



M60

M60-G

M65

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CLAMP ONCE - MACHINE COMPLETE



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The design of today for the production of tomorrow

He who wants to stay ahead in the market place must react quickly and be flexible to his customers' requirements. Add to this that components are becoming increasingly more complex and hence more demanding to manufacture. By concentrating all manufacturing steps in a multifunctional MILLTURN turning-boring-milling center, the stringent requirements of current and future manufacturing jobs are fulfilled, spot on, every time.

The possibility of freely interpolating the NC axes B, C, X, Y, Z offers the user an incomparable range of technologies. Complete machining without manual intervention, by turning, drilling, milling, gun-drilling, internal and external gear cutting, turn milling, circular milling as well as automatic workpiece gauging for tight tolerances, and compensation of thermal influences. Any geometrical profile can be produced efficiently and with maximum precision, and there are no bounds to workpiece complexity. Supreme flexibility.

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Features



80 bar coolant pressure



Tool change in whichever position



Heavy inside machining

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Features



Gear Hobbing



Workpiece transfer



Active B-axis

The tool magazine - disc instead of chain magazine



Up to 120 tool stations

The numerous types of machining require a large number of different tools. Up to 120 tool stations (depending on tool system) within the exceedingly safe operating disc type tool magazine ensures sufficient reserve. It's not just the number of tools that counts, the maximum size is important: even tools with 500mm (optionally 900mm) length and 20kg weight pose no problem for the super fast tool changing robot with double gripper.

Maximum user friendliness

In order to minimise shuttling distances and hence undesirable non-productive times during tool change, the change position can be programmed ad lib over the entire longitudinal stroke. For optimum userfriendliness, tools are exchanged from and into the magazine at the front of the machine while machining is in progress.

Convenient software functions support the anticipating, multi-order tooling of the magazine, guaranteeing optimum utilisation of tools until their edge life is up.



Additional flap for long system tools



Maintenance free disc magazine

The prismatic tool system

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 to 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 inside machining tools, two different magazine types are available, i.e.

Pick-up-magazine

Up to two tools with a maximum length of 1500mm and a weight of 200kg can be automatically deposited in this separate magazine arranged above the head-stock.

Heavy boring bar changing device

An extension of the standard disc-type magazine provides accommodation, apart from the standard tools, for up to 18 bars measuring 2000mm and weighing 150kg maximum. In this case, automatic handling of the tools is ensured by a supplementary tool robot.

Production time parallel loading of boring bars

This device serves for loading ID machining tools with prismatic fixture directly into the magazine, through a separate door. The loading operation does not require any interruption of the production process.

The U-Axis

This additional NC-axis (U-axis) mounted on the milling unit allows the use of facing heads and rotating boring bars with radius adjustment. This gives a MILLTURN the full functionality of a specialised machining centre with drilling sleeve.



WFL-System boring bar



Pick-up-magazine



Heavy boring bar magazine



Production time parallel loading for boring bars



U-Axis

Applications for prismatic tools



■ Bottle boring

The prismatic tool system brings a remarkable expansion of the machines' functionality. However, MULLTURNS need not fear the comparison with specialised machines:

On the contrary, thanks to their ability to offer complete machining in one single unit, they invariably guarantee optimum results as far as the concentricity of outside and inside diameters is concerned, while easily fulfilling even the strictest positional tolerances of bores and milled surfaces.



■ Ejector drilling

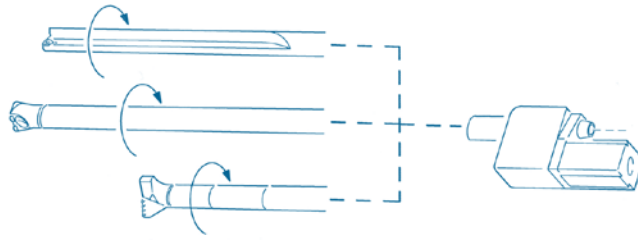


■ Internal milling



■ Tool probing

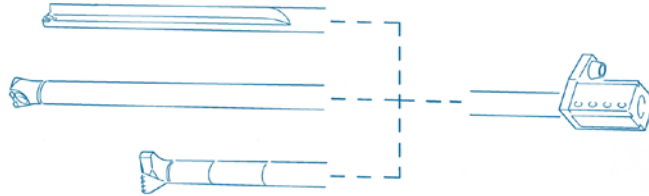
■ **Deep-hole drilling tool**
rotating, with coolant supply



