

SEPTEMBER 2020

**HAINBUCH**

REPORT

ISSUE 36 THE MAGAZINE FOR CUSTOMERS, EMPLOYEES, AND FRIENDS

**AN ENTIRELY
NEW LEAGUE**

TOPlus premium

Standard chuck with μm precision

HIGHLY TALENTED

Clamp and measure simultaneously:
the IQ clamping devices

AUTOMATION

Everything runs automatically with
the AC [automatic change] line

FACTS & FIGURES

INTERNATIONAL **12** SUBSIDIARIES

WORLDWIDE MORE THAN **900** EMPLOYEES

1000 SPECIAL SOLUTIONS EVERY YEAR

FOUNDED IN **1951**

INDUSTRY **4.0** DIGITAL FUTURE SOLUTIONS

45 DESIGN ENGINEERS

SPANNTOP INVENTED IN **1977**

IQ CLAMPING DEVICES WITH INTELLIGENCE

CFRP LIGHTWEIGHT CLAMPING DEVICES
MADE OF CARBON FIBER

MORE THAN **150** PATENTS

IMPRINT

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Dear customers, dear employees, and dear friends,

We have used this time of crisis to be creative and to work full-throttle on further developments. This quote from John F. Kennedy says it well: »Those who tackle where the others start talking have a head start in life«. And this is exactly what we have done: We have not just listened to your desires and the challenges that you deal with every day, but rather we have tackled them and have implemented solutions.

And now we ask you: What do a new league, a new era, and a highly talented clamping device have in common? They all help you to offload your employees, save money, and produce faster. For example, with the µm-precision »TOPlus premium« standard chuck, with our AC [automatic change] line for auto-

matic clamping head and clamping device change-over or with the intelligent clamping device that can clamp and measure simultaneously.

But this is certainly not everything that we have developed and expanded. With the 2-jaw module our modular family has received a new addition – the compact alternative to a large centric clamping vise.

In May, we opened our new Shipping Logistics Center at our site in Marbach [Germany]. We want stocked products to be in your hands within 24 hours for orders in Germany. As a result, deliveries will be faster for the whole world. Isn't that great?

Sincerely,
HAINBUCH Executive Board


Gerhard Rall


Hans-Michael Weller


Sylvia Rall



AN ENTIRELY NEW LEAGUE

WITH THE »**TOPlus premium**«
WE CONQUER THE LEAGUE
OF μm -PRECISION CHUCKS

Have you ever relied on hydro- or membrane-expansion clamping devices for accuracy requirements in the range of $\leq 5 \mu\text{m}$? Understandable, because thus far, we haven't been quite able to keep up in this range. We have changed this situation and the answer is called: **TOPlus premium** chuck. In addition to accuracy, you also benefit from other advantages, and it's even available from stock.

TOPlus premium

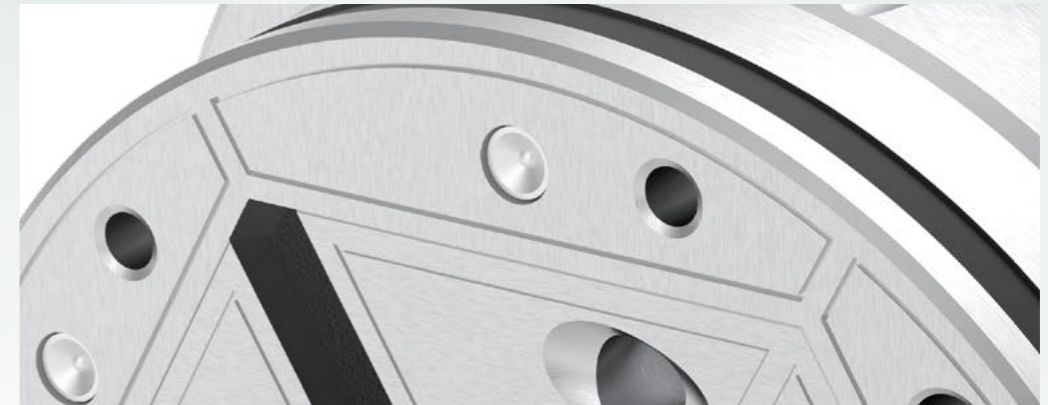
When is the TOPlus premium the ideal chuck for you?

