WFL MILLTURN TECHNOLOGIES

M100 | M120 | M150

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

M100 M120 M150

CLAMP ONCE – MACHINE COMPLETE

GROUP 1906 AUTANIA

The heavyweight class

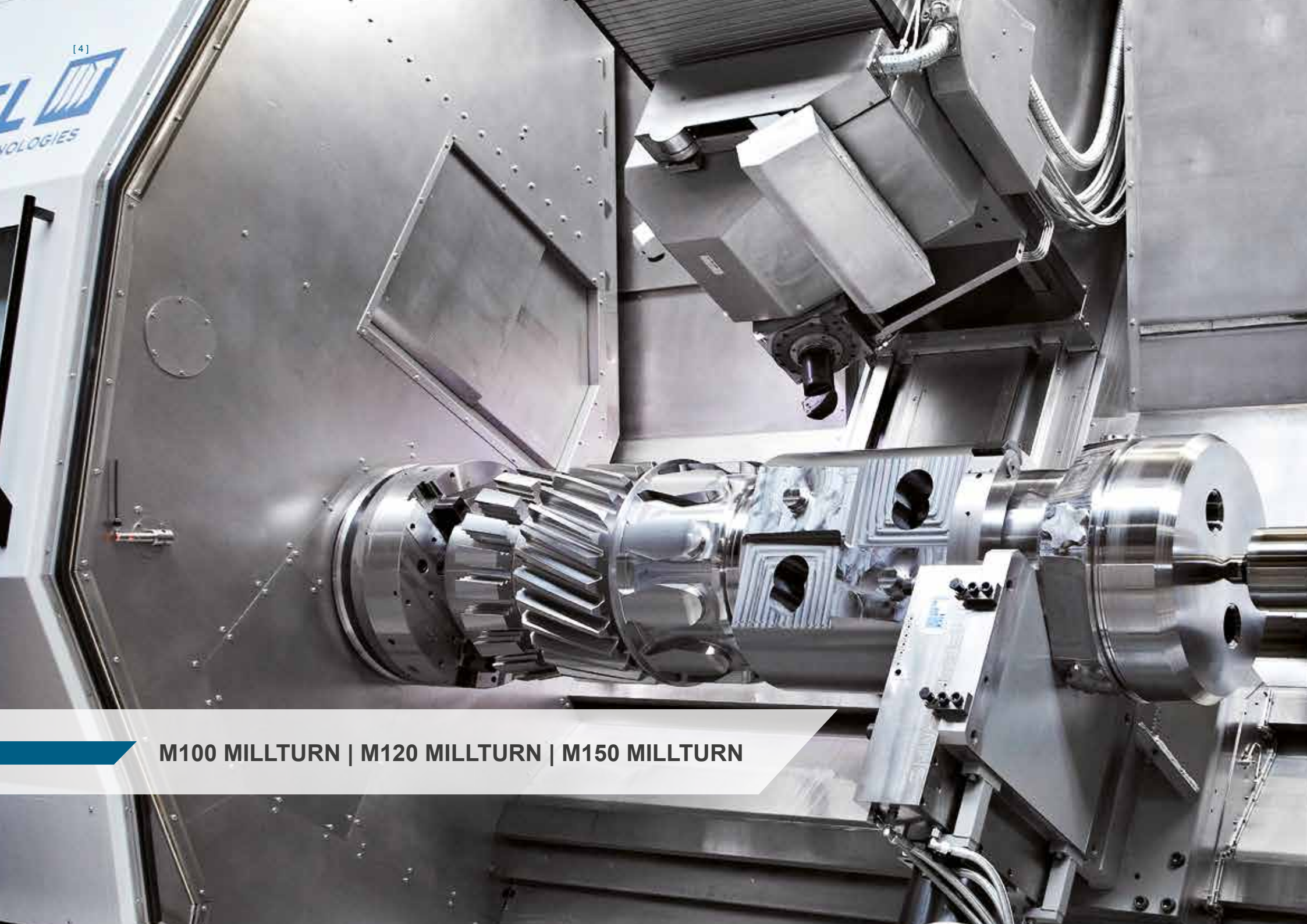
With the models M100, M120 and M150 WFL Millturn Technologies is presenting the absolute champions of multifunctional turning-boring-and-milling centers, allowing one-hit machining of complex workpieces of up to 8m* length. Besides superior output and torque values of the spindle drives, the imposing feed forces in all axes make for superb dynamics and maximum productivity.

Ingeniously multifunctional

Turning, milling, boring, gear cutting, gun drilling as well as ID machining can be performed under any angle of the tool. The interpolation of up to five axes makes machining of any geometrical profile possible. The sturdy, single piece 60° slant bed made of grey cast iron and the use of generously dimensioned guideways with extra-wide size ensure perfect stability and optimum antivibration behaviour. The incomparable number of hardware and software options plus the meticulously designed machine structure are the consequence of many years at the edge of technology.

* bigger dimensions upon request

M150
MILLTURN



M100 MILLTURN | M120 MILLTURN | M150 MILLTURN

Features

Ergonomically designed workspace

In-process measuring

Chuck mounted on right side

Prismatic tools system

WFL system boring bar

Pick-up-magazine

Heavy boring bar magazine

The prismatic interface

A second tool interface takes care of those tools that exceed the maximum dimensions of the standard equipment. Thanks to the particularly stable prismatic accommodation, boring bars, solid drills, angular heads and facing heads can be securely fixed onto the milling unit. The use of the special WFL system boring bar opens up the possibility of automatically changing the cutting heads too. For the automatic handling of heavy ID-machining tools, two different magazine types are available.

Pick-up magazine

Up to 4 tools (3 on the M100 and M120) with a maximum length of 1700 mm and a weight of 200 kg can be automatically deposited in this separate magazine above the headstock.

Heavy boring bar magazine

An extension of the standard disc-type magazine and the corresponding tool stations accomodates up to 18 bars measuring 2,500 mm and weighing 180 kg maximum in addition to the standard tools. In this case, automatic handling of the tools is ensured by a supplementary tool robot.

The standard tool interface

In order to respond to the demands of the broad technological spectrum, MILLTURN turning-boring-milling centers use only modular tool interfaces with the highest levels of long-term precision and the maximum rigidity (HSK, Capto, KM, etc.). The high pull-in forces of the standard tool interface provide for particularly reliable machining. WFL offers a broad range of add-ons to ensure highly-productive deep hole drilling processes and to enable a variety of special technologies to be used.

