Klartext

HEIDENHAIN

The CNC PILOT 640 with TURN PLUS

Create an NC program at the push of a button

Editorial

Dear Klartext Reader,

Your order books are full, skilled employees are a rare commodity, and additional machines won't just magically appear overnight. New machines take time to deliver, and you would require space for them as well. So what you really need is to optimize existing processes and get the most out of your machine park. Only then will you be able to complete jobs quickly and take on new orders.

This is exactly what we want to help you with in our latest edition of the Klartext Magazine, so that you can become even better in your core area—machining.

You'll read, for example, about how machining companies are using TNC controls in their production departments to increase competitiveness, productivity, and quality. You may also be surprised by the wide variety of approaches that exist for meeting this challenge.

In addition, you'll find quite a bit of information about how HEIDENHAIN can support you directly. Of all the control functions, training courses, and helpline services discussed here, perhaps you'll find just the thing you need to help you take an important step toward process optimization. Or maybe there's something here that will free you up from nettlesome secondary tasks, allowing you to concentrate on your core competencies.

So come take a look inside the new Klartext. Happy reading!

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Our website always provides you with the latest interactive content in a modern format. Here you can experience multimedia Klartext reports as well as find information, tips, and training course offerings.
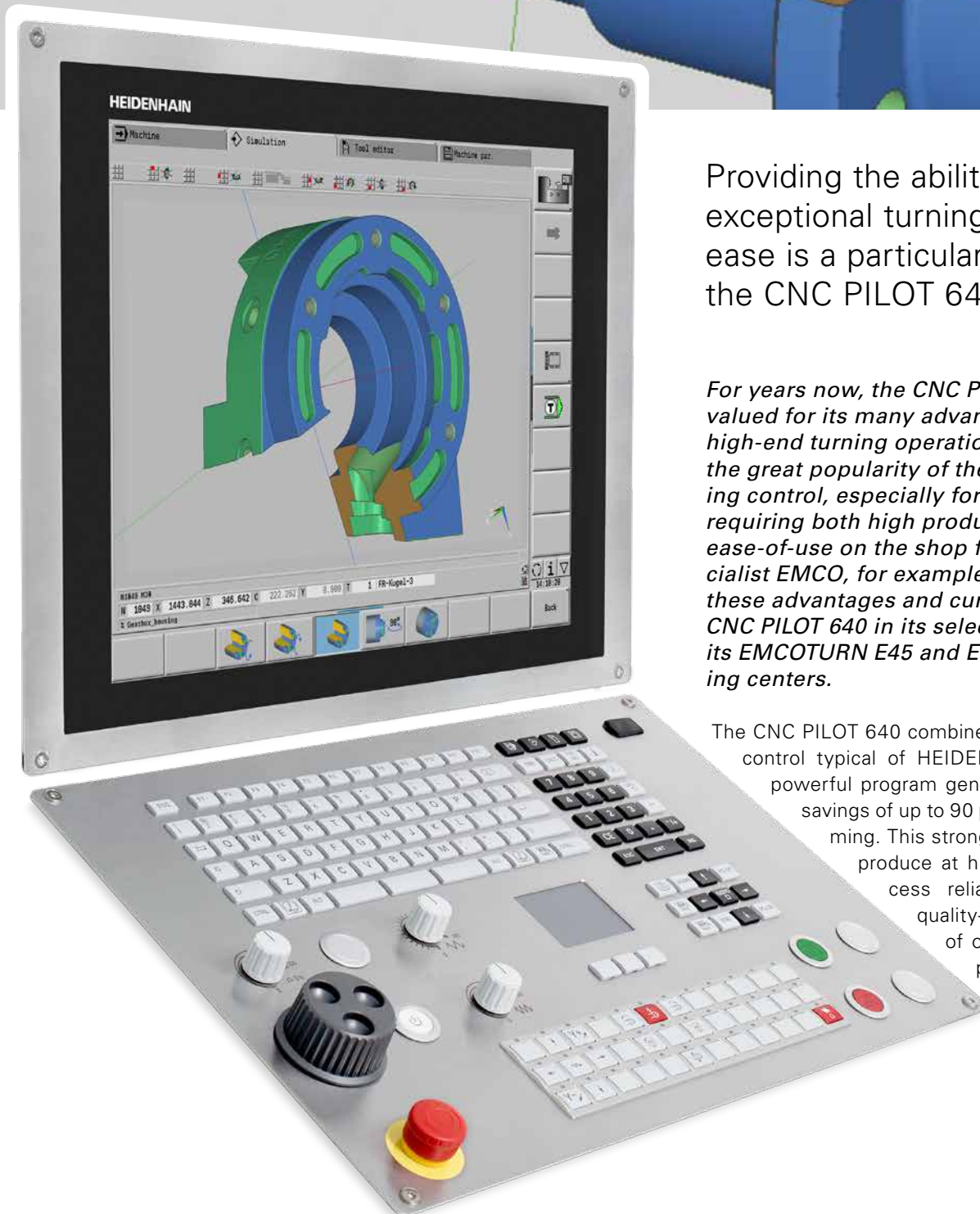
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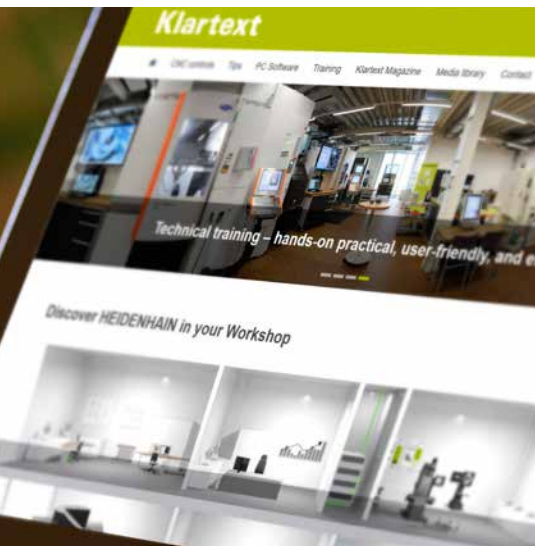
Klartext

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Content

High-end turning

at the push of a button

Providing the ability to achieve exceptional turning results with ease is a particular strength of the CNC PILOT 640.

For years now, the CNC PILOT 640 has been valued for its many advantages in simplifying high-end turning operations. This explains the great popularity of the HEIDENHAIN turning control, especially for use in applications requiring both high production quality and ease-of-use on the shop floor. The lathe specialist EMCO, for example, has recognized these advantages and currently includes the CNC PILOT 640 in its selection of controls for its EMCOTURN E45 and EMCOTURN E65 turning centers.

