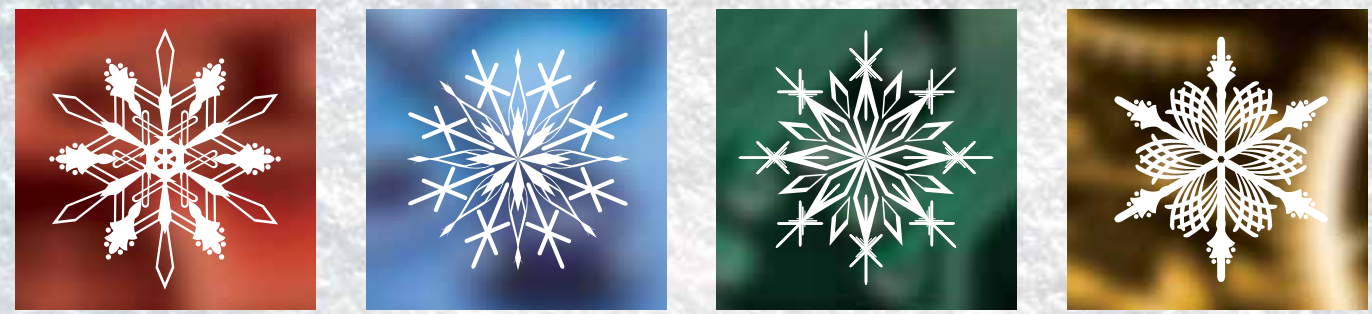
decomagazine

THINK PARTS **THINK TORNOS**

51 04/09 ENGLISH



THINK 2010 **THINK HAPPY NEW YEAR**

Distilled
experience

Torx multi-spindle
milling cycle

The kingdom of
Thailand

Lubricant
monitoring pays off

UTILIS®

Tooling for High Technology

WERKZEUGE FÜR DIE MIKROMECHANIK

ABSTECHEN

OUTILLAGE POUR LA MICROMÉCANIQUE

TRONÇONNAGE

TOOLS FOR THE MICROMECHANICS

CUT OFF

Utilis AG, Precision Tools
Kreuzlingerstrasse 22, CH-8555 Müllheim
Phone +41 52 762 62 62, Fax +41 52 762 62 00
info@utilis.com, www.utilis.com

Utilis France SARL, Outils de précision
597, avenue du Mont Blanc, FR-74460 Marnaz
Téléphone +33 4 50 96 36 30, Téléfax +33 4 50 96 37 93
contact@utilis.com, www.utilis.com

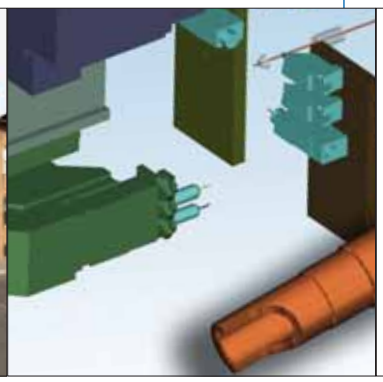
10

The answer is…
everything is possible!

24

Just in time: A different approach worth the fight for Otto Engineering – and its hometown

33



QA Technology chooses to pair PartMaker SwissCAM with their Tornos Deco 7a

41

Thread-whirling with 12 blades

IMPRESSUM

Circulation: 14'000 copies

Available in: English / French / German / Italian / Swedish / Spanish

TORNOS S.A.
Rue Industrielle 111
CH-2740 Moutier
www.tornos.com
Phone ++41 (0)32 494 44 44
Fax ++41 (0)32 494 49 07

Editing Manager:
Willi Nef
nef.w@tornos.com

Publishing advisor:
Pierre-Yves Kohler
pykohler@eurotec-bi.com

Graphic & Desktop Publishing:
Claude Mayerat
CH-2852 Courtételle
Phone ++41 (0)79 689 28 45

Printer: AVD GOLDACH
CH-9403 Goldach
Phone ++41 (0)71 844 94 44

Contact:
redaction@decomag.ch
www.decomag.ch

SUMMARY

Medical Industry

New Engineering Solutions for the Human Body

PICCOMFT

A drilling, turning, boring and threading combination tool.

Dmin. 4 mm

TANG-GRIP

- Excellent part straightness and improved surface finish
- Unique tangential clamping method
- Increased tool life

SWISSCUT

A compact tool design for Swiss-type automatics and CNC lathes, providing reduced setup time and easy indexing without having to remove the toolholder from the machine.

SOLIDDRILL

The unique requirements of the medical industry make specially tailored drills essential for optimal performance.

Dmin. 0.8 mm

8250

P M K N S H

3P

SUMO TEC

Member IMC Group

ISCAR HARTMETALL AG
Wespenstrasse 14, CH-8500 Frauenfeld
Tel. +41 (0) 52 728 08 50 Fax +41 (0) 52 728 08 55
office@iscar.ch www.iscar.ch

LOOK REALLY CLOSE!

At the end of October the global press announced that the recession is officially over for the USA. Simultaneously, the German Government's statistical office corrected its forecast from negative to positive growth for 2010. These are both welcome news in a time of extreme uncertainty.

At present, especially over the last 3 month, many customers have seen an increase in orders resulting in some profitable months for the first time in a while. Other manufacturers still suffer, but in general it finally seems that the worst is over.

So, in terms of capital equipment - customers are now starting to look around at what is out there and what kind of production equipment would be most suitable for their future needs. An excellent address is Tornos; and when turning to Tornos they should look really close. Tornos has invested heavily over the past few years in the development of new products to ensure that for each individual customer Tornos can offer an ideal solution. More specifically, in 2003 Tornos had only 3 product platforms to offer to customers like the Deco a for high precision and complex parts, the SAS 16.6 and the MultiDECO CNC machine for multispindle users.

Since 2003, Tornos has worked step by step to extend the single spindle portfolio with the Micro platform, then the Sigma platform, then the DECO e platform and the Delta platform. Furthermore, at the end of 2009 the Gamma line will be introduced to further extend the comprehensive portfolio of single spindle machines. Looking at the multispindle machines, the MultiAlpha was added to the range - the most capable machine for finishing complex parts. We then added the MultiSigma machine with great capabilities for relatively complex parts.

But this is not all. In 2008, Tornos acquired Almac; a company that now enables Tornos to offer high precision vertical milling machines, bar-end milling machines, turning centres and speciality products such as engraving machines - an interesting extension to the Tornos brand.

With these 13 product platforms, Tornos can now offer its customers the ideal machine that corresponds exactly to the end users specific needs. So, when a customer considers investing in new equipment, look really closely at what Tornos has to offer.

Willi Nef

DISTILLED EXPERIENCE

At the World Exhibition of Machine Tools in Paris in 1959, Tornos unveiled to the public something that was to revolutionise the world of high-volume production of small, precision components. Following several years of development, what the company launched at that time was the first multispindle lathe capable of finishing workpieces to accurate tolerances and to high standards of surface quality. In 2009, 50 years later, the SAS 16.6 cam-type lathe, a direct descendant of the AS-14 machine from 1959 is still being manufactured and is still the perfect answer to specific requirements.

An extraordinary experience…

Between 1959 and 1962, the year it started making deliveries to customers, Tornos fine-tuned and refined its new machine to enable it to create flawless products. To view this in the context of the period, you need to bear in mind that a multispindle lathe was intended primarily for the very high-volume production of components known as "reduced quality parts", and this perception was what Tornos set out to transform by putting forward a machine capable of achieving the same high quality standards as single-spindle lathes and turning machines. Very swiftly, the market responded favourably to this new way of working, which enabled more to be manufactured, with each workpiece intimately acquainted with precision accurate to within hundredths of a millimetre. Single workpieces not requiring much by the way of back operation could be finished on this machine. More complex workpieces were then placed in fixtures on a second means of production such as a transfer machine. Customer's machine shops were growing rapidly, to such a point where some customers were working with more than 400 machines!

Digital curve

From 1986, engineers at Tornos began to develop digital machines that delivered much more by the way of flexibility and versatility. This family is based on the very broad range of experience gained by the company through the creation of cam-type and NC single-spindle machines plus cam-type multispindles. The first CNC 632 and SAS 36 DC machines enabled Tornos to integrate highly productive CNC technologies in their multispindle products. The MultiDeco family was launched in 1997 and since that time, it has never ceased to grow, with 6 or 8-spindle turning machines capable of machining diameters of 20, 26 then even 32 mm in their Multideco, MultiAlpha and MultiSigma variants. At the same time, the company put forward the option of fitting digital guides on the SAS 16.6. Even though this solution was technically viable, it did not meet with success because of the extra space required and the use of this kind of carriage action proved less than ideal. It was duly abandoned.