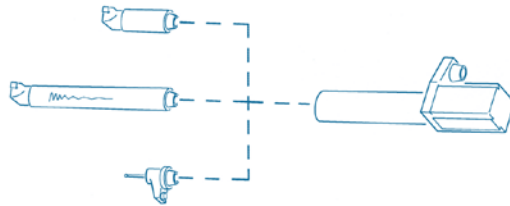
■ **CNC special contour bar**
rotating, with radius adjustment
(seat pocket machining)



■ **Deep-hole drilling tool**
for centric bore



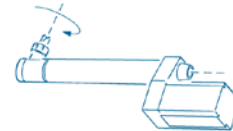
■ **WFL system boring bar**
automatic head change



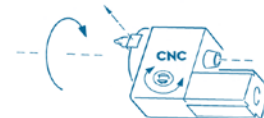
■ **Boring bar**
single-piece, vibration damped



■ **ID machining tool**
driven



■ **CNC facing head**
rotating, with radius adjustment
B-axis: $-45^\circ / +90^\circ$



■ **CNC special contour boring bar**
with radius adjustment (bottle boring)



Software solutions by WFL



State-of-the-art control technology

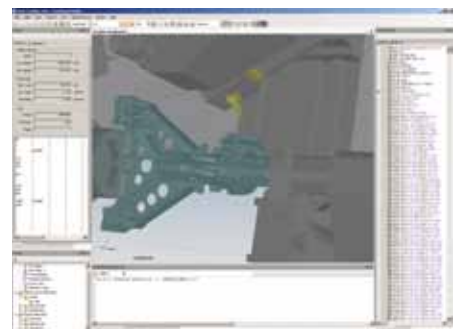
The Sinumerik 840D is tailored for the machining operations and features not only highest possible processing power and exceptionally user-friendly programming but also perfect compatibility with all established CAD-CAM-systems. An Ethernet connection allows the transfer of NC-programs, technology data, measuring logs, tool data and magazine occupation at any time.

Your safety is a central concern

The newly developed Millturn safety concept is based exclusively on the use of electronic functions. The advantages are extremely short response times when compared to conventional solutions, simpler switch cabinet design and the possibility of making a precise error diagnosis on the spot or via modem.

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. WFL provides the



Simulation



Reality

user with comprehensive, modular gauging software and well-proven know-how for intelligent gauging strategies, so that a maximum of negative variables can be excluded from the very beginning. Building from the software provided, the user is able to define his own elaborate, his own measuring sequences, even for the most complex applications. Before the actual machining, the position of the workpiece as well as workpiece features or forging allowances, if any, are determined exactly. Subsequent machining is carried out with reference to the actual position. Tool wear is compensated automatically. The temperature offset software by WFL monitors thermal expansion of the workpiece throughout the machining process. This guarantees extremely close tolerances and helps to avoid costly rejects. The measured data can be memorized on the hard disk or printed immediately.

Up to 12 monitoring channels for extra safety ...

During the cutting operation, the built-in process monitoring system surveys and visualizes the forces developed in all axes and spindles. This makes the metal cutting process transparent throughout, and optimization potentials easy to identify. The tool breakage and collision monitoring protects the machine efficiently from overload. In the teach-in mode the control system stores the cutting forces, comparing them with previous values. If the cutting forces are outside the freely definable tolerance limits, machining is interrupted.

Ergonomic industrial design

Another instance of the value bestowed on user-friendliness is the operating panel with an integrated printer compartment. The swiveling monitor can be perfectly and swiftly adapted to individual needs. Moreover, the unit can be moved towards the tool magazine over the whole working range.

