

COMPLETE

Nr. 02/21

The complete machining magazine

SUCCESS STORY | Kersten Maschinenbau – Technological versatility in a class of its own

INNOVATION | EuProGigant, Gaia-X and WFL – what unites these three?

ALL EYES ON | WFL Heavyweight Performance



All eyes on:

The MILLTURN 5.0

With foresight into a future of smart complete machining.

Burgenland.
The sunny side of Austria.

The birds are chirping, nature is blooming and the first splashes of colour are appearing in the meadows. Spring is in the air. After a long time inside the same four walls, a holiday full of Pannonian hospitality is the perfect escape. With 300 days of sun a year and the earliest spring in Austria, Burgenland is the ideal setting to take a break from everyday life.

„Every business is a software business now.“

Dean Leffingwell

Dear valued customers, Dear readers,

Everything revolves around data. Industrial digitalisation affects machines, processes and systems. With greater control over the physical functional readiness of the machines, digitalisation improves industrial productivity. Reducing machine downtimes also increases the reliability of the systems. This makes it possible to increase production, whereby the systems along the production line are better linked to and coordinated with employees as a result of digitalisation.

We have been offering our customers top-quality and top-performance products for almost three decades. The MILLTURN delivers stability, efficiency and maximum performance when it comes to complete machining. Our vision also encompasses the intelligent and safe networking of machine and operator. We therefore work tirelessly on both software and connectivity and provide our customers with a complete package: whether it's simulation in CrashGuard Studio, collision monitoring directly on the machine control system, process monitoring with WFL iControl or measurement using scanning methods – your production data is perfectly accessible at all times thanks to our ready-made software solutions.

The „EuProGigant“ project also focusses on production data and the way it is exchanged. Every machine and every sensor generates data. But how does all this production data tie together?

How is it exchanged, for whom is it useful, how is it handled? The purpose of this project is to demonstrate how a highly networked production environment can be enhanced with self-organising and stabilising properties.

Flexible automation solutions are also in high demand and feature state-of-the-art interfaces. In addition to classic handling solutions, customer projects may also include a higher-level host computer system, for example. This „brain“ takes over the entire logic and logistics from within the self-sufficient, flexible production cell. In addition to workpiece tracking and management, the system also transmits all operating data to the MES (Manufacturing Execution System) provided by the customer.

As always, this edition contains fascinating user reports, this time from the aerospace and energy industry. From a technology point of view, you will find reports on „Heavyweight machining“ and part two of the „Measuring technology“ series. The latest WFL cover story introduces our customer service department.

We hope you find this edition interesting and informative. Stay well-connected!

The WFL Management Team



Günther Mayr
Managing Director Sales, Technologies
and Services

Norbert Jungreithmayr
CEO



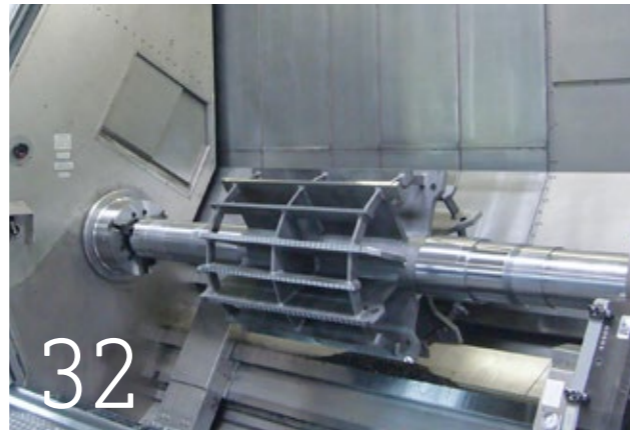
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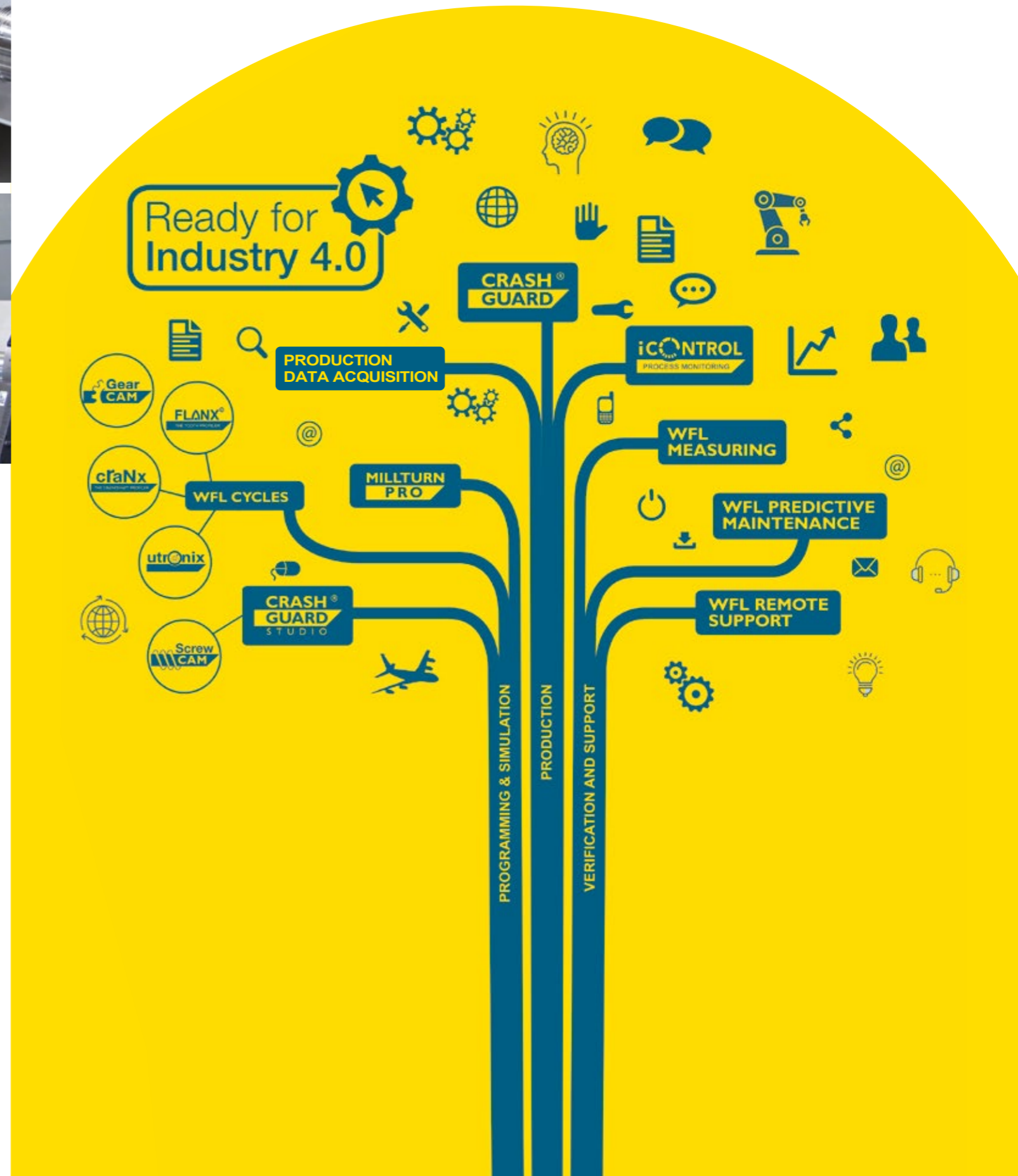
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Just like an orchid garden...

Wolfgang Mitterlehner –
the haven of tranquillity and mastermind of WFL Customer Service

In WFL Customer Service, everything revolves around customer satisfaction. Just like an orchid garden, this requires care, maintenance and attentiveness for sustainable production. Personal support and finding simple solutions to problems are daily tasks in the essential and extensive department at WFL.

The objective is to keep the „customer orchid garden“ clean, tidy and free from problems. The Service department deals simply and efficiently with customer-specific issues with various individual activities and the associated departments. Always accessible and with an eye on the state of the art, Wolfgang Mitterlehner motivates his team to deliver top performance at all times. In our Complete Interview, Wolfgang Mitterlehner gives us an insight into the everyday work of WFL Customer Service and answers some of our questions.

Mr Mitterlehner, you witnessed WFL's beginnings and are one of the company's „founding fathers“. Tell us how it all began.

That's not quite true as I wasn't there from the very start. I joined WFL in 1998 and WFL was taken over by Autania in 1993. I started in the production and com-

missioning department. In 2001 I moved to Service. At that time, everything was done quite casually, albeit with laborious processes such as putting individual parts out for tender or compiling the vast range of documents given to service technicians. This tiresome work united the team, laying the foundations for a solid service concept. Even back then, it was possible to log into a machine with a remote modem (56k) and carry out remote maintenance. This enabled information to be transported quickly and easily, which helped the entire workforce to respond more efficiently. This also made service call-outs easier and better structured.

What were the most important milestones for you?

Service expanded slowly but continuously and the demands placed on the team became greater. At this point I'd like to thank my predecessor, Peter Granegger, who laid the foundation on which we are still building in the Service department. I am extremely grateful for all the work he did. I see the continuous growth, the well thought-out structure of the team and the general workflow as a huge achievement. The most important milestone for me was becoming head of the department in 2018.

Where do you see your own personal strengths and weaknesses?

One of my greatest strengths is my ability to remain calm in stressful situations and approach problems with concentration and composure. I don't see the point in getting flustered and racing around trying to solve a problem. Strength lies in tranquillity. I also think of my solution-oriented mindset as a personal strength. I'm always thinking two or three steps ahead in order to avoid complications. I suppose my weakness is perfectionism, which can be a hindrance when carrying out service work. The Service department needs to be able to respond quickly, which means a desire for everything to be perfect can get in the way.

What is your preferred leadership style?

My leadership style is definitely cooperative, you could say „laissez-faire“. My employees carry out their tasks under their own responsibility and are given a huge amount of independence. I give them a lot of freedom to manage their own time. At the end of the day, the result needs to be right and the customer needs to be satisfied. Our service technicians in particular represent our company and play a key role in tailoring everything towards customer satisfaction.



ESSENTIAL

Care, maintenance and attentiveness are key criteria for sustainable production for WFL Customer Service. Personal support and finding simple solutions to problems are daily tasks in the essential and extensive department at WFL.

How do you maintain your work-life balance?

A „work-life balance“ isn't that easy to maintain when you have a lot of responsibility. I can't just leave work and switch off. For that reason, I combine my private and professional life and make sure they work together. Very often, decisions need to be made via telephone, for example. It's rarely possible to contain these within a fixed window of time.

As I live in the countryside, I'm able to spend my free time in nature. I enjoy sports such as mountain biking and running. This allows me to switch off and recharge my batteries. I do, however, come up with one or two ideas while exercising. It's often helped me to come up with a new solution or resolve problems. My favourite way to spend my free time is with my family, and it is the hours spent with them that give me the necessary balance with my working life.

What key values form the foundation for your daily actions, decisions, plans?