The CNC PILOT 640 combines the optimized motion control typical of HEIDENHAIN controls with a powerful program generating feature for time savings of up to 90 percent during programming. This strong package allows you to produce at high efficiency with process reliability and exceptional quality—even for a batch size of one with complex workpiece geometries. Along the way, you can rely on the following functions and options:

EMCOTURN E65

emco group

A CNC PILOT 640, in the version featuring a 15.6-inch widescreen display, on an EMCOTURN E65

The CNC PILOT 640 combines the optimized motion control typical of HEIDENHAIN controls with highly efficient program generation.

TURN PLUS – create an NC program at the push of a button

With TURN PLUS, you can create NC programs in a very little time. After describing the contours of the workpiece blank and the finished part, you need only specify the material and the work-holding to be used. The TURN PLUS function takes care of the rest automatically, including the following tasks:

- Analysis of the contours
- Selection of the machining strategy
- Selection of the tools and cutting data
- Creation of NC blocks

The result is an extensively commented smart.Turn program with work blocks (referred to as units). This also works automatically for complex workpieces that require drilling and milling operations and for operations on the front face, rear side, and lateral surfaces. The advantage of this is that, after defining the geometry, you can achieve time savings of up to 90 percent—time that would otherwise have been spent on conventional programming and machining.

Interactive Contour Programming (ICP)

If you have to contend with complex parts or incomplete workpiece dimensions, then you need Interactive Contour Programming (ICP). With this feature, you can simply describe the contour elements the way they are dimensioned in the drawing or import the contour from a DXF drawing file. The CNC PILOT 640 then automatically calculates any missing coordinates, intersections, center points, etc. (provided that they are mathematically defined). If multiple solutions are possible, then the control displays the mathematically possible variants, allowing you to select the one you prefer. Of course, it is also possible to supplement or modify already existing contours.

Visual inspection prior to machining

The high-resolution, finely detailed 3-D simulation generated by the CNC PILOT 640 gives you a preview of the machining results for turning, drilling, and machining processes before actual machining begins. Navigation is very simple and intuitive. You can rotate your view of the part on any axis and thereby visually inspect a workpiece blank or finished part from any angle. You can also zoom in on features, including, of course, on C-axis contours located on lateral surfaces or front faces and on Y-axis contours in a tilted plane. The 3-D simulation thereby helps you detect the smallest of errors prior to machining. Even in cases of complex, multi-channel programming, you can still simulate and display the tool movements of the participating slides on the workpieces in advance.
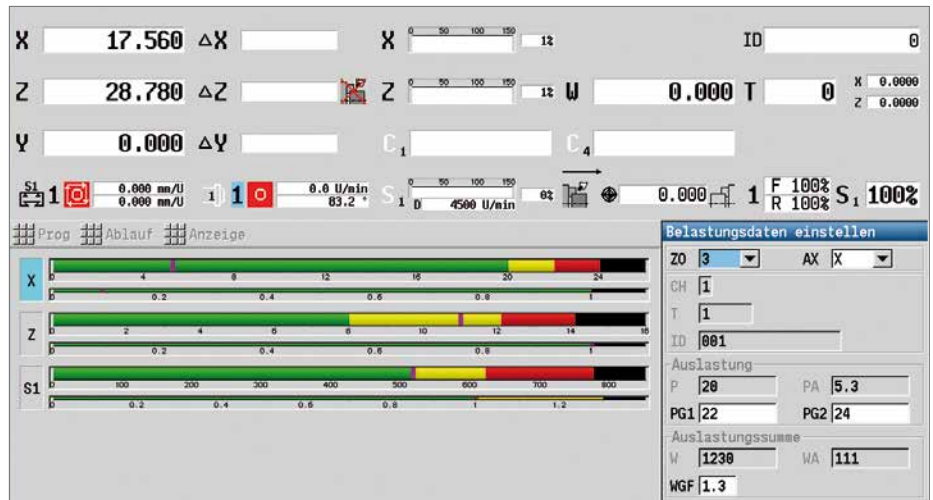
Intelligent monitoring: Load Monitoring provides an easily understandable graphical display of the load values.

Detect tool wear and breakage during machining

The Load Monitoring function keeps track of the motor loads on the machine's spindle and feed axes and compares them to the load values of a reference operation. The CNC PILOT 640 provides an intuitive graphical display of the load values in a separate window. All you need to do is define two limit values that will trigger different error reactions:

- If the first limit is exceeded, then the CNC PILOT 640 identifies the current tool as worn and automatically replaces it with a previously defined sister tool at the next tool call.
- If the second limit is exceeded, then the CNC PILOT 640 assumes that there is an impermissible load (e.g., tool breakage) and halts the machining process.

This significantly increases process reliability during machining, especially during unmanned shifts.

Full-surface machining with B axis and counter spindle

Machines equipped with B axes allow you to perform drilling and milling operations in spatially tilted planes. The CNC PILOT 640 can handle such tasks quickly and easily. You simply program the machining operation as usual in the main plane and then benefit from the following:

- Efficient program creation with smart.Turn
- Effective turning, milling, and drilling operations with internal control cycles
- Six-sided full-surface machining
- Increased productivity and reduced machining time

Watch the video at the Klartext Portal.

State-of-the-art multitouch operation and intuitive display

The CNC PILOT 640 can be ordered with a splash-proof and scratch-resistant touchscreen that has been designed specifically for use in harsh shop conditions. The control is operated by means of gestures in the same manner as smartphones and tablets. What's more, the touchscreen of the CNC PILOT 640 lucidly displays the exact context-sensitive information you need in order to program, operate, and monitor your control and machine:

- Help graphics explain the required parameters as you program.
- The simulation shows you all of the tool movements at a high level of realism and accuracy.
- During program run, the CNC PILOT 640 displays comprehensive data on the tool position, the speed and load of the drives, and the current machine status.

CAD-CAM-TNC: the new NC programming course for TNC experts

The right training course for everyone interested in knowing how to optimize a CAM system and postprocessor for the functionalities of the TNC and how to improve externally created programs on the TNC.

Many TNC controls are programmed externally on CAM systems. For this reason, the HEIDENHAIN trainers at the Training Center in Traunreut, Germany, have developed a new course entitled "CAD-CAM-TNC." This three-day course covers special features provided by the TNC for the creation of external programs.

Enabling you to adapt your systems to the functionalities of the TNC

This NC programming course does not, however, deal with the creation of 3-D models using a CAD system, nor does it cover CAM programming itself, because the software vendors can do a much better job of this for their own systems. Instead, this course deals with the settings in the CAM system, and especially in the postprocessor, that should be considered in order to take optimum advantage of the TNC's functionalities. Of course, "CAD-CAM-TNC" will also cover the analysis and intervention capabilities offered by the TNC for improving externally prepared programs at the machine. For example, the 3-D simulation graphics of the TNC 640 let you easily detect visible flaws on the workpiece surface and, ideally, to correct them as well.