For the programmer



3D-Simulation-software for the verification of CNC programmes on the computer



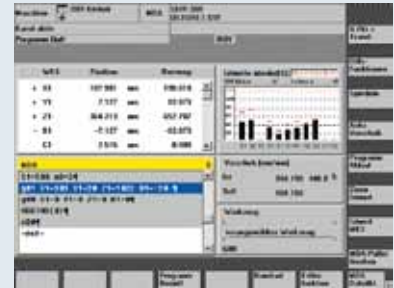
For the operator



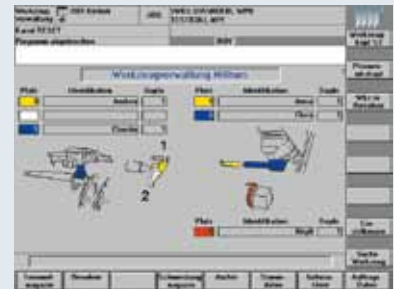
Software for real time collision prevention, integrated in the interpolator of the CNC system



Software



Process monitoring



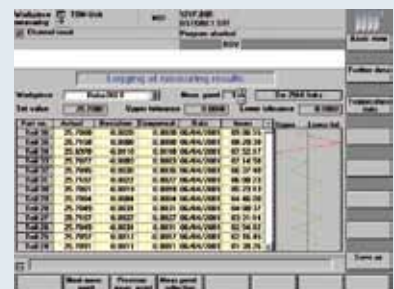
Tool management



Tool offset



Temperature compensation

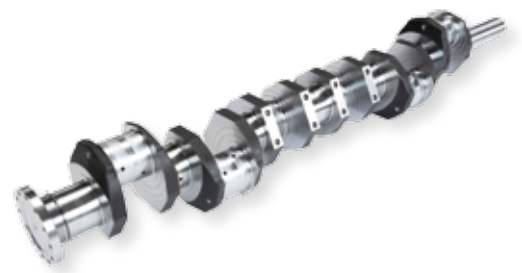


Measured data logging

High profits even with small batch sizes



A MILLTURN not only offers you a proven precision machine tool but also a solution tailored to your individual needs, giving an immediate competitive advantage and very rapid pay-back.



Individual solution for workpiece clamping



CNC facing head



Ergonomic design

A clear option for one-hit machining

Multifunctional machine tools are exposed to a more complex pattern of stress than a standard lathe, due to their much wider spectrum of technologies.

All forces transmitted by the turning-boring-milling unit have been considered in the calculation for the cross-section of the machine bed. The massive 60° slant bed with its generously dimensioned and wide-spaced guideways guarantees maximum stability and optimum anti-vibration behaviour.

To take the load off the spindle bearings of the turning-boring-milling unit during heavy-duty turning cuts, the tool post is indexed and clamped hydraulically.

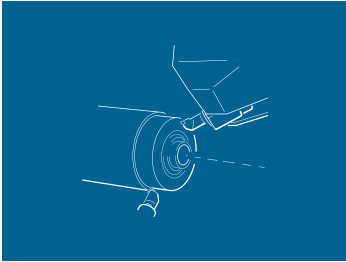
In addition, the B-axis can be indexed every 2,5°, a feature that comes in handy for heavy roughing cuts when turning or milling.

Predefined shifting points protect the MILLTURN effectively from mechanical deformation in case of a collision and allow rapid and easy realignment.

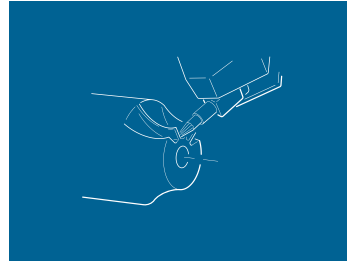
Measures such as the thermal separation of gearbox and headstock as well as the temperature stabilisation of the tool head make constant machining conditions.



