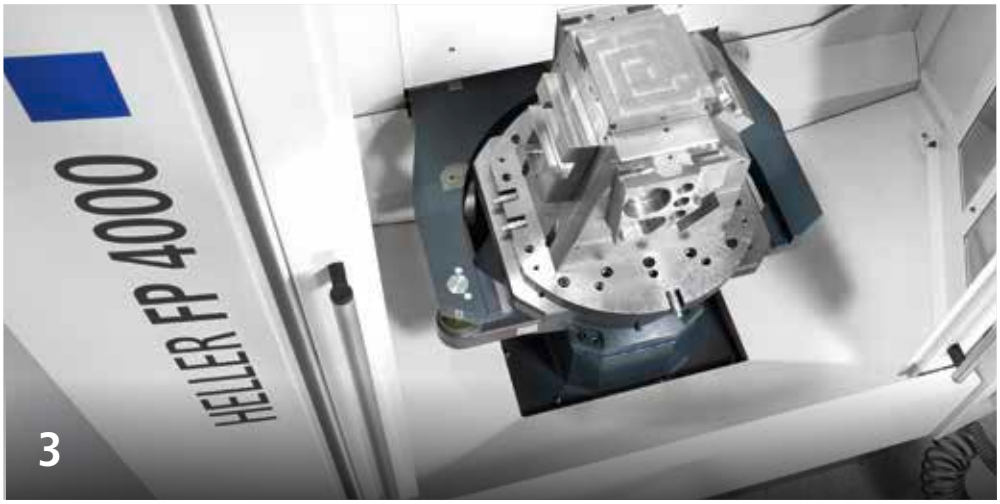
Imbalance detection integrated into the controller during machining

Highly reliable tilting moments thanks to compact design

Rotary clamping device with oil-hydraulically actuated diaphragm brake

Rotary table positioning through direct path measurement with absolute rotary encoder

Optionally-available "Media interface" for hydraulic workpiece clamping to 60 bar for F and C series, F series has additional 200 bar or 200 bar with proportional valve technology



3

Chip disposal

Perfect answers to your needs

Chip conveyor and coolant unit

With scraper conveyor or hinge band conveyor - depending on machining process requirements

Coolant unit in paper band filter or vacuum rotation filter technology

Cooling lubricant high pressure with 50 bar, optionally with 70 bar

Internal coolant supply with up to 7 pressure stages programmable in the NC program

High coolant unit tank volumes delivering high volumetric flows

Optional additional coolant cooler for even higher process reliability through thermal stability

Work area

1 Size 4000: Unrestricted chip evacuation below the spindle and central conveyor for fast chip removal and increased production

Machine sizes 6000 to 16000: Optimised chip disposal from the work area by 3 spiral conveyors

Continuous self-cleaning effect of the moved concertina cover by stainless steel louvres

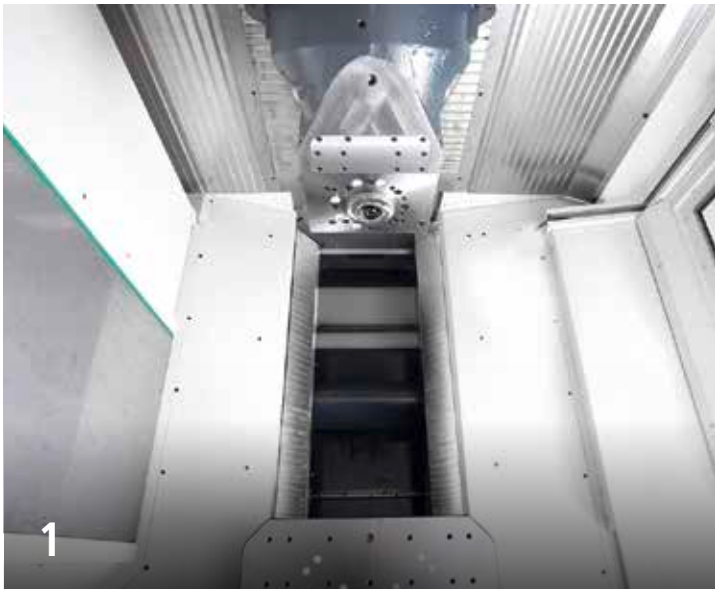
Extensive flushing nozzles for wet machining for keeping workpiece and work area clean as standard