When you ...

- ... want to produce parts with a run-out of $\leq 5 \mu\text{m}$.
- ... want to clamp delicate/thin-walled parts, as well as massive/bulky parts in a high-precision clamping device.
- ... particularly want to keep your investment in the clamping elements small.
- ... want to load the machine automatically with a robot.
- ... want to handle high-mix low-volume part production.



AVAILABLE
END
OF 2020



TOPlus premium introduces itself:

Certainly, for many installed parts a run-out of $\leq 10 \mu\text{m}$ is fully sufficient. Nevertheless, more and more frequently parts with a run-out of $\leq 5 \mu\text{m}$ are becoming standard. Vehicle transmissions are getting quieter and quieter, because the gears are becoming more precise. With TOPlus premium and the associated clamping heads, where run-out at your components is concerned there are no more worries, since run-out is always $\leq 5 \mu\text{m}$.

There are those who desire automatic loading of the machine by a robot. This can pose problems if the opening stroke is too small. With the TOPlus premium chuck in conjunction with a clamping head, the opening stroke is large enough and facilitates loading, even if the robot works with some degree of inaccuracy. Moreover, there is also the fact that it is robust and not as sensitive as a hydro-expansion clamping device. A light touch with the workpiece has no effect on the TOPlus premium when loading. Your process remains stable.

And now let's talk about the price: You pay merely a fraction of what you would have to fork over for a hydro-expansion or membrane clamping device. The chuck is a stocked item, in other words it is a standard product, and in addition has reasonably priced μm -precision clamping heads for your specific workpiece diameter.

Summing up:

Better run-out accuracy for high-precision workpieces, a stable process, and more money in your pocket!

On a side note: Like all chucks at HAINBUCH – the TOPlus premium is part of our modular system. Therefore you benefit from change-over from outside to inside or jaw clamping in two minutes, maximum.

FOR THE FUTURE I SEE HEXAGONAL!

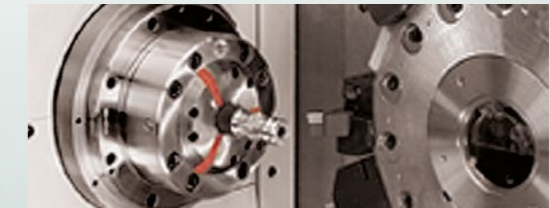
1958 Collet

The first products leave the Marbach [Germany] production facility.



1977 SPANNTOP

The invention of a completely new chuck system turns the clamping device world upside down.



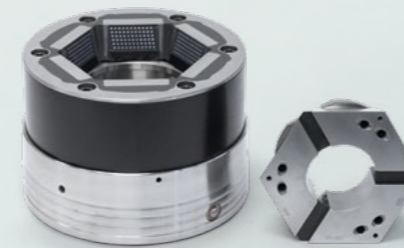
2006 TOPlus

The chuck with hexagonal clamping geometry is brought to market.



2007 TOPlus IQ

Just one year later the intelligent version with integrated measuring technology is developed.



2012 TOPlus mini & SPANNTOP mini

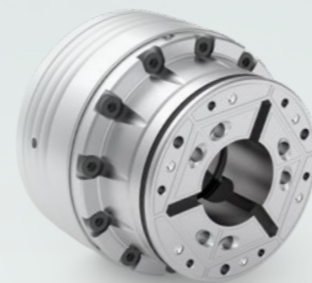
The small and lightweight chucks first see the light of day.



2020

TOPlus premium

The mini-chucks are further-developed: Chucks with the highest precision.



TOPlus IQ & SPANNTOP IQ

Smart workpiece clamping technology with even higher measuring intelligence.



TOPlus AC & SPANNTOP AC

The chuck gets even smarter: automatic change-over of clamping head with end-stop.



HIGHLY TALENTED

clamp & measure

The IQ chucks can do two things simultaneously: They can clamp workpieces, and in doing so perform various measurements. Thus, work steps in production are being facilitated, you might also save additional measurement processes. This means that your employees have time for other tasks, and there is no need for extra machine stops to take measurements. Moreover, it is certainly reassuring, when you have a clamping device with intelligence that automatically initiates necessary measures.



