



M200

CLAMP ONCE – MACHINE COMPLETE

M200
[DE] [EN] [US] [FR] [IT] [ES] [BR] [RU] [CN] [JP]

M200 MILLTURN – A new dimension in complete machining

Designed by the Austrian high tech company WFL Millturn Technologies, the M200 MILLTURN is a first-class multifunctional turning-boring-milling center. Complete machining enters a whole new dimension with this revolutionary machine-tool generation.

Established MILLTURN-assemblies were combined with a new machine bed concept in order to create an uncompromising turning-boring-milling center for complete machining of large work pieces. Different headstock and tailstock versions cover operations ranging from the production of aerospace components with large swing diameters to the production of large and heavy chuck or shaft parts.



■ New workpiece dimensions

■ Impressive performance

■ Superior flexibility



M200

Uncompromising machining

The centerpiece of the M200 is a new heavy duty turning-boring-milling unit that achieves top performances with regards to all types of cutting technologies.

The full potential of the cutting tools involved in these operations may be exploited with the help of the stable HSK-A125 tool interface. Moreover, powerful drives generate the highest feed forces possible and a dynamic that is exceptional for a machine of this size. Besides heavy duty boring and deep boring operations, the M200 offers unlimited possibilities for workpiece ID machining.



A large number of customized solutions can easily be achieved with the standard modules. WFL, however, is also the right partner for individual special solutions, as it has decades of experience in project-related machine-tool building.

Productivity benefits acquire a new dimension with the exceptional machine concept of the M200 MILLTURN, as a considerable part of the costly workpiece handling is no longer required. In addition to this, sophisticated and thus expensive clamping devices, which are



necessary parts in conventional machining centers, are no longer required.

The fully enclosed working area with variable platform concept (patent pending) is yet another feature that makes the M200 MILLTURN stand out from conventional machine tools in this size category. The innovative design of this platform concept gives the machine operator best possible access to the workpiece. Apart from the substantial productivity benefits, the M200 MILLTURN also sets new benchmarks in terms of safety, cleanliness and ergonomics.



The standard tool interface

In order to meet the demands of a wide and varied technological spectrum, MILLTURN turning-boring-milling centers exclusively use modular tool interfaces that provide continuous precision and maximum stiffness. For the accomplishment of highly efficient deep hole drilling operations and for the use of different special technologies, WFL provides a large range of additional options.

Coolant pressure



- High pressure coolant supply directly through the milling spindle
- MILLTURN turning-boring-milling center as full deep hole drilling machine
- No additional tool interface necessary till 200 bar
- High pressure coolant to optimize chip breaking
- Increase in tool life

Ejector drilling



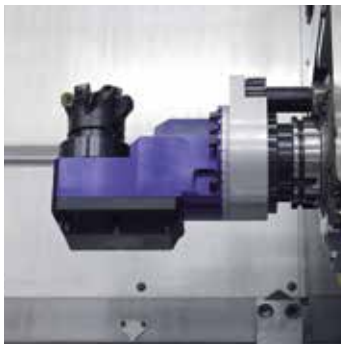
- External coolant interface for high volume coolant throughput
- Automatic docking also for external coolant interface
- Additional manual interface for automatic docking available
- Individual sizing of the coolant pumps and filters

Ultra High Pressure Coolant (UHPC)



- Considerable improvement of chip breaking
- Special advantages when working with high temperature resistant materials
- Significant increase in cutting parameters (time-saving)
- Increase in tool life of the cutting tools
- UHPC with up to 350 bar
- Increased process security and reduced machining costs

Special heads



- Special heads for particular machining challenges (workpiece geometries which are difficult to access, special operations, special coolant adapters)
- Handling by means of the automatic tool changer
- Optional torque support prevents unwanted rotation of the special head and provides rigid connection to the B-axis housing

Tool magazine



Tool change

- Generously dimensioned and automated tool changer with double gripper
- Time-saving due to a highly dynamic changing sequence
- Reliable changing sequences, also with heavy tool weights
- Tool change in any Z-axis position
- Tool change of tools measuring up to 1000 mm and 40 kg possible