High coolant pressure

- High coolant pressure for optimised chip breakage
- Coolant pressure below 150 bar – High Pressure Coolant (HPC)
- Coolant pressure between 150 and 350 bar – Ultra High Pressure Coolant (UHPC)
- Significant increases in cutting parameters, tool life and process safety
- Reduced machining costs
- No additional interfaces required for up to 200 bar (coolant supplied directly through the milling spindle)

Coolant solutions for deep hole drilling

- High coolant supply rates to ensure the best possible removal of chips from the hole – this makes the MILLTURN a fully-fledged deep hole drilling machine
- Coolant supply rates of up to 800 l/min
- External interfaces with manual or automatic docking
- Additional manual interfaces possible for automatic docking
- Individual configuration of the coolant pumps and filters

Special tool heads

- Special tool heads for special manufacturing requirements (difficult to access workpiece geometries, special processes and special coolant solutions)
- The special tool heads are handled by means of the automatic tool changer
- Optional torque support prevents undesirable turning of the special tool head and ensures a rigid connection to the swivel housing

Ultra-High Pressure Coolant (UHPC)

Ejector drilling

Angular head with torque support

The tool magazine

A sufficient number of tool stations

The comprehensive range of machining possibilities requires a large number of tools. Up to 180 tool stations (depending on the tool system) housed in a particularly reliable disc magazine guarantee a sufficient quantity. In addition to the disc magazine, a chain magazine is also available as an option, providing a capacity of up to 200* tool stations. The tool changer travels in a lengthwise direction by means of a wear-free rack and pinion drive. The quick and robust tool changer with double gripper ensures that the tool changing process remains reliable in the long term.

Maximum user-friendliness

In order to reduce travel movements to a minimum, thereby also reducing non-productive idle time during tool changes, particularly in the case of long shaft components, the tool change position can be freely programmed anywhere along the travel path. The magazine can be equipped from the front side of the machine, even during machining, demonstrating the highest possible level of user-friendliness. Convenient software functions support the forward-looking and cross-task assembly of the magazine and guarantee that the tools will be able to be used until the end of the tool life.

* Higher values available upon request

Loading aid for heavy tools

Maintenance-free disc magazine

Optional chain magazine

Loading equipment for prismatic tools

WFL provides different supporting systems for easy handling of heavy ID-tools with prismatic accommodation:

Lifting device for prismatic tools

This device ensures that the tools are always in the right position on the crane hook and can thus be mounted easily to the prismatic tool interface on the milling unit. After clamping the tool (manually or hydraulically), it can be used immediately or stored in the magazine (pick-up station or external heavy boring bar magazine) by the milling unit for later use.

Loading support for prismatic tools

With this system, the heavy ID-machining tools can be mounted directly into the external heavy boring bar magazine and placed into the corresponding tool stations through the sliding window at the magazine front while machining is in progress.

Lifting device

Direct loading

U-axis

The use of driven tools with additonal NC-drive as, facing heads (D´Andrea) or special boring bars for „seat pocket machining“ (e.g. Cogsdill, ITS) requires an additional NC-axis. WFL offers such an axis (U-axis) as an option.

Even after the integration of this U-axis, the option of angular machining remains. This option can entail enormous cost reduction potentials, especially for the aerospace industry as well as for manufacturers in the oil and gas industry. In order to ensure the necessary stability, only the prism tool interface is used to accommodate tools on the U-axis. Automatic tool change is carried out either via the pick-up magazine or the prism tool changer.

Seat Pocket

Facing head

Big bar slide

As an alternative to the prismatic tool system supported by either a pick-up station or a heavy duty boring bar changer, a separate boring bar slide is available for very deep and heavy ID-operations. This slide can be coupled with the slide carrying the milling unit or be independent and operated via a separate NC-drive.

This equipment allows the use of a boring bar with a diameter of 220mm* and a variable length of up to 2000mm*. It is equipped with an automatic system tool accommodation and tools can be loaded via the standard tool changer.

Without interrupting the machining process these tools can be taken out of the magazine, controlled and fitted with new inserts.

* larger on request

Tool change on boring bar

Tool control

Workpiece support

Supporting device

Supporting device heavy

Power chucks

WFL offers a wide variety of 2-, 3-, 4- and 6-jaw chucks as well as face plates, compensating chucks and indexing chucks, if required. For special tasks also workpiece-specific chucks are used.

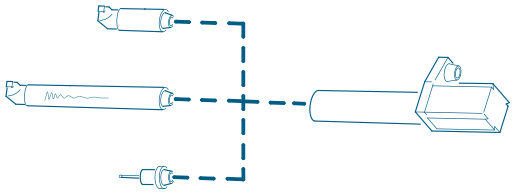
Steady rests

Depending on the slenderness of the workpiece, one or more steady rests of a variety of models and additional support tools can be used for supporting a workpiece during machining.

The steady rest slide(s) are positioned in the working area NC-controlled either by towing with the top slide or by an independent movement with a separate NC-drive. Clamping and disengaging of the slide on the guideway is automatic.

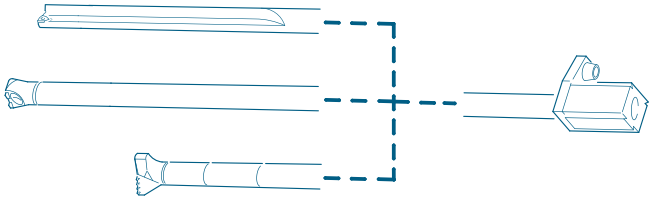
Prismatic tools

WFL system boring bar
Automatic tool head change

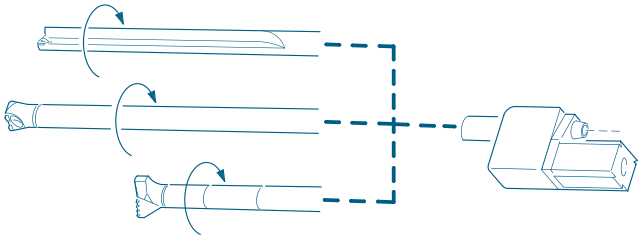


Boring bar
Single-piece, vibration damped

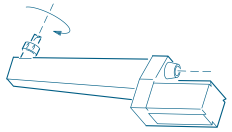
Deep hole drilling tool
For central holes



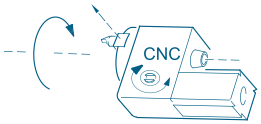
Deep hole drilling tool
Rotating, with coolant supply



Internal machining tool
Driven

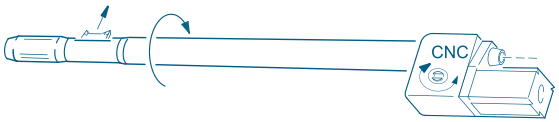


CNC facing head
Rotating with radial feed out
B-axis: -90° / +45°



CNC special contour boring bar
Static with radial feed out
(bottle boring)

CNC special contour boring bar
Rotating with radial feed out
(seat pocket machining)



Ergonomic industrial design

Simple tool setting-up

- Optimal accessibility from the front
- Setting-up during machining
- Large magazine windows that slide smoothly in a horizontal direction
- Optional loading aid for heavy prismatic tools