SAS 16, THE HISTORY OF A LEGEND

1874	First multispindles on the market
1959	AS14
1970's	Chucker versions
1970's	Integrated Caddie feeder
1984	SAS 16, to fit diameters up to 16 mm
1988	SAS 16 DC, spindle motors with programmable cam shafts
1994	SAS 16.6, locking action with Hirth teeth and manifold indexing. New design
1995	Stopping version
1996	Version with 2 workpieces per cycle
1996	Digital guide bars
1997	Electronic handwheels
1997	Integrated MSF-316 feeder

A parallel range of complementary products was launched in 1975 with the BS 14. This family then developed through the different versions of the BS 20.

Today, more than 3500 Tornos multispindle lathes are still in operational service.

In 2009, Tornos is only able to offer the perfectly crafted multispindle and chucker solutions that it does because its engineers have grasped the need to incorporate their prestigious legacy and the tremendous depth of experience embodied by the AS 14 the SAS 16.

Complementary products

We often hear it said that the cam-type machine is a species heading for extinction. Pascal Chételat, a planning specialist and long-time technical and commercial manager at Tornos has this to say to us: "It is true that, for short production run, the NC-controlled multispindle lathe offers benefits in terms of flexibility. Moreover, they have much more highly-developed capabilities when it comes to machining in counter or 'back' operating mode. Nonetheless, SAS 16.6 is always right on the money if you require exceptional productivity from an ultra-compact footprint. We continue to sell this machine, and our customers continue to be satisfied with it".

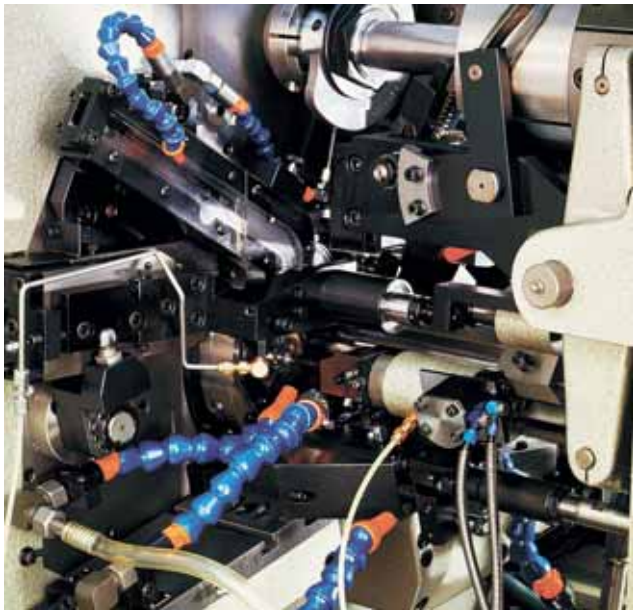
Even though Tornos directs most of its marketing efforts towards the innovative, a 'cam-type' solution for multispindle lathes is still alive and well, and can often be found in machine shops alongside their MultiDeco, MultiAlpha or MultiSigma counterparts. Mr. Laurent Martin, a multispindle customer of Tornos for the last 50 years, has this to say: "Our move to multispindle units with numerical control enabled us to access other markets and different kinds of demands. With these machines, we are able to manufacture production runs of 30 to 50 000 components very efficiently indeed. These two types of machine are therefore complementary".

INGENIOUS ATTACHMENTS

More than 300 attachments are available for the SAS 16.6, almost all of which are fully interchangeable and suitable for use on the AS14, SAS 16, SAS 16 DC and the SAS 16.6. This current level of compatibility delivers great flexibility to the machine shops of our corporate clients. Here are a few examples:

- Polygon-headed attachment for thread-milling
- Chamfering attachment
- Thread-rolling attachment
- Rotary tip milling attachment
- Fixed-position drill
- Double rotating drill
- Independent spindle
- Calibrating tool holder
- Countersink tool holder

There are solutions for every operation, from the simplest to the most complex.



CHUCKER : A SUCCESS OVER SEVERAL DECADES

Ever since the seventies, manufacturers in the automotive sector have sought ways of machining workpieces from blocks of material instead of bar stock. Tornos developed and delivered chucker machines capable of creating automotive components such as truck valves and then moved on to watch cases and other types of component. Then the manufacturers of miniature bearings found themselves confronted by the same kind of problem, so a solution based on the same principle was implemented for the production of bearing races. The flexibility of numerical control (NC) and the modular nature of MultiAlpha and MultiSigma machines now open the door to many alternatives, which can be fine-tuned to the manufacturing needs of a wide and diverse range of customers.

A proven technology

The SAS 16.6 machine on offer today is the culmination of 50 years of evolution. While many of its characteristics have remained in place since the product was originally launched, such as the working angle of 205 degrees, assuring optimum distribution of tool advances and optimisation of the number of work cycles required to achieve a maximum production output of 80 workpieces per minute, other strong features have been developed and added since that time.

The locking action delivered by Hirth gearing has greatly enhanced the robustness and precision of the machine, while the Manifold indexing system delivers shock and vibration-free indexing action. These two elements lie at the heart of the precision and quality of machining operations created on the SAS 16.6. The scope for locking the spindle enables transverse or eccentric operations to be performed on the front end of the workpiece, while the counter-turret enables 3 counter operations to be performed in masked time. This makes it possible to finish workpieces of average complexity.

While an NC machine may be able to "do everything" thanks to its programming capability, there are some types of production operation that do not require this level of flexibility, but which still require specific operations. To respond to these needs, over the years Tornos has developed special items of equipment and is now able to offer a very diverse and versatile range of products. For example, two counter-spindles can be fitted to machine relatively simple workpieces two at a time, i.e. within the same cycle. This makes it possible to increase productivity levels to beyond 120 workpieces per minute.

Five decades on, and still state of the art

There are not many products out there to have stayed the course for five decades while always remaining perfectly attuned to contemporary requirements. The SAS 16.6 is one such product. Yes indeed, it is a cam-type turning machine and yes, it is still difficult to switch between production runs (even though its presetting capability does improve matters), and yes it no longer has a 'modern' look and feel, and yes it is no longer as fashionable as to be working on an NC lathe, or on one equipped with an integrated PC… but look how efficient this unit is !

Would you like to learn more about the SAS-16.6 ? Visit :
http://www.tornos.com/dnld/prd-pdf/tornos-multideco-sas166-uk.pdf
or contact Tornos on + 41 32 494 44 44 – contact@tornos.com

THE ANSWER IS… EVERYTHING IS POSSIBLE!

At the EMO show in Milan, I've met the owners of Vertx, a Stockholm (Sweden) based company as well as Ehn & Land and Tornos representatives. The company signed at the show for a new DECO 7a machine to face its increasing demands in high precision small parts and parts specialized for fiber optics.




Young and dynamic

In 1997, MM Akerman and Eriksson decided to create their own company and performed a spin off from a business already active in the same field. It was clear at the start that the mission of the new company would be to help their customers design and produce their connectors and other high precision small parts. *"The idea was to offer them our capacities in engineering before producing the parts. Therefore we needed an efficient means of production",* says M. Akerman. In little more than 10 years, Vertx has become a well known producer of these types of products.

Market evolution

The company designs unique parts for its customers and this is the key, Mr Eriksson says: *"When a customer comes to us with any idea, our first answer is "no problem" and then we look for solutions that fit their needs. Obviously the parts have to be in the range of diameters we can machine, apart that, everything is possible and so far we've always been able to meet our customers' requirements."* This philosophy sees Vertx continually working in the delivery of high-end solutions. Mr Akerman continues: *"We are not active in the mass production of standard fiber optics connectors; we only produce custom designed products."*

Parts finished on the machines…

Even if active in high-end solutions, Vertx must do everything to guarantee mastered costs. One way to ensure this is to avoid any secondary operations. *"We bought the last Tornos machine of the millennium. That was in December 1999 and it was a Deco 13a. We chose this machine because we saw it perfectly matched with our vision to completely finish parts on the machine… and our idea proved to be accurate,"* says Mr Akerman. *"With the Tornos machines we can produce endlessly without any question. In our Deco 7a, we can hold a three micron range without supervision; it is of high importance for a small company like ours. We push the machines to their limit, for instance, during the last seven weeks, we reached 1000 working hours on one machine, and this demonstrates our work rate."*

… solution provider

As production increased, the company was confronted with some cleaning troubles. Mr Eriksson remembers: *"we were not satisfied with the way our parts were cleaned; we had to perform too many manual operations, to ensure the correct level of cleanliness. That was obviously not rational, neither in term of costs, nor in terms of capacity. We carefully analyzed several solutions and finally decided to buy an Amsonic combined machine. The result was as expected (again) and we no longer had to manually cleanse any part."* It is important for customers to know that they can count on their part producer.