The clamping devices with integrated measuring intelligence only inform the machine operator when the process is outside of the defined limits. Thanks to the monitoring and various automatic measurements, they reduce manual measurement procedures, prevent machining of scrap parts, and enable demand-oriented and status-oriented maintenance intervals. These advantages increase machine availability and process capability.

The installed sensors enable touchless transmission of energy and measurement data directly to the machine controller. The controller executes a sample setpoint comparison. If there are deviations, a message is output or a correction is initiated.



Variant	Pull-back	Deadlength	Pull-back	Deadlength	T211 pull-back	T211 pull-back	T212 pull-back
Measurement parameters							
Workpiece Ø	✓	✓	✓	✓	✓		✓
Temperature	✓	✓	✓	✓	✓		✓
RPM	✓	✓	✓	✓	✓		✓
Workpiece contact	✓		✓		✓		✓
Workpiece clamping force	✓	✓					



Measuring on the machine

IQ chuck for measuring workpiece diameter, temperature, RPM, workpiece contact, and workpiece clamping force. Data is processed in the controller or in the master computer and is displayed on the machine panel.



Measuring when handling the workpiece

Use the IQ chuck for measuring the finished workpiece diameter. This data is processed in the controller or in the master computer and can also be visually output via an LED ring on the chuck.



External measuring station

IQ mandrel for measuring the finished workpiece bore. This data is processed in the controller or in the master computer and can also be visually output via a display on the measuring station.

START WITH US INTO A NEW AUTOMATION ERA

In addition to the change-over of clamping heads and end stops fully automated, we provide solutions for automated change-over of mandrels and chucks as well.

You don't believe it? We would be pleased to show you the various possibilities.

When the task at hand is to automate processes for clamping workpieces, we are the right partner for you.



WITH OUR NEW AC [AUTOMATIC CHANGE] LINE, EVERYTHING RUNS AUTOMATICALLY!

We can justifiably claim that we are pros in the area of clamping device change-over, more specifically we are the world-champion for quick-change. Why? For decades we have been working on reducing set-up times and quick change-over. Thousands of centroteX quick change-over interfaces are being used with μm -precision success by our customers, where they ensure immense savings, day-in, day-out.

However, even if our clamping solutions can be set-up in no time at all, the future is in automation. With our **TOPlus AC** and **SPANNTOP AC** chucks, clamping heads and workpiece end-stops can be changed automatically. This is the foundation for the automation of clamping processes; it enables unattended set-up and manufacturing of workpieces with different clamping diameters, clamping profiles, and clamping lengths.

For example on a vertical lathe, the spindle and chuck move above the required clamping head and end-stop. Then, through the reliable process the clamping head and end-stop can be changed within a few seconds. This change-over procedure can also be executed by a robot or gantry for horizontal lathe or a machining center.

But what's it like when changing complete clamping devices? In this case our proven centroteX quick change-over interfaces are most certainly a good choice. Change-over by hand takes only 5 minutes. However, the requirement of the future is different, namely here as well the requirement is to change automatically and unattended. This is where our **centroteX AC** solutions come into play; these solutions are used successfully by our customers for automatic change-over of mandrels and chucks. For this we offer individual interfaces that make our customers' manufacturing completely flexible.



Are you interested, or do you simply want to hear about what's possible? Unfortunately, we are not yet receiving an automated »I am interested signal«. So please give us a call or send an inquiry.