A realistic sample workpiece

In order to demonstrate various effects in a realistic manner, the trainers have combined different TNC functions in the machining of a mold part. This vividly illustrates the impact of changing certain functions when it comes to the surface of the workpiece. In particular, 3-D tool radius compensation is covered in great detail. But functions from Dynamic Efficiency and Dynamic Precision are dealt with as well, allowing you to improve the dynamic behavior of your machine and the efficiency of your roughing operations. We will also be introducing the tried-and-true KinematicsOpt functions and Global Program Settings.

Is this the right course for you?

The NC programming course "CAD-CAM-TNC" is geared toward the following specialists:

- Application engineers, as well as users and machine setters who work with milling machines equipped with a TNC control and who would like to know how to improve externally prepared NC programs directly on the control
- CAM programmers who want to create high-quality CAM programs that take powerful TNC functions into account
- Postprocessor programmers who want to create high-quality postprocessors for TNC controls
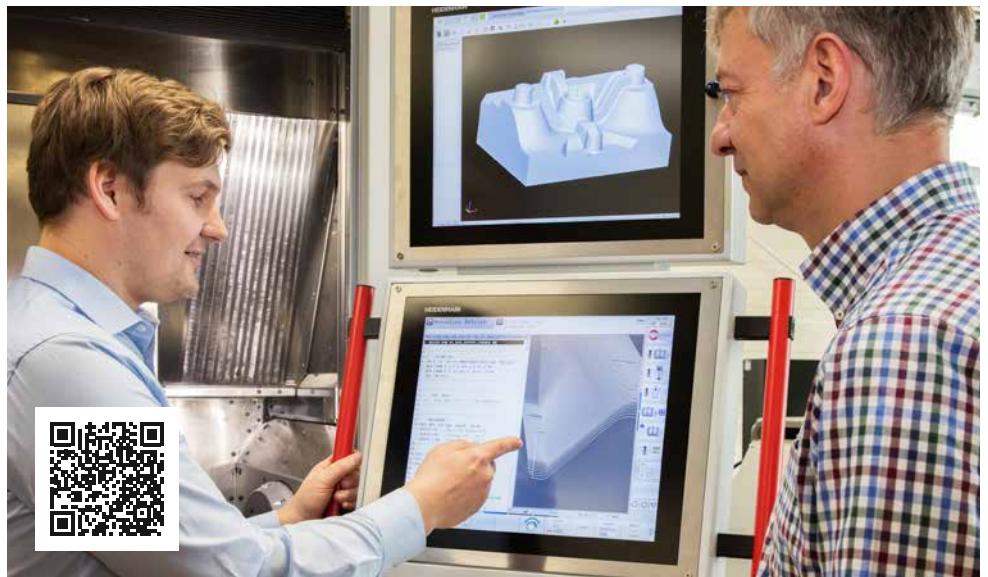
Greater competitiveness takes a skillful touch

Convenience and time savings through touchscreen operation of the TNC 640

For his company, Gernot Lugauer relies on a highly skilled team equipped with powerful production technology. The part manufacturer based in the Tyrolean town of Jenbach has invested in a C 42 U Hermle machining center featuring an HS flex handling system. The machine's new automation functions free up the team to focus on value-added tasks. Of course, increasing throughput in the production of one-off parts is also a must. At the same time, Lugauer's employees have gained a new and attractive workstation complete with a HEIDENHAIN TNC 640 that, thanks to its touchscreen operation, has also become a convenient control center for the management of production jobs.

Making room for improved performance

Just a stone's throw away from Lake Achen and the Zillertal in Austria stands the impressive machine park of Lugauer GmbH. A look inside presents visitors with the inspiring sight of state-of-the-art machine tools. Here, Gernot Lugauer greets the Klartext team in a relaxed atmosphere and resolutely explains how he intends to strengthen his company's competitiveness through an interplay between state-of-the-art automation technology and strong teamwork.

"What can you do with the Hermle C 42 U that you couldn't do before?" we asked. The answer surprised us: "With this machine, we can basically do exactly the same things we were able to do before," says Lugauer. So what was the reason for buying it? By increasing the amount of unattended machining, this sophisticated five-axis machining

center, equipped with a pallet changer and a tool magazine for 220 tools, promises to make the non-stop production of one-off parts more economical.

The production team faces a daunting task: in order for a batch size of one to be economical, every initial part needs to pass muster. The foundation for this high level of process reliability is laid by the CAD and CAM systems used by the company's highly skilled employees to create and simulate machining programs. These same employees then set up the machine, organize the various production jobs on the control, and monitor the machining process. This is why they want to take full advantage of automation potential and maximize unattended production time. "The team now has more time for programming while the machines are at work," explains Lugauer.

Simple and intuitive

The more effectively and flexibly production jobs can be organized, the easier it is for employees to manage their time for a wide variety of other tasks. The HEIDENHAIN TNC 640 with touchscreen contributes toward achieving this goal by virtue of its convenient and intuitive operation. Simply moving one's fingertips is all it takes to navigate through file directories and to load programs.

With just the right touch, programs and parameters can be optimized with greater speed thanks to faster scrolling and easier editing. The soft key rows can be easily swiped into place as needed, and the machine operator can use gestures to view the simulation from any angle. This makes the error-free operation of the control faster and simpler.

Managing Director Gernot Lugauer relies on automation and skilled team players.

The production specialists at Lugauer can use the Hermle Automation Control System (HACS) management tool directly on the user-friendly touchscreen of the TNC 640. This turns the workstation at the TNC 640 into the control center for production job management and process monitoring. The employees can intuitively manage the system overview, work plans, tools, tasks, and pallets, which can be configured conveniently by means of drag and drop. "At first, we had to get used to the new operating design, but we got the hang of it very quickly," says machining specialist Armin Winkler, adding that "now we wouldn't want to do without it." Based on his facial expression, it would seem that both the machine and its control are putting the staff in a good mood.

A TNC 640 with touchscreen operation serves as the "control center" for the C 42 U Hermle machining center, which is equipped with an HS flex handling system.

The team makes the difference

Gernot Lugauer doesn't have any reservations about mentioning the long bike trips he takes on his vacations. As the company's managing director, he can enjoy his time off with peace of mind because his strategy for strong teamwork is paying off.

The team members at Lugauer use the unattended production time to support colleagues with programming work. This sense of teamwork is very important to Gernot Lugauer because it promotes constructive cooperation and lets every single employee contribute optimally to the company's value creation.

For managing director Gernot Lugauer, investing in the C 42 U with the TNC 640 was a decisive step in achieving the ideal conditions for his team's strong performance and in thereby securing his company's competitive edge. In view of the growing challenges of finding skilled workers in today's job market, it is par-

ticularly important that one's existing team be able to operate with greater value added. Gernot Lugauer isn't using automation solely for the purpose of optimizing production processes but also in order to create the margins needed for accomplishing demanding tasks without simultaneously raising pressure on individual employees.

