# 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. Additional machines won't just magically appear overnight and would take up space in your shop. What you really need is to optimize your existing processes to get the most out of your machine park. Only then will you be able to complete jobs quickly and take new orders.

In this edition of *Klartext*, we want to help you 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 be surprised by the wide variety of options available 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, we hope you'll find what you need to help take an important step toward process optimization. Or maybe there's something here that will free you up from time-consuming secondary tasks, allowing you to concentrate on your core competencies.

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







#### Publishing details

#### Publisher

DR. JOHANNES HEIDENHAIN GmbH Postbox 1260 83292 Traunreut, Germany Tel: +49 8669 31-0 HEIDENHAIN on the Internet: www.heidenhain.de

#### Responsible

Frank Muthmann E-mail: info@heidenhain.de Klartext on the Internet: www.klartext-portal.com

#### Layout

Expert Communication GmbH Richard-Reitzner-Allee 1 85540 Haar, Germany E-mail: info@expert-communication.de www.expert-communication.de

**Photo credits** 

All other images: © DR. JOHANNES HEIDENHAIN GmbH

### Discover the *Klartext* Portal!

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.

www.klartext-portal.com











# **Klartext** 67 + 06/2018

# Content

High-end turning at the push of a button Providing the ability to achieve exceptional turning results with ease is a unique strength of the CNC PILOT 640.	4
HEIDENHAIN Significantly Expands TNCTraining Opportunities in 2018	7
<b>Greater competitiveness takes a skillful touch</b> Convenience and time savings through touchscreen operation of the TNC 640.	8
Fast and beautiful aluminum rims The company APP TECH produces 60,000 top-of-the-line aluminum wheel rims every year, thanks in no small part to the TNC 640.	11
<b>Plan the future</b> The TNC 640 won't help you predict the future. But it will help you precisely plan the production sequence for upcoming jobs ahead of time using the Batch Process Manager.	14
A U.S. Manufacturing Success Story	16
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.	20
More information means greater advantages The new generation of the TS 460 and TT 460 touch probes from	

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.

22

Ô

HEIDENHAIN

# High-end turning at the push of a button

田市 翌年 田市

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

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 powerful 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:

0



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 quickly create NC programs. After describing the contours of the workpiece blank and the finished part, you need only specify the material and the workholding 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 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 easy-to-understand 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



#### 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 clearly 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.

#### TRAINING

# HEIDENHAIN Significantly Expands TNC Training Opportunities in 2018



To support the increased interest and use of HEIDENHAIN'S TNC controls in North America, HEIDENHAIN has invested in additional resources and developed a significantly increased offering of available classes in 2018. With the goal of enabling TNC users to take full advantage of the many capabilities of these powerful controls, an average of two TNC classes per month will be given at the HEIDENHAIN Training Center in the Chicago area (Schaumburg, IL). HEIDENHAIN's new TNC classes range from two to five days, and focus on a specific topic. Users can select from any of seven different classes, from Basic to Advanced trainings, including other options on specific needs such as 5-axis. Class topics include:

- Basic Training
- Operation Training
- 5-axis Machining
- Free Contour Programming
- Q-Parameter Programming
- TNC Workpiece Measuring with TouchProbes
- Advanced Training

 The full 2018 schedule and course descriptions can be found online at: training.heidenhain.com/en\_US/



Each class is given by a HEIDENHAINcertified trainer, with a fee of \$600 per student, and allows a maximum of only six participants. Information about discounted hotels in the area are available at signup. REPORT ON LUGAUER

# 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-theart 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. 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.

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



# 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-

Precise selection of the viewing angle using intuitive gestures.

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 singlepart production and an overall more enjoyable work experience.







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

## "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.

surface," he says. So the machining operations are 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, stressing 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." 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 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.