Optimal view of the workpiece

- Large safety windows provide the best possible overview of the working area
- Optional spin windows
- Innovative and energy-saving lighting concept with LED lamps

Machine operation made easy

- Adjustable operator panel
- Tiltable 19-inch display
- Ability of the operator panel to travel along the full length of the working range as far as the tool magazine

Modular machine concept for customer-specific manufacturing solutions

1. Machine bed

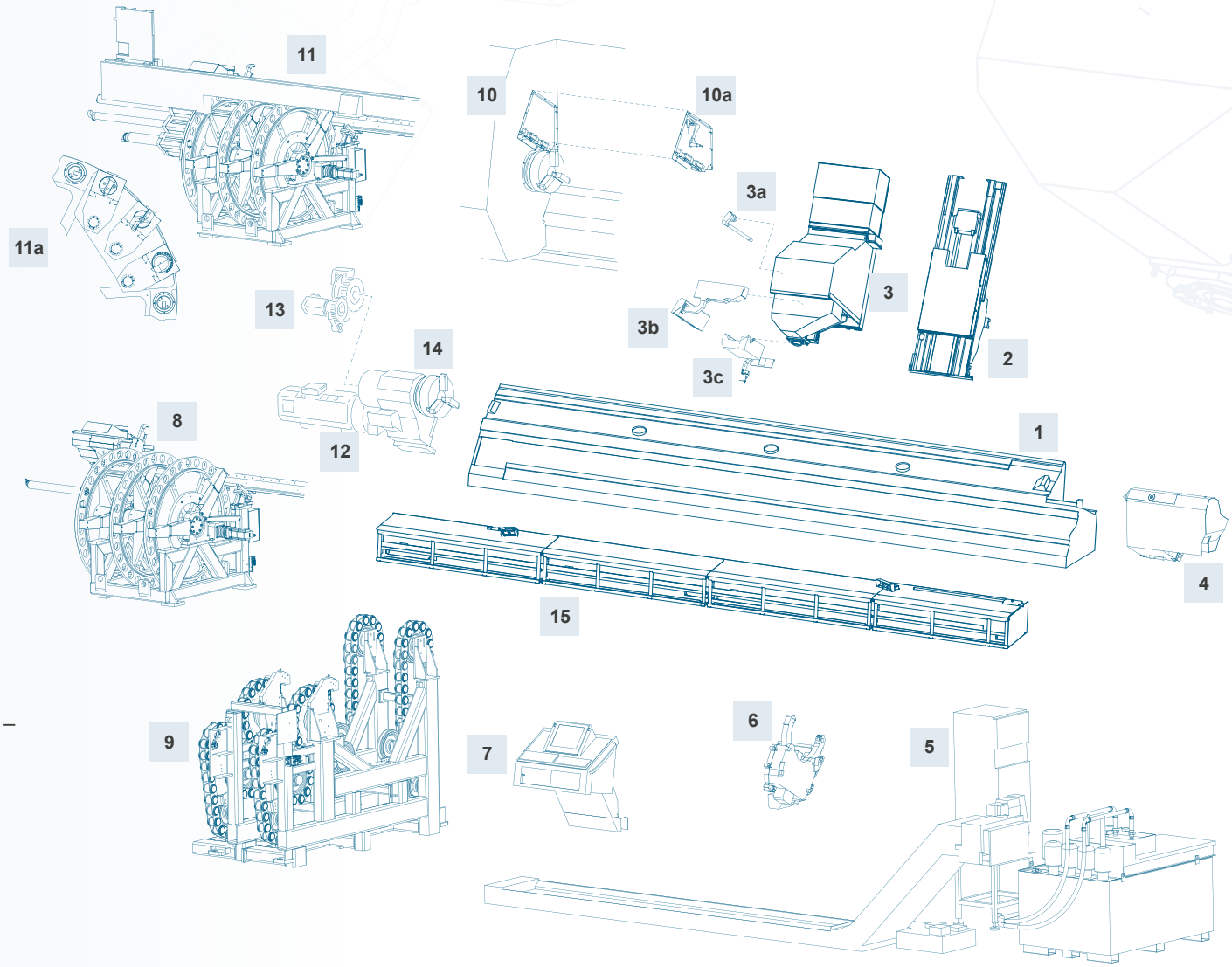
- 60° slant bed with large-scale guide ways
- Heavily ribbed cast body, designed to provide optimal torsional rigidity
- Optimal damping properties
- Minimal influx thanks to optimised chip flow
- Compact design of the bottom slides

2. Compound slide

- Cast body with optimal damping properties
- Best possible torsional and bending strength

3. Turning-boring-milling unit

- Linear direct measuring system in the X- and Y-axes
- Interpolable B-axis and B-axis clamping
- Indexable milling spindle
- Standard tool interface
- Optional prismatic tool interface
- Coolant supplied directly through the milling spindle (up to 200 bar)
- Optional external coolant supply for high supply rates – manual and automatic docking variants **(3a)**
- Optional U-axis for feed out tools **(3b)**
- Optional integrated measuring probe **(3c)**



4. Tailstock
- Positioning and feed force by easy software cycle Adjustable tip height
- Automatically positionable (dragged or with its own NC drive)
- Optional NC quill

5. Chip conveyor and coolant cleaning system
- Travels to the right
- With coolant tank and filter system

6. Steady rest
- Self-centring steady rests
- Individual clamping device and support solutions
- Automatically positionable (dragged or with its own NC drive)

7. Operator panel
- Control elements for the Siemens Sinumerik 840D sl control system
- Integrated printer

8. Disc magazine
- For up to 180 tools with a standard tool interface
- Setting-up parallel to machining time
- Max. tool length: 900 mm
- Max. tool weight: 20 kg
- Automatic tool change

9. Chain magazine (optional)
- For high tool requirements
- For up to 200 tools with a standard tool interface
- Setting-up parallel to machining time
- Automatic tool change

10. Pick-up magazine (optional)
- For up to 3 prismatic tools
- Design variants for long tools with standard tool interfaces
- Max. tool length: 1700 mm
- Max. tool weight: 200 kg
- Automatic tool change
- Optional integrated tool control using a measuring probe in the form of a probe or a laser **(10a)**

11. Prismatic tool magazine (optional)
- Expansion of the standard disc magazine
- For up to 18 prismatic tools – max. 6 segments with 3 positions each **(11a)**
- Max. tool length: 2500 mm
- Max. tool weight: 180 kg
- Automatic tool change

12. Main spindle
- AC drive with 2-speed gearbox
- Motor and headstock thermally separated
- Robust cast housing with stable spindle bearing

13. C-axis with retaining brake
- Can be swivelled hydraulically
- Clearance-free AC drive with Harmonic Drive
- Separate retaining brake for machining while the main spindle is static (optional damping function)

14. Chuck
- Partially-hollow or hollow centre clamping
- Automatic power chuck
- Rapid changing of clamping jaws
- Tool-specific special clamping devices

15. Energy supply platform
- Platform height 600 mm
- Optional installation in the assembly pit
- Energy chains outside the working area

Software solutions by WFL

The latest in control technology

Not only does the Sinumerik 840D sl, which is perfectly-suited to machining tasks, have the highest processing power, alongside its especially user-friendly programming it is also perfectly compatible with all current CAD/CAM systems. NC programs, technological data, measuring protocols, tool data and machine and process parameters can be transferred to a host computer, for example, using an Ethernet connection. This means that the MILLTURN is fully prepared for connection to networked production and to meet future requirements.