Tool change

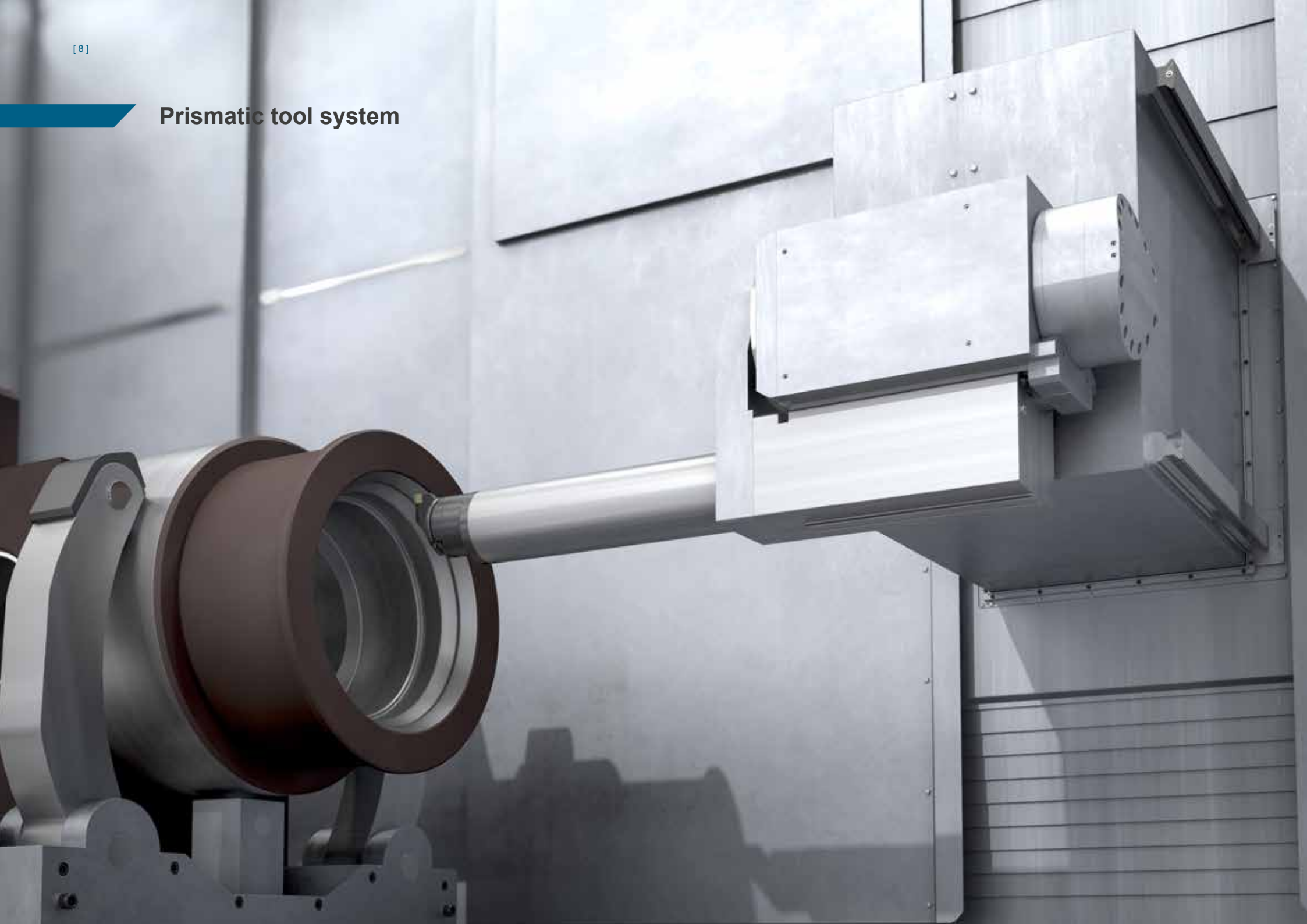
Tool magazine

- Standard disc-type magazine with up to 90 tool stations
- Optional chain magazine for operations involving a high number of tools
- Optional magazine version for particularly long and heavy tools (e.g. heavy boring bars)
- Optimum user-friendliness of all magazine versions