I'll throw a few words out there: respect, openness, honesty, loyalty, groundedness

and trust. These are really important values to me. I base all of my decisions and actions on these values. Appreciation is also an important quality. The entire team has to deal with a wide range of pressures and therefore deserves utmost respect.

What is the current structure of WFL Service, which areas fall under your responsibility?

As soon as a machine has been installed at a customer's site, it falls under the responsibility of Service. From this point onwards, we are responsible for maintaining and safeguarding the productivity of the MILLTURN throughout its entire machine life. Service comprises Administration, Training, Technical Support and Spares. The administrative team takes care of travel planning, fleet management, travel expense accounting, visa procurement, etc. The training team plays an essential role in maintaining knowledge transfer. Hours of expertise are transferred to technicians, creating the foundation and prerequisite for problem-free order fulfilment. The first time the customer contacts WFL is also important. This is where Technical

Support comes in, from public relations to support all the way through to technician call-out planning. The Spares team is responsible for spare parts management, ensuring we have everything in stock and there are no delays. Quotation and order processing as well as spare parts sales are also within the remit of the Spares team. The subsidiaries outside Austria are also essential. The USA, Brazil, Germany, Russia and China have been installed as independent Service subsidiaries with teams trained and supported by us.

What do you think constitutes good support and service?

I see WFL as a first-class machine producer. But this also includes first-class support and service. For me, it is extremely important that the customer has a fixed address or contact person. If a customer has a problem, the top priority is to resolve it with all available resources. Experienced service technicians have an impressive amount of expertise. Our goal is always to provide the best possible support for our customers and to be there for them whenever they need us.

What is it that you like about customer service?

We talk about this a lot internally and what it is that we like about this job. We often have to deal with a wide variety of problems from early until late, but ultimately it is about the end result and customer satisfaction. Resolving problems together and learning from them so that the next steps we take prevent them from happening again: that's what we like about it.

How efficient is the process chain within WFL Customer Service? If a problem occurs in Germany, China or the USA, for example, how quickly is a service technician on site?

We have to distinguish between the different countries here, as we have some subsidiaries in other countries with dedicated service managers. The respective teams are extremely well networked and communicate perfectly with one another. In the event of problems in a particular area, help is provided in the

country in question. Of course various other threads are spun in the background to ensure we respond as quickly as possible. This means everyone has the same amount of information at all times, which means we can work together to find the perfect solution. „Networking“ is the magic word here, which is what enables us to act quickly and offer customers efficient, competent service. If a call-out is required, this is coordinated from Linz. Urgent call-outs are planned here at the headquarters but we also have warehouses in the branch offices where we store common spare parts so that we can respond even more quickly. On average, our technicians are on site within 24 hours.

What do you do when you are confronted with an unfamiliar problem?

First the problem is logged. The next step is to understand the problem. Then our chain of actions comes into effect. We are supported in this by other WFL departments such as the design department,

project planning and development. It is these departments that help us resolve problems we don't come across every day and are on hand to provide advice and support to the Service team. When an issue arises, everything else is put to one side and everyone focusses all their attention on finding a solution. I find this teamwork remarkable.

How do you see the Customer Service department in the future?

Bearing in mind key topics such as digitalisation, Industry 4.0, predictive maintenance, IoT and networked machines, things are set to change in future. But I see all these things as playing a supporting role. The classic service will always be there, as it is ultimately the employees, from office staff to service technicians, who provide the personal service that ensures customer satisfaction. The experience that service technicians and other Service employees build up over the years is what makes service excellent.

„Service means seeing the whole business through the eyes of the customer.“

Axel Haitzer



EXPERIENCED

Service technicians have an impressive amount of expertise.



When you hear the word „successful“, who or what comes to mind?

For me, WFL has a clear success story. Success is a feeling of happiness. This is what I see when a person’s skills increase in line with the challenge. If the challenge becomes too much, too quickly, this results in stress and burn-out. If the challenge is too easy, a person can become bored. Over the last few years, WFL has focussed on the needs and challenges of both its customers and its own employees, which is why it has been so successful. This is also the reason behind WFL Customer Service success. We consider the needs of the customer, analyse these on a continual basis and challenge ourselves to meet them. This work and mindset is in itself a success story.

What inspired you to do what you do?

I’ve always had an interest in technology. I was therefore able to quickly identify

with the complex WFL machines and knew straight away that they were in the elite class. Over time I have realised that customer satisfaction is also important to me. That was the incentive to progress my career in this direction. During my ‘hands-on’ years in this area, Service has become extremely important to me and something I am very proud of.

What’s in store for your department in future?

Digitalisation is at the very top of the list. We are currently in the implementation phase of mobile order processing, which will allow us to go paperless. We want to digitalise the sharing of information with technicians, internal order processing and also accounting. We are also continuously expanding the Service department in Linz and strengthening our international subsidiaries. It’s important to us to be as close as possible to the customer.



PERSONAL INFORMATION

Name: Wolfgang Mitterlehner

Age: 42

Home town: Mönchdorf

Training:

1985 - 1989 Primary school

1989 - 1993 Secondary school

1993 - 1997 HTL Steyr, Technical College for Telecommunications

2000 - 2002 Professional Academy for Automation Technology

Background:

1997 - 1998 Elektro Pachner

1998 - 2001 WFL

2001 - Several months at Engel

2001 - to date WFL

WFL:

1998 - 2001 WFL IBN (Commissioning)

From 2001 Service

2001 - 2015 WFL Customer Service, Technical Support

2016 - 2018 Deputy Head of WFL Customer Service

From 2018 Head of WFL Customer Service

All eyes on...

WFL Heavyweight Performance

by WFL Millturn Technologies

Machining large and very heavy components is often an extremely complex undertaking that involves considerable costs. Not so with „WFL Heavyweight Performance“. Here, process reliability and, above all, time savings, take centre stage.



All eyes on

WFL Heavyweight Performance

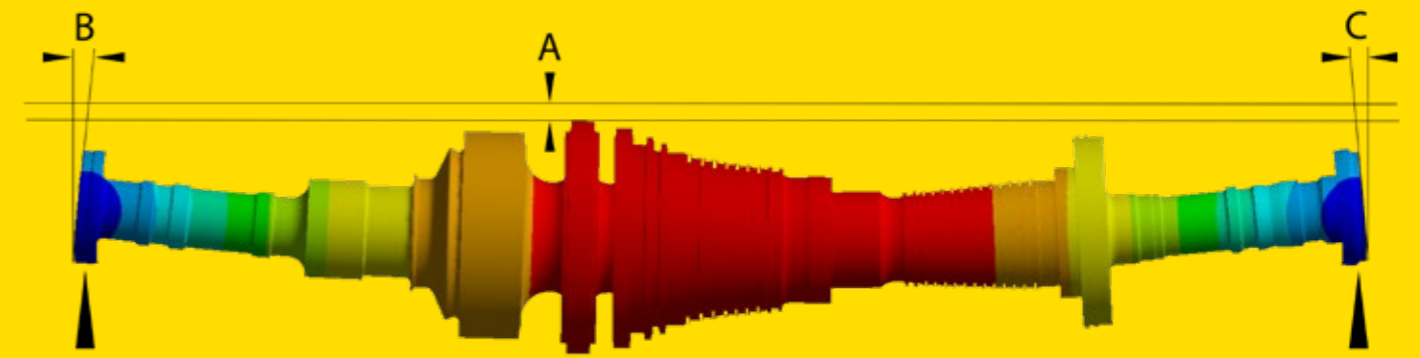
by WFL Millturn Technologies

Higher, faster, farther – all this is great, but now „longer, wider and heavier” is also possible. Industrial requirements are becoming increasingly stringent. This is where „Heavyweight complete machining” from WFL comes into play.

Special requirements call for special measures. To meet these requirements, WFL can realise a workpiece weight of up to 60 tonnes. What’s extraordinary about this is that heavy components such as these can be machined with a single clamping procedure. A MILLTURN can handle high-strength steel or HRSA (Heat-Resistant Super Alloy) material with ease. This no longer requires special machines, as was previously the case in multi-step production processes. The use of special in-process mea-

surement methods and temperature compensation corrects any workpiece displacement, thereby increasing the overall machining quality. With the WFL measurement methods, a workpiece can be produced with maximum precision even under unfavourable production conditions (e.g. external influences such as temperature changes during the production process).

Tedious workpiece changeover processes or clamping device adjustments are now a thing of the past, as both of these tasks can be significantly reduced with a MILLTURN. With the most diverse range of machine assemblies from M100 to M200, a perfectly harmonised machine can be realised to suit any customer requirement.



Heavy workpieces, particularly those with a high slenderness ratio, exhibit considerable sag when supported on few support points. With an accompanying FEM (Finite Element Method) calculation, it is possible to precisely determine the best way to provide clamping and support.

Industries



Examples of parts that can be produced:

- Gas turbines
- Steam turbines
- Components for wind power plants
- Rollers
- Crankshafts
- Gear components
- Shaft parts

Advantages

- Reduced set-up time
- Years of experience in optimum complete machining methods incl. distortion-free and secure workpiece clamping
- Advance FEM calculations to ensure the correct design of the workpiece clamping
- Optimum workpiece support (roller or hydrostatic steady rest)
- Minimised production errors
- Optimum machining quality and production
- Extremely stable machine construction
- Closed working area for machining with a high coolant pressure and flow rate as well as chip removal for automatic extraction
- Excellent ergonomics with very good workpiece accessibility in the working area
- Flexible measurement technologies (variable cycles)
- CrashGuard Studio for programme testing
- Production support from WFL technicians
- Uncomplicated design and support



This demo part weighs around 20 tonnes and can be machined in a single clamping procedure.



Closed working area for machining with a high coolant pressure and flow rate as well as chip removal for automatic extraction.



Distortion-free and secure clamping.