With a skillful touch, Gernot Lugauer is combining the potential of the new machine with the expertise of his employees. The result is highly economical single-part production and an overall more enjoyable work experience.

Precise selection of the viewing angle using intuitive gestures.

"At first, we had to get used to the new operating design, but we got the hang of it very quickly. Now we wouldn't want to do without it."

Armin Winkler, machining specialist at Lugauer GmbH

Fast and beautiful aluminum rims

Soon to adorn elegant sports cars: forged rims in the shipping department at APP TECH.

The company APP TECH produces 60 000 top-of-the-line aluminum wheel rims every year. This is thanks in no small part to the TNC 640.

By ensuring better vehicle dynamics and handling characteristics, aluminum rims make for faster driving. And they're not only meant to be stylish, but they also make even a parked car look fast. Yet not all aluminum rims are created equal. At the pinnacle of quality are forged aluminum and magnesium rims, such as those produced by APP TECH for premium automaker brands, renowned tuners, and the motorsport industry. Their speed comes from the low weight and high rigidity of the forged material used. And milling plays a crucial role when it come to their appearance. The fact that APP TECH's milling work is fast in its own right is due to the TCN 640 and the Italian TNC Club.

Compared with conventional cast rims, forged rims are wider and lighter. This has a positive effect on driving performance, vehicle dynamics, and handling characteristics. The forging process also lays the groundwork for achieving an exceptional surface finish during machining. But this is only possible with the help of a high-performance machine and a control that enables highly accurate contour control. This is why, for its finish machining, APP TECH uses five-axis machining centers equipped with the TNC 640 control from HEIDENHAIN. Moreover, the company's membership in the Italian TNC Club means that its TNC operators know their equipment inside and out. This allows them to get the most out of their controls when it comes to surface quality and productivity and to continually optimize production processes.

Getting the perfect surface finish faster

Francesco Doro, who is responsible for machines and automation, gave us a look at the secrets of APP TECH's production methods. The heat-treated aluminum and magnesium blocks are first prepared using lathe work and three-axis machining operations before they receive their finish on the company's five-axis machines. "Continuous five-axis machining is performed using the flank of the conical tool," explains Francesco Doro, adding that "this technique gives us a better surface finish within a shorter amount of time than would be possible using the tip of a spherical tool." "During this process, the TNC 640 from HEIDENHAIN has an important role to play in maintaining the accuracy of the tool path because the tiniest positioning error in the working space of the tool would damage the surface," he says. The machining oper-

> " The TNC 640 from HEIDENHAIN plays a key role in maintaining the accuracy of the tool path. "
>
> Francesco Doro, responsible for machines and automation at APP TECH

Dream rims with a perfect surface finish: the optimized motion control of the TNC 640 puts a shine in the eyes of auto fans.

ations are thus mainly performed using Cycle 32 TOLERANCE. This cycle optimizes the motion control and adapts it to the machining operation in order to achieve the desired accuracy, without scrimping on dynamics.

The processes employed at APP TECH make use of a further strength of the TNC 640. The work steps of turning, three-axis machining, and five-axis machining require extreme accuracy during the setting of workpiece presets. Francesco Doro explains the solution as follows: "In order to avoid errors in the workpiece position, the 3-D coordinate system must be oriented to the surface of the rim and not to the surface of the machine. We achieve this using a HEIDENHAIN workpiece touch probe and the Cycle TCH PROBE 431 on the TNC 640."

Adventuresome in the quest for perfection

APP TECH employees are adventuresome in their quest for perfection. Nothing is impossible. No machine setup and no combination of control functions is too far-fetched not to be taken into consideration at least once to see whether they might offer advantages for machining. The company's membership in the Italian TNC Club encourages this curiosity because, time and again, the club helps staff at APP TECH to discover new sides to their TNC controls. "This attitude is the reason we have been able to reach our leading market position over the course of the years," says Francesca De Boni, managing director at APP TECH, with justifiable pride.

Francesco Doro provides the following example of a rim that is milled and polished by a five-axis machining center with the TNC 640 and using the tool flank: "With the identical CAM system, part program, and machining parameters, we were able to reduce the scrap rate caused by aesthetic defects from thirty percent down to two percent using the TNC 640," he says, adding that "at the same time, the machine is now ten percent faster." "This shows very clearly what kind of impact the control has on the machining process," he stresses.

APP TECH is currently reorganizing its production processes in order to optimize the process flow; an important role is planned for the TNC 640. Francesca De Boni explains: "Due to the exceptional production results that we attained with HEIDENHAIN controls, we plan to buy an additional seven TNC controls. This will definitely allow us to maintain our high standards of quality, and I believe we will even improve on them."

By the way, when it comes to improving things, APP TECH, like many companies, is currently venturing into the world of digital production. In a pilot project being conducted in cooperation with HEIDENHAIN, the manufacturer of forged rims is now testing the new StateMonitor software from the Connected Machining package of functions. "Based on the recording and analysis of machine statuses in a networked production setup, we anticipate gaining solid data about our production processes that will allow us to determine where we can still make improvements," says Francesco Doro in describing what APP TECH expects to achieve with the solutions from HEIDENHAIN.

A victory for quality and design: every year, 60 000 premium rims roll out from Mestrino into the four corners of the world.

Keeping APP TECH on a course of success (from left to right): Francesca De Boni (managing director), Francesco Doro (responsible for machines and automation), and Lorenzo Vezzani (supply chain manager)

Forging success at APP TECH

APP TECH produces forged aluminum and magnesium rims for premium automaker brands as well as for the motorsport and tuning sectors. The company supports its customers throughout the entire production process, from initial design and validation using finite element analysis to on-site measurements and the delivery of rims that are ready for use. Every year, over 60 000 finished rims leave the company's plant in Mestrino, a town between Vicenza and Padua in the northern Italian region of Veneto.

Compared with conventional cast rims, forged rims produced by APP TECH feature higher rigidity and a significantly better Young's modulus. In other words, their structural rigidity is considerably higher. This advantage stems from the material's lack of porosity, higher density, and its even grain size distribution in the matrix of the forged section, allowing for the production of lightweight rims with exceptional stability and handling charactersticis.

> " The TNC 640 shows us very clearly what kind of impact the control has on the production process. "

Francesco Doro, responsible for machines and automation at APP TECH

A small selection, but tremendous variety: APP TECH has just the perfect rim to suit every taste.

Plan the future

The TNC 640 won't help you predict the future. But what it does allow you to do is to very precisely plan the production sequence ahead of time for upcoming jobs using the Batch Process Manager.