Chain Magazine

Prismatic tool system



Prismatic tool interface

- Second solid interface at the B-axis housing of the turning-boring-milling unit
- For tools exceeding the maximum dimensions of the standard tools
- Solid clamping of boring bars, solid drills, angular heads and facing heads
- Use of the WFL system boring bar allows automated change of the cutting heads
- Two different magazine types available for the automatic handling of heavy ID machining tools



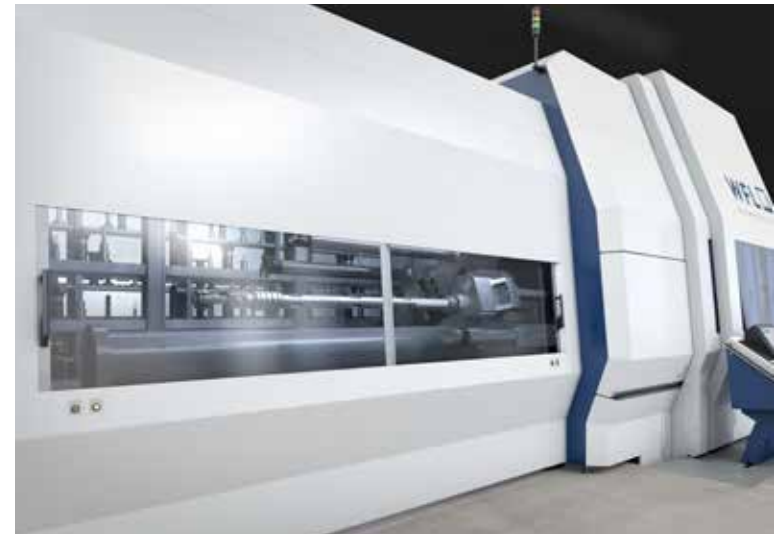
Pick-up magazine

Pick-up magazine

- Additional tool magazine above the headstock
- 5 magazine stations
- Max. tool length: 3000 mm
- Max. tool weight: 300 kg

Heavy boring bar magazine

- Additional disc-type magazine with 15 stations
- Max. tool length: 3000 mm
- Max. tool weight: 300 kg
- Automatic tool handling via an additional heavy duty tool changer



Heavy boring bar magazine

U-axis



- U-axis solution for cavities and complex spindle operations
- For tools like CNC facing heads, special feed out bars for bottle boring and seat pocket machining
- Angular machining also possible with optional U-axis
- Enormous cost reduction potential for manufacturers in the aerospace, oil and gas industry
- Highest possible stability due to tool accommodation via prismatic interface
- Automatic tool change, also for large tools



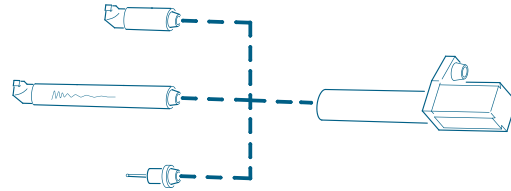
CNC facing head



Internal machining for seat pocket

Prismatic tool system

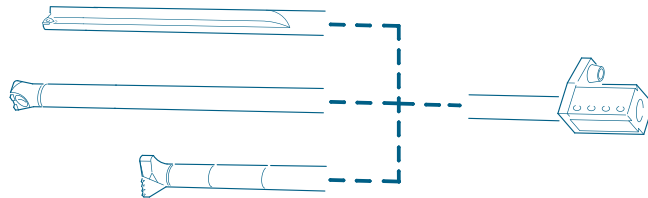
WFL system boring bar
automatic head change



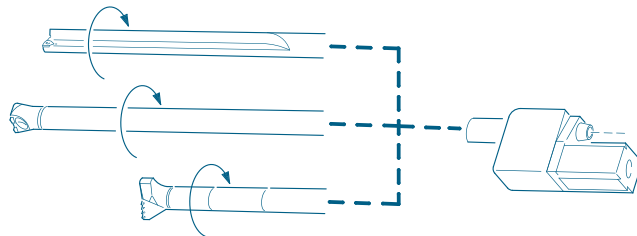
Boring bar
single-piece, vibration damped



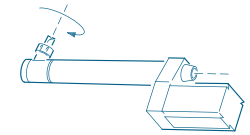
Deep hole drilling tool
for concentric bore