## "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



# 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 characteristics.

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 it will allow you to precisely plan the production sequence for upcoming jobs ahead of time 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

Necessary manual interventions External tool		Object Time				10:08 Next sanual intervention: 59m 43s		
		READER_10H7 11:00						
Program	Duration	End	PresetToolPgs Status		Pallet			
Pallet House Pallet House Seitenbearbeitung side machinin. Haus house.h Haushouse.h Haushouse.h Haushouse.h Ention theme Entiot	23m 54c 23m 10 6m 339 0m 65 6m 155 78m 46 3m 15 3m 15 3m 55 55 55 55 55 55 55 55 55 55 55 55 55	19:38 10:46 10:53 11:02 11:05 11:21 11:32	2444222244	>>>>×>>>×>>×>>	*****		Name Starp Oshus table Reference point [7 Locked D Bachinable R	

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



how long your jobs list will take to complete. 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.



# A U.S. Manufacturing

Success Story

Manufacturing specialty parts to spec as well as supporting youthbased manufacturing programs has kept Marten Machining in Wisconsin strong and growing in the U.S. for over 30 years. This now large job shop continues to invest in equipment and area youth, and attributes its use of five-axis machining as a significant part of its success.

"It's no secret that manufacturing in the U.S. has its challenges, and Marten Machining has not been an exception," explained David Marten, Vice President. The now 30,500-square-foot manufacturing facility in Wisconsin started out in a two-car garage in 1984. "But to survive and thrive, we've had to continue to look for new ways and projects relevant to the times, keep improving capabilities and invest in area youth to show them the value of manufacturing." And that they have done. While currently manufacturing parts to order using mostly five-axis and a few specialty machines for a variety of customers, those at Marten also offer complete service including knowledge and support to develop and design new manufacturing strategies that solve engineering challenges and problems. This team of trained staff offer added value in a constantly changing industry.

Now using eleven five-axis HERMLE milling machines that are coupled with HEIDENHAIN'S TNC controls, Marten's facility produces parts around the clock for many industries, including medical, aerospace and precision tools to name a few. Serving as a source for many companies that don't have the time or resources to design and produce parts themselves, some complex, Marten is assuming that role for many.

"What has driven our growth even from the beginning is our ongoing commitment

5-Axis machining using the HEIDENHAIN TNC at Marten

to invest in resources to produce specialty high tolerance parts," explained Marten.

# Investment/Benefits in Equipment Resources

Starting with only a manual mill, manual lathe and a band saw in his garage in central Wisconsin, Alan Marten opened his machine shop for business in 1984. While making specialty parts for area businesses, Marten acquired a job to machine stainless steel cases used for printing numbers on checks, but needed a more accurate machine to do so as the holes on those parts needed to be held to .0002". So, in 1987, Marten's first CNC machine was purchased. "Our first HERMLE machine with the HEIDENHAIN CNC control could easily handle the job," remembered David Marten whose father is the originator. "At that point, being able to circular interpolate those holes on the CNC machines made the job much more accurate as well as efficient.



"From here, the business took off," added Marten. With more jobs, came the investment of three more HERMLE machines with the newest in HEIDENHAIN controls to handle the work. In 1989, Marten Machining built the first section of their current large facility in Stevens Point, WI, moving in the following year. Quality work was followed by more job requests, and in 1998, Marten staff invested in their first five-axis CNC machine, another HERMLE mill with a HEIDENHAIN control with even more advanced capabilities.

"These machines are just easy to understand and use," said Marten. "The HEIDENHAIN control has a whole keyboard right on it, and has a lot of ergonomic and visual prompts. Creature comforts that our operators like, and are helping to make us successful."

"Beginning five-axis milling was indeed our next milestone," added Marten. At that time, David explained that Marten manufactured some parts that were full "These machines are just easy to understand and use. The HEIDENHAIN control has a whole keyboard right on it, and has a lot of ergonomic and visual prompts. Creature comforts that our operators like, and are helping to make us successful."

controls on a daily basis.