Switzerland or Sweden?

If some people from abroad are already mixing Sweden and Switzerland, Vertx won't help them to clarify. This company works mainly with Swiss customers. Mr Akerman says: *"Our machines are from Tornos, Schaublin and Amsonic and the bar loaders are from LNS or Tornos. Most of the tools are also bought in Switzerland and the material to be machined comes from L Klein (Bienne, Switzerland). It ensures that we have the level of quality we can rely on."* This bases the good reputation of Vertx, but the know-how of the company is the main reason why customers are placing repeat business. M. Eriksson says: *"We handle the whole process, we discuss with our customers, do the drawings, the programming and the machining. We do large series runs but also prototypes. It's often sister parts that allow us to be very reactive."*

Ehn & Land: A reliable partner

I tried to discover how Tornos is represented in Sweden and how the service works. MM Eriksson and Akerman said: *"when it is necessary, the service works well,"* but there are not many needs for that service as the machines run well. Mr Eriksson adds: *"I also consult Ehn & Land if I have some questions about intricate programming, and here too I can only praise the service we receive."*

WHY WORK WITH VERTX

What their customers say is that Vertx has:

- superior know how in
  - developing and
  - machining in high quality
- wide knowledge of fiber optics and high precision small parts
- offers a complete solution from advice, drawing to cleaning
- has a flat organization, resulting in
  - short response times both in terms of study and production

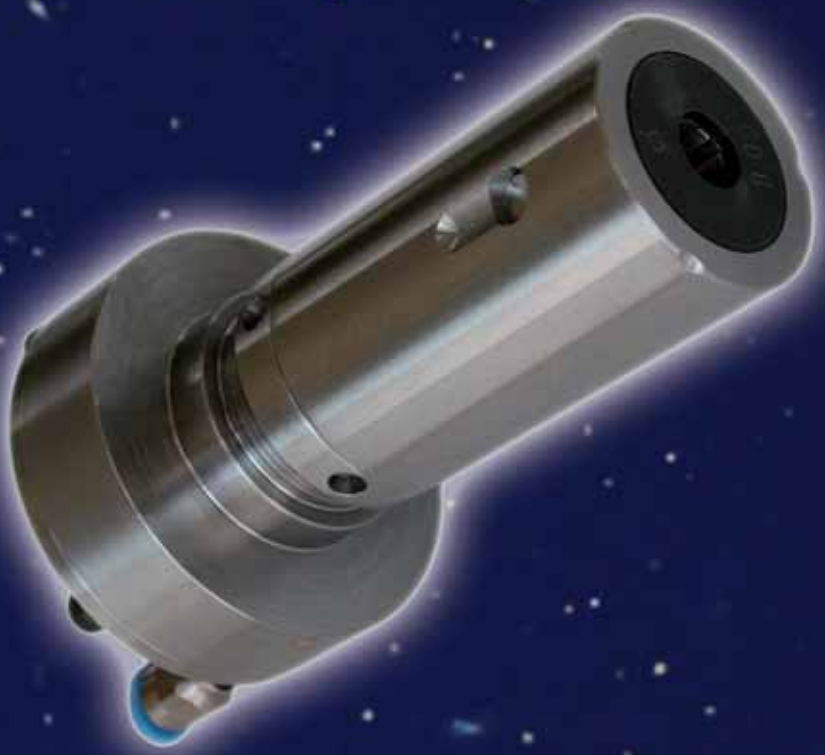
From left to right, MM Caspard (Tornos Moutier), Akerman and Eriksson (Vertx) and Karlsén (Ehn & Land) in Milan in front of their new Deco 7a machine.

WVERTX FINMEKANIK AB
Seminariegatan 30 D
SE-752 28 Uppsala
Sweden
Tel: +46 (0)18-51 52 40
Fax: +46 (0)18-51 52 50
info@vertx.se

EHN & LAND AB
Box 20068
SE-161 02 Bromma
Sweden
Tel: +46 08 635 34 50
Fax: +46 08 635 34 70
info@ehnland.se
www.ehnland.se

Canon 3 positions.Habegger
Habegger Führungsbüchse 3 Positionen
Habegger guide bush 3 positions

Nouveau
Neu
New



HAROLD
HABEGGER
MADE IN SWITZERLAND
www.habegger-sa.com

A MODULAR MACHINING PLATFORM…

To be able to offer competitive quality and resale prices for machined parts, manufacturers, whether these are subcontractors or have an integrated manufacture, must have production equipment that provides the highest levels of quality and machining capacities. Even more than this, it must be logical, upgradeable and modular. This means that the production equipment is perfectly suited, not only to the parts of today, but also those of tomorrow.

Logic…

In terms of the design of machines for this type of production, the same constraints apply. Mr. Gutknecht, CEO of Almac, explained to us how the company came to offer logical and adaptable solutions: *"Our range is very flexible. We have five lines of machines on which we can fit 3 types of different slides. In actual fact, we are equipped with virtually all existing features to meet the needs of our customers. It's up to us to combine modularity to find a product that meets expectations."* This way of working ensures that we not only offer extensive modularity, but also guarantees that the components are well understood and tested.

… also found in the CU 1007

The Almac CU 1007 machining centre from Tornos is a perfect example of Tornos' philosophy, namely, to offer highly precise machining solutions without compromising quality and allowing finishing on the machine without secondary operations. The standard machine is extensively equipped (see box) so that it can fulfil all the standard requirements that this type of production equipment must meet.

ISO 25 ‚Random' type 30-position tool changer

Integrated tools pre-setting system

EQUIPMENT TO FULFIL ALL REQUIREMENTS

Basic

- ISO 25 ‚Random' type 30-position tool changer
- 3R gripper chuck
- Two-axis divider (B and C)
- 4-axis divider with vertical/horizontal scale
- HF electric spindles (30,000rpm)
- Integrated tools pre-setting system

Options

- HSK 25A 64-position tool changer
- HF additional spindle (80,000 rpm)
- Air/oil spray
- Additional high flow pump for the cleaning cycle
- Robotisation and palletisation

The machine is available in four basic versions, namely 3 axes, 4 ½ axes, 5 axes (4 simultaneous) and 5 simultaneous axes. This means that a configuration that corresponds most closely to the types of parts to be made can be selected. As the programming and use of different types of configuration are similar, it is quite common for customers to own a range of machines.

Options mean that even more choices can be made. But the flexibility and modularity do not stop there. The machine can be connected to a workpiece loading and unloading system using a 6-axis robot.

A robot for higher quality…

As we have seen above, the CU1007 machining centre was designed with modularity as one of its main aims. The machining centre can be equipped with a palletisation and robotisation system. As it has short cycles, this kind of robot offers considerable potential for use in terms of the machine's milling cycles. Mr. Gutknecht said: *"We have decided to offer a 6-axis robot that does not simply wait for machining operations to take place, but which provides real added value by operating concurrently. While the machine is machining, the robot not only manipulates*

the workpieces for loading and unloading in trays, but also provides the option of carrying out deburring and buffing operations".

This automation saves precious time and increases the repeatability and precision of the workpieces produced by getting rid of manual operations which are always liable to introduce errors.