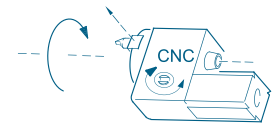
Deep hole drilling tool
rotating for off center bore,
with coolant supply



ID machining tool
driven



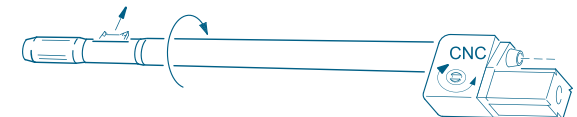
CNC facing head
rotating, with radius adjustment
B-axis: -90° / +45°



CNC special contour boring bar
stationary, with radius adjustment
(bottle boring)



CNC special contour boring bar
rotating, with radius adjustment
(seat pocket machining)



Big bar slide

- Additional slide for heavy duty drilling and boring
- No reduction of the Z-axis travel
- Machining length (overhang) of the heavy boring bar is freely programmable (for maximum stability at various machining depths)
- Heavy boring bar dimension on request
- Standard interface for modular tooling heads
- Automatic tool change via standard tool changer



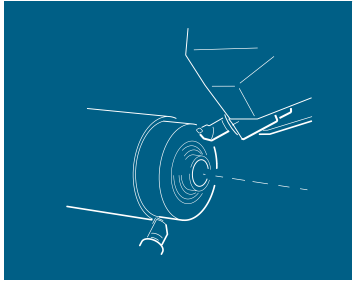
Tool control in the working area



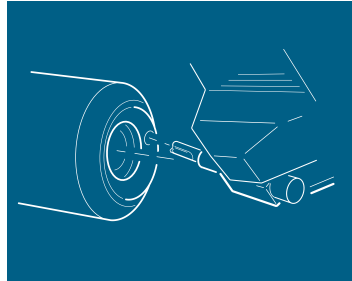