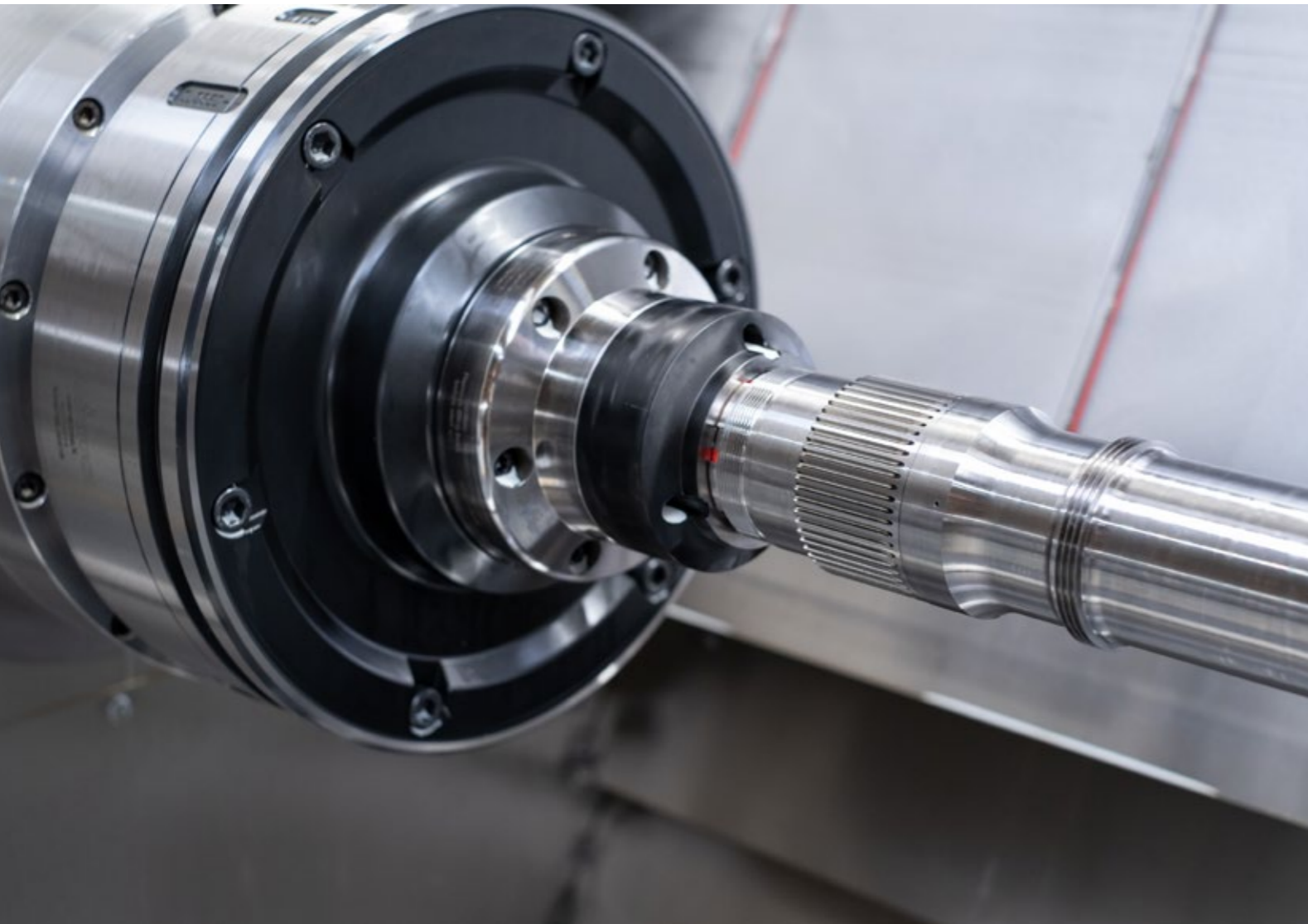
Highly stable machine construction.



WFL can realise a workpiece weight of up to 60 tonnes.



Correct, optimum workpiece support (roller or hydrostatic steady rest).



EFFICIENCY

The production of the shafts covers diverse machining technologies: the shaft is manufactured in 3 clampings whereas mandrels are used to clamp the inside diameter (with Centrotex quick-change system). Furthermore, the manufacturing process involves hobbing of 2 splines with a quality of 5 and Module 1.27 mm.



Flying high with Alp Aviation

Our editorial team flew to Eskisehir to talk to Mr. Serkan Erten, Business Unit Director from Engine Business Unit at Alp Aviation, and found out about the business fields of Alp Aviation as well as the connection between WFL and Alp.



Serkan Erten
Business Unit Director,
Engine Unit

meter. Among our clients are the world's leading aerospace companies, such as Pratt & Whitney, Sikorsky, Collins Aerospace, Honeywell, Pratt & Whitney Canada, Lockheed Martin, and Boeing.

We are mainly selling to North America and Canada, but besides US companies we also deliver to Europe, e.g. Poland, France, and the Czech Republic. The export ratio is about 98 %, whereas 90 % are being delivered to North America. For manufacturing we only have the facility in Eskisehir, where five business units are located. One of Alp's business units is the Aerostructure business unit. The typical customers are Boeing, Lockheed Martin, Sikorsky as well as Collins Aerospace. The second business unit is the Engine business unit which I am responsible for. We are producing/manufacturing engine dynamic components, mainly for Pratt and Whitney and Honeywell. Together with Pratt & Whitney. At military level, we are working on the F-135 Engine, and at commercial level, we are working on the Geared Turbofan (GTF) engines. Honeywell is an important customer for engine components too. We started to produce tie shafts for their commercial

engines. For that purpose, we invested in a complete machining center from WFL, to be more precise in a M40 MILLTURN with 3,000 mm center distance. The third business unit is the Rotary Wing business unit. Their main responsibility is to provide dynamic helicopter components, gears, gearboxes and other dynamic components for helicopters. The fourth business unit is Special Processes. Here we have a huge capability inhouse and can do the chemical and mechanical processes by ourselves. There is also a fifth business unit for landing gears. We are working together with Collins Aerospace and Heroux Devtek on the F-35 program and on other commercial programs for Boeing and Airbus.

What has been the main purpose to invest in a MILLTURN complete machining center of WFL?

I have to start by explaining how our company works. At the moment, we have over 250 machine tools and we are producing a wide range of parts for the Aerospace Industry. Mainly 5-axis milling and complete machining centers is being used for producing those components. On the new M40 MILLTURN from WFL we only



PRODUCTION PAR EXCELLENCE

The M40 MILLTURN with 3,000 mm center distance and a turning diameter of 520 mm is producing a tie shaft with a length of approx. 1,500 mm and a diameter of 74 mm in 3 clampings. The production time of the workpiece is around 7 hours.

manufacture shafts. The main purpose of the investment was to be at the center of excellence in shaft production for engine producers. With the MILLTURN of WFL we have become a tie shaft producer for our customers. Tie shafts are a critical component of engines and serve as a connection between the turbine and the compressor.

The length of the tie shafts manufactured at Alp Aviation ranges from 1,000 mm and to 2,000 mm. The main materials that are used for the production of tie shafts are Inconel and maraging steel. We have lots of experience with Inconel production, as we have already started to produce engine components made of titanium or Inconel in 2008. For that reason, we have enough experience with these materials. With regards to the shafts we continue to work with Inconel material and high strength steel.

Can you tell us about the main requirements for investing in a new complete machining center?

To be able to produce dynamic engine components, we need productive and process reliable high-tech machines and outstanding technological performance. Generally, nickel alloys are commonly used during engine component production. These special nickel alloys are highly heat resistant. That is to say, these materials are extremely rigid, difficult to machine and a high level of technological expertise is required to meet the high-quality standards in the industry.

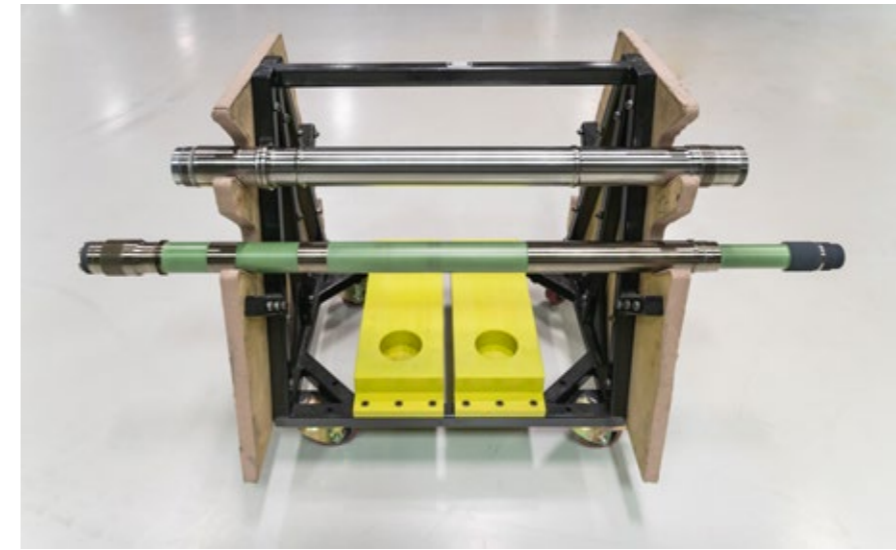
Which batch sizes are common in your industry and business unit?

In the commercial Aerospace business, the product range varies depending on the commercial platforms. In some cases, we are producing around 600 workpieces per year, depending on the size of

the commercial platforms. The medium volume of production ranges from 200 to 300 pieces per year. But this is the limit, our industry is not known for automation and large series. We are not talking about 10,000 pieces of workpieces per year, in the Aerospace Business the maximum volume is around 1,000 pieces per year.

Which machines or processes were replaced upon the purchase of the M40 MILLTURN?

With installing the new MILLTURN we started to produce larger shafts for the first time. That means we only bought the machine to be able to produce bigger shafts. Up to this point of time we only manufactured smaller shafts starting from 250 to 500 mm length on rather small machines. When we received drawings for bigger and longer shafts we established contact with WFL, because we knew that WFL has a very good repu-



THE WORKPIECES

Two different shafts are being produced on the M40 MILLTURN / 3000mm. The length of the tie shafts is reaching from 1,000mm to approx. 2,000mm. The main materials that are used for producing tie shafts are Inconel and Steel (Maraging).



VOLUME

Operator (Yunus Emre Karadayi) is responsible for the production of approx. 200 pieces of shafts per year.

By doing complete machining on one single machine tool, processing time could be reduced by 30 % and an increase in flexibility of 60 % could be achieved.

tation in the Aerospace industry. Now we are producing about 200 shafts per year.

What are the technological possibilities with the M40 MILLTURN?

With the implementation of the M40 MILLTURN we achieved perfect machining performance, high surface quality, high static, and dynamic rigidity as well as reliable and repeatable accuracy. Especially for shaft production, in-process measurement is an important technology to achieve the tight tolerances. We prefer multitasking machines, as there is no need to move parts from one machine to another one. Time saving was as well an important factor for buying the machine.

What are the main advantages of complete machining?

By doing complete machining on one single machine tool, processing time could be reduced by 30 % and an increase in

flexibility of 60 % could be achieved. Our customers need to rely on our performance, and it is really important to work most efficiently and achieve low lead times.

Can you tell me a little bit more about the manufacturing of the tie shafts in the MILLTURN. It would be interesting to get an insight in the production process.

The production of one shaft, starting with the procurement of the materials up to the finishing processes, lasts around 6 weeks. This type of shaft requires chemical as well as mechanical processes, such as heat treatment, shot peening, chrome plating, silver plating, grinding or balancing. The six weeks refer to the entire process. The fact that the whole process can be done inhouse is the main power and strength of Alp Aviation in order to convince the customer's needs.

What are the future strategies of Alp Aviation?

We aim to be at the center of excellence regarding design and manufacturing of engines as well as fixed wing and rotary wing dynamic components. Furthermore, we intend to be at the center of excellence for the production of shafts. Alp Aviation has been approved as Research and Development Center by the Turkish Government. This is an important step for gaining even more significant roles in national and international programs as a design and engineering partner. We will be able to be a global subsystem supplier in Design and Production for our customers.

The current topic of Industry 4.0 is circulating in many companies. Which measures did you take with regards to Industry 4.0?