Phone +49 7144.907-333 or sales@hainbuch.de



A new addition to the modular family

Brand new: 2-jaw module

the compact alternative to a large centric clamping vise

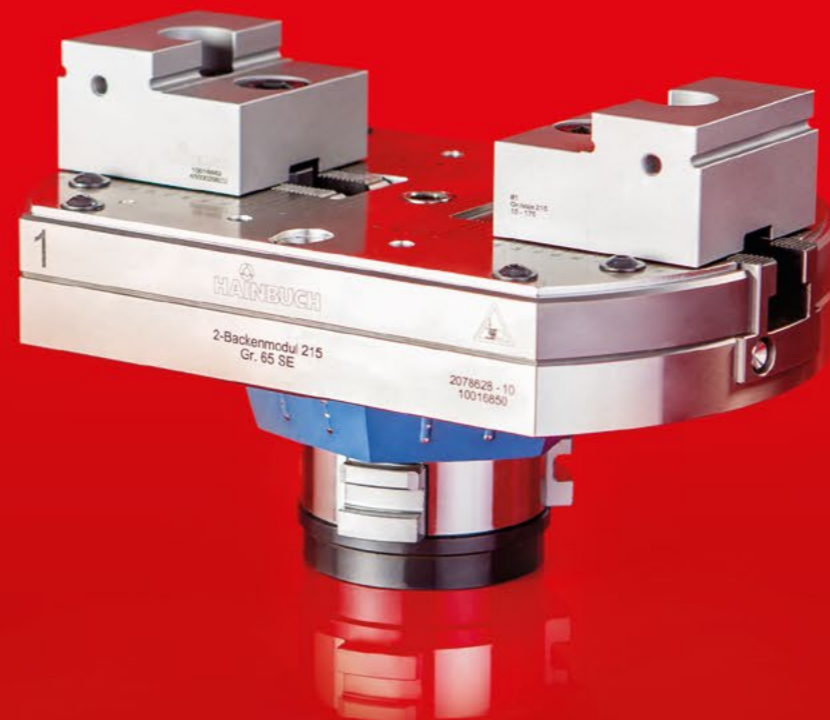
Whether the workpiece is round or cubic, large or small, with the modular system any type of clamping is possible. Round workpieces are best clamped from outside with our clamping heads. However, when your clamping heads reach their limits, because you want to clamp a larger workpiece area, then you can rely on our jaw clamping with the 3-jaw module. And for cubic parts? Use the new adaptation centric clamping vise: the 2-jaw module!

With the 2-jaw module you change-over to centric clamping in two minutes. This is possible because the basic unit, into which the 2-jaw module is inserted, is a HAINBUCH chuck or stationary chuck. Conversion occurs without clamping device change-over, and thanks to the integrated CENTREX quick change-over interface, it is also possible without having to align. It can be used on machining centers, milling machines, and on lathes up to 1,500 revolutions per minute.

Thus, for a large parts spectrum, you are absolutely flexible and always have the perfect solution for the respective clamping situation.

Advantages

- Clamping device change-over in two minutes
- Maximum flexibility for a large parts spectrum
- Alignment is not required



The HAINBUCH modular system

One system, two basic variants, even more possibilities

Clamping devices rotating



TOPlus chuck TOPlus mini chuck



SPANNTOP chuck SPANNTOP mini chuck



TOROK manual chuck

Clamping devices stationary

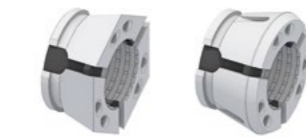


MANOK plus manual stationary chuck



HYDROK hydraulic stationary chuck

Clamping element

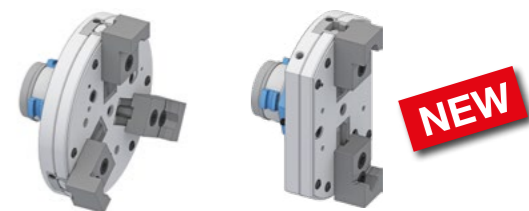


Clamping head - O.D. clamping

Adaptation clamping devices



MANDO Adapt mandrel - I.D. clamping



3-jaw module 2-jaw module



Face driver adaptation



Morse taper adaptation



Magnet module

TWO VISIONARY COMPANIES CONQUER THE SKIES

Diesel aircraft engine from EPS in test,
installed weight:
700 lb.

EPS is developing a diesel engine for private aircraft and uses the high-precision and flexible modular system from HAINBUCH for production

In Northwest Wisconsin [USA] a small and committed group of the company EPS [Engineered Propulsion Systems; New Richmond] is working on an engine that is revolutionizing general aviation and could influence diverse areas of flying. The team is making the final preparations for a diesel engine that would be suitable for private aircraft based on weight, size, and power.

Why diesel?