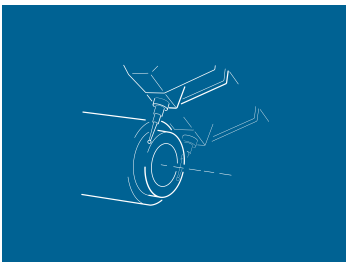
Technologies by WFL



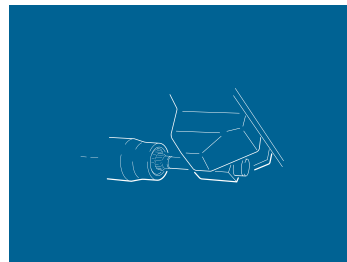
4-axis-turning



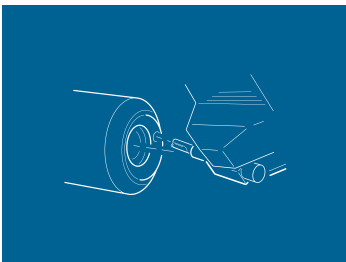
5-axis milling



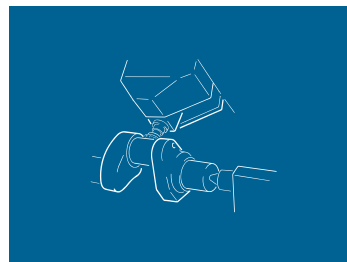
In-process measuring



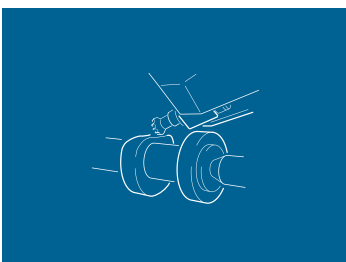
Shaping



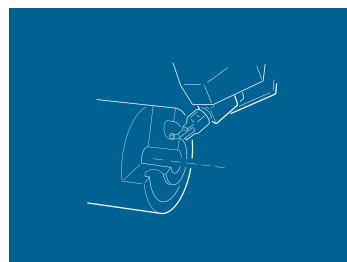
Drilling



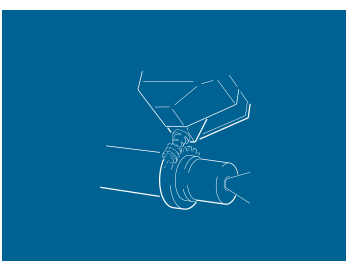
Milling of crankshaft pins



Cam milling



B-axis turning

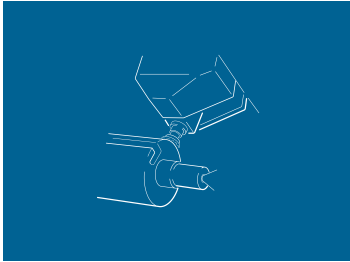


Gear hobbing

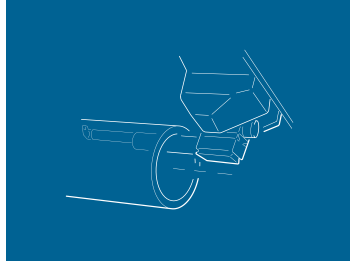


Special tool heads

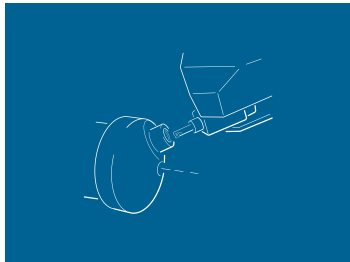