… better productivity and better profits

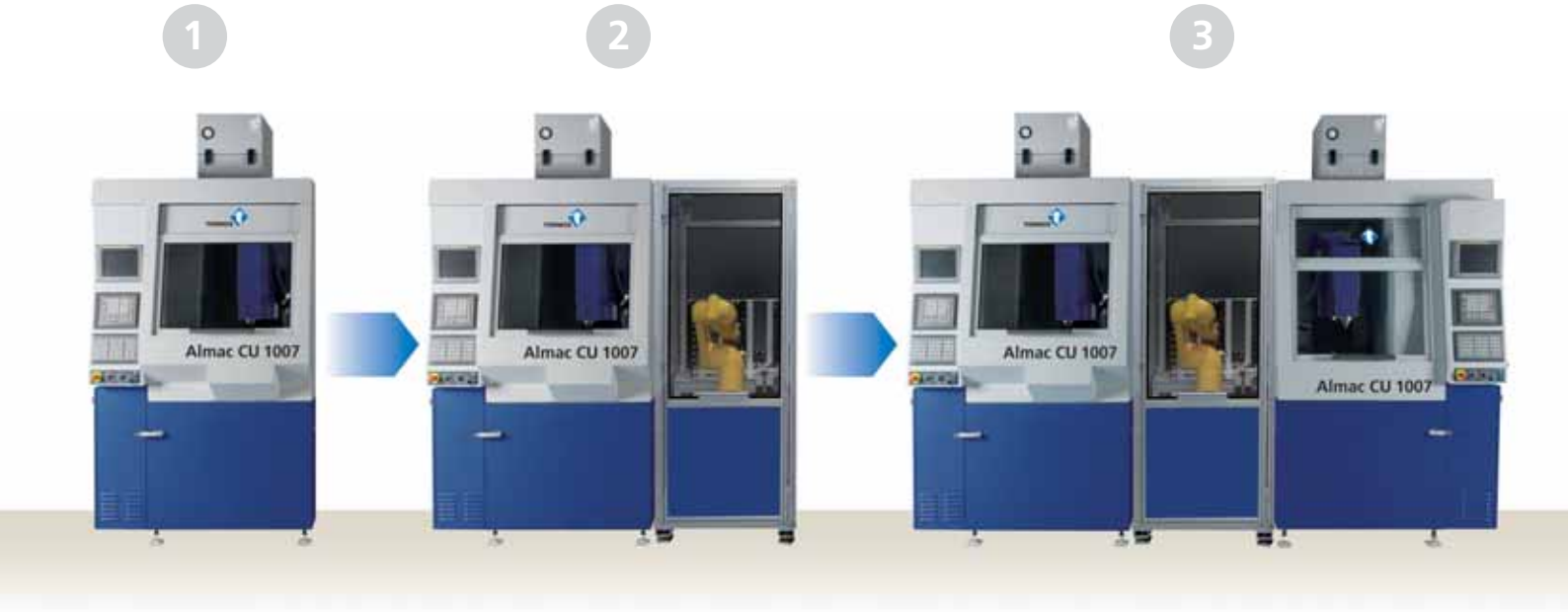
When production needs to be increased, the user can easily add a CU 1007 centre on the other side of the robotisation and palletisation system (see image). This second machine is designed to mirror the first, and it provides a fully integrated, highly ergonomic solution.

This logic is compatible with all versions of the CU 1007. Mr. Gutknecht says: *"Our customers combine different versions of machines, for example they first invest in a 3-axis centre and when production requires, they add a 4, 4.5 or 5-axis centre to it. The second centre installed uses the robot capacities already available and creates an integrated production unit combining the two machining centres".*

The machines can then be set up to machine both sides of the workpiece (one on each centre) at the same time, rather than sequentially as before, whilst still using the finishing functions provided by the robot. The return on investment for this second machine is therefore very quick. Once the workpieces are complete, the trays can be directly integrated into a wider process that includes washing or stamping for example.

For all domains…

Watches, jewellery, medical, electronics or mechatronics; Almac is aiming to cater for all industries, even though their clientele currently come mainly from the watchmaking sector. When asked about this, Mr. Gutknecht told us: *"We have focused on our main customers through lack of sales resources. A few years ago, we had an agent in Germany and our 'precision – appearance – finished parts' concept met with great success. Unfortunately, this agent no longer works for us. We are now very happy to be able to offer Almac solutions in Germany once again via the Tornos network".* Even though no further mention was made, Mr. Gutknecht made it clear to us that they are aiming for success on an international level.



When production needs to be increased, the end user can easily add a pallet or robotic system (2) to improve productivity. At a later stage or even simultaneously, the end user can integrate an additional CU 1007 machining centre (3) that can "share" the robot system.

… thanks to watchmaking precision

The reputation of Switzerland as a hub of quality and precision is already well-established and that is in part due to watchmaking, which has been instrumental in raising the country's profile for many decades. For the manufacture of these watchmaking parts, the brands can thankfully rely on machine manufacturers who place the same importance on quality and precision constraints. For a manufacturer such as Almac, we can offer several decades of experience, fulfilling the requirements of one of the most demanding sectors there is, along with our machines. For a manufacturer wishing to produce finished parts where precision and the surface finish are very important, this is a major advantage.

Small but tough

Requiring just 2.5m² of floor space, the CU 1007 is very compact. If two centres are required, connected to the centre by a robotisation unit, a mere 4 metres by 1 metre 30 centimetres of floor space is needed. In terms of efficiency per m², this really is a feat.

The CU 1007 has X and Y slides on pre-stressed rails and ballscrews. The vertical axis is formed by a solid cast iron prism upon which a rectangular sleeve moves, guided by four rails and moved by ballscrews. This design of machine is rigid and highly stable and guarantees it can ensure not only the precision, but also the quality of the surface finish.

Understanding requirements

For modular machines, precision and efficiency are incredibly important factors for success on the market, but they are not all. Mr. Gutknecht told us: *"Of course, there is the technical aspect, but once this side has been perfected, I would say that our ability to listen to the customer and therefore to gain a perfect understanding of their requirements to ensure we can offer the best production equipment possible really makes a difference".*

And it is modularity that ensures the company can provide this service; we have come full circle back to the heart of this article, proving the concept makes perfect sense. The Tornos network as a whole would be delighted to explain the advantages of the Almac CU 1007 machining centre as well as the benefits of the complete range of products.

Almac

Almac SA
Boulevard des Eplatures 39
CH-2300 Chaux-de-Fonds
Tél. +41 (0)32 925 35 50
Fax +41 (0)32 925 35 60
info@almac.ch
www.almac.ch

NEW

TORX MULTISPINDLE MILLING CYCLE

A new milling cycle for a six-lobe recess for machining TORX head screws is now available as an option with TB-DECO ADV 2009. This cycle can be used on the Multideco, MultiSigma et MultiAlpha lines.

Screws with Torx heads are being used more and more in different fields, and in particular in the medical field, since they offer the best resistance during tightening.

There are different ways to create a Torx outline, the fastest being through binding. First, the drilling is done, and then a swage, mounted on a binding device with the Torx outline is pushed into the part. One condition essential to the success of this operation is to have clearance for the swarf at the base of the drilling. As this is not always possible, milling the Torx is another frequently-used alternative method. Having been provided with the complex profiles and the use of the milling cutter, we developed the macros which we describe in this article. These macros make it easier to programme the milling, provide the best quality for the part and also preserve the life of the milling cutter by using the ideal speeds for cutting and feeding the part.

Why this new cycle ?

Tornos has made a commitment to respond as best they can to the needs of their customers by making the programmer's work easier. This makes maximum use of the capabilities offered by the machines and tools to ensure the best quality of machining while at the same time increasing the service life of the tools.

Here are the three major improvements in the creation of Torx :

1. Simplified programming of circle arcs using a configurable cycle.
2. Improved finishes from machining with linear movement on the Z axis.
3. Optimisation of milling cutter life by varying machining feed between internal and external lobes.

Use

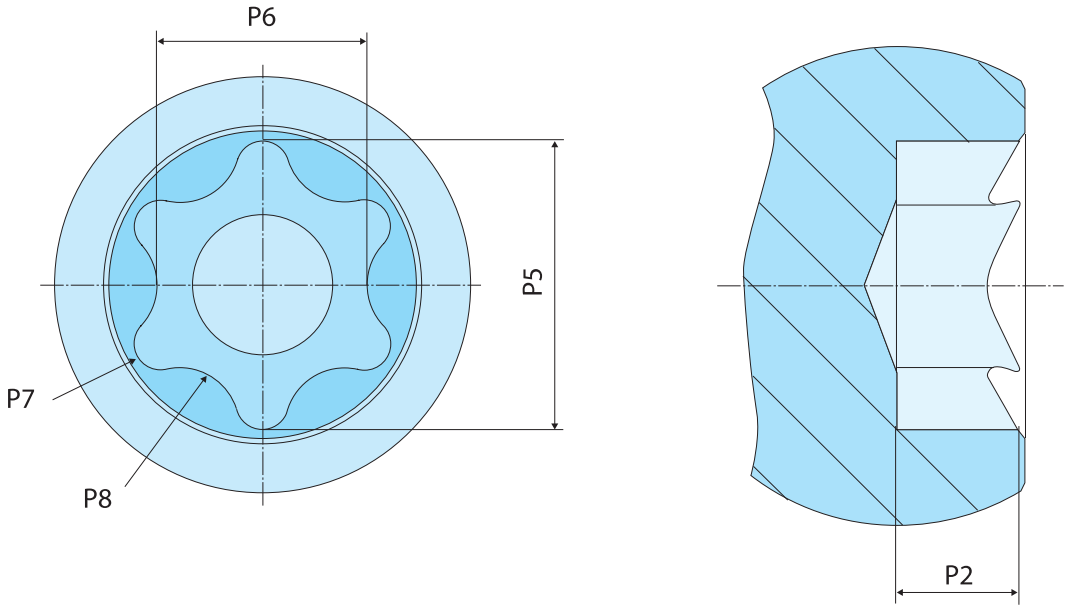
The macro may be used on any station in operation or secondary operation.

The Torx recess can be programmed either on the XpYp plane, or on the X pCp plane in polar coordinates, or on the YpCp plane in polar coordinates to create the Torx recess on the end units.