David Marten, Vice President of Marten Machining

dynamic five-axis milling, but also used the machine for five-sided machining. Parts that were previously done in two or three operations by changing the work holding and part orientation, were now done in one operation. Then, Marten was machining many assemblies for medical parts, as well as fixtures for assembly, test and laser-welding. The successful transition from three-axis to five-axis had begun. "All along, our CNC control transitions were easy," explained Marten's longtime Shop Supervisor Shawn Demski. "HEIDENHAIN's controls utilize conversational programming, and each model upgrade incorporated advances that just added to our progress such as better tool management and various cycles. I think it is the easiest CNC on which someone new can get up to speed, and it's really a strong control." <sup>44</sup>HEIDENHAIN's controls utilize conversational programming, and each model upgrade incorporated advances that just added to our progress such as better tool management and various cycles. I think it is the easiest CNC on which someone new can get up to speed, and it's really a strong control.<sup>37</sup>

Shawn Demskin, Shop Supervisor of Marten Machining

ISO certified, quality and submicron accuracy is manufactured in all parts at Marten.

Marten added, "What also drove a lot of our new work at that critical time was then being able to review a set of prints, analyze it, and find and resolve any issues utilizing our new capabilities."

In 2004, when the opportunity to manufacture tough-to-machine radiation shielding that required long cycle times presented itself, Marten staff soon realized loading material every few hours was tedious. So they invested in their first five-axis HERMLE/HEIDENHAIN machine with an automated Erowa pallet. "Finally, we were able to program all of this, and let it load and run automatically on nights and weekends!" explained Marten.

"In 2013, Marten started doing work on component parts for implantable medical devices," explained Marten. "This forced us to develop special inspection processes and adjust our manufacturing as needed in order to ensure repeatability and accuracy during automation. We got ISO 9001 and ISO 13485 certified, and we continue to find ways to improve and move forward."

The five-axis machining era had taken hold at Marten. Demski added "Another great feature to note on our five-axis machines is that they are all set up with HEIDENHAIN'S KinematicsOpt cycle so our operators can put in the part, and the cycle will automatically calibrate the machine. So, when the machine heats up and cools down, and you're running different kinds of parts, it can do so automatically and extremely accurately!"

Demski gives an example where Marten recently had to machine impellers which had to hold the outside to a profile of .00025" using five-axis. With good cutters and the Kinematics feature enabled, they were able to hold it repeatedly. "The controls we are now using are the HEIDENHAIN iTNC 530 models, and are very capable machines," added Demski. "We often have to cut very hard material such as inconel and hastelloy, and do so well. We recently finished machining some 24-inch long aluminum aerospace parts using five-axis, and with all parameters and cycles set up in the control, even our first piece off was good. Overall, anytime you can eliminate a machining operation such as when using five-axis, you're better off, and this is especially true with sensitive aerospace parts."

Continuing to grow and invest in similar equipment, Marten now has many HERMLE/HEIDENHAIN machine workhorses with pallet automation on site, as well as some additional finishing/specialty machines such as CMMs. "We have three more five-axis HERMLE machine on order now, and these will all have the newest HEIDENHAIN TNC 640 control on board with even more capabilities," added Marten.

## Investments/Benefits in Training Area Youth

With state-of-the-art equipment in place, successful manufacturing businesses also require knowledgeable operators to handle the incoming workload. Marten management understands that, and is and has been devoted to many area youthbased manufacturing training programs in order to attract educated employees. "Not only did we have seven apprentices work with us this past year, but we also volunteer at the local high school's machine shop program. And we partner with regional tech schools, and participate in the local school district's 'Heavy Metal Tours' program," said Marten.

The fourth annual Heavy Metal Tour was held in central Wisconsin this October where over 100 sixth and seventh graders were bussed to various manufacturing facilities to see them in action. At Marten, besides the annual cutting demonstration at a manual lathe given by Marten founder Alan, control stations are set up where CNC instruction and programming experiments can be done.

"In one area, we lay out a coordinate system to make a 2D part profile. The students put those coordinates in the control and run the program to make a part," said Marten. "We also do a sample job using aluminum with a high-feed tool path on one of our newest machines, the HERMLE C22 with a HEIDENHAIN iTNC 530 control. The kids really get a kick out of it because it moves fast, chips are flying and it's making a lot noise. At the end, they end up with a flawless finished part!"