Additional flushing of the machine bed

Easy to clean thanks to good access to the work area

Air and flushing gun as standard

Optional extraction of lubricants from the work area



Proven and perfected

1


2


3

Table concept

1 One arm philosophy: Short-stroke doors can be operated by one arm

2 Optional: Convenient operating terminal at the tool loading position

Best-possible access to the work area

Optimally-designed guard panels

Linear-guided, smooth running doors, hence optimal access during loading

Pallet changer concept

3 Optimum access to operating stations

Control panel at the setting station with integrated media guns

Simple connection to all standard automation systems

Optionally with pane blow-off device at the main operating door

Short distance to the centre of the setting station for convenient handling

Automatic setting/desetting sequence for increased process reliability and short idle times

Control panel is ergonomically integrated into the guard panels

Tool setting

Tool setting at the magazine when spindle is running

Smooth running doors to the setting station with linear guide

Optionally-available: User-friendly operating panel

Control

Ideal solution for complete machining

For perfect 5-axis machining: Sinumerik 840D sl

Highly-accurate speed and acceleration control

Variable adjustment to individual requirements with good accuracy and surface finish

Operator interface SINUMERIK Operate for efficient programming and operation

Comprehensive cycle package as standard

User-friendly setup functions

For combined processing: Sinumerik 840D sl

Highly-accurate speed and acceleration control

Variable adjustment to individual requirements with good accuracy and surface finish

Graphical cycle support

Remote diagnosis via HELLER RDS

Integrated balancing functionality

Maintenance

Optimised life cycle costs in an instant

1 All function-relevant systems and components are quickly and easily accessible

Easily removable guards and positioning designed for maintenance purposes guarantees access by a single action

The main spindles can be quickly replaced thanks to HELLER's tried and proven Zero Spindle system

2 The concentration of supply units and maintenance points at just a few locations ensures quick and easy inspection and operation

A quick response HELLER spare parts service equates to the shortest possible production interruptions in an emergency

With package offers for maximum savings

HELLER BLUE
Energy-efficient packages that guarantee you an energy saving of up to 30%

Regenerative drive systems, servomotors that make efficient use of the entire speed range and output-reduced valves have been standard at Heller for many years. Methods for optimising the topology of structural components (e.g. beds and columns) have also been consistently in use for a number of years.

Thus enabling rigidities to be increased and the mass of moved components to be optimised. The new HELLER BLUE energy-efficient packages allow - depending on the machining situation - further potentials to be systematically exploited. The more universal and versatile the machining tasks, the more important an adaptive (i.e. demand-regulated) current consumption of the periphery and main units, to be able to optimise various operating points.

HELLER BLUE basic

Basic supply for all H, F and C series

Use of IE2 motors with up to 5% less current consumption

Individual switch-off of individual consumers after a programmable specified time

HELLER BLUE supply

Needs-driven compressed air shut-off

Constant media and filter monitoring supported in uninterrupted machine operation

HELLER BLUE smartsupply

Flexible switch off/on of all consumers

In additional to HELLER BLUE supply, switch off or sleep mode for further function units such as coolers, pumps, lights, chip conveyors, drives, seal air and other options

HELLER BLUE coolant

A frequency converter ideally adapts the volume flow of the high pressure coolant pump and hence also the energy consumption to your machining requirements

HELLER BLUE chill

Flexible control instead of ON/OFF circuit

Just like the coolant pump, the central cooler can also be controlled via a frequency converter in line with machining requirements