Since the topic popped up, we have been following all the technological develop-



ments in the world. A flexible manufacturing system with four machine tools and a centralized tool change system has been established two years ago and thanks to this innovative solution productivity increased by 30 %. Our aim is to reduce labor hours and increase the technological improvements. For that reason, all our in-

vestments are a base for this approach. When we made the decision to invest in a MILLTURN, we also discussed this topic and the future development. As soon as the economic situation is getting better and requests are increasing, we will probably invest in further machines as well in automation.



THE TEAM

Serkan Erten (on the right), Business Unit Director from the Engine Unit of Alp Aviation in front of the new M40 MILLTURN complete machining center. Together with his team of engineers (from left to right: Yunus Emre Karadayi - CNC Operator, Emin Er - Method Engineer, Duygu Sen - Engineering Manager, Mesut Ayan - Senior Method Engineer and Serkan Erten - Business Unit Director) he leads the field of Dynamic & Static Engine and APU parts and is responsible for being at the center of excellence regarding the production of shafts.

Established in: 1998

Located in: Turkey

Employees: 1,300, from that 200 engineers

Industry: Supplier of Aerospace components

Business Units: Aerostructure Business, Engine Business, Rotary Wing Business, Special Process Business and Landing Gear Business

In communication with:

Mr. Serkan Erten, Business Unit Director
Field: Engine Business Unit

Typical products of ALP Aviation:

Dynamic and Static Engine and APU Parts, Helicopter Dynamic Parts & Assemblies, Helicopter Tail Rotor Drive Shaft, Landing Gears and Assemblies, Structural Parts & Assemblies for Aircraft, Hydraulic and Fuel Systems Tube Assemblies for various platforms of Boeing and Airbus.

All eyes on...

Automation with line and area gantry

by WFL Millturn Technologies

FRAI is your partner, from the initial concept development for an automated system to implementation and commissioning, all the way through to system maintenance. From robot cells to flexible gantry solutions, the company offers extensive automation concepts with maximum customer benefits to the highest quality standards.



All eyes on

Automation with line and area gantry by WFL Millturn Technologies

FRAI specialises in the development and production of flexible automation systems. Depending on the customer's requirements, different automation variants are used for automatic workpiece loading and unloading.

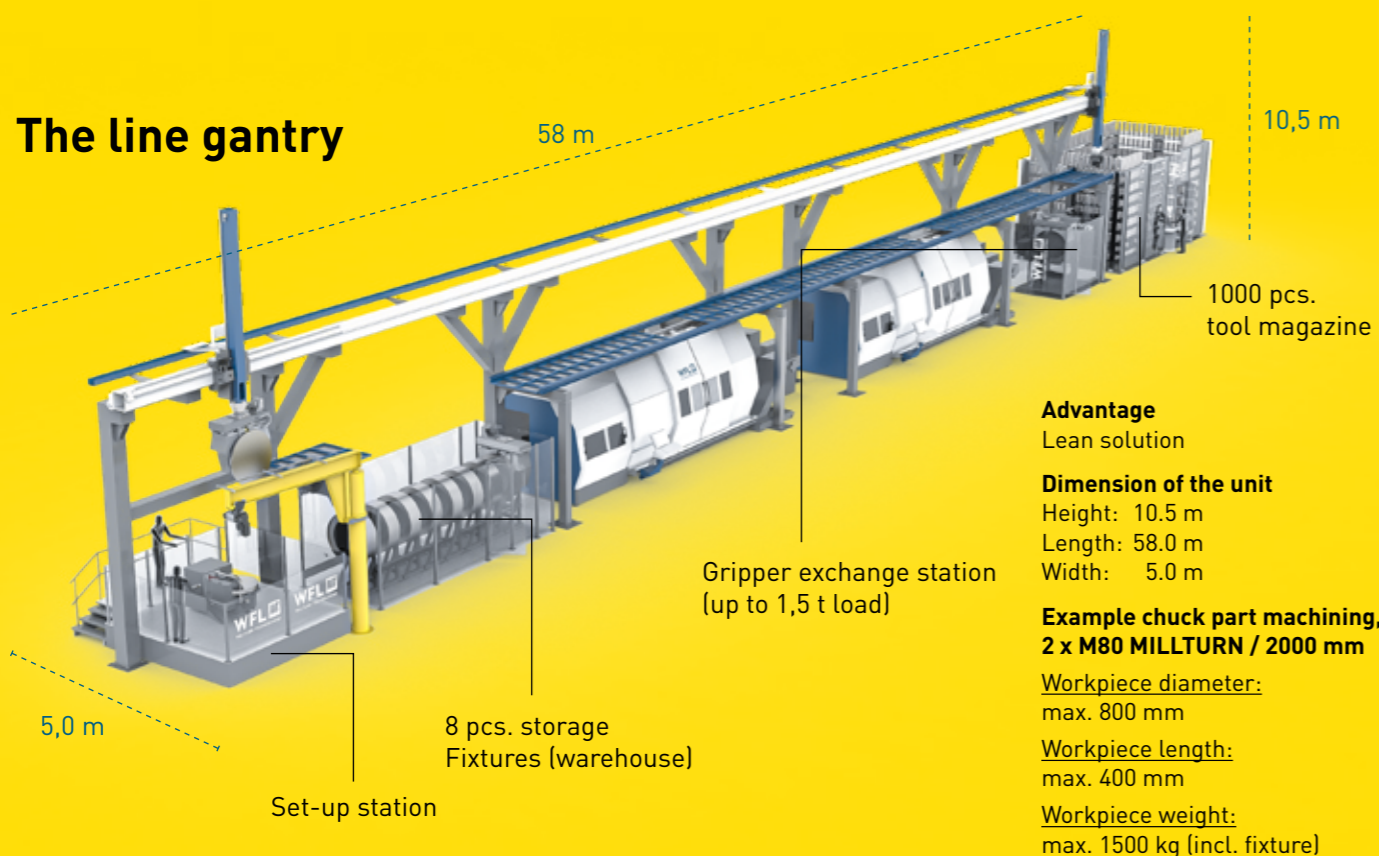
In addition to the classic handling solutions, WFL turnkey projects are equipped with a higher-level host computer system as standard. This „brain“ takes over the entire logic and logistics from within the fully self-sufficient, flexible production cell. In addition to workpiece tracking and tool management, the system also transmits all operating data (operational data acquisition) to the MES (Manufacturing Execution System) provided by the customer. One of the most efficient automation variants for production processes is the gantry robot. With loading from above, the modular gantry robot enables unrestricted access to the machine while taking up very little space. The modularity inherent in the design means that long travel paths and large

working areas can be realised and huge loads can be handled. The minimal space requirement is often a key advantage in small production areas, particularly when retrofitting automation solutions.

Line and area gantries consist of the same basic assemblies:

- Machine(s)
- Area gantry
- Set-up station for workpieces
- External tool magazine (if required)
- Buffer/lung/warehouse for multiple workpieces (mounted on fixtures)
- Gripper changeover station (if required)
 - >> Gripper for fixtures
 - >> Gripper for tools

The line gantry



The area gantry

Advantage

Low ceiling height

Dimension of the unit

Height: 7,5 m

Length: 31,0 m

Width: 12,0 m

Example chuck part machining, 2 x M80 MILLTURN / 2000 mm

Workpiece diameter:

max. 800 mm

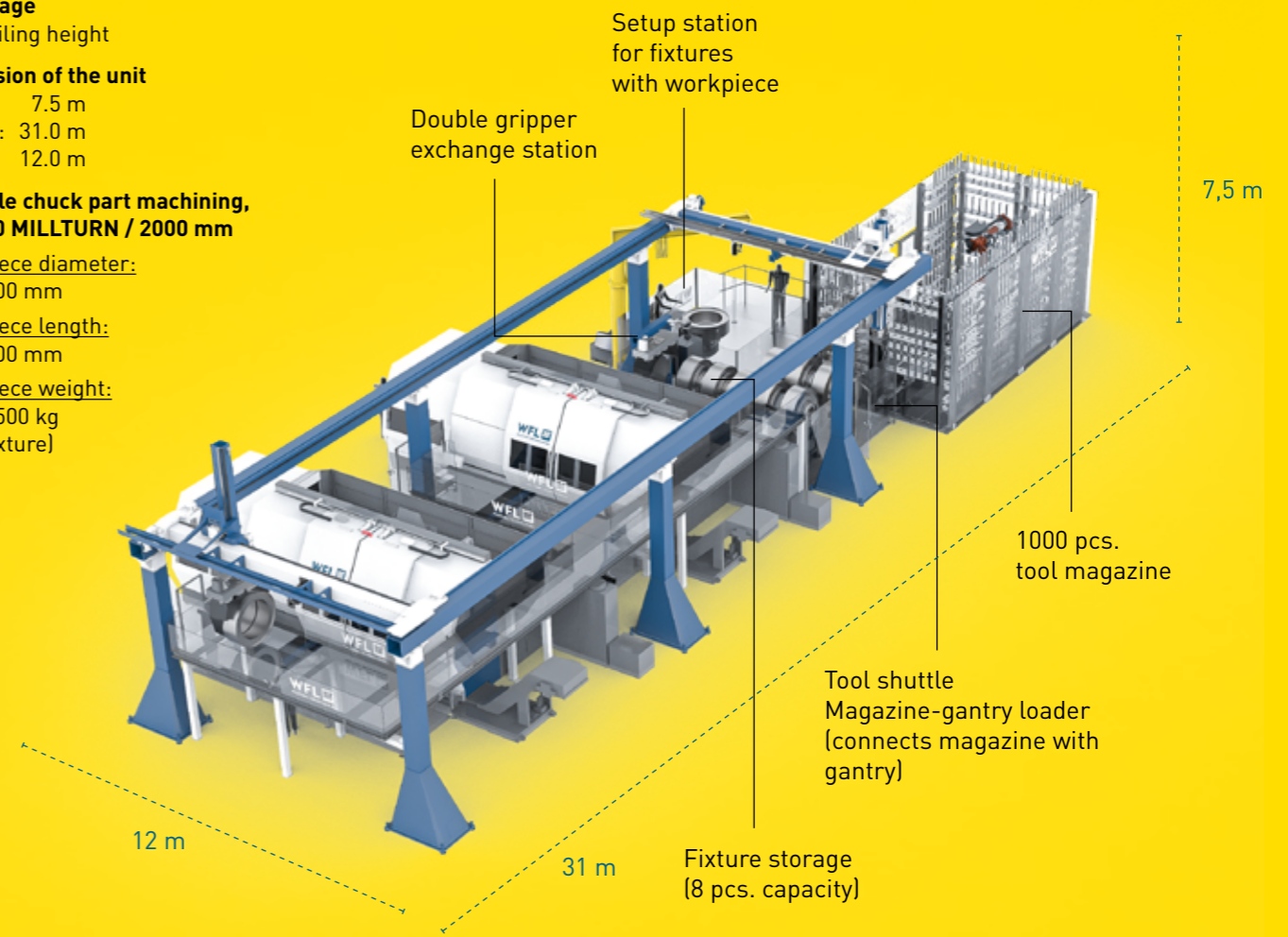
Workpiece length:

max. 400 mm

Workpiece weight:

max. 1500 kg

(incl. fixture)



Mobile robot automation

The factory of the future requires mobility and flexibility. Intelligent, mobile robot units are now replacing static production lines. Mobile robots move independently around the room and provide absolute flexibility for industry.