Ryan Kuebker, Project Coordinator, states: »Our engine offers all the advantages of a conventional diesel engine, and even more. For example, it transports more payload over great distances with less fuel consumption. It can drive an aluminum propeller and delivers more horse power and torque with fewer emissions. And because it can be fueled with Jet A or diesel, the engine is not dependent on special aviation fuel. More importantly, the greater availability of diesel offers a particular advantage for pilots in remote regions, such as Alaska.«

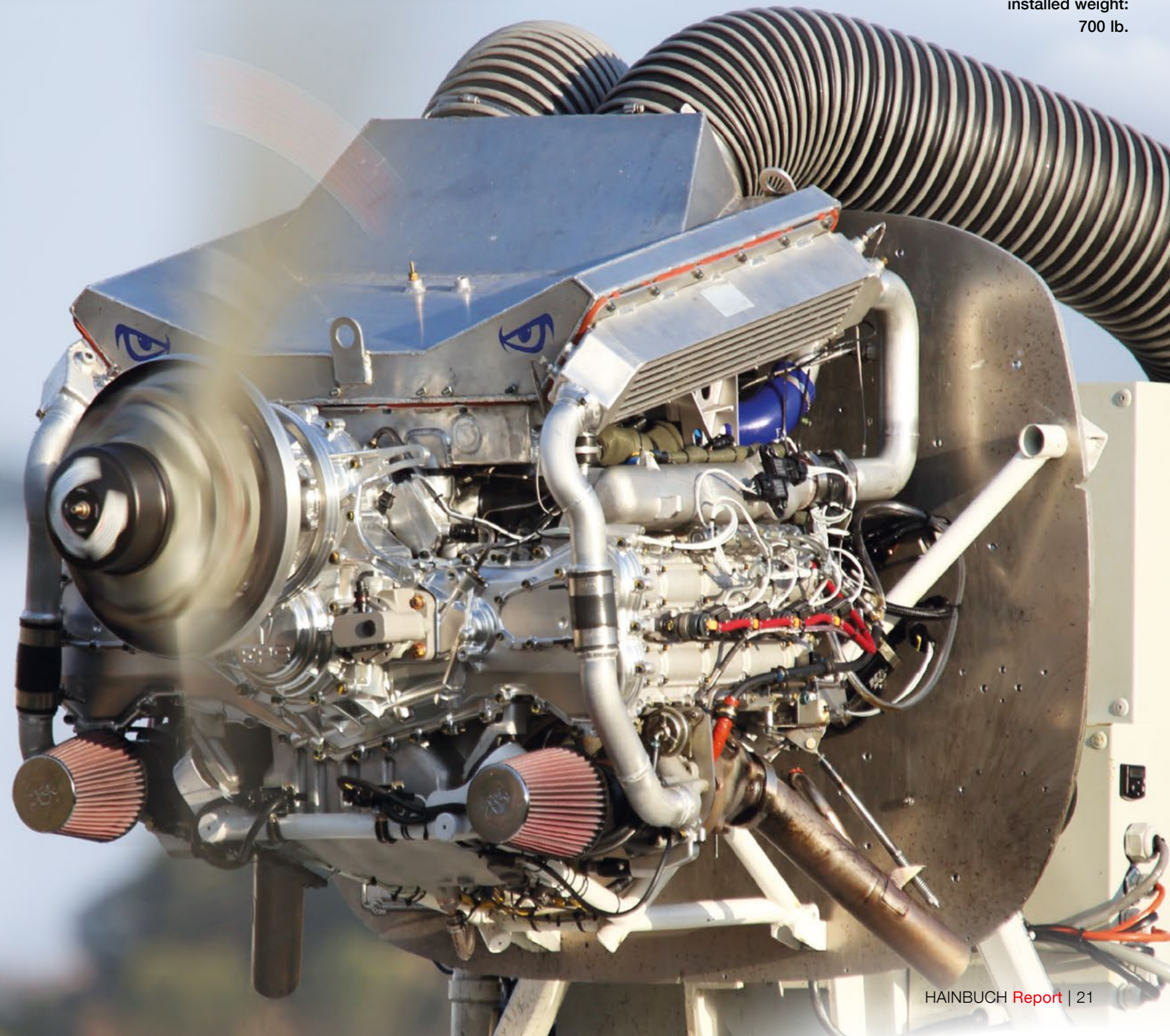
The original concept came from the founders and lead engineers: Michael Fuchs [President] and Steven Weinzierl [Vice President]. Fuchs graduated from RWTH Aachen University and has extensive experience with aircraft turbines. He developed the concept for this diesel engine in 2005; six years later he was able to start building the prototype: »The idea came about through the work with

drone engines. At that time you could already imagine that the long-established dominance of aviation fuel would some day come to an end. We were leaning in the direction of general aviation, because the manufacturers in this sector use older engine types, where there is minimal possibility for further development.«