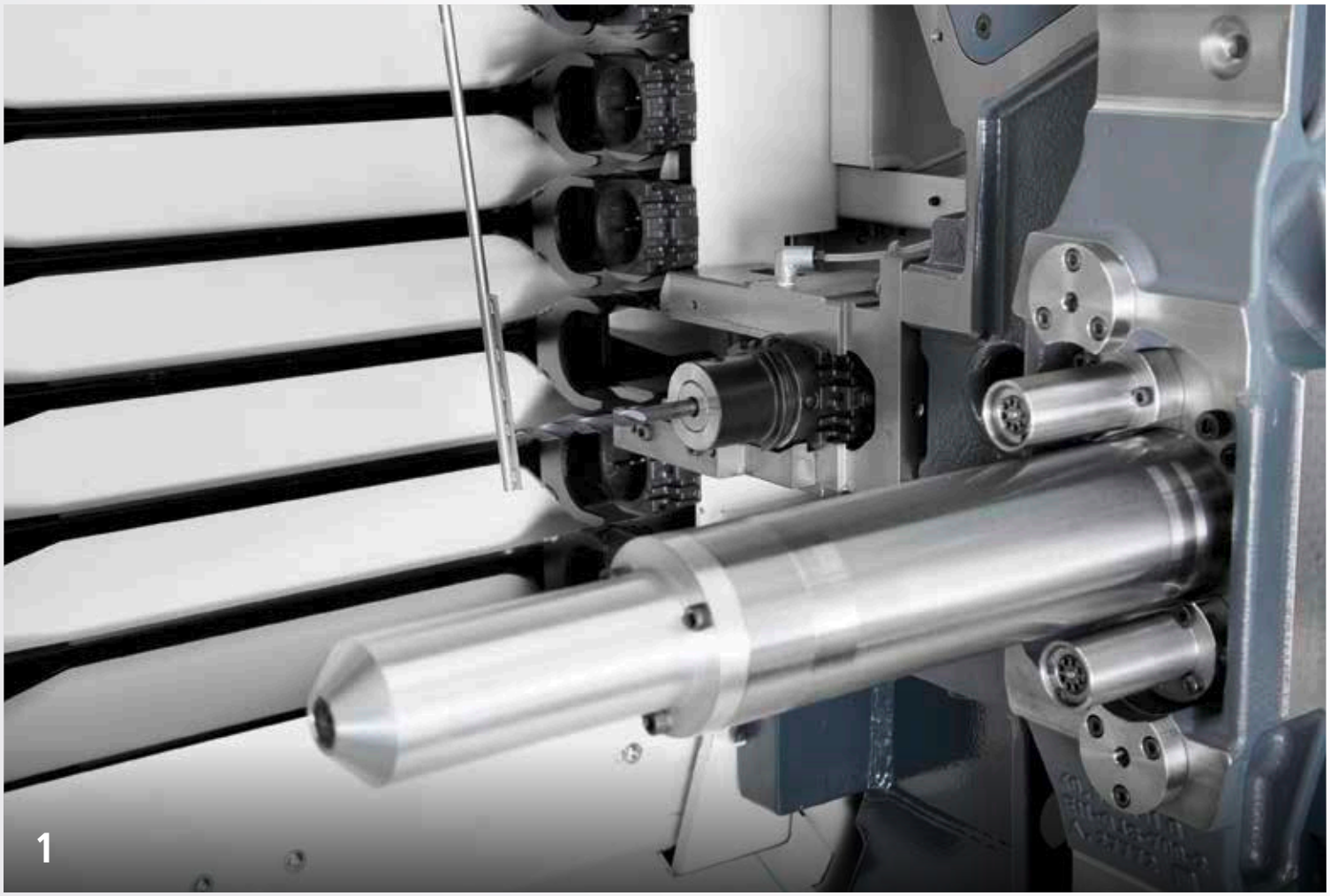
The current consumption is significantly reduced by a new compression technology