Advantages of the mobile robot solution:

- Unrestricted layout design
- Machines can be integrated directly in the respective place of installation
- Hardly any additional interfering contours when the mobile robot is not in use, thereby guaranteeing unrestricted access for manual activities.

Advantages

- **Set-up station for workpieces:** these are clamped on the fixture or the finished part is removed
- **External tool magazine:** saves costs compared with individual magazines for each machine
- **Warehouse for 8 fixtures (optionally for more fixtures):** prolongs the autonomous time of the cell (unmanned shift)
- **Gripper changeover station:** individual grippers for fixtures and tools
- **Wide product range:** Product variety is „infinitely“ large thanks to the use of fixtures.
- **Line gantry:** slim but long and high (ceiling height 10,5 m).
- **Area gantry:** short and low (7,5 m) but wide.
- **We offer various scalable solutions depending on the space available on the customer's premises.**



We love...

...Burgenland

Lying east of the Alps, the state is brimming with Mediterranean flair and has been blessed with an incredible natural environment. The sunshine and gentle wind which blows through the forests relax the soul, giving one a simpler outlook on life.



MEDITERRANEAN
The famous lighthouse on the Neusiedler See at sunset.

In 2021, the youngest state in Austria celebrated 100 years of belonging to the Republic. In some areas of Burgenland it feels as if time has stood still and nothing has changed. And that's in a positive way – it feels like entering a new world. With its Pannonian (Burgenland) charm, it is completely authentic and not boring in the slightest. Over the centuries, Burgenland has undergone unparalleled development. What was once a poor area known for its agriculture has become a model region in many regards. It is not only society that has changed but also the townscapes and everyday life. All the more important not to forget the everyday culture and events that have had a lasting impact on the region. Local museums and theatres showcase its eventful history in order to share it with the next generation.

A history with highs and lows

At the end of the Second World War, a German-speaking minority lived in the far west of today's Hungary. This group was separated from Austria following the fall of the Habsburg Monarchy. In 1919 this area was separated from Hungary as the population felt a closer association with Austria. In 1921, popular votes, rebellions and discussions led to the integration of today's Burgenland into the Austrian Republic. The state capital should have been Sopron, but a popular vote decreed that the historical city should remain in Hungary. In 1925, Eisenstadt finally became the state capital of Burgenland, taking the title from Bad Sauerbrunn.

The name Burgenland refers to the four former administrative units – Pressburg, Wieselburg, Ödenburg and Eisenburg. Today, none of these regions is actually located in Burgenland, but the name was retained. During the course of history, Burgenland was the scene of major events. The large-scale emigration to America, the different ethnic groups and the period of the Second World War and beyond shaped the region's history. The artificial border – the Iron Curtain – also divided society for a long time. When the Iron Curtain fell in 1989, the region was transformed from an area of division to an area of solidarity and unification.

Despite this solidarity, the memory of life in Burgenland during that time has not

been lost. The buildings that have been re-erected true to their original, informative exhibits and sites steeped in history recall a Burgenland that many today cannot imagine. Both the joys of everyday life and the fears of the population during those times form an integral part of these exhibits. The fates of the people are highlighted to create an awareness of past events.

Charming and typically Pannonian

A particular highlight of Burgenland is living in a simple but highly aesthetic environment. Tasteful and well-maintained, it is a place for finding inner peace, feeling the originality of the landscape all around and taking the time to enjoy it all. This style of living is known as Pannonian living.

Living in the sunshine. From the carefully renovated Kellerstöckl and moder-

nised estate through to the noble winery, throughout Burgenland you will find a variety of wonderful places to stay that will give you a real experience of the typical Pannonian way of life. Often concealed in vineyards surrounded by an idyllic landscape with Burgenland flair everywhere you look. Far removed from hectic, overcrowded towns and cities, here you'll experience a particularly relaxing holiday.

Where indulgence is at home

Where once workers would relax after a day in the vineyard, letting their eyes wander over the magnificent landscape, is now an oasis of relaxation. Over time and following modernisation, the Kellerstöckl became too small for the winemakers. Today, the picture-perfect buildings are experiencing a renaissance and are more appreciated than ever. The small romantic houses have been renovated with a huge amount of love and atten-



MAGNIFICENT
Güssing castle in its unique grandeur.

tion to detail and opened for guests. This loving transformation into cosy holiday homes allows visitors to enjoy a holiday right in the heart of this beautiful place.

As well as excellent wines, the region is known for its genuine hospitality. Whether it's a visit to a homely tavern, a guided wine-tasting experience with the winemakers themselves or a meal in a renowned restaurant, visitors to Southern Burgenland can be sure of getting their money's worth and being welcomed with open arms. Don't miss the opportunity to sample the famous Uhdler, a hearty cold platter or the region's other culinary specialities.

Today, in 2021, Burgenland is a model region within the European Union in many respects. The easternmost state in Austria is a prime example for renewable energies and economic development. Burgenland is a much-loved home, haven of tranquillity and sanctuary for many.



RELAXATION
awaits visitors to the Leopoldina Temple in the Park of Esterhazy Palace.



CONCEALED
The grapevines for winemaking near a wine cellar along the Styrian wine route.



FACTS
Population: 296.040
Size: 3.962 km²
Capital: Eisenstadt
Districts: 171

EDITOR'S TIPS

Nature reserves:
www.burgenland.info/erleben/natur-erleben/naturparke

Tabor ruin:
Untere Hauptstraße 7, Neusiedl am See (North Burgenland)

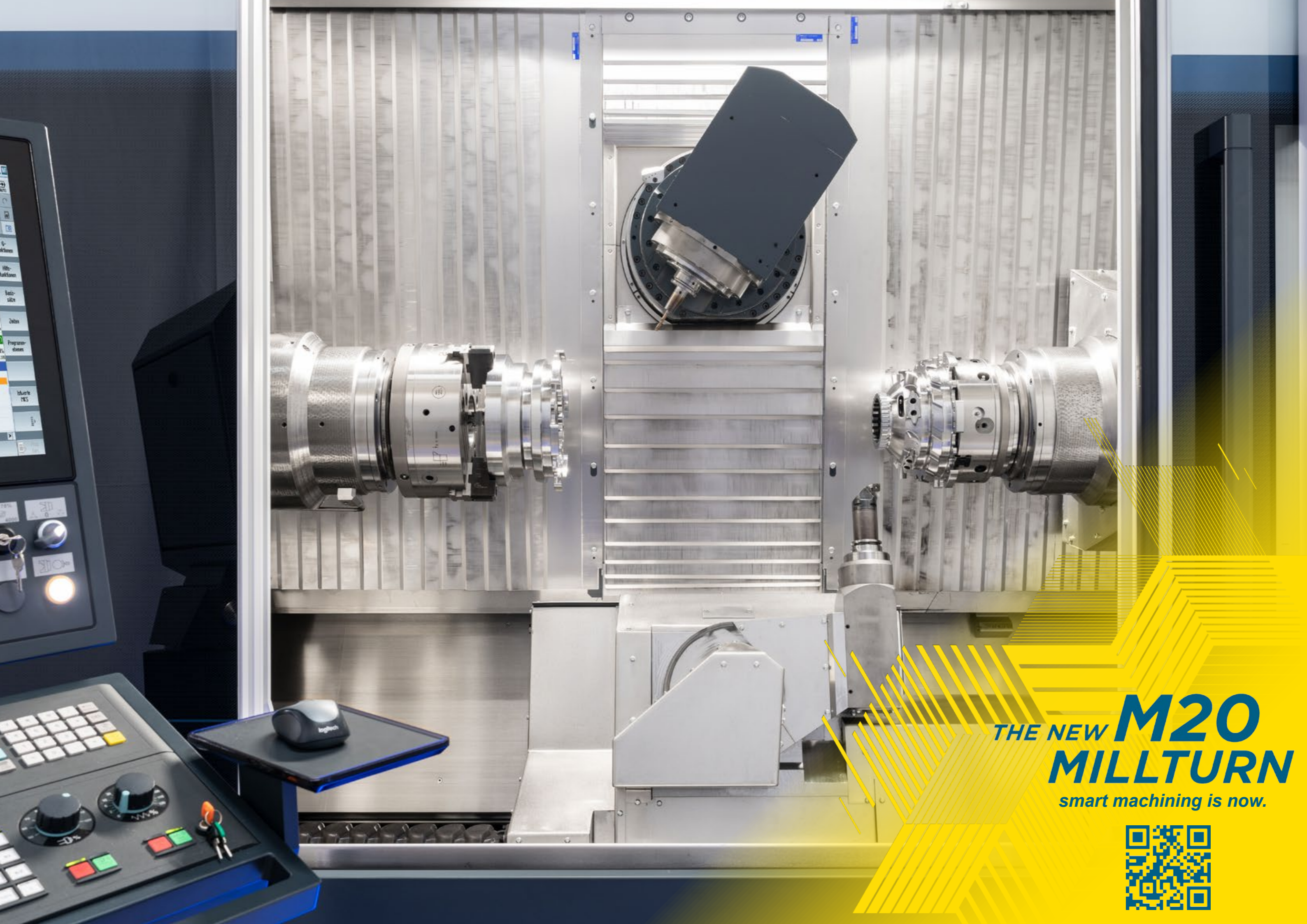
Kobersdorf castle:
Schlossgasse 3, Kobersdorf (Middle Burgenland)

Weinek's Kellerstöckl:
Zeinerberg, 7522 Heiligenbrunn
Two charming houses, one of which is a designated historic monument, in Heiligenbrunn and on the Kulmer Berg in Eberau.

Tschardaken:
Frauenkirchner Straße 1, 7131 Halbtturn
The wooden maize 'Tschardaken' (huts) are typical of Halbtturn and distinguish the landscape like no other area in Seewinkel.

Noric-Pannonian burial mounds: The Noric-Pannonian burial mounds in Bernstein are burial sites from the 1st and 2nd centuries and lie not far from the Planetenwanderweg. (South Burgenland).

More information about Burgenland: www.burgenland.info



THE NEW **M20**
MILLTURN
smart machining is now.





All eyes on

CrashGuard Studio

by WFL Millturn Technologies

The most effective way to test and optimise new or modified CNC programmes is through the use of the 3D simulation software CrashGuard Studio. These tests can be carried out at an external programming station or directly on the machine control system itself. By optimising the machining process and ensuring faults are corrected early, users can expect a significant reduction in the risk of collisions and rejects, while also minimising unproductive downtimes. This unlocks new potential and offers clear competitive advantages.

The launch of major release 3 in mid-2019 saw new capabilities added to CrashGuard Studio, including material removal simulation and visualisation functions. As a result, simulations can be carried out more quickly with greater accuracy and increased visual quality. It was also specially optimised to utilise the benefits of CPUs (Central Processing Units) and GPUs (Graphic Processing Units).