Safety is a central concern

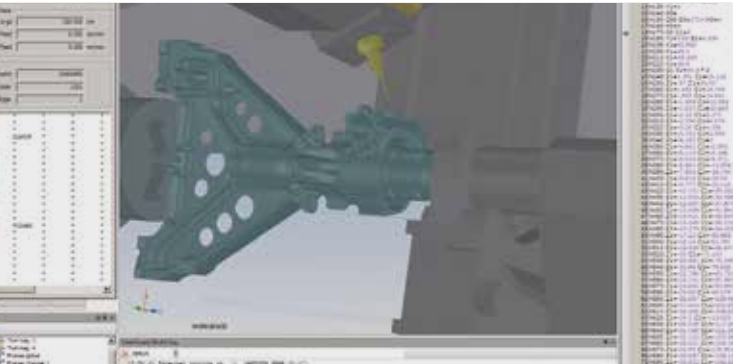
The sophisticated MILLTURN safety concept works on an exclusively electronic basis. The advantages of this are that the system reacts extremely quickly in comparison to conventional concepts, the cabinet configuration is more simple and it provides the option of precise fault diagnosis on site and via a network connection.

Good parts from the very first workpiece

High-precision measuring probes, linear direct measuring systems and clearance-free anti-friction guideways transform the MILLTURN into a 3D measuring machine. WFL provides the user with comprehensive modular measuring software and proven expertise for intelligent measuring strategies, which serve to exclude as many error-causing variables as possible, right from the very start.

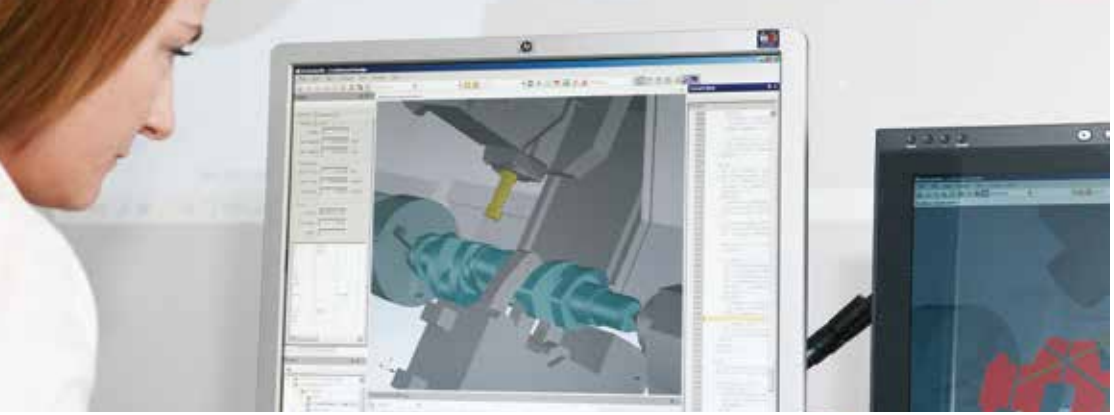
- Creation of complex user-specific measuring processes
- Determination of workpiece features or any forging allowances prior to machining
- Automatic recording and compensation for tool wear
- Software-controlled temperature compensation in order to eliminate machining errors caused by the thermal expansion of the workpiece
- Saving or printing of measuring protocols

Simulation



Reality

Technology cycles



CrashGuard Studio

CrashGuard

Professional CAM solutions from WFL

… for the programmer:

CrashGuard Studio: Offline 3D simulation with material removal to enable verification of NC programs
Millturn PRO: Programming editor in CrashGuard Studio with interactive graphics

… for the machine operator:

CrashGuard: Real time collision prevention software within the CNC machine control system

Safe machining with up to 12 monitoring channels...

During machining, the sophisticated process monitoring visualises and monitors the flow of forces on all of the axes and spindles. This renders the cutting process fully transparent and makes it easy to identify potential for optimisation.

- Tool breakage and collision monitoring
- Teach-In procedure to enable cutting forces to be saved and used for calibration in the event that the same task is repeated
- Machining aborts in the event that the process parameters exceed the freely-definable tolerance limits