Two recess programming modes are available:

A) By specifying the recess number according to the ISO 10664 standard (P1).

B) By entering the parameters of the recess shape (P4 to P8).



Programmable parameters

PARAMETER	COMMENTS
P1	Torx recess #
P2	Recess depth [mm]
P3	Milling feed/Internal segment feed if used with P5 [mm/min] or [mm/rev]
P4	Number of lobes
P5	Circumscribed diameter of the recess [mm]
P6	Inscribed diameter of the recess [mm]
P7	External radius of the recess [mm]
P8	Internal radius of the recess [mm]
P11	Depth of the helical infeed [mm]
P14	Number of false passes
P16	Feed on the external segment
P17	Timeout taken from Cxx axis reference [Sec]
P18	Docking/Removal from the recess
P19	Direction of machining (clockwise/anti-clockwise)
P20	Insert corrector

Other benefits

- **Ideal speed,** depending on the value of parameter P20, the programmed feedrate will be the tangential speed of the milling cutter rather than the speed at its centre. The cycle calculates the speed of the centre of the milling cutter based on the tangential speed.
- **Ease of use,** only three parameters are needed to programme the milling of a Torx with a helical infeed from the milling cutter :
  - The number of the recess in compliance with the ISO 10664 standard
  - The depth of the recess.
  - The machining feed

Programming example for a typical Torx following the ISO standard
Programme to execute the end working of a part on station 6

M1605	Spindle S16 stop
G1 Z16=1 X16=0 G100 T1601 D0	Positioning at the start of machining
G9xx P1=20 P2=-2 P3=80	Torx machining

Programming example for a special Torx with parameters to be input according to the required profile
Programme to execute the Torx machining to a depth of 8 mm on station 6, the Torx characteristics are input into the G900 macro from the various Pxx in the table.

M1605	Spindle S16 stop
G1 Z16=1 X16=0 G100 T1601 D0	Positioning at the start of machining
G1 Z16=-7 G100	Positioning at the start of Torx entry
G9xx P2=-10 P3=80 P4=6 P5=4.5 P6=3.27 P7=0.43 P8=0.87	Torx Machining cycle
G1 Z16=1 G100	Clearance on Z (away from the subject)

Programming example for when the displacement necessary for activating the geometry of the milling cutter is too large to be achieved within the part. (See below for explanation)
Programming example with the geometry taken from the front of the part before entering, to automatically develop the profile for the macro based on the Torx to be created (explanation Before a macro can be created, the axis must be displaced by a certain amount to take the geometry of the tools. If the space is not sufficient there will be a warning, and it will be necessary to take the geometry from in front of the part, as in the example below)

M1605	Spindle S16 stop
G1 Z16=1 X16=0 G100 T1601 D0	Positioning at the start of machining
M1698 D-1	Transmit function
G4 X1	0 spindle search time
G1 X16=-3 C16=-3 G100	Positioning for docking
G1 X16=1 C16=1 G100 G142	Docking with use of the corrector
G1 Z16=-7 G100	Positioning at the start of Torx entry
G9xx P2=-10 P3=80 P4=6 P5=4.5 P6=3.27 P7=0.43 P8=0.87	Torx Machining cycle
G1 G100 X16=0 C16=-1.5	Positioning for removal
G1 Z16=1 G100	Clearance on Z (away from the subject)
G1 X16=-3 G40 G100	Removal with corrector cancellation
M1699	Transmit function cancellation

PROGRAMMING MACRO FOR THE DELTA LINE

To make programming for the Delta line easier, Tornos has developed new programming macros. These are the same type as those used on the Sigma or Micro range of machines, which means that users who are already familiar with them find themselves in the exact same set up, allowing them to avoid errors and simplifying programming. In addition, they offer some new features and improvements.

All that is needed is to enter the required information relating to the manufacture of the workpiece into a model programme and everything is set. The often tedious calculations of the zero offsets are made and then automatically integrated into the machine.

The macros are created so that a programme designed for a Delta 12 machine is completely identical to and compatible with a programme designed for a Delta 20 machine. This is true regardless of the fact that the stroke of the Z4 axis is not the same, and therefore they have different zero offsets. The macro is able to adapt its calculations according to the type of machine - automatically !

The macros are programmed using the G9xx codes.
G900 = Entering the global variables.
G910 = Initial cut.
G911 = Position for the cut
G912 = Workpiece feeding
G913 = Bar feeding
G921 = Initialisation of channel 2
G924 = Pick-up of the workpiece

Below is a general description of the different macros.

G900 entering the global variables

This is the basic macro. This provides all the information required to make the calculations, which are entered using arguments (A, B, C, etc.). Some arguments are mandatory and others are optional.

A :	Cutting tool number
B :	Bar diameter
C :	Feed during the initial cut
D :	Length of the workpiece
E :	Surplus feeding to the first workpiece
H :	Type of guide bush (fixed, rotating, motorised guide bush, no guide bush)
I :	Width of the cutting tool
J :	Spindle mode (programming the feed rates in m/min or mm/turn)
K :	Workpiece pick-up distance
S :	Angle of the cutting tool
V :	Cutting speed or number of spindle turns to the initial cut (dependent on J)
Y :	Additional thickness of facing in OP
Z :	Additional thickness of facing in counter OP

The geometry of the counter spindle collet is entered in the same way as the tool geometry, and uses the position T4040.

G910 initial cut

This macro is used at the very start of a programme. It calls the cutting tool and crosses the bar.

G911 position for the cut

Used for positioning the Z-axis for the cut.

Optional argument:

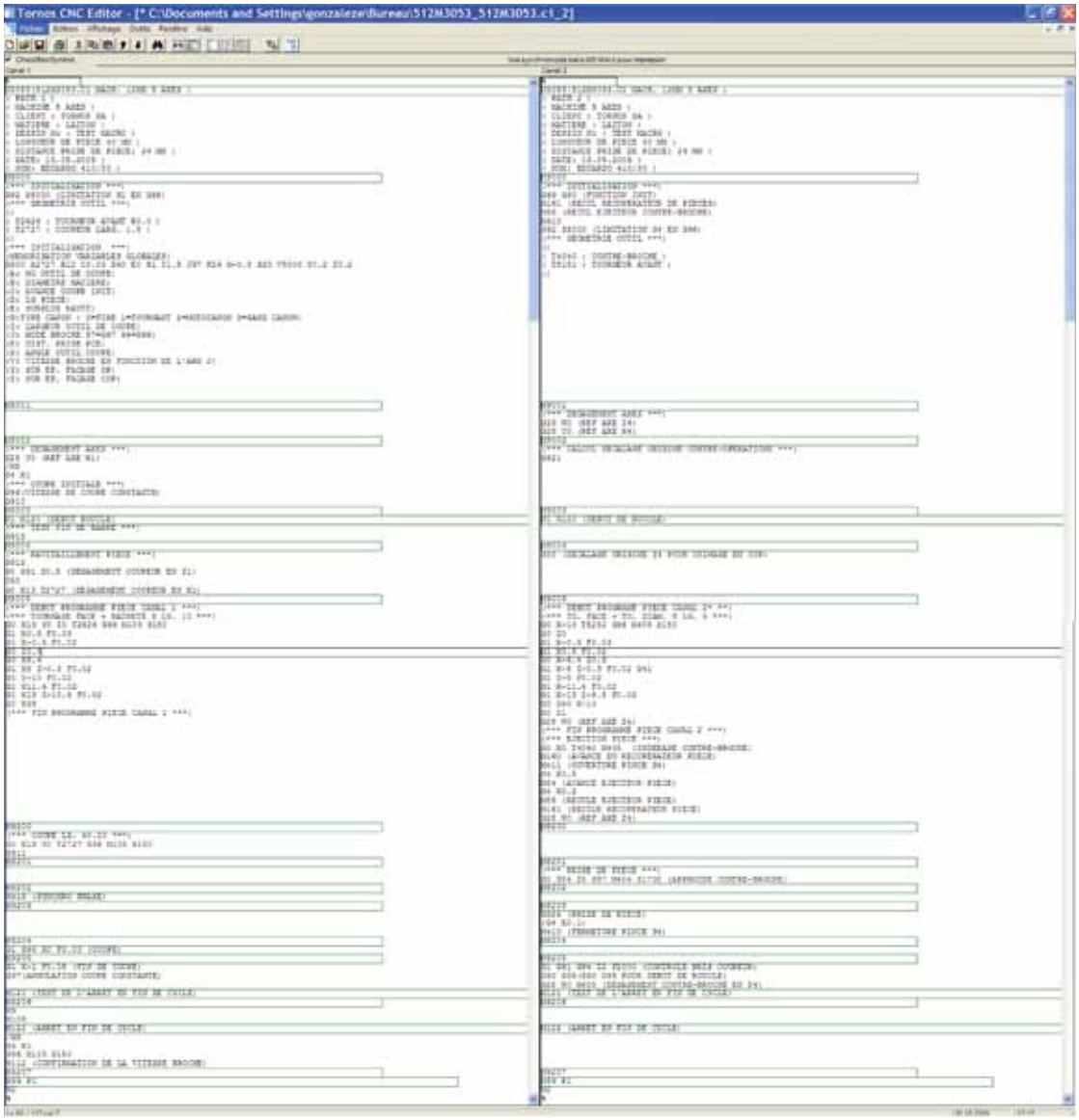
F:	Feed rate of the Z-axis for positioning

G912 workpiece feeding

Used for feeding the workpiece, including opening and closing the collet.