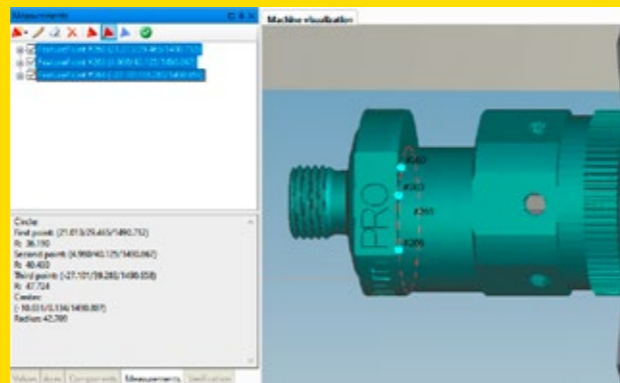
The latest product version, which was released in June 2021, is Version 3.2., which introduced the newly developed functions for modelling and manufacturing plasticising screws for the plastics industry. These functionalities are offered as an additional option with CrashGuard Studio. There are, however, more new features and functions that are being improved or replaced:

New measuring functions

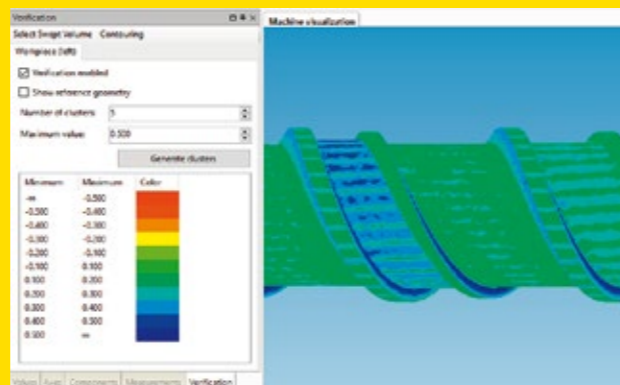
The measuring functions using the mouse have been revised and expanded. It is now easier to select sharp edges on the workpiece geometry generated using the VML (Virtual Modeling Library), for example.

Verification and validation

The Verification window provides functions for analysing the simulated workpiece geometry. Undersized or oversized dimensions can be detected using a geometric comparison in relation to a target geometry (in STL or BVP format).



Improved scaling of the generated workpiece geometries



Verification window for analysing the simulated workpiece geometry



Ergonomic and efficient thanks to 3D mouse

Remove flying material (VML):

This function enables material that is removed during cutting, for example, to now also be removed while using the VML.

Parallel projection (VML):

The parallel projection can now also be activated via the symbol while using the VML. Performance during material removal calculation has also been improved with VML.

Material removal simulation (VML):

Product version 3.0 of CrashGuard Studio now features a new material removal simulation based on the Virtual Modeling Library (VML). This enables quicker simulation with greater accuracy.

3D mouse support:

3D mouse support enables more ergonomic and efficient working within the workpiece and machine visualisation system.

CrashGuard Studio is the ideal extension to all CAD/CAM software as well as the WFL CrashGuard collision prevention software. The material removal simulation enables 3D geometries of workpieces in any machining state to be exported. Data relating to the workpieces, tools and clamping devices can be transferred in any format.



ScrewCAM screw programming – the new plug-in in CrashGuard Studio:

Geometric functions:

- Single- or multi-flighted channels
- Changeable depth
- Any change in pitch
- Wall shaping that can be defined in a cross-section by a radius to the channel base and a wall inclination.

Technological functions:

- Rough machining with automatic cut distribution and Y-offset control (turn-milling)
- Wall finishing with automatic „best fit“ tool orientation and floor finishing.
- Channel base finishing
- Chamfering of barrier bars

The advantages:

- Programming is based on 2D drawings
- Preview of 3D object can be generated
- All machining steps involved in the production of a workpiece in a single piece of software
- Can be simulated in CrashGuard Studio





„It is crucial that we are always at the cutting edge of technology.“

Udo Kersten

Kersten Maschinenbau

Technological versatility in a class of its own

With its 28,000 inhabitants, the town of Meissen in the German state of Saxony is best known for being home to Europe's oldest manufacturer of porcelain. But it is not only the production of the finest porcelain that defines Meissen; the surrounding area also has plenty to offer in the way of industry. Kersten, the specialist mechanical engineering company, was established in 1965. After the German reunification, the company ran with two small milling centres and 12 employees, and over the years, the production of parts and components developed into the main area of business. In 2004, the company moved into a newly acquired office and manufacturing facility in the Niederau industrial estate. It was at this time that first contact was established with WFL Millturn Technologies, at which point Kersten Maschinenbau transitioned to complete machining. The first M65 MILLTURN from WFL entered service at Kersten Maschinenbau's manufacturing facilities back in 2006. It is used primarily for the production of shafts, generators and gearbox parts for the wind power industry.

Range of parts 'without limits'

Kersten Maschinenbau mainly supplies customers in Germany, Austria and Switzerland, however, the parts that are manufactured here can be found all around

the globe. Customers range from mechanical engineering (e.g. electric machinery) companies, generator and motor production companies, rail engines, coupling and gear manufacturers to printing press manufacturers. As a result, there is a constant demand for Kersten products from companies such as textile machine manufacturers, plant manufacturers, measuring technology companies and special machinery manufacturers. "This

„The versatility of the prismatic tool magazine and the generously dimensioned tool changer provide us with many options here.“

broad range ensures both flexibility and security," says Udo Kersten, CEO of Kersten Maschinenbau. "As a supplier, we have a wide range of customers, which means that we deal with an extremely diverse range of parts. To manage this, we have a high degree of vertical integra-

tion with cutting of blanks, welding, heat treatment and assembly of components. Three high-precision coordinate measuring machines ensure that all manufactured parts can also be measured and dispatched with records. The mechanical departments comprising turning, drilling, milling and complete machining as well as grinding with cylindrical and surface grinding machines form the core of the manufacturing process. All our machines feature various options so that we can react with maximum flexibility when presented with new customer workpieces," adds Udo Kersten.

The world of complete machining

Currently Kersten Maschinenbau has four MILLTURN machine models in use. One of the latest additions is the M80X MILLTURN with a 4500 mm centre distance. Quite simply, flexibility and precision were the main requirements for the new model. Starting with the pickup magazine, a self-centring steady rest with a large clamping range, through to the extended X-travel, it covers the widest possible variety of machining options. Other requirements included stability, multiple technologies and high accuracy. However, the flexibility to use a wide selection of tools in the machines was also of particular importance. As a result, MILLTURN impressed with its excellent tool handling using the large

number of standard tools (up to 900 mm in length) and the ability to accommodate large boring bars using the prismatic tool interface.

“The versatility of the prismatic tool magazine and the generously dimensioned tool changer provide us with many options here,” explains Udo Kersten. “On top of that, another major concern was the large Y-travel. Ultimately, however, it was the overall concept or package, which had already shown its worth in previous years, that was once again decisive.”

“All MILLTURN models are currently designed for shaft part production, although the machining of chuck parts is also possible. We are currently focusing on the machining of shafts, rollers, bushings and bores. These workpiece groups are mainly run on the MILLTURNS – the different turning length options were important to us,” Udo Kersten comments. The smallest complete machining centre, a M50 MILLTURN, with a turning length of 3000 mm, optimally fulfils the requirements for the parts to be machined on it. The reinforcement on the side of the internal machining options played a major role in the last purchase decision. A specially damped system boring bar for vibration-free finishing was also included in the acquisition of the M80X MILLTURN. This enables automatic tool head change at the boring bar tip, making it possible to machine complex internal contours. The longer the boring bar, the more Z-travel is needed. The M80X MILLTURN with 4500 mm machining length met this requirement and enables the use of vibration damped boring bars up to 1700 mm long and weighing 200 kg. Compared to the standard M80 model, the X-stroke of the M80X has been extended by 150 mm giving a total of 1050 mm. The longer X-stroke enables the use of longer tools, especially for deep cross holes.

Currently, textile industry components are being produced on the M80X MILLTURN, specifically the workpieces for yarn production in textile machines. “Here we produce workpieces with long, slim boring bars that have very high accuracy and run-out requirements. A particularly high standard of internal contour machining is also required,”

concludes Udo Kersten. At the end of 2020, the M80X MILLTURN began producing components for yarn winders.

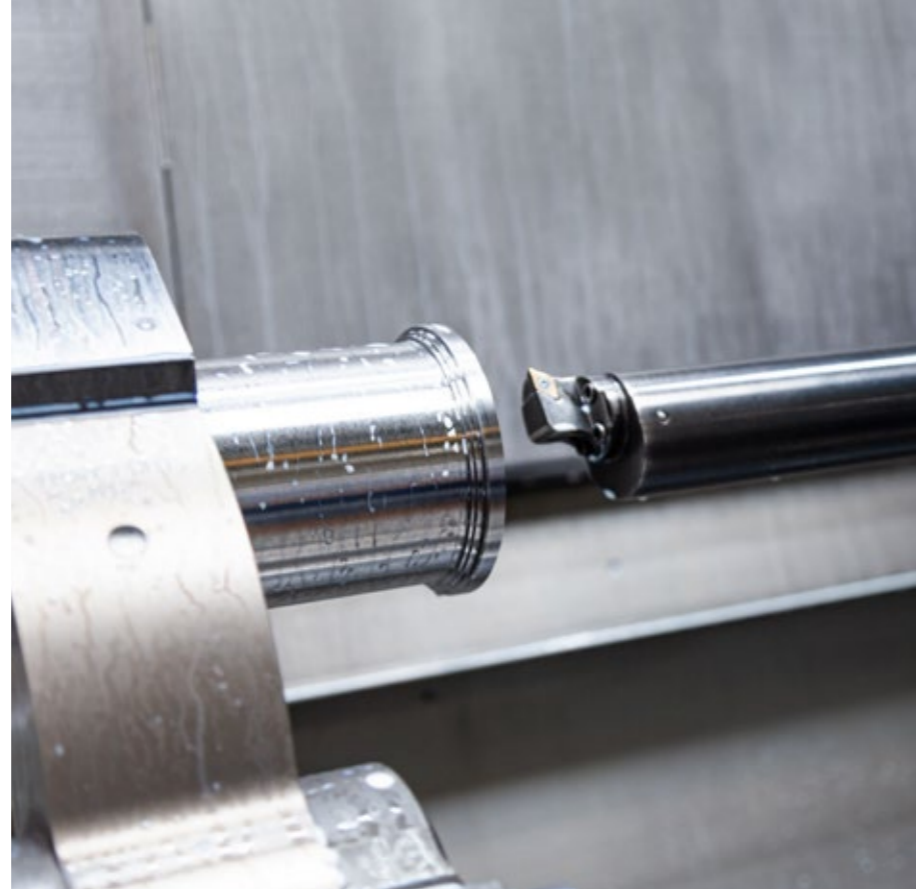
Technological flexibility

From a technological point of view, we can perform any kind of mechanical machining, including internal grooves, serrations and gears. External gears are milled, and the internal gears are punched. When it comes to gear milling, the advantages of the MILLTURN milling unit concept with a high-torque gear shaft come into their own. On the one hand, when pre-machining with large tools, it provides a very high torque combined with high power, while on the other hand, the high speeds during finishing of the gears ensure short machining times. The technologically optimal torque power curve of the milling unit ensures perfect cutting conditions in every speed range. Combined with WFL’s FLANX gear cutting software, this results in an extremely flexible and efficient solution. A

slotting tool with an 800 mm deep nut, developed in-house by Kersten, is used on the M50 MILLTURN. “The stability of the MILLTURN machines means that we can keep trying and implementing things like this. These machines have such great stability that they are a natural fit for such applications.”