The TNC 640 provides a number of powerful functions for pallet machining and the serial production of workpieces. One of them is the Batch Process Manager (Option 154). With it, you can plan the next production sequence directly on the control. When you specify a jobs list, the Batch Process Manager will test it ahead of time. This gives you important information about upcoming jobs, such as when manual interventions will be necessary and how long the machine will be in use. The Batch Process Manager therefore allows detailed planning of the production sequence. This is particularly important for unmanned shifts and for the smooth execution of pending production orders.

Organizing your upcoming jobs is easy with the Batch Process Manager. For example, you can enter the planned jobs for the night shift, the entire day, or the upcoming weekend. The control will automatically check whether all of the requirements for seamless execution of the entered jobs are met:

- Is a preset defined at the pallet, program, and fixture levels?
- Are the required tools available in the tool magazine, and is their remaining tool life sufficient?
- Does the NC program run in simulation mode without error messages?

Seeing how long your jobs will take

The Batch Process Manager displays the results of this analysis in a clear and intuitive graphical overview, with green checkmarks appearing when everything is in order. You can immediately recognize whether all of the programs will execute error-free and whether all of the required tools are available. At the same time, it is possible to see at a glance how long your jobs list will take to com-

The user can immediately see when manual interventions will be needed within the production sequence.

plete. The Batch Process Manager also repeats its tests cyclically, so that the displayed data are continually updated.

If the control detects a problem (such as a tool with insufficient service life for the planned machining operation), then the Batch Process Manager will display the expected time for the required manual intervention—in this case, a tool change. The Batch Process Manager will inform you in advance about the following:

- The machining sequence
- The time of the next manual intervention
- The program duration and run time
- Status information regarding the preset, tool, and NC program.

Option 93, "extended tool management," must be enabled in order to run all of the tests pertaining to tools. The execution of the NC programs is performed either through the pallet management function or, as usual, over the individual NC program in the Program Run, Full Sequence operating mode.

Very simple to use

The new Batch Process Manager is based on the pallet management function of the TNC 640—or, to be more precise, it interprets the pallet file in the background. All of the entries you make into the Batch Process Manager are stored in this pallet file by the TNC control. The following process elements can be entered:

- Pallet
- Clamping
- Program

Based on these process elements, the Batch Process Manager models the actual situation of a machine with pallets. Each pallet receives its own entry, or, alternatively, you can define a fixture level and the appropriate NC program for the workpieces.

To this end, the Batch Process Manager also offers convenient editing options. You can copy, move, and paste individual entries or entire process elements. It is even possible to create new entries during pallet machining. This allows you to prepare a pallet list that will be executed in sequence. You are also able to lock individual programs or even entire pallets that will then simply be skipped over during the sequential execution of the jobs.

Versatile, with exciting potential

Although the Batch Process Manager is primarily intended for milling machines featuring automation, it also makes sense for use in classic one-off production. This is because you can also use the abovementioned process elements for machines that do not have pallets. In this case, you can use the system settings to configure how the machine will behave at the end of an NC program. In an automated production environment, these behaviors include whether the next pallet will be loaded and whether the machining operation will be continued automatically, or whether the machine operator should set up the next workpiece and then start the subsequent machining operation.

HEIDENHAIN is currently working on expanding the functionality of the Batch Process Manager. Among others things, plans are currently underway for the Batch Process Manager to be available for use within the Program Run, Full Sequence operating mode.

The Batch Process Manager always ensures that you have the right workpiece and the appropriate tool in the working space.
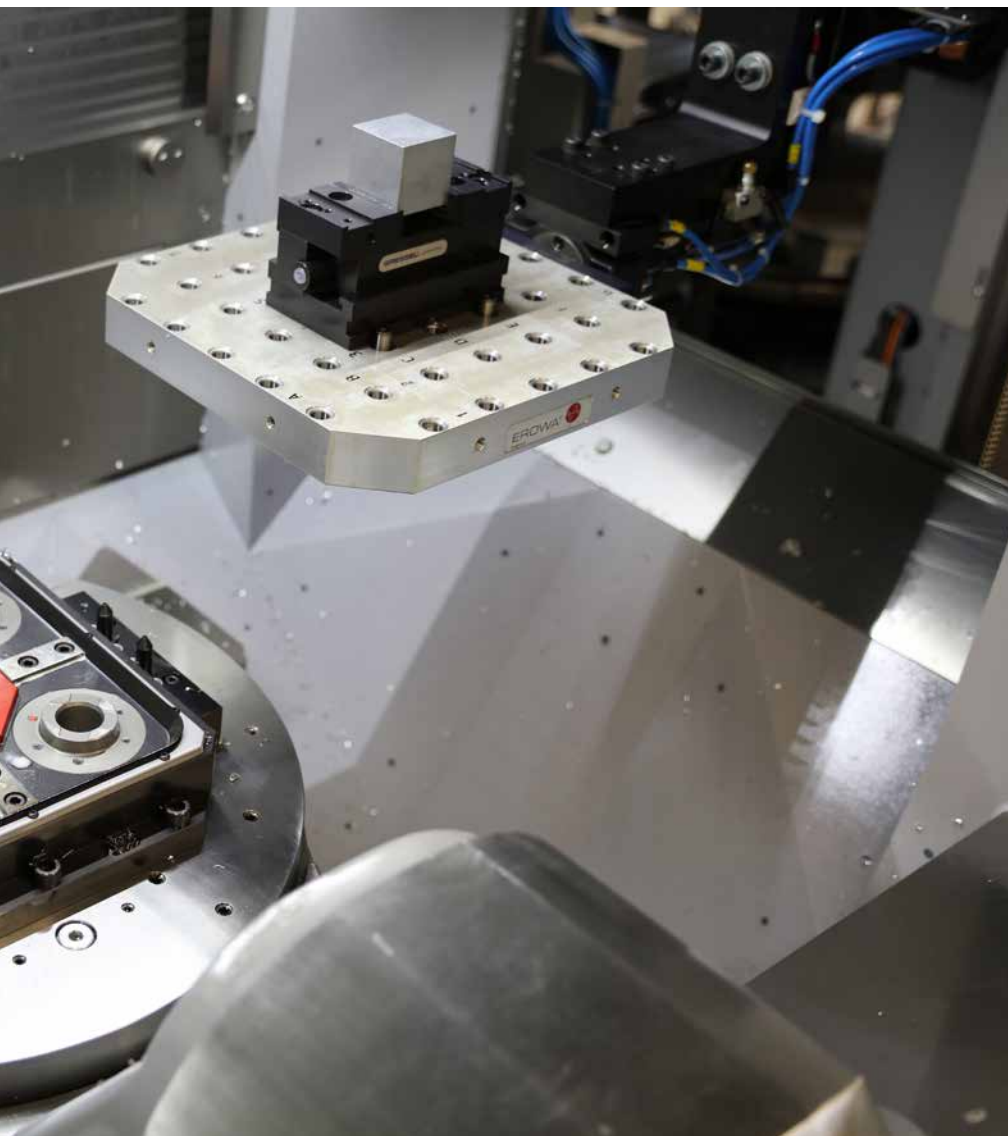
Doing things better

Because Bernd Köhler couldn't get parts in the quality he needed, he made the decision to manufacture them himself. In 1999, he purchased a three-axis machine from Fehlmann, equipped with a TNC 426 control from HEIDENHAIN. The decision was both gutsy and smart.