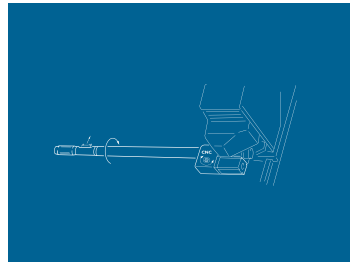
Turn-milling



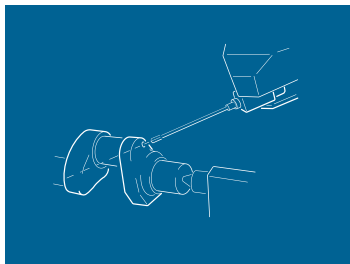
Drilling +
i.d. boring



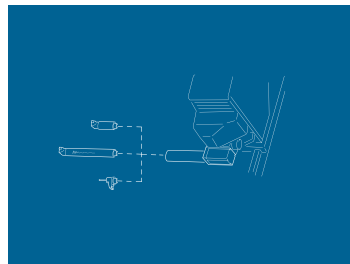
Circular milling



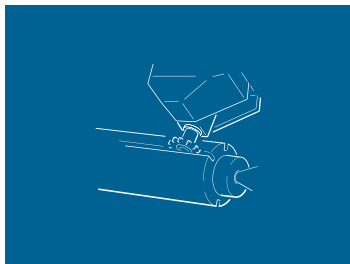
CNC special
contour bar



Gun drilling



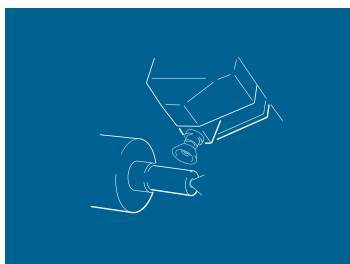
WFL system
boring bar



Milling



ID machining tool



Grinding
+ fine machining



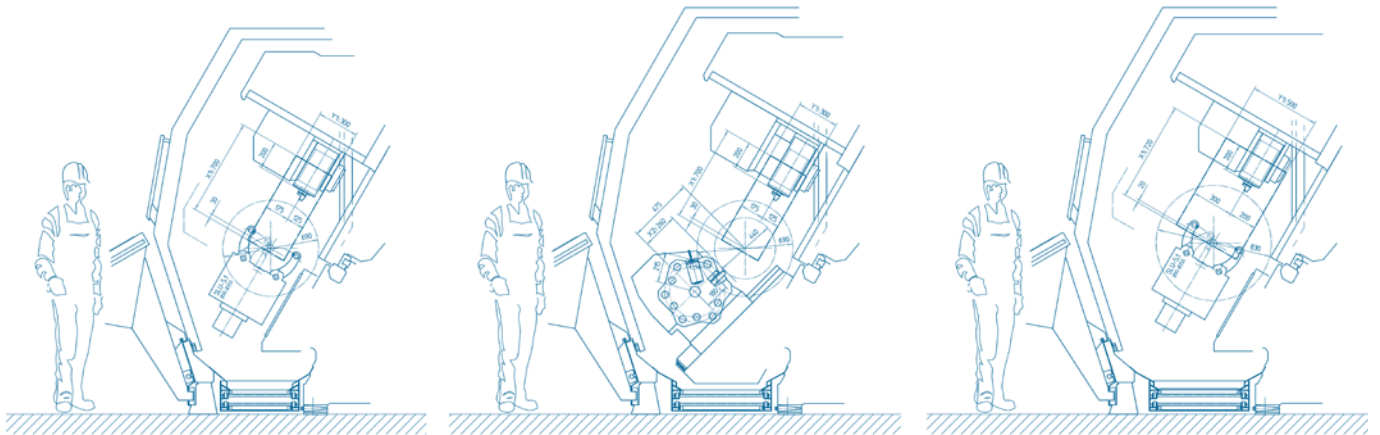
CNC facing head



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NC-axis

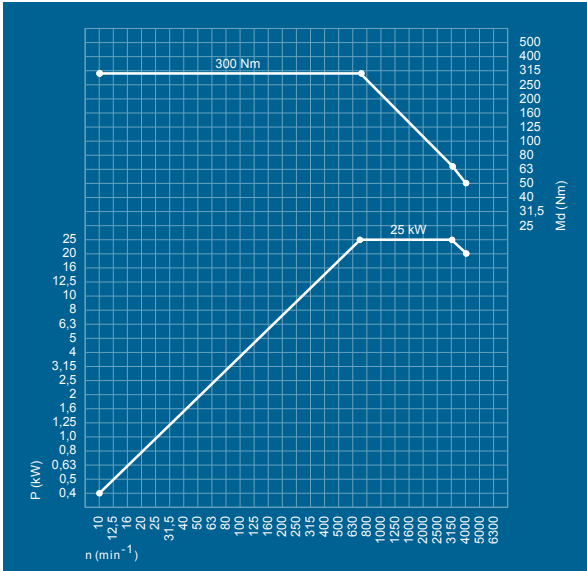


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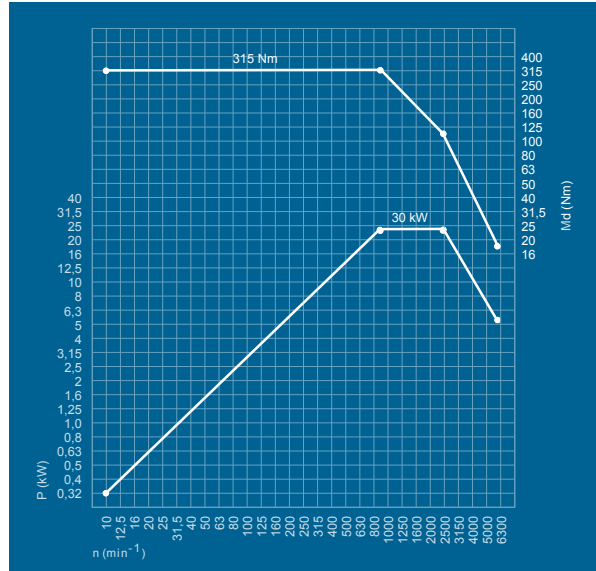