Big bar slide

Technologies by WFL

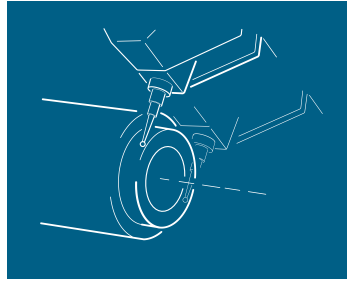
4-axis turning



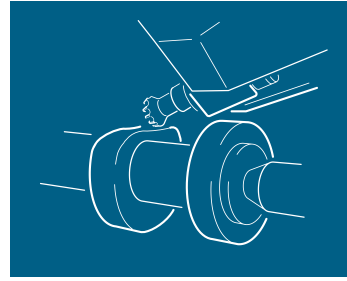
Drilling



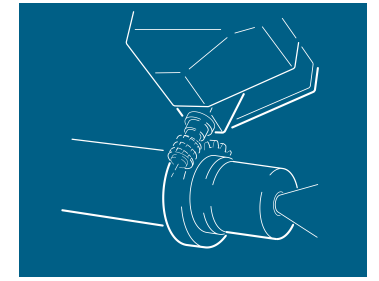
In-process measuring



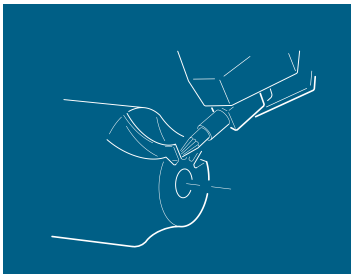
Cam-milling



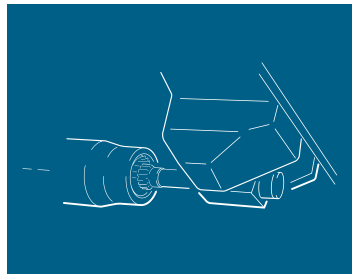
Gear hobbing



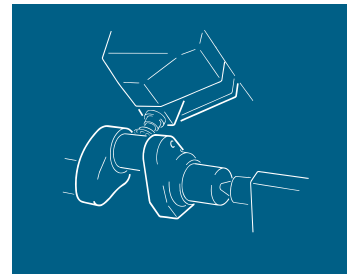
5-axis milling



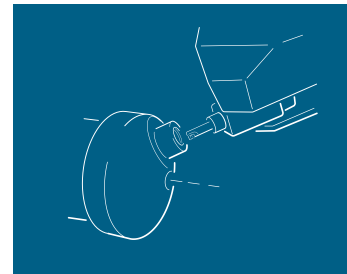
Shaping



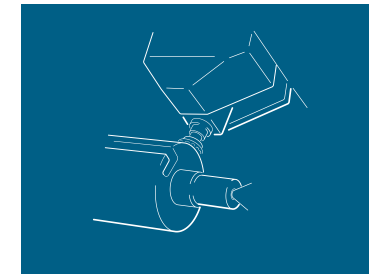
Milling of crankshaft pins



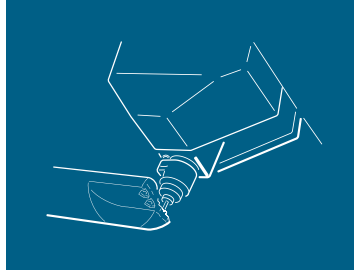
Circular milling



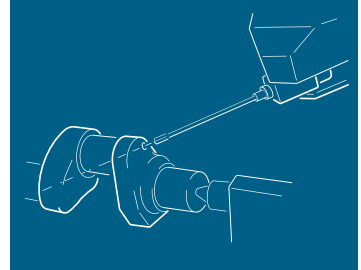
Turn-milling



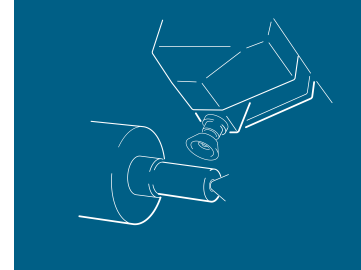
Special tool heads



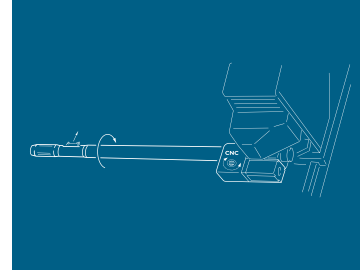
Gun drilling



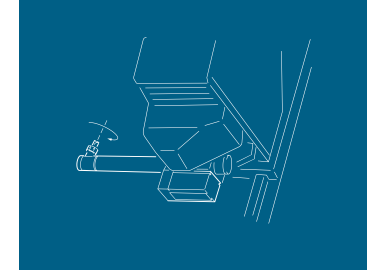
Grinding + fine machining



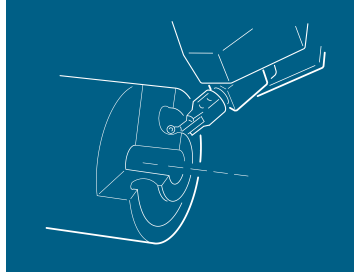
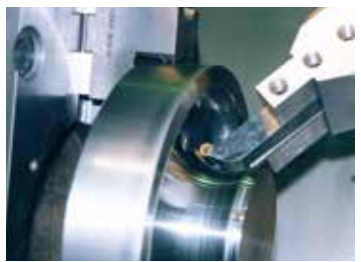
CNC special contour boring bar