Having high standards can be a launching point for successful entrepreneurship. Thanks to Köhler Präzisionstechnik's uncompromising pursuit of quality and flexibility, the Ehrenfriedersdorf-based company is enjoying continuous growth. And the company from Saxony doesn't even need to advertise. Its good reputation precedes it, and this ensures that the company's order books are full.

As the travelers arrived in Germany's Ore Mountains on a January evening, the region's romantic side was on display. Decorative candle-holders called Schwibbögen shined from the windows of houses into the darkness, and the hotel reception staff welcomed the Klartext team with regional woodworking products decorating the lobby, including nutcrackers, incense smokers, and a Christmas pyramid.

The contrast the next morning could hardly have been greater: visually speaking, the lobby of the manufacturing company Köhler Präzesionstechnik was very matter-of-fact and technological, with two racing motorcycles from days gone by testifying to the company's beginnings and to the personal passion of its founder. Next to the motorcycles stood a showcase packed with samples of polished parts from the production department. We received a hearty welcome from the founder and senior manager, Bernd Köhler, and from his son Jörg, who oversees the company's production department and who would accompany us during the next few hours.

The dream team at Köhler ever since the company's founding: Fehlmann machines with HEIDENHAIN controls
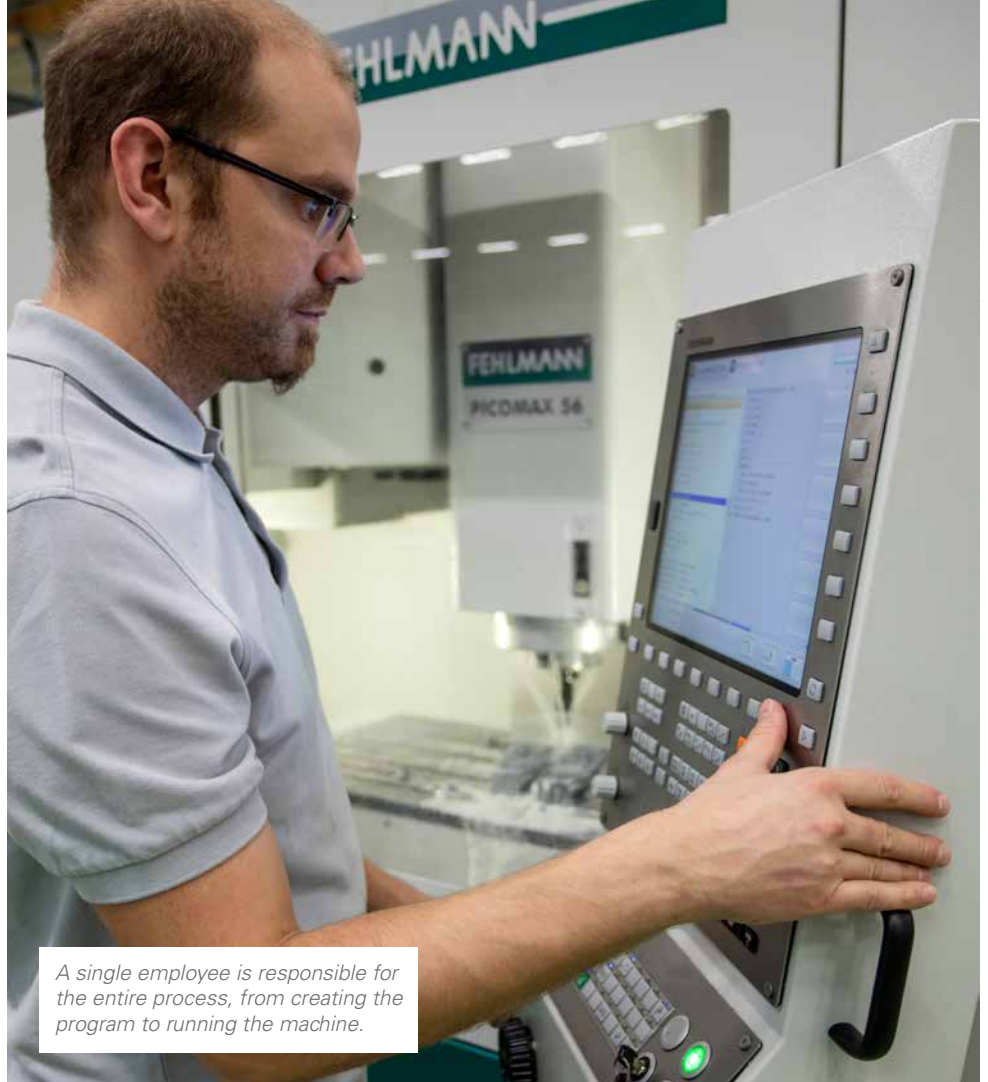
A single employee is responsible for the entire process, from creating the program to running the machine.

A gutsy decision

To truly understand the success of Köhler Präzisionstechnik, it helps to take a brief but exciting excursion into the life of Bernd Köhler himself. Köhler formerly worked on the development of new motorcycles in the testing department of the motorbike manufacturer Zschopau. And he knew what counted in the business because he also happened to be a successful motorcycle racer in his own right. In 1979, for example, he won the GDR motorcycle championship in the 125 cc class on an MZ RE.

In 1993, he founded the company Zweiradtechnik Köhler and began developing motorcycles and building prototypes for big-name German motorcycle manufacturers. During his development work, Bernd Köhler was frequently displeased with the quality of the components being delivered for his prototypes. "The parts weren't always up to par or accurate enough, and they frequently had to be reworked or even re-ordered," says the company founder. So rather than frequently complaining about parts and having to search for better suppliers,

Köhler made a bold decision: he would do it himself, only better.

In 1999, he purchased a three-axis machine from Fehlmann equipped with a TNC 426 and, together with his two sons (his second son, Jens Köhler, works for the company on the business end of things), commenced production in an add-on to his residential home. "The first machine didn't have a tool changer, and every workpiece had to be clamped by hand," says Bernd Köhler in describing the company's early days. "With three-axis machining, it was possible to make only very simple parts," he adds.