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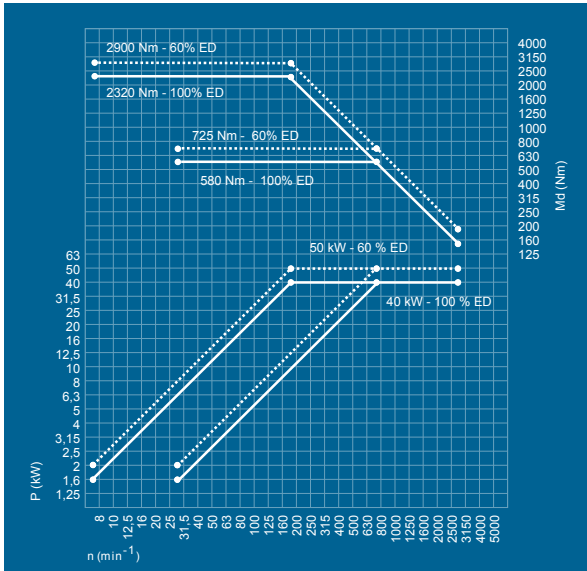




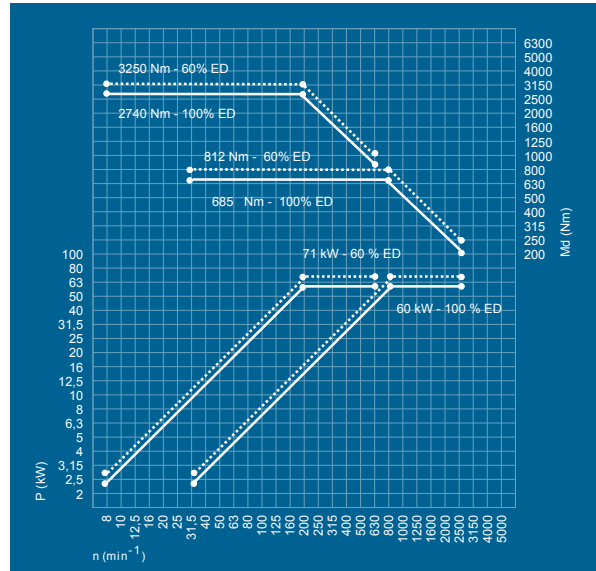
Millig spindle 25 kW - 4000 min⁻¹



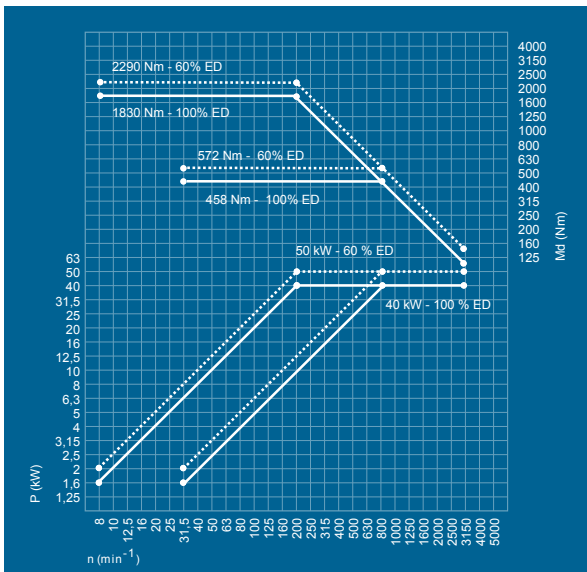
Millig spindle 30 kW - 6000 min⁻¹



Main spindle 50(40) kW - 2600 min⁻¹



Main spindle 71(60) kW - 2600 min⁻¹



Main spindle - left / right 50(40) kW - 3300 min⁻¹