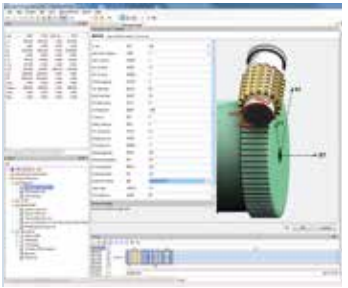
Process monitoring

Tool management

Tool correction

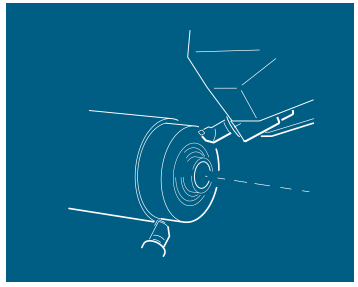
Temperature compensation

Millturn PRO programming editor

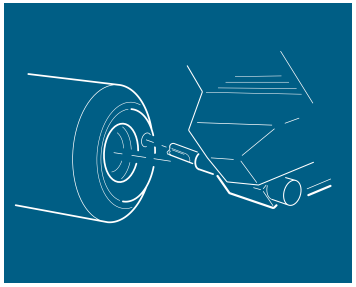


Technologies by WFL

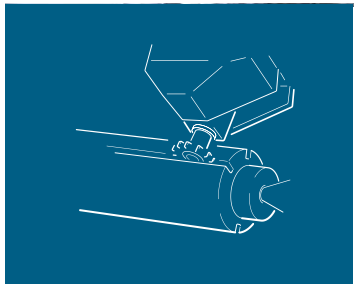
- Turning



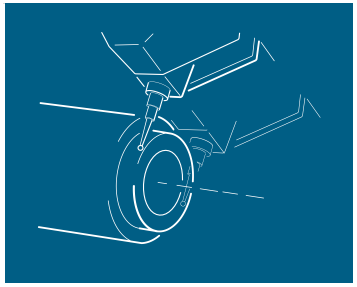
- Drilling



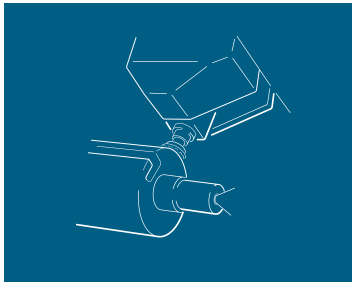
- Milling



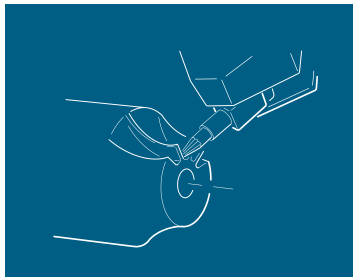
- In-process measuring



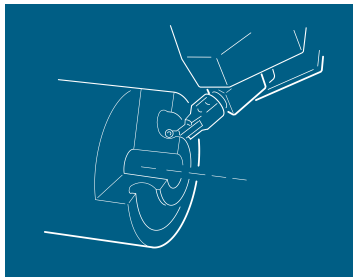
- Turn-milling



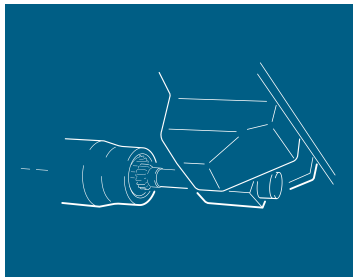
- 5-axis milling



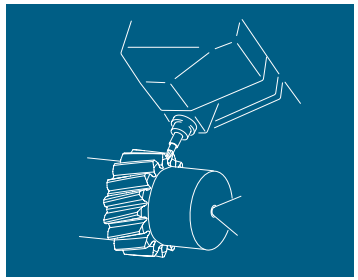
- B-axis turning



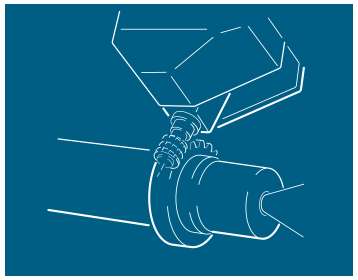
- Shaping of gear teeth (Flanx-Spline)



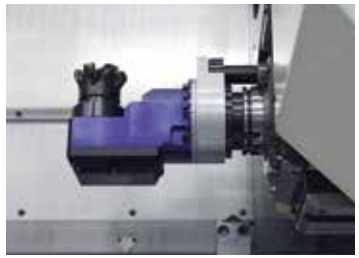
- Milling of gear teeth (Flanx-LM)

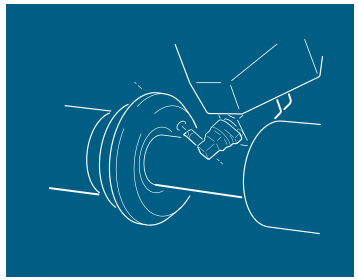


- Hobbing of gear teeth (Flanx-Hob)