As a supplier, both the range of workpieces and the batch sizes can vary. The most common batch sizes are between 20 and 100 pieces. The company therefore focuses on flexible and customer-specific order processing. Kersten Maschinenbau can basically cover everything from individual pieces to large batches.

The two most recently acquired machines, the M50 MILLTURN and the M80X MILLTURN, marked an expansion of the plant’s machinery. Since 2013, an M120 MILLTURN with 6500 mm turning length has also been working reliably in a three-shift system. To date, no machine has been decommissioned. The



NO LIMITS

With the new M80X MILLTURN complete machining centre, which has a machining length of 4500 mm, there are no limits to deep internal machining. Kersten has a variety of vibration damped boring bars available for this purpose.



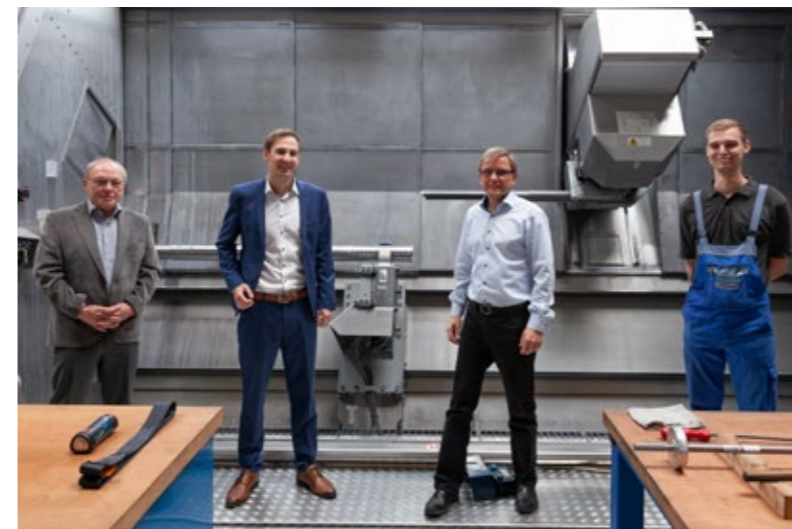
UNIVERSAL

The universal range of applications for WFL machines allows the use of a wide variety of machining technologies. Using an internal smoothing tool for the highest bore qualities.



MULTIFUNCTIONAL

Complete machining of a welded rotor shaft.



THE TEAM

The WFL and Kersten team: from left to right: Bruno Reisbeck, Regional Sales Manager WFL, Andreas Lehner, Regional Sales Manager WFL, Udo Kersten, Managing Director Kersten Maschinenbau and Florian Eichler, M80X MILLTURN Machine Operator.

purchases always involved an expansion of capacity, but also with a view to exploiting the additional technological potential of the newer machine models. “Technological progress was important to us here. It is crucial that we are always at the cutting edge of technology,” concludes Udo Kersten.

From programming to production

The programming and simulation of the workpieces is carried out at Kersten using TopSolid CAM. WFL provides 3D models of the machines which can be virtually mapped in TopSolid CAM. The existing postprocessor serves as a link to convert the TopSolid CAM programs into ISO codes required by the control system. Two programmers are currently working on the MILLTURNS.

Many different factors are required in order to run a simulation accurately: the machine model, clamping devices, the blank or component data and tools. Kersten has been working on a major digitalisation project for some time now. As part of this process, the entire tool organisation is optimised in order to have all the necessary 3D models available. The challenge here is to capture more than 20,000 tool items, from which about 150,000 variations of complete tools can be generated. Kersten is currently making excellent progress in digitising tool data. In the CAM system, the 3D digitised tools can then be loaded, and the simulation created in the program – this means genuine added value.

Indispensable

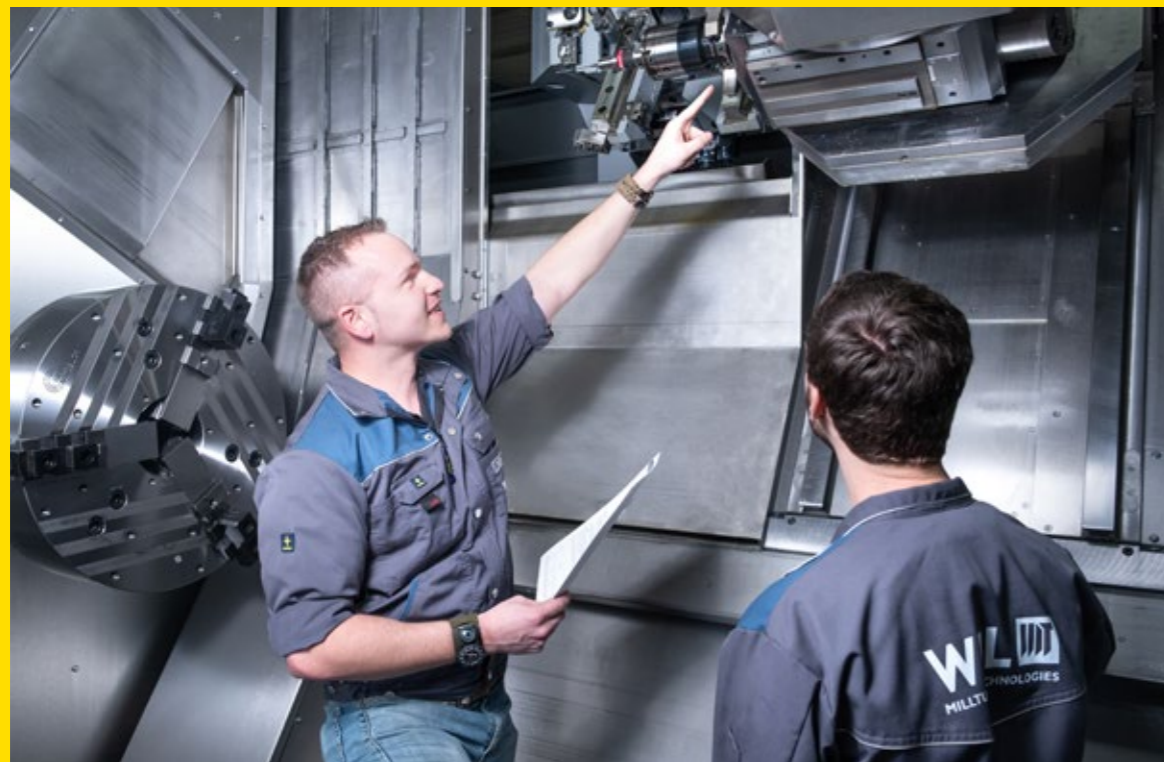
Complete machining ensures higher accuracy and eliminates reclamping errors. The complexity of the workpieces is increasing and can be better reproduced by this type of machine. Five different axes can be used for machining and interpolation in a single clamping. Lead times are shortened, idle times are eliminated, storage space is saved and ultimately the throughput becomes faster and more efficient. “We have been won over by the numerous benefits of complete machining ever since we purchased our first complete machining centre in 2004. We have clearly seen that it has major advantages over conventional manufacturing,” concludes Udo Kersten.



All eyes on

WFL BASIC MAINTENANCE

We keep your machine fit and production secure.



BENEFITS of the annual WFL Basic Maintenance Agreement:

- Functional testing of the safety devices ensures highest possible operational safety
- Active prevention of malfunctions and production downtimes
- Increased profitability through longer service life
- Preservation of the machine value
- Increased longevity of core components
- Reduced control effort and personnel costs
- Optimal cooperation through regular and professional support from WFL
- Preventive measure assessment through continuous maintenance
- Lower repair costs in relation to preventive measure elicitation
- Additional special discount
- Comprehensive machine check including replacement of recurring wear parts
- Cost transparency thanks to an annual flat rate
- Maintenance log for transparent documentation of the machine status



In order to ensure the desired productivity and availability of a MILLTURN, regular preventative maintenance is vital. Regular maintenance prevents production downtime and ensures the consistent quality of the workpieces as well as the longevity of the machine. The WFL Basic Maintenance offers a perfect overall package regarding the future production.



We keep your MILLTURN running! Scope of the Basic Maintenance Agreement:

1. Drive belts – Inspection of the drive belts of all axes and spindles for wear and contamination.

2. Scrapers – Inspection of guideway scrapers for wear and exact scraping position.

Filter elements – Exchange of filter elements of the machine's energy supply: 1: Filter element new, 2: Filter element used,

3. Telescopic covers – Inspection of telescopic covers for wear, leakage, ease of movement and mechanical deformations.

Guideways – Inspection of guideways and linear guideways for damage and wear.

Backlash – Inspection of axes for backlash.

4. Tool clamping package – Determination of pull-in force on tool clamping package.

5. Tool changer – Inspection of the tool change process for correct tool change positions.

6. Geometry check – Inspection of the entire machine geometry for accuracy.

Bearing clearance of the milling spindle – Determination of the bearing clearance and run-out errors at the milling spindle.

Basic Maintenance Agreement – Wear parts package individually tailored to your machine.

Request your basis maintenance now via hotline@wfl.at or spares@wfl.at



An M35 MILLTURN has taken up residence in the laboratory of the Institute for Manufacturing at the Technical University of Vienna. It has immediately been put to use for research surrounding Industry 4.0.



Here's to a great partnership! Chairman of the Institute Dr. Friedrich Bleicher with WFL CEO Norbert Jungreithmayr in front of the M35 MILLTURN in the laboratory of the Institute for Manufacturing

The IC0tronic Tool in operation. The machine is currently carrying out tests with a „sensored tool“, which has sensors built into the tool accommodation to allow it to communicate with the machine. The sensor technology significantly simplifies the workflow, and not only does it optimise the milling process, but it also increases the machine's productivity.

Innovations:

EuProGigant, Gaia-X, WFL and what unites these three

„We have a long-standing partnership with the Technical University of Vienna. We have already carried out successful research on the optimisation of machining technologies, including the machining of difficult materials. We are delighted to be able to provide a MILLTURN for this latest research and look forward to working on exciting, forward-looking projects together.“

Norbert Jungreithmayr, CEO WFL Millturn Technologies.

Everyone is talking about Big Data. Data is the new gold – including in the production environment. Every machine and every sensor generates data. But how does all this production data tie together? How is it exchanged, for whom is it useful, how is it handled? For Big Data in production, data sovereignty is a decisive factor for future success, particularly in Europe. It is not just about increasing sales and productivity, but also about several million jobs. Adherence to EU climate protection goals is also an important consideration across all sites. What sort of data infrastructure would make Europe's production and manufacturing industry more sovereign, more efficient, more stable and more sustainable?