Staff at Marten also offers each tour student the opportunity to take an aluminum tag that incorporates the "Heavy Metal Tour" title and machine their own name into it to take home." Marten stresses that the immersive experience for the students is very important, and added "they need to see manufacturing as the interesting, viable and important employment option that it is. Then it becomes a real option to pursue as adults."



Student apprentices at Marten (from left to right): Dan Zdroik, Baylor Braatz, Connor Pliska, Olivia Helminiak, Mike Zdroik, Mark Wedde, and Maddie Hinaus

The apprenticeship program at Marten began in 1992, and has grown ever since. Many of Marten's high school student apprentices work full time there over the summer, and some have even come back after secondary schooling to pursue careers. "To handle manufacturing programming requires technical and problem-solving skills," added Marten. "We show our apprentices and students that math does matter, but creativity is important too." Marten recounted an art teacher that spoke to him after a previous Heavy Metal Tour part-drawing demonstration who said that she "didn't realize a job like this would require so much creativity." Marten answered, "it does, and we are always looking for those future employees with a combination of those relevant skills."

Demski added "we offer valuable employment opportunities to many with those necessary skills, and by doing so, we are very happy to help continue to grow this community."

#### Summary

"Young people are the future of manufacturing," said Marten. "And we're seeing some real energy and interest here to grow this business," who added that the learning never stops. Even at Marten, equipment training is set up as a regular program.

"Even now, for example, two of our SPASH (Stevens Point Area Senior High) student apprentices, are staying late on Thursday nights to do MasterCam training to create programming, then put it into our HEIDENHAIN controls. This provides great value to them and to our organization." That, coupled with the keeping atop of the latest in manufacturing equipment advancements is keeping Marten viable and very competitive in the U.S. manufacturing sector.

New made-to-order parts with the fiveaxis machining are typically done at Marten and delivered to customers within the U.S. in three to four weeks. "In 1998, we saw the opportunity to take advantage of and learn this new five-axis machining technology," explains Marten, "and we continue to keep growing with it today."

# 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 if your network is complex and your configuration requires customization, installation will run much smoother with expert help from the HEIDENHAIN Service Department. Thom Berg, from our Technical Service helpline, explains why.

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

**Thom Berg**: 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. 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 it 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 inhouse employee or even an external IT service provider. Someone also ought to be present whom we can instruct in the use of the software.

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 Connected Machining training courses at the Training Center in Traunreut are booked solid for 2018. So we are indeed anticipating a rise in demand.



Thom Berg from the Service Department's technical helpline

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. 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 twohour session, you have gained a fully functional connection with customerspecific settings, and you have a user who has been trained to make further adjustments and connect additional machines entirely on their own. 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. Berg, thank you for your time!

#### Get connected with the commissioning service now:

North American TNC Service Contact: Phone: 847-519-1191 x3358 E-mail: TNCservice@heidenhain.com North American TNC Programming and Applications Support: Phone: 847-490-1191 x3380 E-mail: TNCapplications@heidenhain.com

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* 



#### **TOUCH PROBES**

# 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

TS 460

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.heidenhain.com/endat



# 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:

- Battery status
- Touch probe status (e.g., "ready" or "not ready" and "stylus deflected" or "stylus in rest position")
- 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 identification 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.



# HEIDENHAIN



For the first time, milling and turning are combined in one TNC. With HEIDENHAIN's TNC 640, users can now switch as desired between milling and turning—within the same NC program. Switchover is independent of the machine kinematics. It automatically takes the respective operating mode into account and without any additional action. This new simplicity is complemented by dialog-guided plain language programming, the optimized user interface, powerful programming aids as well as comprehensive cycle packets taken from amply field-proven HEIDENHAIN controls into the TNC 640.

HEIDENHAIN CORPORATION, 333 East State Parkway, Schaumburg, IL 60173 847-490-1191 www.heidenhain.us

Angle Encoders + Linear Encoders + Contouring Controls + Position Displays + Length Gauges + Rotary Encoders