Lightweight and powerful

The materials of the EPS engine constitute an important unique selling proposition. The materials should be lighter; at the same time they should offer higher performance and greater reliability. Due to the cost and efficiency requirements, components were designed with a view towards simple production and if possible multiple functions. For example, in the auxiliary drive section there are two fuel pumps, a water pump, the generator drive, and other components.

Kuebker explains: »The compact arrangement of the components posed entirely unique challenges, since we had to bring form and function into harmony in such a manner that we ended up with a package that was as small as possible with the desired weight. Currently at 700 lb we are approximately 50 lb over the weight of conventional gasoline engines.«





The MANDO Adapt mandrel is part of the HAINBUCH modular system.

Enthusiasm in the industry

The unique concept has sparked the interest of the entire industry. Legendary pilot Dick Rutan and others are regularly kept up to date. Even before certification of the prototype [180° V8 concept] there were inquiries, as to whether a 4-cylinder variant for drones could be considered.

»Right from the start we maintained an exchange and worked together with US and foreign aircraft manufacturers«, says Fuchs. The investors, as well as potential customers are not only enthusiastic about the apparent advantages, they are also excited about the long-term savings potential promised by the new engine.

»Although we assume that the engine will initially be 30 % more expensive than aviation fuel engines that are customary on the market, the trade-off is that the engine will not require inspection until after 3,000 hours«, Kuebker adds. »Moreover, we estimate that the engine block will last up to 9,000 hours. If you add up the reductions due to the lower price of diesel, considerable savings arise over time.« Now that the certification procedure is on track, the EPS management team is concentrating more on the production planning.

Focus on flexible and precise clamping devices

For Scott Lindahl, Production Manager, the propeller shaft, which includes transmission [gear cutting] as well as the bearing diameter in 17-4 PH stainless steel, poses a particular challenge. Jared Manhart, CNC Machine Operator, explains the procedure: »We start with a raw forging. Since the engine has more than 20 gears, we decided to mill the gearing elements ourselves on the lathe.

To guarantee a good run-out, the workpiece must be clamped from the inside. Prior to cutting the gears or splines, we face, drill and turn the part with multiple bearing diameters requiring a tolerance of $\pm 7 \mu\text{m}$.«

To ensure the necessary precision, but also efficient clamping device change-over, EPS decided on the HAINBUCH modular system. It enables fast change-over from O.D. clamping with a clamping head to I.D. clamping with a mandrel. »I knew about HAINBUCH from earlier times. I discussed our application with the HAINBUCH consultants at the IMTS Exhibition and we determined that this was the best solution for us«, reports Fuchs.

Since ultimately the propeller must still be bolted onto the shaft, using a tailstock was not an option. Also the machine does not offer a lot of space. The chuck from HAINBUCH is designed for maximum holding forces on the O.D. [outer diameter] and can be quickly changed over, in order to use the MANDO mandrel for inner diameters.

The segmented clamping bushing of the MANDO system consists of multiple steel segments, which are held together by vulcanized rubber elements. The large holding surface ensures maximum force when clamping-in, and thus rigid clamping for the machining, without damaging the surface of the workpiece. »This is particularly important when milling gears«, explains Manhart. »When machining such parts there are phases with and phases without resetting the tool, and any deviation, any contact would ruin an extremely expensive workpiece.«

Another Machine Operator, Nicholas Mahoney, supplements: »The workpiece projects 25 centimeters and there is no vibration. Without tailstock, this is an extraordinary achievement. In addition, we were able to reduce our throughput times for the propeller shaft to approx. one hour – less than half the time we required in the first attempt. Another advantage of the system is the fast clamping device change-over. Once we have the FAA approval and the engine goes into series production, then we can ensure the tolerances and still reach our production targets. And we can also change over to bar feed without long downtimes.«

Given the flexibility of the HAINBUCH system, the firm is now discussing possible use of a rotation chuck for the purpose optimizing capacity utilization and efficiency for selected milling processes. »Simultaneously achieving high precision and efficiency in production is our style of work«, summarizes Fuchs.