EuProGigant is leading the way

EuProGigant, the Austrian-German key project for Gaia-X, has called on 16 companies, universities and research institutions to answer this question. With the

support of the Austrian Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology (BMK), the Austrian Research Promotion Agency (FFG) and the German Federal Ministry for Economic Affairs and Energy (BMWi), a European „Production Gigant“ is set to be introduced in the next four years. The consortium is focussing on data-driven added value based on the principles of the European Gaia-X data infrastructure.

Gaia-X

Gaia-X is the European data infrastructure in which artificial intelligence will play a significant role. The aim is to detect and proactively prevent faults in production processes.

WFL in the EuProGigant project

WFL has provided the consortium with a MILLTURN as a demo machine for the

Industry 4.0 pilot factory created by the Technical University of Vienna, which, with iControl process monitoring and the necessary electronics and software, has been prepared for the use of sensor-based tools. A similarly equipped machine will also be available in the in-house Millturn Innovation Center at the manufacturing plant in Linz, which will enable high-frequency process signals to be used both in the control system and in processed format in conjunction with cloud solutions for process optimisation in new control circuits.

In the machine tool sector, the activities at the Institute for Manufacturing at the Technical University of Vienna are primarily focussed on the design, calculation, measurement-based analysis and optimisation of machines as well as their components and assemblies. The perfect place for a MILLTURN. The M35 MILLTURN with a centre distance of 2000 mm, a swing diameter of 520

mm and a milling power of 27 kW was installed in the manufacturing laboratory at the start of 2021. Working at a speed of 12,000 rpm, the machine enables the complete machining of complex shaft and chuck parts and combines the functionality of a turning machine, a 5-axis machining centre and a gear hobbing or deep hole drilling machine in a single item of production equipment.

Focussing on smart manufacturing

The MILLTURN has immediately been put to use for research surrounding Industry 4.0. The researchers are particularly interested in the use of sensors in the machines and the way in which they record and process data. The more heavily sensor technology is used, the easier it is for machines and tools to communicate with each other. This results in a simplified workflow and lower costs all round.

The benefits are clear: the tools and machines communicate in real time, which then improves process monitoring, parameter optimisation, and even the control of speed and feed rates. This allows tools to be used for longer, cuts costs and guarantees process stability. All in all, this fascinating research field is bringing us closer than ever to harnessing the true potential of „smart manufacturing“.

For further information, visit: euproigigant.com

Hard facts about the project:

- Optimisation of the speed and flexibility of value creation through implementation of the technical architecture of an infrastructure and data ecosystem according to the principles of Gaia-X.
- The 3 central ideas: Stability in the industrial ecosystem, holistic data management in the cloud, European knowledge database
- Project runtime: 01/03/2021-28/02/2025. Led by a binational, Austrian-German project consortium. Funded by BMK (AT), FFG (AT), BMWi (DE), DLR (DE)





All eyes on

Measuring technology Part 2

by WFL Millturn Technologies



In order to meet today's requirements, it is important to make measuring an integral component of forward-looking production processes. The closed-loop approach attempts to make the network consisting of production system, machine, operator and measuring technology as simple and efficient as possible. One of the most important elements in this network is measuring during the production process.

Before a measuring probe can be used to take a measurement, it must be calibrated. This is usually performed by the operator before the start of a machining process. Calibration can also be carried out fully automatically via the NC programme.

After touching the surface with the stylus, a measuring probe must experience a certain deflection before the switching signal is sent to the machine control system. This pre-travel is not known a priori and is dependent on the length of the stylus, the feed direction, etc. but can be accurately reproduced.

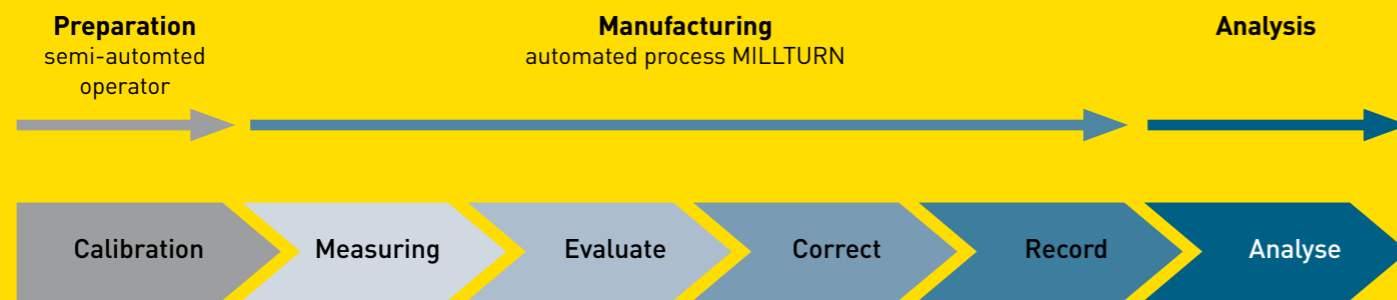
The pre-travel does not need to be known for many standard measurement methods, for example measuring the depth of a milling pocket. When the measuring probe touches the refer-

ence surface and the bottom of the pocket, the difference between the two switching points reveals the exact pocket depth - even without calibration - as the two measuring points are approached with the same feed direction and the corresponding pre-travels cancel each other out when the difference is formed.

If, however, features such as the width of a milling pocket or a shaft diameter are to be measured with the Y-axis, opposing surfaces on the workpiece must be approached with the opposite feed direction and the difference between the switching points must be determined. To obtain accurate measured values in this case, it is necessary to calibrate the measuring probe, i.e. to know the precise pre-travels.

Calibration is only possible if the expected target value is known. Calibration can be carried out either at any point or using a calibration device. The measuring probe can be calibrated at any diameter, with a calibration ring or a special jig.

Calibration with a jig simplifies the calibration process, as the target value is already known and is stored with the corresponding machine data in the control system.

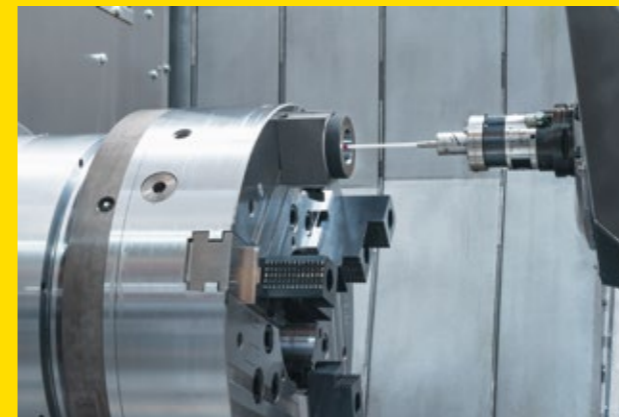


Calibration device on the tailstock of the M200 MILLTURN incl. temperature compensation

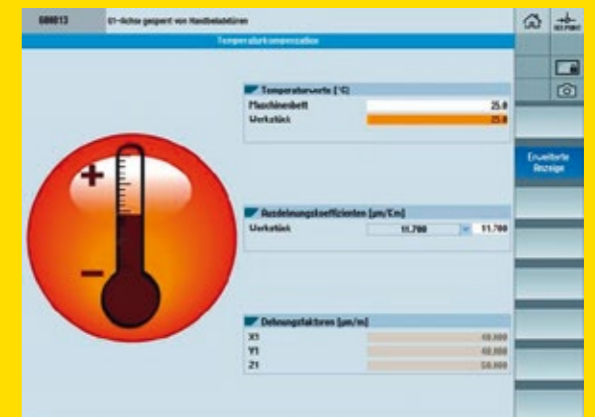
Temperature-stabilised water from the coolant system flows through the calibration device, which is mounted on the tailstock in the direction of the Y-axis and has a cover which prevents ingress of dirt into the measurement room.

In the middle of the calibration device, there is a cuboid on which the switching points of the measuring probe can be determined in the X1, Y1 and Z1 direction. Up to 12 measuring points are

also fitted at which distances of different lengths can be calibrated. Two temperature sensors are used to automatically record the current temperature of the calibration device and the machine bed. Calibration at the 12 measuring points enables the current thermal expansion status of the measurement system for machine axis Y to be accurately determined. This is particularly important with large workpiece diameters. The thermal expansion of the measurement system in the X and Z direction is taken into account using the measured temperature for the machine bed and the known expansion coefficients for the measuring systems.



Calibration of the measuring probe on the calibration ring.



The WFL measurement and correction cycles ensure that the measurement results from the machine now match the actual dimensions of the workpiece at a standard temperature of 20°. If tools or positions are corrected, the temperature compensation/back calculation to the standard temperature of 20°C is beneficial for the achievable accuracy.



A portable measurement device is supplied for recording the workpiece temperature. Right before the final machining of a tight fit, for example, a menu screen can be automatically displayed via an NC subprogramme. This prompts the operator to measure the current workpiece temperature and enter it on the screen.



Example:
1. The 500-mm-long shaft with a temperature of 26°C is measured in the machine. The machine temperature is 20°C. Since in this case the workpiece has reached excess temperature, it expands and too large a measurement is measured. Without temperature compensation, the actual length is 500.033 mm.

Temperature expansion coefficient workpiece = 11 µm/Km
Temperature expansion coefficient measuring ruler = 8 µm/Km

The blisk hub

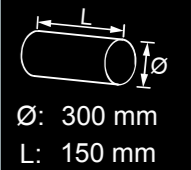


Advantages of the M20-G MILLTURN:

- Powerful and high-torque water-cooled motor spindles
- Very small gaps in the lower slide systems, as no telescopic plates
- Optional individual tool holder at the bottom
- Automatic workpiece transfer
- Production cell with integrated loading and unloading
- B-axis for turning-boring-milling unit with direct drive via water-cooled torque motor
- Excellent dynamics

DEMO

Steel
42CrMo4



M20-G



1. Machining on the main spindle:

- Continuous drilling in the centre with individual tool holder
- Rough turning of the internal contour with individual tool holder
- Rough turning of the external contour and plane surface with turning-boring-milling unit
- Plunge-turning of the external groove with turning-boring-milling unit
- Plunge-turning of the internal groove with individual tool holder
- Finish turning of the internal contour with individual tool holder
- Finish turning of the external contour, partially by means of swivelling B-axis with turning-boring-milling unit
- Axial rough and finish milling on the flange with turning-boring-milling unit
- Flange holes are produced with the turning-boring-milling unit

2. Machining on the counter spindle (at the same time as machining on the main spindle)

- Rough and finish turning of the remaining external contour
- Finish turning of the internal contour
- Gear skiving of the external and internal gear
- Rough and finish milling of the dovetail contour
- Rough and finish milling of the remaining external contour, partially by means of 5-axis milling
- Production of radial holes

» QUESTIONS | COMMENTS | IDEAS?

You have questions regarding our products, technologies or machining? We are looking forward to your mail at office@wfl.at

» FACTS COMPLETE

Our customer magazin „COMPLETE“ is available in German and English. Additionally a download link can be found on our homepage.



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