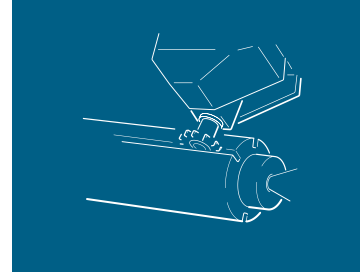
ID machining tool



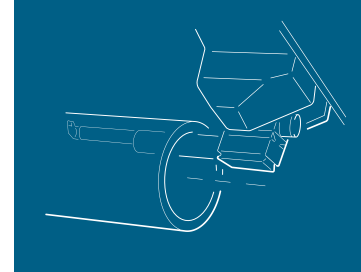
B-axis turning



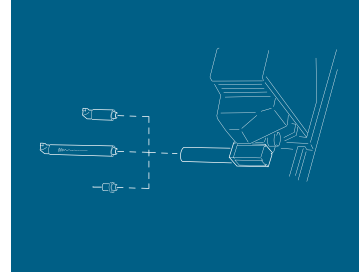
Milling



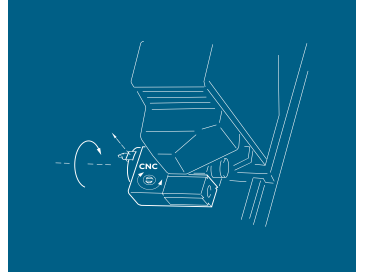
Drilling + ID boring



WFL system boring bar



CNC facing head



Ergonomic industrial design



- User-friendly access to the tool magazine from the front of the machine
- Tool exchange while machining is in progress
- Large sliding windows of the tool magazine easy to move
- Optional loading device for heavy tools



- Height-adjustable operating panel
- Tilttable 19-inch screen
- Longitudinal movement of the operating panel covering the whole working area up to and including the tool magazine
- Integrated printer compartment

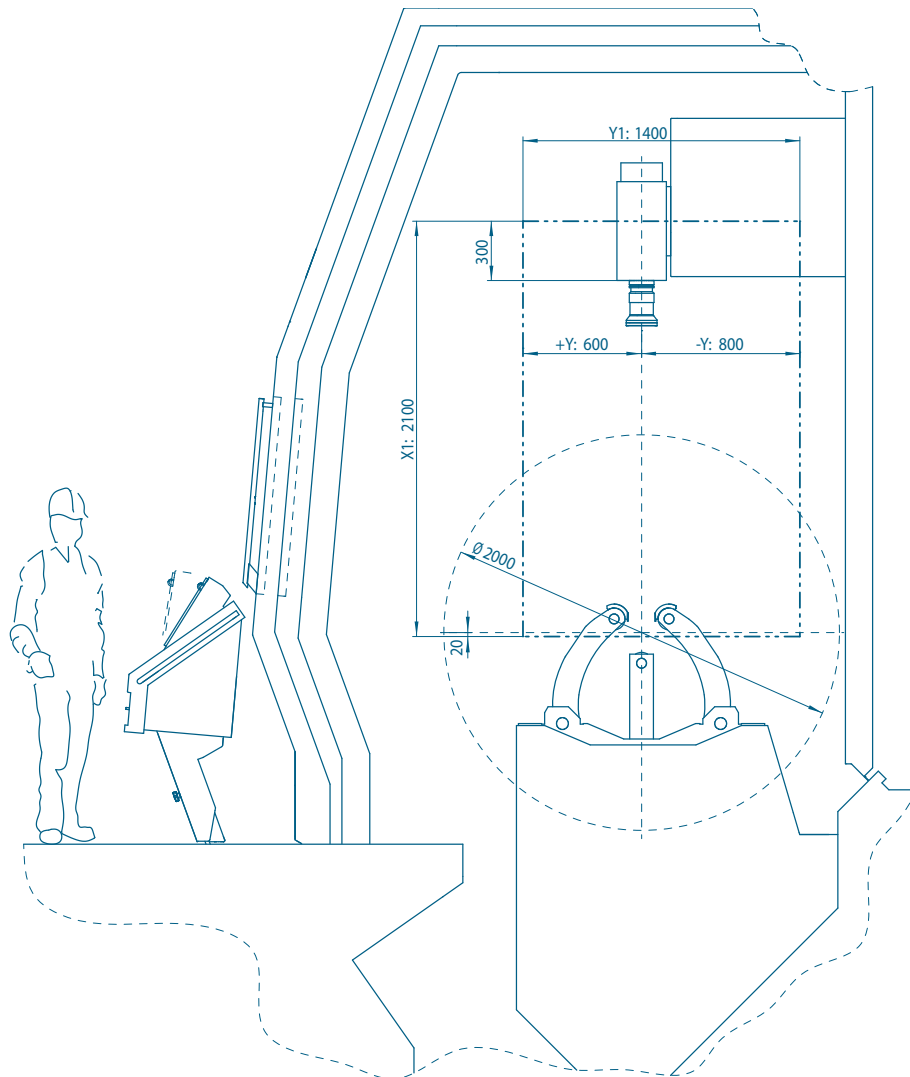


- Innovative access solution for the working area (patent pending)
- Platform concept in the working area adaptable to the workpiece for best possible and safe access
- Fully enclosed working area for maximum security and cleanliness