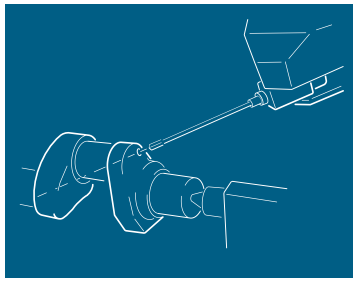


- Special tool heads

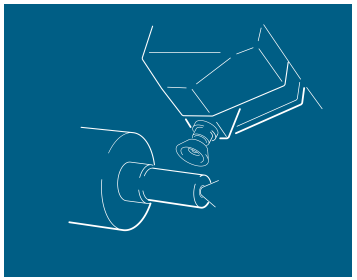




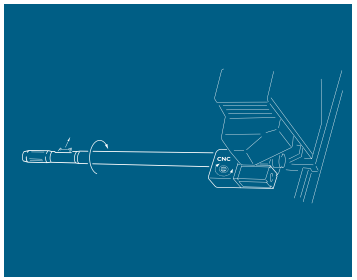
- Deep hole drilling



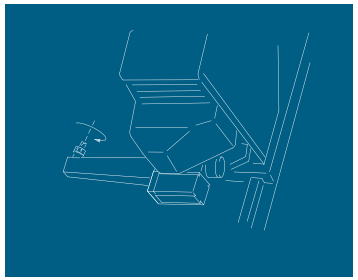
- Grinding and fine machining



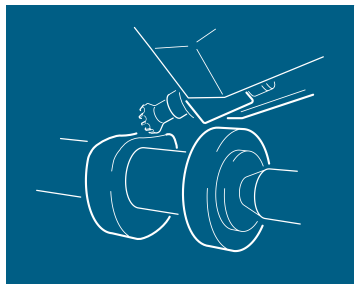
- CNC special contour boring bar



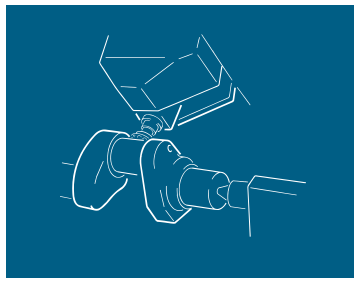
- Internal machining tool



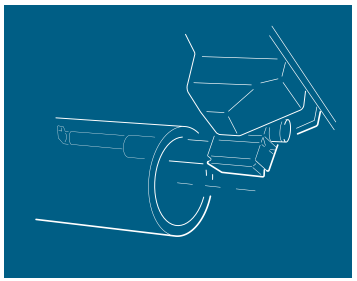
- Cam milling



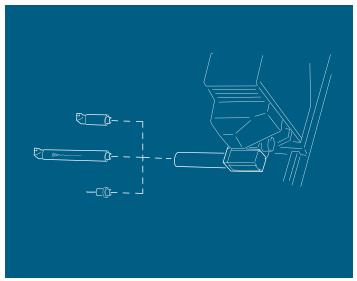
- Milling of crankshaft pins



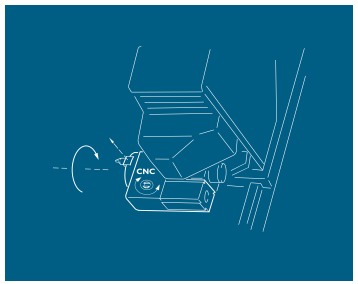
- Drilling and internal turning



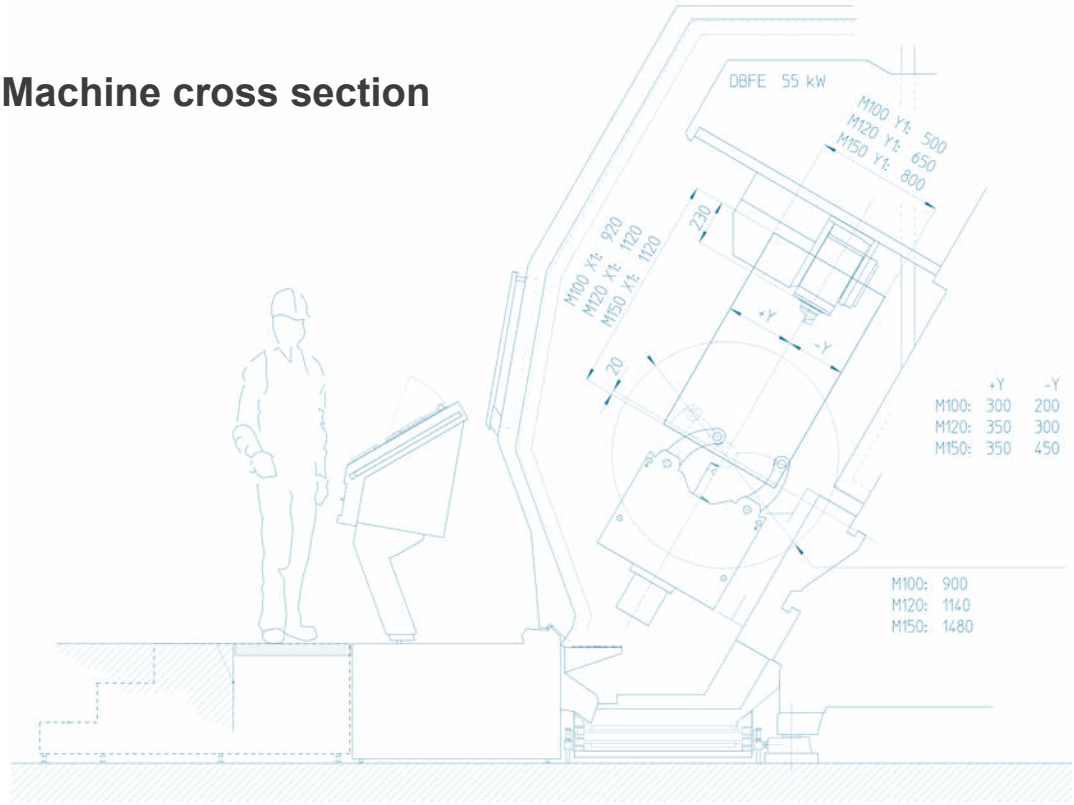
- WFL system boring bar



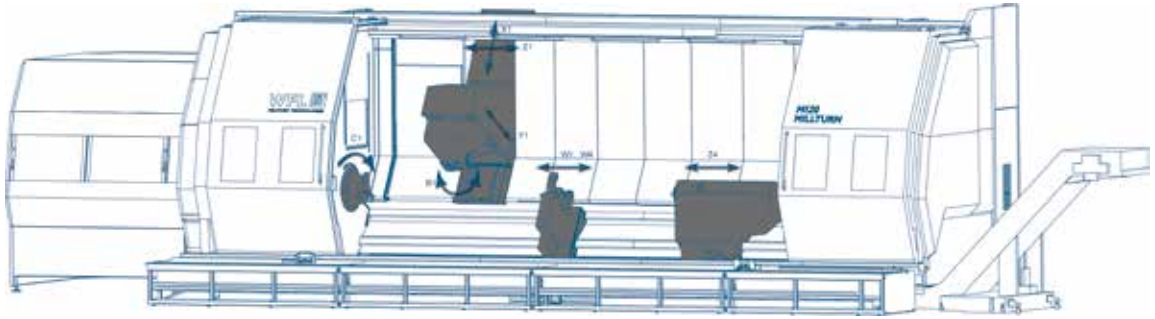
- CNC facing head



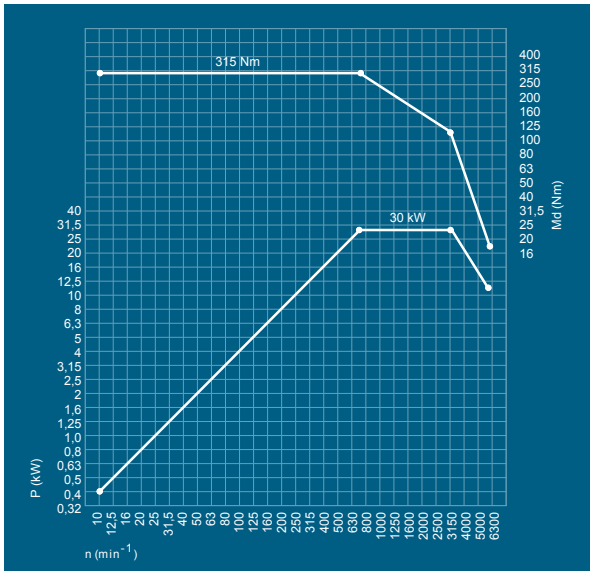
Machine cross section



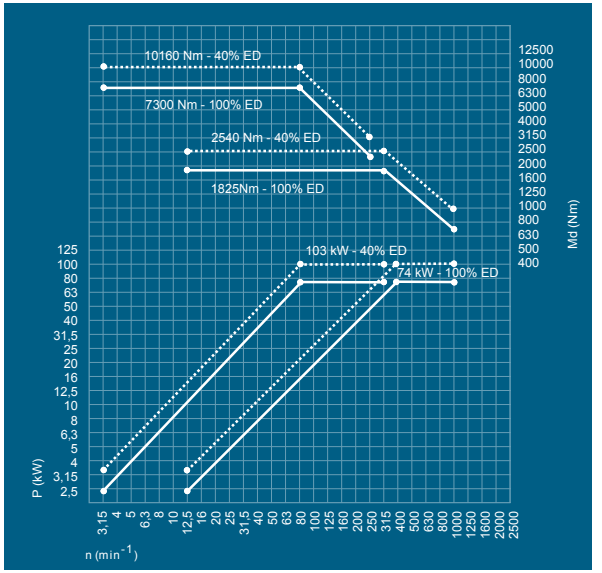
Axis scheme



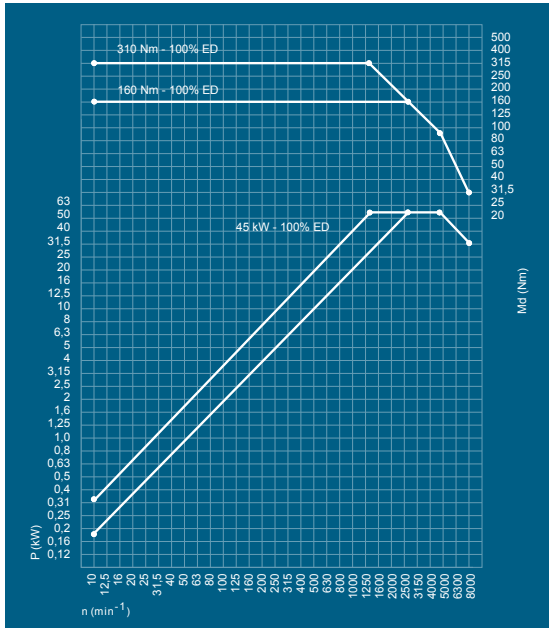
M100 | M120 | M150 MILLTURN



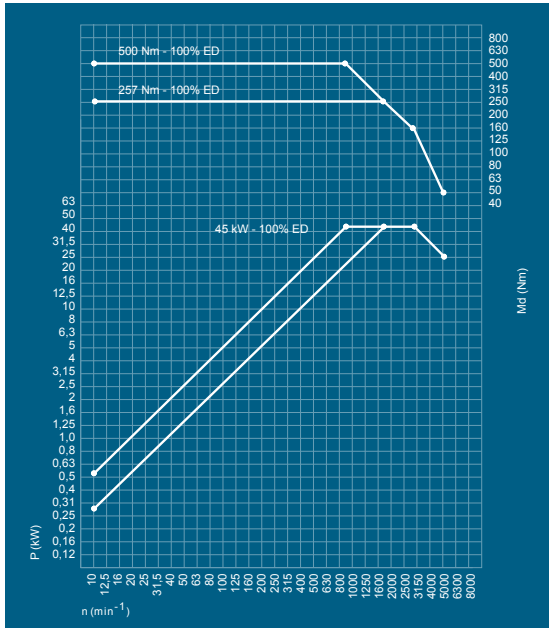
Milling unit 30 kW - 6000 min^{-1}



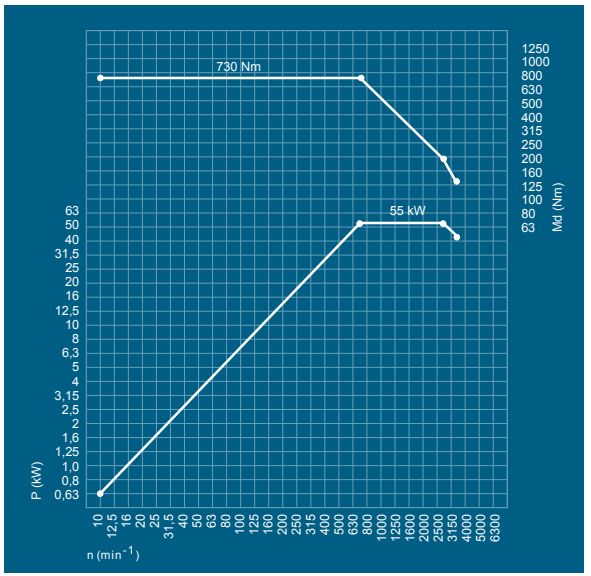
Main spindle 103(74) kW - 1000 min^{-1}



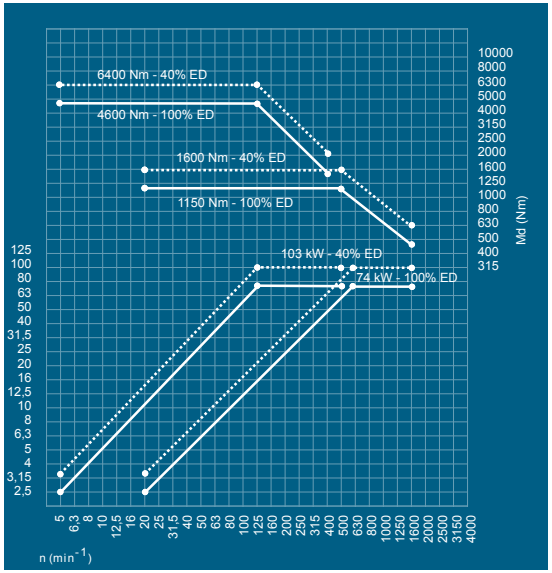
Milling unit 45 kW - 8000 min^{-1}



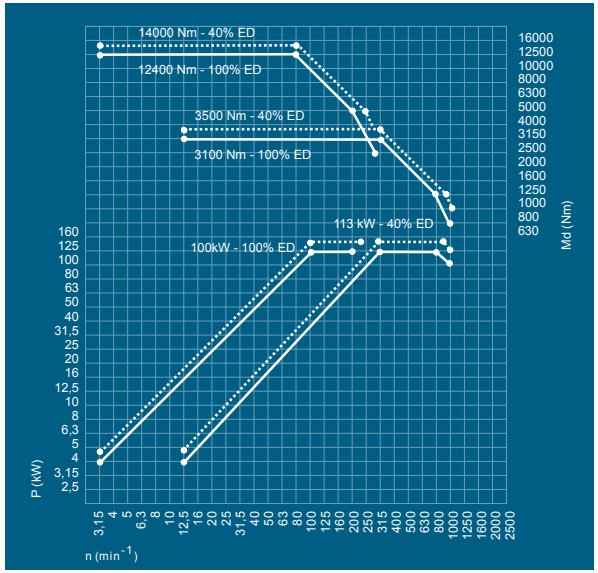
Milling unit 45 kW - 5000 min^{-1}



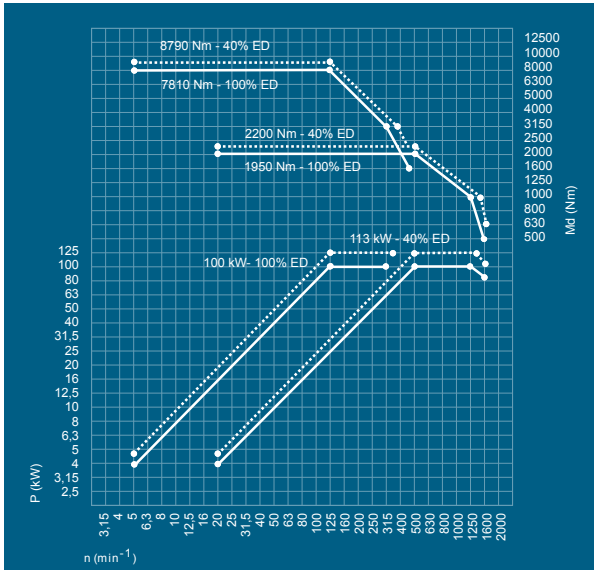
Milling unit 55 kW - 3200 min^{-1}



Main spindle 103(74) kW - 1600 min^{-1}



Main spindle 113(100) kW - 1000 min^{-1}



Main spindle 113(100) kW - 1600 min^{-1}

WFL MILLTURN TECHNOLOGIES

		M100 MILLTURN	M120 MILLTURN	M150 MILLTURN
WORKING RANGE				
Center distance	mm	2000 / 3000 / 5000 / 6500 / 8000 / 10000 / 12000	2000 / 3000 / 5000 / 6500 / 8000 / 10000 / 12000	2000 / 3000 / 5000 / 6500 / 8000 / 10000 / 12000
Turning length incl. standard chuck approx.	mm	2150 / 3150 / 5200 / 6700 / 8200 / 10200 / 12200	2150 / 3150 / 5200 / 6700 / 8200 / 10200 / 12200	2150 / 3150 / 5200 / 6700 / 8200 / 10200 / 12200
Swing diameter over top slide	mm	900	1140	1480