Keeping a vision for the future

When Köhler's son Jörg describes the company's current production methods, it quickly becomes clear just how radically Köhler Präzisionstechnik has changed since its founding and how much foresight its three managing directors have shown in keeping their family-owned business competitive for

the future: "We are currently focused on maximum automation and flexibility," says Köhler, adding that "what has remained constant over the years has been both our commitment to the flexible production of parts that leave nothing to be desired in terms of accuracy and quality and the machine builder Fehlmann along with the TNC controls from HEIDENHAIN."

The determination with which the Köhlers have built their company over the past years becomes immediately apparent to visitors when they are led through the lobby's heavy steel door into the impressive and spotlessly clean production area. Here, Fehlmann machines, arrayed in pairs, can be seen carrying out their work. Between all of the machine pairs is a pallet system and a gripper arm for highly automated loading of the machines. The production area is adjoined by the design office, where the NC programs are created, simulated, and brought to the machines.

Jörg Köhler summarizes the programming process as follows: "Our customers usually send us 3-D models with

The company founder, Bernd Köhler, and his son Jörg were there to explain everything to the Klartext team.

all of the necessary data. We then turn these models into NC programs using Edgecam, and this always includes a complete simulation of the machining process and machine configuration. This is why every machine has its own postprocessor. When we send our programs to the machine, everything should already have been prepared to perfection so that we can manufacture without delays."

Specialists whose expertise spans the whole process

Ideally, a single employee is put in charge of the entire process—from design, to setup, to running the machine. Jörg Köhler sums up the advantages of this approach as follows: "A staff member who oversees the whole process knows why he has programmed and arranged things the way he did. There are no delays and there isn't any need to check with other people—whereas a second worker would first have to fa-

miliarize himself with everything. That's why well-qualified specialists for programing and setup are absolutely essential to our company. And our specialists also benefit from having a lot of variety in their work since they are constantly alternating between the production order and the machine."

The products that leave the production halls of Köhler Präzisionstechnik every day also exhibit a lot of variety. The company's milling machines manufacture parts for customers hailing from the micro-electronics, automotive, machine manufacturing, medical technology, precision mechanics, and optical industries. These parts all meet exacting requirements when it comes to quality, accuracy, and surface finish. Jörg Köhler sums up what customers want and what Köhler Präzisionstechnik delivers as follows: "With the exception of cast iron, we work with every type of material ranging from plastics to stainless steel. We produce simple parts that take only five minutes to complete as well as complex workpieces that are in the machine for an hour or more. We manufacture

from a batch size of one all the way up to large series, and we even do urgently needed replacement parts overnight. In addition to quality and accuracy, flexibility is one of the pillars or our success."

Automation enhances flexibility

But how is it possible to produce urgently needed replacement parts overnight in such a highly automated production setup? We just had to ask! After all, a high level of automation normally has the reputation for being more of a hindrance than a help when it comes to short-term production planning. Jörg Köhler can only laugh. "In the pallet system that is joined to each pair of machines, we have up to 135 spaces for pallets sized 320 mm by 320 mm," he says, adding that "it doesn't matter which workpieces we clamp onto them so long as the matching NC program and the required tools are available at one of the two machines and controls." "This also allows us to squeeze in jobs at any time, especially for parts we have already done before

Standard setup: two machines with a pallet system enable unattended shifts at night and on the weekend.

> " Thanks to the PLANE SPATIAL function of the HEIDENHAIN controls and the HEIDENHAIN touch probes in the machines, we are able to run any part on any of the other machines. "
>
> Jörg Köhler, partner at Präzisionstechnik Köhler GbR

and for which we therefore already have all of the data and information," says Köhler. He goes on to explain that "the crew from the afternoon shift sets up the parts on one of the machines, the night shift does the actual machining work, and the morning shift gets everything ready for shipment; our customers benefit from receiving a replacement part within twenty-four hours."

The combination of automation and flexibility appears to be one of the company's secrets to success. Jörg Köhler explains the reason for the company's chosen machine arrangement as follows: "We made a conscious decision in favor of two machines with a pallet system and gripper-arm loading," he says, adding that "if problems arise during loading, then only two machines are left idle, whereas in a production chain with only a single robot loading multiple machines, the entire chain would be left idle. In order to maintain flexible alternatives, we also make sure that all of the programs for the five-axis machines have a similar structure and are based on the same subprogram." Köhler goes on to elaborate that "thanks to the PLANE SPATIAL function of the HEIDENHAIN controls and the HEIDENHAIN touch probes in the machines, we are able to run any part on any of the other machines; the HEIDENHAIN control and touch probes ensure the correct position and location with complete reliability."

Probing for uninterrupted processes

Köhler Präzisionstechnik makes intensive use of HEIDENHAIN touch probes and their corresponding cycles on the TNC control for workpiece and tool measurement (e.g., in order to determine the location and position of the parts for rear-face machining). They are also used to check for tool damage on the machine. Prior to long machining steps, the tools that will be used are thoroughly checked for wear and potential breakage and, if necessary, are replaced so as to prevent disruptions to the machining process. For smaller parts, tool inspection is performed at defined intervals.

The intelligent combination of automation and flexibility at Köhler Präzisionstechnik also has an impact on the topic of tool wear. "If a part series can no longer be produced due to a lack of tools in the tool changer, then, in our case, this does not cause the machine to stop—the system simply switches to a different part for which the required tools are still available," says Jörg Köhler, explaining why he and his employees are able to go home worry-free prior to an upcoming unattended night or weekend shift. "Nobody is present at the company then, although we do have someone on call who gets a text message or an e-mail on their cell phone and comes in twice on the weekend to load the machines with workpiece blanks," says Jörg Köhler. His father, Bernd Köhler, adds, "Machines are supposed to do the night and weekend work; they don't need a break, but our staff should be allowed to rest then. People are able to perform demanding tasks only when they are well-rested and motivated."

Service is better than do-it-yourself

The StateMonitor software gives you an overview of the status of your machines and jobs at all times. To keep the overview when installing StateMonitor, you can simply take advantage of our commissioning service.

Of course, you can also install the StateMonitor software on your own. But the more complex your network is and the more customized your configuration is supposed to be, the smoother your installation will be with the help of the experts from the HEIDENHAIN Service Department. Why is that? In this Klartext interview, Tobias Habermann, from our Technical Service helpline, will explain why this is the case.

Klartext: Mr. Habermann, is the StateMonitor software so complex that HEIDENHAIN has to offer a commissioning service for the installation process?

Tobias Habermann: No, certainly not. But StateMonitor offers so many options that support for installation and setup can indeed make sense. In fact, this is the case with most well-known software solutions: for example, everyone can create a text or a small spreadsheet, but those who want to use the advanced features require intensive training.

What exactly do you do during commissioning?

This varies based on the customer, the machines, the network setup, and the requirements that will be placed on StateMonitor. Together with the customer, we usually connect two or three machines, provide initial instruction on how to use the desired StateMonitor features, and set up StateMonitor to be used with these functions.

That sounds like a lot. How long does the commissioning service take?