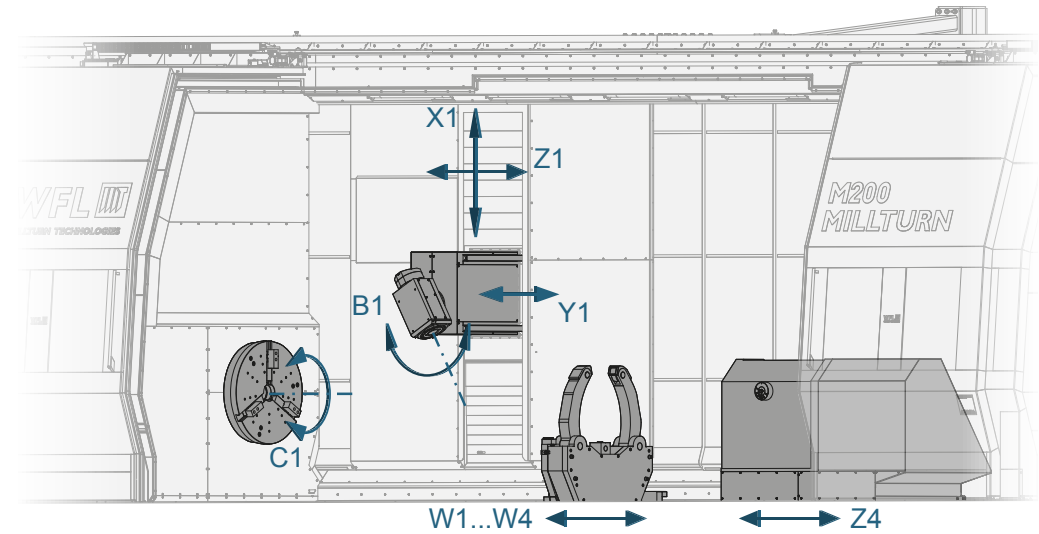


- Large dimensioned safety glass windows for best possible vision in the working area
- Optional spin windows
- Innovative lighting concept with LED lighting
- Automatic, solid sliding doors

Machine cross section



Axes scheme



C1: C-axis of the left main spindle

B1: B-axis of the turning-boring-milling unit (B-axis housing)

X1: X-axis of the turning-boring-milling unit

Y1: Y-axis of the turning-boring-milling unit

Z1: Z-axis of the turning-boring-milling unit

W1-W4: Z-axes of the steady rest slides

Z4: Z-axis of the tailstock

Software solutions by WFL

State-of-the-art control technology

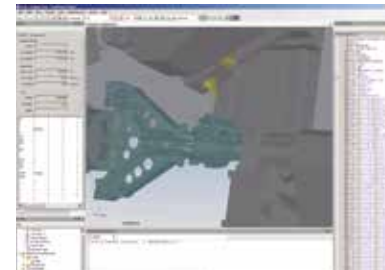
- CNC control Sinumerik 840D sl with highest possible processing power
- Exceptionally user-friendly programming
- Perfect compatibility with all established CAD/CAM systems
- Transfer of NC programs, technology data, measuring logs, tool data and magazine occupation via Ethernet

Safety is a central concern

- Sophisticated MILLTURN safety concept based on electronic functions
- Comprehensive error diagnosis on the spot or via the Internet
- Extremely short response times and simple control cabinet design offer substantial advantages compared to conventional solutions

No more first-off inspection, accurate log

- High-precision probes, linear position feedback systems and backlash-free antifriction guideways transform the MILLTURN into a 3D measuring machine
- Modular gaging software including intelligent gaging strategies
- Creation of complex user-specific gaging sequences possible
- Determination of work piece features or forging allowances before the actual machining
- Tool wear is compensated automatically
- Software-based temperature compensation to rule out machining faults caused by thermal expansion of the workpiece
- Hard disk storage or printing of measuring protocols



Simulation



Reality

Up to 12 monitoring channels for extra safety ...