Arguments:

F:	Feed rate of the Z-axis during drawback
S:	Number of spindle turns during feeding of the workpiece
U:	Timeout after opening of the collet
V:	Timeout before closure of the collet
W:	Timeout after closure of the collet



Model of a Delta programme with TORNOS CNC EDITOR

G913 bar feeding

Used for changing the bar.

Arguments:

F:	Feed rate of the Z-axis
M:	Lubrication ON or OFF during changing of the bar
S:	Number of turns of the spindle during extraction and introduction of the new bar
U:	Timeout after opening of the collet
V:	Timeout before closure of the collet
W:	Timeout after closure of the collet
X:	Depth along X for deburring the chute
Z:	Introduction and removal of the bar in the guide bush

G921 initialisation of channel 2

Used right at the start of the programme for channel 2, start-up macro.
This copies the values of the zero offsets from G54 Z4 and G55 Z4.
Tests whether the machine is in mm or in inches.

G924 pick-up of the workpiece

Used for gripping the workpiece, it allows the counter spindle to be placed in the position for picking up the workpiece.

Arguments:

F:	Feed rate of the Z4 axis during pick-up of the workpiece
A:	Geometry of the cutter used (if two cutting tools are being used)

The options presented in this article are integrated into the new Delta machines sold from this point onwards. This software version is perfectly compatible with the previous programming system. It is therefore entirely possible to use old programmes (which do not contain these macros) on new machines.

On request, Tornos can also update the software on machines already installed. (Version 7 software)

For more information, please contact your local Tornos dealer.

Pinces et embouts · Zangen und Endstücke · Collets and end pieces

for

LNS, TRAUB, FMB, IEMCA, CUCCHI
TORNOS, BECHLER, PETERMANN

ANDRÉ FREI ET FILS SA

Rue des Gorges 26
Tél. +41 32 497 71 30
www.frei-andre.ch

CH-2738 Court
Fax +41 32 497 71 35

JUST IN TIME: A DIFFERENT APPROACH WORTH THE FIGHT FOR OTTO ENGINEERING – AND ITS HOMETOWN

Otto Engineering, in business for nearly fifty years, today markets their products via two divisions, Otto Controls and Otto Communications. The machine shop run by John Lang services the Controls Division which manufactures parts for their extensive line of switches and grips used in forklifts, tractors, medical defibrillator paddles, washing machines, Formula One steering wheels, B2 bomber flight controls, the Space Shuttle, and much more. The Communications Division of the company manufactures and assembles headsets for large corporations (like Disney), and for pilots and military on the field, as well as surveillance.

When John Lang joined Otto Engineering twenty-two years ago, the company was not nearly the successful $90 million controls and communications OEM that it is today. Their industry was different too. And so was their hometown of Carpentersville, Illinois on the banks of the Fox River in the United States.

Switches and controls manufacturers with thousands of SKUs like Otto were under great pressure to move production to China and regain cost competitiveness. So, Lang, Otto's machine shop manager, looked around and assessed the situation. He decided it would not be in Otto's best interest to follow the easy path to China. Instead, he dug his heels in and fought hard to keep the business at home. But he had a lot of work to do to make that happen.

"When I joined the company we had four machines here," explains Lang. *"We were a $7 million dollar company. And 46 % of everything made went in the garbage."*

Lang knew that the company needed to change the way they approached manufacturing. As an engineering-focused OEM, Otto had great products. But the machine shop was taking too long to produce the component parts and there was entirely too much waste. They needed to make parts more efficiently so they could bring prices down on their end products and stay competitive.

Says Lang, *"As we grew, one of the things I kept telling the owners was 'you're really not making the parts right.' When industry changes, you need different equipment."*

Learning to make parts the right way

So Otto added machines over the next fifteen years, including about a dozen single spindle turning centers. And they began to make their parts in a more modern way. Using their engineering ingenuity, they

worked to consolidate and pre-set tools in the turning centers to reduce setup times and streamline production.

Tom Secreto, Otto's machine shop supervisor explains, *"We started developing these concepts on some of our 15-20 year old equipment. We got the idea of putting tools (in set spots) in the machine. We created stations for rough turn, and assigned spots where we're always going to drill and bore, for example. And we were like 'Wow! This is really reducing our setup time!' We were reducing setups across the whole shop."*

Then, when the turning centers were maxed out and Otto realized they needed more spindles to match capacity, instead of simply purchasing more single spindle turning centers, they stepped back again and looked at the problem from an engineering perspective.

And at IMTS (the International Manufacturing Technology tradeshow) in Chicago in 2002, they discovered the solution – a multispindle machine. As Secreto put it, "Once we saw these full CNC multispindles at the show (John and I) were thinking 'We could do this same concept of pre-set tooling with one of those machines and it would just be unbelievable.'" The team wondered if they could get the job done using less floorspace and less overhead by purchasing one multi spindle machine instead of several single spindles. But, perhaps when others saw the price tag of a multi and were unsure it would work for their operation, not everyone at Otto was on board with the idea of buying a multispindle machine from the get-go.

The fight for a multispindle begins

By 2004, Otto was a twenty million dollar company employing 230 people. They had just purchased and were rehabbing a 150-year old building across the river for their Communications Division. The Controls Division was also in an historical building that Otto painstakingly preserved and kept in absolute pristine condition – not a drop of oil on the floor. Everything Otto did now was "the right way." Efficient. Clean. Managed. It was a company of passionate people with big ideas and the energy to get things done.

Otto sought to continue to reduce their parts inventory to Just In Time levels – from one month's worth of parts to one week's worth of parts – or less. The plan was to run 400 different part numbers on a multispindle with an average lot size of 100 pieces. But as our readers know, multispindle machines are generally classified as lower flexibility, higher volume machine tools. Lang and Secreto were determined to find out if a multispindle machine could indeed handle their high flexibility, low volume workload.

"It was a nine month argument," begins Lang. *"I put my job on the line for this machine and I fought almost every department in the building. Because, again, everybody wanted to go to China. But I didn't want all these parts to go overseas. I was convinced that the way we beat China is through technology… and responsiveness. We had to come up with a way to make our parts inexpensive and quick."*

Lang and Secreto worked with the multi machine manufacturer to come up with the tooling and processing scheme that would prove the multi could

work in their shop. In the end, Lang and Secreto won and Otto added its first multi to their line up. Says Secreto, *"Now that we've done it. They're sold on it!"* The efficiency that was to be achieved in terms of floor space and increased productivity were benefits that the company president and owner, Tom Roeser, could now clearly see.

A multispindle machine turned out to be the right answer. The company was growing by leaps and bounds. Their customer base had shifted from 80 % military to 80 % commercial. And then when 9/11 hit, their business changed again. *"A lot of our competitors were flattened,"* explains Lang. *"The airline industry was dead. Everyone in our sector was down 20-40 %. But we were up 8 %. It was our busiest time. We had so much business between September 11 and January that we couldn't hire enough people. Our surveillance products were selling like wildfire. We really had a huge growth spurt. We went from about 50 million dollars to 80 million dollars in about 3 or 4 years. So to do that, this was the type of technology we needed."*

The multispindle concept worked beautifully. Otto grouped their parts into families with similar geometric and dimensional features to allow them to go from part to part with minimal changeover times. Cycle times were reduced from a minute down to 10 seconds and made Otto so productive that within just four years they were at capacity again. That capacity wall was the next hurdle.