Swing over bed	mm	980 / 940 / 920 / 880 / 860 / 820 / 780	1220 / 1180 / 1160 / 1120 / 1100 / 1060 / 1020	1560 / 1520 / 1500 / 1460 / 1440 / 1400 / 1360
TURNING SPINDLE				
Spindle head DIN 55026	Size	A15	A15 / B20 // A15 / B20	A15 / B20 // A15 / B20
Spindle bore	mm	220	220 / 245 // 220 / 245	220 / 245 // 220 / 245
Spindle diameter in front bearing	mm	320	320	320
MAIN DRIVE				
Max. power, 40% duty cycle	kW	103 // 113	103 // 113	103 // 113
Max. power 100% duty cycle	kW	74 // 100	74 // 100	74 // 100
Max. speed	min^{-1}	1600 / 1000 // 1600 / 1000	1600 / 1000 // 1600 / 1000	1600 / 1000 // 1600 / 1000
Max. torque, 40% duty cycle	Nm	6400 / 10160 // 8790 / 14000	6400 / 10160 // 8790 / 14000	6400 / 10160 // 8790 / 14000
Torque at the spindle max. 100% duty cycle	NM	4600 / 7300 // 7810 / 12400	4600 / 7300 // 7810 / 12400	4600 / 7300 // 7810 / 12400
C-AXIS				
Max. speed	min^{-1}	12,5	12,5 / 9 / *	12,5 / 9 / *
Torque at the spindle max. 100% duty cycle	Nm	6000	6000 / 12000	6000 / 12000
Smallest programmable increment	Degrees	0,0001	0,0001 / 0,0001	0,0001 / 0,0001
TURNING-BORING-MILLING UNIT – UPPER TOOL CARRIER				
Max. power 100% duty cycle	kW	30 / 55	30 // 45 // 55	45 // 55
Max. speed	min^{-1}	6000 / 3200	6000 // 5000 / 8000 // 3200	5000 / 8000 // 3200
Torque at the spindle max. 100% duty cycle	Nm	315 / 730	315 // 500 / 310 // 730	500 / 310 // 730
Milling spindle diameter in front bearing	mm	100 / 130	100 / 130 / 130	130 // 130
Z-axis travel	mm	2310 / 3330 / 5370 / 6870 / 8370 / 10370 / 12370	2310 / 3330 / 5370 / 6870 / 8370 / 10370 / 12370	2310 / 3330 / 5370 / 6870 / 8370 / 10370 / 12370
X-axis travel	mm	920 (-20…+900)	1120 (-20…+1100)	1120 (-20…+1100)
Travel Y-axis 30kW	mm	600 (-200 / +400)	600 (-250 / +350)	-
Travel Y-axis 45kW	mm	-	650 (-290/+360)	800 (-400 /+400)
Travel Y-axis 55kW	mm	500 (-200 / +300)	650 (-300 / +350)	800 (-450 / +350)
Z-axis feed force 100% duty cycle	kN	30	30	30
X-axis feed force 100% duty cycle	kN	31,5	31,5	31,5
Y-axis feed force 100% duty cycle 30kW / 45kW / 55kW	kN	20 / 25	20 / 27 / 25	27 / 25