- Perfected built-in process monitoring system to survey and visualize the forces developed in all axes and spindles
- Transparent metal cutting process and optimization potentials easy to identify
- Tool breakage and collision monitoring
- Teach-in mode stores cutting forces and allows comparison with previous values
- Interruption of machining if the cutting forces exceed the freely definable tolerance limits

Professional CAM solutions by WFL

**CRASH®
GUARD
STUDIO**

... for the programmer:

- **CrashGuard Studio** – 3D simulation software for the verification of NC programs on the computer
- **Millturn PRO** – Graphically interactive program editor in CrashGuard Studio



**CRASH®
GUARD**

... for the operator:

- **CrashGuard** – Software for real time collision prevention, integrated in the interpolator of the CNC system



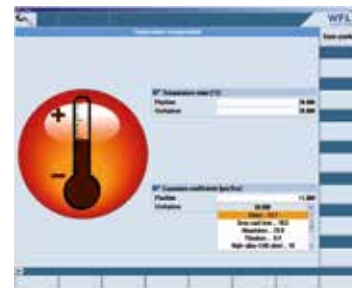
Process monitoring



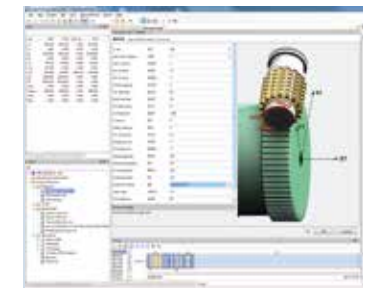
Tool management



Tool offset



Temperature compensation



Millturn PRO program editor

M200 MILLTURN

WORKING RANGE

Nominal center distance	mm	5000 / 6500 / 8000 / 10000 / 12000 / 14000 *
Turning length max. (depending on clamping device)	mm	5200 / 6700 / 8200 / 10200 / 12200 / 14200 *
Turning diameter max.	mm	2000

TURNING SPINDLE

Spindle head, version 1 / 2 / 3	DIN 55026	B20 / B28 / B28
Spindle bore, version 1 / 2 / 3	mm	200 / 220 / 320
Spindle diameter in front bearing, version 1 / 2 / 3	mm	300 / 480 / 600

MAIN DRIVE

Power max. (100% duty cycle), version 1 / 2 / 3	kW	100 / 120 / 160
Torque max. (100% duty cycle), version 1 / 2 / 3	Nm	9800 / 40000 / 80000
Spindle speed max. – main spindle, version 1 / 2 / 3	min ⁻¹	1000 / 500 / 350

C-AXIS

Speed max., version 1 / 2 / 3	min ⁻¹	9 / 9 / 9
Torque max. (100% duty cycle), version 1 / 2 / 3	Nm	12000 / 15000 / 30000
Smallest programmable increment	Degrees	0,001

TAILSTOCK (Mechatronic)

Quill diameter	mm	300 / 500
Quill travel	mm	300
Feed force max. (adjustable)	kN	9 - 75 / 50 - 400
Live center	DIN 228	Me 100 / WFL center
Weight of workpiece max.	kg	15000 / 60000

* higher values on request

** other systems on request

TURNING-BORING-MILLING UNIT

Power max. (100% duty cycle)	kW	80
Spindle speed max.	min ⁻¹	3500
Torque max. (100% duty cycle)	Nm	1800
Travel Z-axis	mm	5700 / 7200 / 8700 / 10700 / 12700 / 14700
Travel Y-axis	mm	1400 (-800 / +600)
Travel X-axis	mm	2100 (-20 / +2080)
Rapid traverse X / Y / Z	m/min	20 / 20 / 20
Swiveling range B-axis	Degrees	220 (-110 / +110)
Additional indexing B-axis	Degrees	2,5
Smallest programmable increment B-axis	Degrees	0,001
Tool system		HSK-A125 **

DISC-TYPE MAGAZINE

Number of tool stations (coded)		30 / 60 / 90 / *
Tool diameter max., neighboring tool places occupied	mm	160
Tool diameter max., neighboring tool places free	mm	320
Tool length max.	mm	1000
Tool weight max.	kg	40

MAIN DIMENSIONS

Length (with 90 off magazine, without chip conveyor)	m	17 / 18,5 / 20 / 22 / 24 / 26
Height (over floor / total)	m	4,9 / 7,1
Width	m	7,5