VITAL STATISTICS

Sales 2008	$90 million US
Employees	534
Tornos Equipment	1 MultiAlpha 8x20
Other Capabilities	Tool & die work CNC machining Plastic molding Assembly Testing Engineering

Markets

- Construction Equipment (crawlers, fork lifts, hazmat)
- Agricultural Equipment (tractors, combines, sprayers)
- Materials Handling Equipment
- Aircraft Flight Controls
- Weapons Systems
- Medical Equipment (defibrillator paddles, imaging)
- Security
- Transportation (buses, transit, heavy truck)
- Industrial Controls
- Commercial Equipment (gas grill electric lighters, washing machines, french fry machines, blenders)
- Recreational Vehicles (golf carts, motorcycles, boats)
- Government/Municipal (police call boxes, crosswalk switches)

Customers	**Certifications**
United States military	RoHS/WEEE/REACH
NASA	ISO 9001, 17025 (A2LA),
Boeing	ISO 14001
Caterpillar	AS9100B
John Deere	FAA Repair Station
Toro	EASA
Motorola	ATEX/IECEx
	TUV TPS 06 ATEX 1 255 X

The machine as inventory

Lang explains, *"We don't have inventory here. When I say that, I mean, they've got enough to build our controls and switches this week. If a machine goes down right now, I'm sending people home. We make so many different things – we have 300 part programs for our controls division. If I had to keep a month's worth of those parts inventoried, we would have so much inventory our customers couldn't afford our switches. The way I sell this to company here is 'the multispindle machine is the inventory.'"*

Now, with the multi on the line and inventory levels reduced to just one week's supply, they suddenly realized they were vulnerable to machine downtime. And, unfortunately, the multispindle they had purchased did not come with the level of service they required – waiting weeks for repair parts was definitely an issue.

"We were doing a fine job making parts on the multi, but I didn't like the machine," explains Lang. *"They didn't have service. I have waited for weeks for repair parts on that machine. And I will not buy another machine of that brand because of it. And as a matter of fact we just got in a part that took 13 weeks to get here."* Tom Secreto adds, *"At 97% capacity, we couldn't move up. One little hiccup and we were done. And so that's when we started looking."*

Enter Tornos

"When Hydromat brought on the Tornos (via the strategic alliance that named Hydromat at the sole distributor of Tornos multispindle machines in the U.S., Canada and Mexico just before IMTS 2006), that perked up my eyes right away because I knew Hydromat was as much an engineering company as they were a distributor of machining products. And that was attractive to me," says Lang. *"I mean – I didn't want to buy one of these machines from just anybody. I wanted to buy one where I was going to get a little service. Because I had known Bruno (Schmitter, President of Hydromat) for a long time, I knew this was going to work."*

In January of 2008, Otto took delivery of their new Tornos MultiAlpha 8x20. And not only have they been happy with the level of service they have received; they discovered many other reasons to appreciate the new machine.

Backworking Bonus

"The Tornos has better backworking capabilities than our old multi," Secreto points out. *"That means I can get more sophisticated parts in the machine. And with 8 spindles instead of 6 spindles, I can put more tools in the machine and I can get more families of parts. Instead of taking something out and putting something in; it's already there. It's ready to go."*

Secreto adds, *"There were parts that we have on (the Tornos) that for instance we would have liked to put in the other multi but we couldn't because there were too many features, grooves, threads, double-threads and as the machine goes around, you run out of stations. With eight spindles you can add a groover and an extra threading operation or another slot or whatever.*

Switch component
(photo of part right off machine).

T2 end product: Dust-tight and moisture-proof 2-way toggle-action large trim switch.

"That's where some of the biggest benefits are. When we bought our first multispindle we didn't understand. If I do a 10-piece order on that machine over there (their first multispindle), I have to put a guy over there for 5-6 hours to set it up and make the 10 pieces… and then the machine sits. Where, with the Tornos, we can slip it in a similar family and it's almost a free thing. Bang! You've got 10 pieces."

And their cycle times have been reduced further on the Tornos too. One particular part that took 4 minutes on the other multi takes just 20 seconds on the Tornos. And the parts come off 100 % complete. Explains Lang, *"We're pulling work off all our other machines. So all the work that's 7/8ths and under that's aluminum, we're moving all that work over to this Swiss machine."*

While Lang recognizes that they are not using the multispindle the traditional way, the system they've developed works so well for them it can't be ignored. Otto's Controls Division has 15 major product categories. With thousands of individual products under each one. And 30 full time engineers are working on new products all the time. That's a lot of variety – and proves just how flexible the Tornos multispindle can be. *"Normally when a person buys a multispindle they buy it for making one part and a million of them,"* says Lang. *"But we set the Tornos up for 30 pieces. We'll set it up for 1000 pieces. 50 pieces. 15 pieces. 3500 pieces. Absolutely. Once the program is in there, then that's when it becomes really good."*

Otto does not like to keep any inventory on their switch cases. As the orders come in, they get them made and shoot them off to the anodizer. Their schedule is roughly two weeks – an order comes in and they ship it out within two weeks. According to Lang, in his industry, that's unheard of. But the way they do it is with pre-set tooling; and, by never changing the material. It's true. No matter what size part they're making, they always use 7/8" diameter aluminum to do it.

The benefit of locking in on one material

"If we're making a ½" diameter case, we make it out of 7/8" diameter," explains Lang. *"The material is always in there and never changes. After the first program is done, our setups are scheduled for fifteen minutes. In some cases it's less than that. But, most people when they think of a multispindle, they think of a 3-day setup. We've reduced our setup times through engineering and pre-set tooling."*

Lang takes a part off the inspection table next to the Tornos. The part will become a sealed "trim" switch about one and a quarter inches long, with a milled slot in one end and three milled notches in the other. There is a deep o-ring sealing surface on the inside and a pinhole on the outside. *"A part like this, if we set this up in one of the other machines, that might be a $200 setup. It may take hours. This way here we just push a few buttons and off we go."*

They use this pre-set tooling and single material protocol not only to save on setup time, but because, as Lang points out, whether the part is large or small, the wasted material only costs them an average of a dime per part.

"We actually make more money in the lower volume stuff," Lang explains. *"Someone orders fifteen… there's not another switch company out there that would set this up for fifteen pieces. We do it and make money at it because we can charge more for the switch. I don't think a lot of people are smart enough to give away the six cents of material difference between the small button parts and the big parts. And because I get money back on the chips, six cents really might be four cents. Plus, if you consider the changeovers – to changeover that bar feeder and all eight collets, pickoff, get it running, knock out the little bugs in it, it's a day of production."*

Secreto chimes in, *"Last year, when we were really cranking, we were knocking out a thirty yard hopper of recycled aluminum every couple weeks. We actually get a price reduction because we buy so much of the 7/8ths aluminum. We're buying more so they give us a better price than buying all these different sizes. I believe their lot size is 170 bars. And last year we were bringing in about three times a week. It's down now, with the economy. But that's where we were, between the two multi machines."*

A tisket, a tasket, a money-making parts catcher basket

Another unique idea from Otto is a parts collection system they created for their multispindle machines to help them run lights out. The system, built of stainless steel, looks like it has four deep-fry baskets, each perched over a stainless drawer that rests on a rolling platform. The whole thing is about six feet long by two feet high by two feet deep (or about 2 meters long by 0.6 meters high and deep) and conveniently rolls into position on large casters to sit under the parts conveyor catching finished parts as they fall out of the machine. It gently separates parts that come off the machine by part program or by hour and helps with quality control – allowing Otto to back-track to a particular bin when a problem occurs.

"When we go home, this machine runs. So, it's lights out. When I say lights out, it better run," Lang says, underscoring just how much their business relies on the Tornos. *"Our goal is to have 50-75 parts or work orders through this machine every single month and 500 hours of production. At the end of the year, that's 6,000 hours of production."*

Otto runs their small lots during the first and second shifts. They save the larger lot sizes for the night and weekend shifts. *"And here's an advantage to getting the part out of the machine on the Tornos,"* says Lang. *"On competitor's machines, is goes down to a chute that narrows at the end and then the parts tend to fall into the chips. So when we go home and run 20,000 parts without anybody here, the parts go down into the chips. But on the Tornos we can catch all those parts and not drop them, that's a huge advantage because now we're physically bringing each one out of the machine individually using Tornos' manipulator. The manipulator is a huge advantage for us."*

The future

"Eventually, we're going to have four identical bins on the other side of the machine," Lang continues. *"So then on a weekend, we can set the Tornos up for 8 programs. We can have it run x amount of parts in each basket and it will automatically go from job to job without anybody being there. When I get the Tornos up to 300 programs – then I will have the flexibility to go through the families of parts and link them together – by processes. By tools. That will be cool. That will catch a lot of eyes. And I'm not afraid of it. What's the worst we can do? Throw away $800 worth of parts? And still get money for the chips."*

"Now, I'll even go a step further. If we had the work, I could put one person on my two multispindle machines on days and one on nights, those two people would outproduce 2:1 the rest of the machines in the shop. Guaranteed. Those machines are equivalent to 7.5 machines. Fifteen machines at full production with two employees instead of eleven. Stop and think about that. That's staggering. That's the beauty of the multi-spindle."

The Tornos keeps them going day and night; producing the switch parts just in time for their assembly crew to put the finished products together and ship them off to customers.