Rapid feed speed Z / X / Y	m / min	15 / 15 / 12,5	15 / 15 / 12,5	15 / 15 / 12,5
B-axis swivelling range	Degrees	- 110 / + 90	- 110 / + 90	- 110 / + 90
B-axis additional indexing	Degrees	2,5	2,5	2,5
B-axis swivelling torque max.	Nm	1200 / 1400	1200 / 1600 / 1400	1600 / 1400
B-axis holding torque, indexed and clamped	Nm	10000 / 15000	10000 / 18000 / 15000	18000 / 15000
Smallest programmable increment on B-axis (interpolable)	Degrees	0,0001	0,0001	0,0001
Tool system	Type	HSK-A100 / C8	HSK-A100 / C8	HSK-A100 / C8

		M100 MILLTURN	M120 MILLTURN	M150 MILLTURN
TAILSTOCK				
Quill diameter	mm	180	180 / 300	300
Quill travel	mm	200	200 / 300	300
Adjustable quill force	kN	5,4 - 45	5,4 - 45 / 9 - 75	9 - 75
Live centre	MK / Me	MK 6	MK 6 / Me 100 (1:20)	Me 100 (1:20)
Max. weight of workpiece	kg	6000*	15000*	15000*
STEADY REST				
Clamping diameter max.	mm	460*	680*	810*
DISC MAGAZINE				
Number of tool stations (place-encoded) 80 / C8	Number	36 / 72 / 108 / *	36 / 72 / 108 / *	36 / 72 / 108 / *
Number of tool stations (place-encoded) 100	Number	30 / 60 / 90 / *	30 / 60 / 90 / *	30 / 60 / 90 / *
Tool diameter, adjacent, max.	mm	110	110	110
Tool diameter, non-adjacent, max.	mm	250	250	250
Max. tool length	mm	900	900	900
Max. tool weight	kg	35	35	35
PRINCIPAL DIMENSIONS OF THE BASE MACHINE				
Length x width x height (max. magazine)	m	12 / 13 / 15 / 17,5 / 19 / 21 / 23 x 6,3 x 4	12 / 13 / 15 / 17,5 / 19 / 21 / 23 x 6,5 x 4	12 / 13 / 15 / 17,5 / 19 / 21 / 23 x 6,7 x 4
Number of sliding doors	Number	2 / 2 / 3 / 4 / 4 / 6 / 6	2 / 2 / 3 / 4 / 4 / 6 / 6	2 / 2 / 3 / 4 / 4 / 6 / 6
Height of the turning spindle/turning centre above the ground	mm	1500	1562	1742
Total weight of the machine approx.	kg	30.000 - 120.000	32.000 -125.000	34.000 - 130.000
CONTROL		Sinumerik 840D sl		
Display on the operator panel	Type	LCD colour display / 19“		
PAINTING		RAL 5023 distant blue, texture / 7035 light grey, texture / 7037 dusty grey, texture		

* Other values available upon request

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