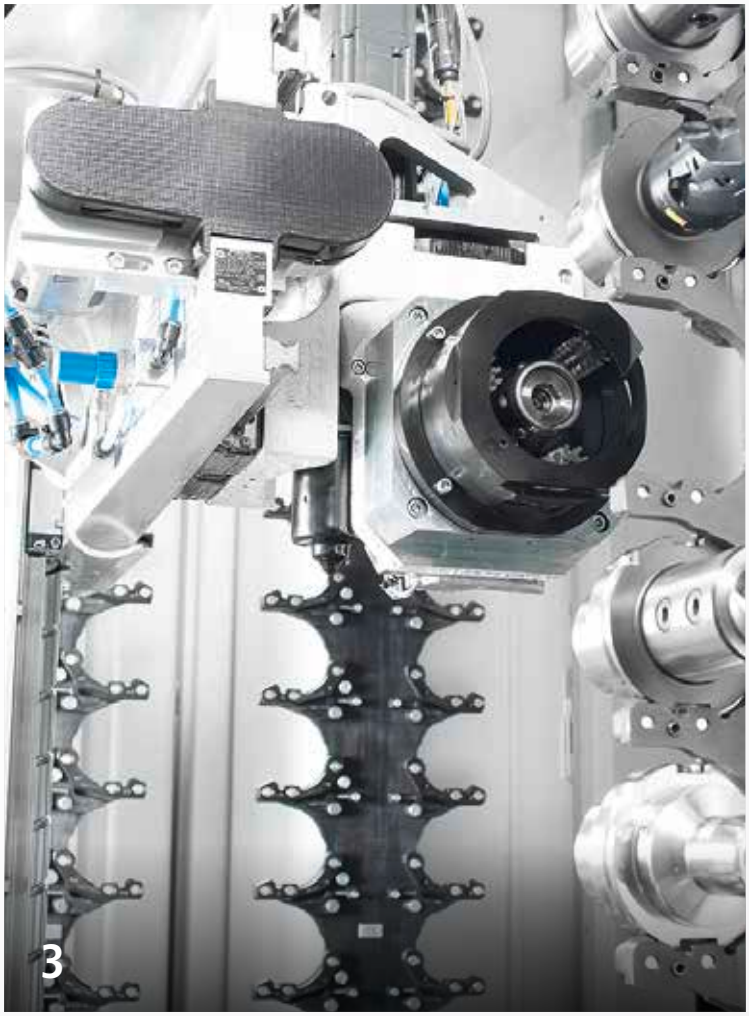
HELLER BLUE hydraulics

High pressure on demand

Booster technology in accordance with the pressure amplification principle ensures low-noise, energy saving high-pressure provisioning while simultaneously minimising heat admission into the hydraulic system

TYPICAL "EXTRA" QUALITY FROM HELLER





1 Tool break monitoring during machining

2 Measuring probe with radio or infrared technology

3 Tool cleaning for chain-type magazine and rack-type magazine – chain-type magazine incl. cartridge rinsing, rack-type magazine with brush and flushing options

HELLER Zero Spindle principle for fast main spindle replacement

HELLER attachment head support (MSK)

Facing slide with special tools (D'Andrea) for turning operations on a machining centre

Spindle growth compensation as standard for guaranteed machining accuracy

Air nozzles on the swivel traverse, pallet support, pallet lock and coupling points for media transfer for optimised process reliability

Laser tool measurement for F series and as combination of lasers and scanner for C series

Swivel range extension

SOLUTIONS FOR HIGHER EFFICIENCY

F and C series machines are productivity centres: They work highly accurately and effectively, remain extremely reliable even under constant load, and can be flexibly adapted to new tasks.

The same is true for our automation solutions. They have been designed to optimise your production process and maximise added value. The results are maximised effective machining time, optimised throughput and increased production output.

We offer automation solutions that perfectly match your requirements and that are constantly being refined. The corresponding cost and safety benefits of these concepts are passed directly on to you.

The offer ranges from simple pallet magazines to pallet rack systems through to flexible robotic cells for complete workpiece handling.