We set aside two hours for each customer. And this isn't counting the preparation needed for the actual service work, meaning that we usually correspond with the customer by e-mail or phone to clarify ahead of time what exactly the customer expects from us and from StateMonitor. We also provide the customer with information beforehand on how to prepare for the commissioning service. When everyone has done their homework by the agreed-upon day, we are able get a lot done in those available two hours.

So what sort of things do you usually need to find out from the customer in advance?

Our questions mainly concern the IT landscape. For example, is the PC or server on which StateMonitor will be run actually in the same network as the machines to be connected? Can we reach this PC for our WebEx session? Are Windows 7, Windows Server 2008 R2, or newer versions available as operating systems? How much free memory needs to be available in order to install and run StateMonitor? Which HEIDENHAIN controls need to be connected?

Which HEIDENHAIN controls are you able connect?

As a rule of thumb, StateMonitor can be used to connect controls dating back to around the year 2007. But we can't say for sure until we know which software version is running on the machine to be connected. And the control must have HEIDENHAIN DNC (Option 18) enabled!

Can any customer who has purchased StateMonitor take advantage of the commissioning service?

Yes, and the customer is not even required to have actually purchased StateMonitor. We even provide commissioning support for the 90-day trial version. It also makes no difference whether StateMonitor was ordered through an OEM when the machine was purchased or if was acquired from a HEIDENHAIN distributor for already existing machines. We like to provide support wherever the need arises. And this doesn't apply only in Germany, by the way. We are currently in the process of setting up a commissioning service internationally through the local HEIDENHAIN branch offices.

What else do customers using this service need to know?

We require a contact person for the entire two hours who is familiar with the company's IT landscape and who can, for example, tell us the needed IP addresses of the machines to be connected. This person can be an in-house employee or even an external IT service provider. Someone also ought to be present whom we can instruct in the use of the software.

Tobias Habermann from the Service Department's technical helpline

Do you perform the commissioning service on evenings and weekends?

We are available during the regular HEIDENHAIN Service Department business hours, and we try to make an appointment with prospective customers during these times. The commissioning service is also being provided by the HEIDENHAIN agencies, and so if we aren't able to offer an appointment, it's definitely worth checking with them.

You mentioned not being able to offer an appointment. Is there really that much demand?

We are just now beginning to deliver the software, so things are still relatively quiet. But there is tremendous interest in the topic of networked machining at the moment. We are seeing this, for example, in the fact that all of our Connecting Machining training courses at the Training Center in Traunreut are booked solid for 2018. So we are indeed anticipating a rise in demand.

We've saved the most delicate question for last. Unlike the other offerings of the HEIDENHAIN helpline, the commissioning service isn't being provided free of charge. Why is that?

We did discuss the cost question intensively. Our customers can take advantage of a tailored service at a very reasonable lump-sum price, and this service includes not only the actual commissioning but also customization based on individual preferences and on-site factors, as well as instruction in the use of the software. And thanks to the WebEx session, the commissioning service is a remote maintenance service that includes basic training in the software—so it's similar to having an on-site visit by a service technician. At the end of the two-hour session, you have gained a fully functional connection with customer-specific settings, and you have a user who has been trained to make further adjustments and connect additional machines entirely on their own. And, as those familiar with the HEIDENHAIN Service Department already know, although we are very exact about lengths and angles down to the micrometer and arc second, when it comes to measuring the time we take to perform our services, we aren't sitting there with a stopwatch.

Mr. Habermann, thank you for your time!

Get connected with the commissioning service now:

HEIDENHAIN helpline for NC Programming

Phone: +49 8669 31-3103

E-mail: service.nc-pgm@heidenhain.de

The commissioning service is being offered by your HEIDENHAIN regional agencies as well. To find an agency for your region, please visit:
https://www.heidenhain.de/de_EN/technical-service/services/services-in-your-region

More information means
greater advantages

The new generation of the TS 460 and TT 460 touch probes from HEIDENHAIN make probing even easier thanks to their ease of installation and use.

The TS 460 workpiece touch probe

The TS 460 touch probe for workpiece measurement, the TT 460 unit for tool measurement, and the SE 661 transceiver have been completely redesigned. A key enhancement is a new interface for the control. This interface provides for reduced workloads, greater operating convenience, versatile diagnostics options, and accurate results regardless of the probing velocity.

Thanks to their setup, measurement, and inspection functions, touch probes help reduce setup times, increase machine usage time, and improve the dimensional accuracy of finished workpieces. Touch probes can perform these tasks with greater accuracy and time savings when they are easier to use and able to provide more data.

Accuracy regardless of the probing velocity

In every wireless transmission, the signal requires a certain amount of time to reach the recipient. For HEIDENHAIN touch probes, this delay is only a few milliseconds, but it still has to be compensated for. This is why, whenever probing operations have had to be especially accurate, TNC users have been forced to adhere to the probing velocity used during calibration. However, this is not always possible in practice.

But with the new touch probe generation, the TNC user can perform probing operations at any speed. This is because a timestamp is transmitted along with the triggering signal, thereby enabling the control to determine the correct probing position irrespective of the probing velocity. Probing outcomes are now highly accurate at any velocity because the correct triggering signal is automatically calculated, ensuring that the exact position value is always ascertained.

+ For more information on EnDat 2.2, please go to: www.endat.de

EnDat 2.2

Trigger signals with timestamp

Diagnostic values

Status information

Electronic ID label

Operating data

The TT 460 tool touch probe

The SE 661 transceiver

User support through data exchange

Time and workload savings take effect as soon as you begin installing the touch probes. Selecting the type of data transfer (radio or infrared) is easy. If you opt for radio operation, then the transceiver will even provide information about the surrounding radio traffic. This helps in selecting the right radio channel for interference-free signal transmission. To keep the touch probe's radio transmission from interfering with the radio signals of other systems, the transmission range of the touch probe can be adapted to the surrounding conditions. Short-range operation prevents not only interference with nearby systems but also reduces current consumption and saves batteries.

If the touch probe is connected to the control, then the TNC user can easily configure other settings directly on the control's user interface. A wide variety of device statuses are displayed, and the user can take advantage of many different diagnostic options. For example, the user receives information

- about the battery status,
- the status of the touch probe (e.g., "ready" or "not ready" and "stylus deflected" or "stylus in rest position"),
- and about the strength of the transmission signal.

The user can also call up the part number and serial number of the connected touch probe. This allows for clear identi-

fication of the unit in the event of servicing, facilitating faster support from the HEIDENHAIN Service Department.

The touch probe also supplies the control with data concerning the currently running probing operation, including data about a possible collision of the touch probe's body with the workpiece or a tool or fixture. And last but not least, all of this functionality isn't limited to a single touch probe, since, of course, it's also possible to implement and operate multiple touch probes on a single machine.