Workpiece

- Propeller shaft of 17-4 PH stainless steel

Machining

- Gear cutting
- Turning various bearing diameters with tolerances of $\pm 7 \mu\text{m}$

Challenge

- High-precision required
- Minimal space in the machine
- Use of a tailstock is not possible

Advantages & savings through use of the MANDO Adapt

- High rigidity
- No scrap
- No vibration, in spite of a short clamping length, workpiece protrudes 25 centimeters [10 inch]
- Fast change-over from O.D. clamping to I.D. clamping, thanks to the modular system
- Throughput time reduced from two hours to one hour

Key advantages

- Extremely fast conversion without disassembling the base clamping device [1–2 min.]
- Large clamping range and vibration damping due to vulcanized clamping elements
- Standard segmented clamping bushing and workpiece end-stop are available for machining to size



The finished propeller shaft after machining, using the precision clamping system from HAINBUCH.

COOL CACHE FOR THE STASH



NEW SHIPPING LOGISTICS CENTER AT OUR SITE IN MARBACH [GERMANY]

Thanks to our lean processes and our new warehouse system, which is now equipped with barcodes, you will receive your desired product significantly faster. Our employees can process your purchase orders much more quickly in the system and with just a few hand motions your product is ready to ship. The original space in the main building we are now using to further expand our Manufacturing and Assembly areas. This also shortens the delivery times!

From many storage facilities at different locations and in different buildings a main warehouse was combined. We built the new »Plant 2.1« in walking distance from our headquarters building. We have provided new space on the shelves for our many clamping heads. Three high-tech elevators for stock organization of the rest of the products round-out the facility.

Everything gives an airy, cleaned-up and well-organized impression. Our employees in Shipping & Receiving, who formerly were almost »stepping on each other's toes«, have larger workstations and can work with greater concentration.



FASTER TO THE DESIRED PRODUCT



Peter Gerster, our Chief Operating Officer, and Werner Knoll, our Head of Shipping & Receiving and the Warehouse, [from left] were responsible for the planning and implementation of this project. They know the processes inside and out due to their many years in the service of the company, 30 and 40 years respectively, and they knew exactly what to develop in the workflows and where improvement potential was slumbering.

»PROCESS FLOW OPTIMIZED.«

Peter Gerster

New teams were formed, internally restructured and processes were adapted in SAP. Now the Shipping & Receiving, and Warehouse employees, as well as the grind-out service, renamed »Quick-Service«, are accommodated in the new building.

This ensures a significantly shorter workflow from incoming order to shipment of the goods.

Of course we also took the environment into account in our planning. We use electric vehicles for our intralogistics. We reduced the flood of paper, we automated IT processes, and we use packaging material that can be recycled for shipping.

PROFILE PLANT 2.1

- Total surface area: 1,300 squaremeter
- Levels: 2
- Electric vehicles for the internal logistics: 2
- Employees: 20



State-of-the-art technology is used: Warehouse elevator with touch screens, electronic labels, and barcode scanners.



Our »Quick-Service« for grinding-out stock items with two grinding machines and a labeling machine is housed in the new facility. Previously stock and grind-out service were in different buildings, time was always lost in transit between these two destinations. Now everything runs faster: Get the clamping head from the warehouse, grind-out, label, and ship.



In a nose dive products shoot down from the warehouse, one level lower into Shipping, where they are packed and then sent en route to the customer.



■ HAINBUCH subsidiaries
■ HAINBUCH agencies

WE ARE AT YOUR SERVICE – WORLDWIDE

- 4 manufacturing locations in Germany
- 12 international subsidiaries
- more than 40 sales agencies

Find our global subsidiaries and sales agencies at www.hainbuch.com