1 Overhead gantry loader

2 Fully automatic loading via mobile robot

3 Pallet rack system

4 Pallet and tool automation system

5 Rotary pallet magazine

6 Semi-automated loading with balancer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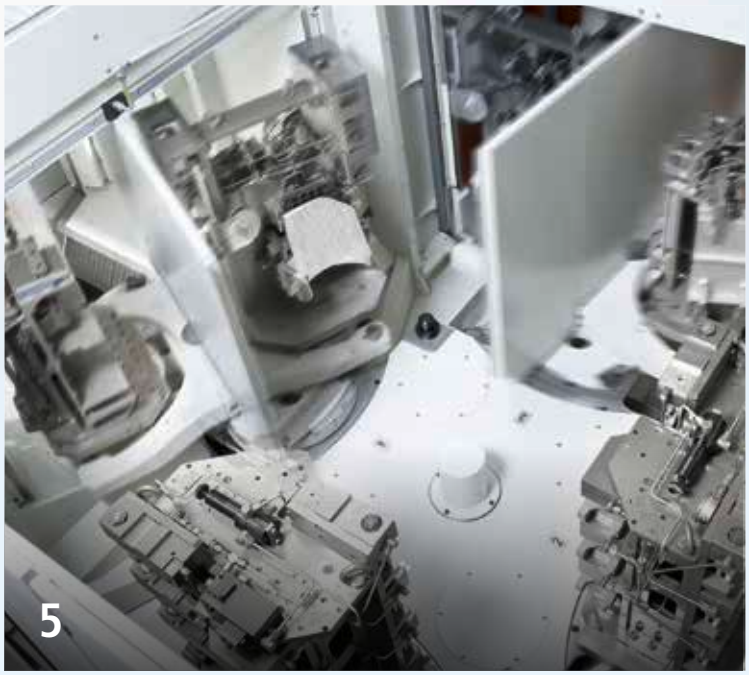
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6

ENSURING MAXIMUM PRODUCTIVITY

Especially when it comes to global competition, maximum productivity is now considered to be the key success factor in machining. Achieving maximum productivity hinges on the interplay between several aspects: besides optimising production, especially the reduction of unplanned downtimes and increasing machine availability. That's why HELLER machines and HELLER Services simply belong together. HELLER Services guarantees optimised machine availability for many years through its worldwide presence, fast reaction times and qualified support. You benefit from a comprehensive range of services:

HELLER Optimisation Packages

To increase the performance and productivity of HELLER machines in your facility, HELLER is offering you an extensive range of standardised optimisation packages. Through these packages, HELLER always provides the right answer to your optimisation requirement, e.g. in adapting to new production tasks. In the following areas:

- Machining unit
- Media supply
- Measuring probe
- Process optimisation
- Guard panels/machine frame
- Software/control
- Workpiece management
- Tool management
- Increased energy efficiency

HELLER Retrofit – new productivity

To make available resources fit again for the production life, we take care of all relevant aspects of retrofitting:

- Status check and disassembly
- Overhaul of the basic machine
- Overhaul of the assemblies
- Conversion of the controller
- Overhaul of the control cabinet and new cabling
- Replace covers and guards
- Acceptance at factory prior to delivery

The result is always a (almost) new machine with higher productivity and safety. The benefit to you: A retrofit machine is covered by the same guarantees and rules of warranty or service availability as a new machine.

HELLER Training

A multitude of practical training sessions that qualify your employees to work on a HELLER machine - offered by the "HELLER Academy". We also offer basic and advanced courses in the following areas:

- Operation
- Programming
- Maintenance

Upon request, HELLER Services can also provide customised, individual training on your own premises. In this case, the contents of this premium training programme will be adapted specifically to the needs of your company, and cover all HELLER specialist areas (technology, control technology and machine technology).

HELLER TPS – the modular service package

To provide you with optimal support as you maximise your productivity, HELLER has developed the TPS (Total Productive Services) modular service package. It comprises various service packages, which integrate seamlessly into your production system – always allowing for your maintenance strategy. You decide which of the three packages is the best solution for you:

Performance Package:
Annual manufacturer inspection

Maintenance Package:
Annual manufacturer maintenance

Full Service Package:
All Inclusive