"We are working a forty hour week. I can honestly say, in the twenty two years that I've been working here, I have never laid anybody off. And I have never had anybody work less than fifty hours until this downturn. So for these guys to be working forty hours now, I think they're happy," Lang says. *"We have the best technology and we have good working conditions. So I have almost no turnover."*

And it's no wonder Otto sees very few employees stray. Because not only did Otto re-engineer their company, discarding old machining protocols in favor of modernization and carefully transforming their old buildings to ensure the place was spic and span; the owner, Tom Roeser went further. Believe it or not, Roeser cleaned up the town and made sure their employees had a nice home environment too. And while this particular "different approach" may not seem to have much to do with machining at first glance, it's an inspiring story in these hard times and a path that proves acting on a passion for doing what's right can reap big rewards.

Fighting hard to keep the business at home: A Rising Tide Lifts All Boats

As a recent Letter to the Editor pointed out in a local newspaper, *"Otto employs hundreds of happy, productive people who leave work with a smile."* But these people weren't always so positive. Carpentersville, the town where Otto is located, had been a rundown, relatively high crime, industrial slum for generations before Otto's owner, Tom Roeser and others he galvanized, took action.

Just as John Lang's convictions about bringing in more equipment to Otto, including the multispindle machines – and completely changing the way Otto functioned – taking on the hard work of moving to pre-set tooling and a single material, Tom Roeser too had a conviction that something had to be done – about the town where his business was located.

Roeser knew that many of his employees lived in Carpentersville, and that investments in the community would help them too. So Roeser got involved and spent tens of millions of dollars revitalizing the dilapidated areas – returning the neighborhood to a safe, clean environment. Putting his own money back into the community, he bought and cleaned up more than a dozen abandoned buildings, and renovated old factories in the downtown area close to his business. All of the five properties that house Otto Controls and Communications, were once unsafe eyesores due to century-old industrial waste. Roeser transformed those too, significantly renovating the factory buildings and restoring their historic charm. And then he expanded the scope of his vision further.

Roeser bought close to fifty townhomes and thirty single family homes within three miles of his business in Carpentersville, stripped them down the their studs and rebuilt them to code – adding insulation, replacing drywall, furnaces, appliances, doors, windows and carpet. He remodeled them and rented or sold them to his employees and other locals, so they would have a nice place to live.

As Roeser was quoted in the local paper, *"We absolutely gut the houses. These are horribly constructed houses and some are uninhabitable. They have mold, water damage, and the electrical is unsafe. When we are finished with them, you have basically a brand-new house for $140,000."* Roeser sells the homes at cost, forgoing any potential profits.

John Lang is clearly proud of what his boss has done. *"We have a lot of assemblers here and they don't make a lot of money. It's just the nature of manufacturing,"* Lang says. *"But Tom has bought dozens of homes in Carpentersville. And he's refurbishing the houses and turning them into very nice family neighborhoods. Carpentersville is not noted as being*

the nicest area. But it's where his business is. And as a businessman he's looking at it saying 'well, if I can make it better I'm going to bring better people to the community and I'm going to raise the value of my business.'"

But all this philanthropy has not depleted Otto's reserves. It has made the company stronger and more successful. The company is doing so well, in fact, that when Otto purchased their Tornos last year, they paid cash. Yes, you read that right. Lang testifies, *"We have never financed a machine. There is no debt at Otto. Period. We could ride this (economic downturn) out a long time."*

Even though the 2009 downturn has reduced Otto's controls machine shop to about 30 % capacity, (down from 60-70 % before the economy slowed) Otto is still outperforming their competitors.

"Our orders are down." Lang points out at the end of the facility tour. *"But if you noticed, everybody's busy. You would not believe how many different prototypes that we have going on right now. I bet each of the guys back in the prototyping area wrote thirty programs for our engineering department in the last two weeks. This will make us strong next year. We're investing in ourselves."*

Today, Otto's success can be attributed to many factors: a low inventory/high profit business model, a diversified customer base, a high quality product, a remarkable lack of debt, an immaculate shop, loyal employees, and a tenacity to fight for what they believe in. Including a great Tornos multispindle machine.

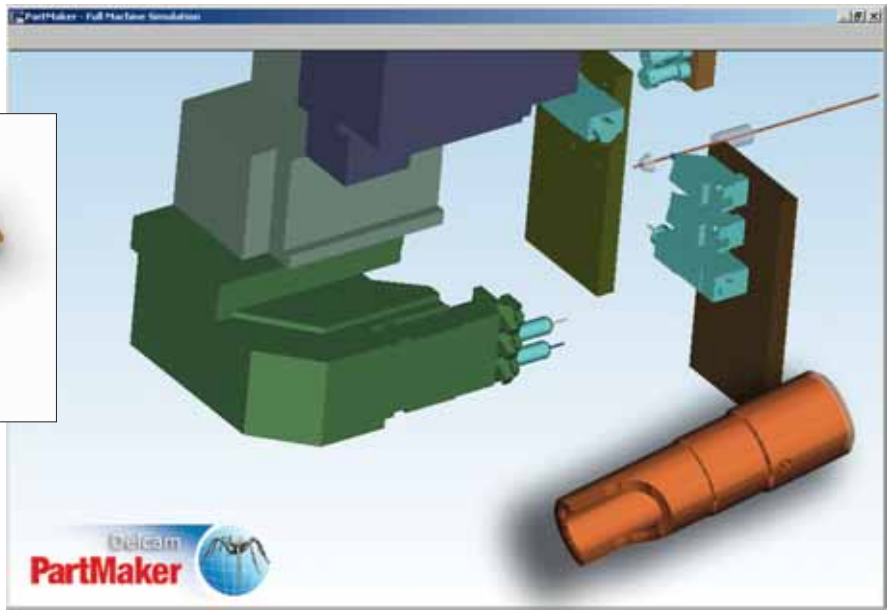
OTTO®

Otto Engineering
2 E. Main Street
Carpentersville, Illinois
www.OTTOexcellence.com

QA TECHNOLOGY CHOOSES TO PAIR PARTMAKER SWISSCAM WITH THEIR TORNOS DECO 7A.

CAM software allows New England (USA) -based manufacturer to efficiently combine the advantages of Deco machines and Partmaker software to turn-around small lot sizes on its Tornos Deco 7a machine.

The actual component shown in the previous diagram as programmed in PartMaker and machined on the Tornos Deco 7a at QA Technology.



A screen shot from PartMaker's 3D simulation model of a part programmed by QA Technology and machined on the Deco 7a at QA Technology.

To listen to Dave Coe, Vice President of QA Technology, a world-leading manufacturer of printed circuit board test probes, tell it, his customers have a simple view of the benefit his company provides.

"The shorter the better as far as our customers are concerned," says Mr. Coe.

When he says short, he's referring to short lead times and small prototype lot sizes of the array of components and connectors his company engineers and manufactures. Historically, QA Technology's component manufacturing had been outsourced to a number of vendors with a variety of CNC machines. Because of the demand for quick turnaround and small lot sizes, QA Technology decided to add CNC Swiss capacity to his company, in order to fill customer requirements that outside vendors simply could not economically and reliably meet.

As a result, QA decided to purchase a Tornos Deco 7a, a machine used by some of their current vendors and one that offered flexible turning and milling capabilities and superior cycle time-savings potential. But since speed of every job was critical and the company lacked TB Deco programming skills -- QA turned to PartMaker to help them bridge the gap between CAD and NC program for their Tornos Swiss turning center. They chose PartMaker SwissCAM, a CAM system specifically designed for programming Swiss-type lathes and one that integrated directly to the TB-Deco operating system that controls the Tornos Deco 7a machine.

PartMaker provides the link between QA's engineering department, which designs its product using both 2D drafting and 3D solid modeling methods, and the manufacturing department that is tasked with

producing the part. *"The really big benefit to having PartMaker is the ability to take the solid model or even the DXF file coming out of our engineering department for the part and immediately import it and be able to view, edit it as necessary and generate accurate tool paths that are not subject to human error as they often are when you are using manual programming methods,"* says Coe.

"After programming the part in PartMaker, we are able export to the TB Deco advanced environment."

How it Works

The SwissCAM module of PartMaker is a CAD/CAM system dedicated to automating the programming of Swiss-type lathes such as the Deco 7a at QA Technology.

PartMaker SwissCAM generates a CNC program by allowing the user to either create or import part geometry into the system, apply tooling to the geometry by choosing a variety of cutting strategies, simulate the part cutting in a virtual 3D environment and then, generate an NC program.

PartMaker SwissCAM is unique in its programming of Swiss-type lathes because its makes use of two patented technologies to do so. The first of these technologies is known as the Divide and Conquer programming strategy. This approach to programming allows the user to look at a multi-axis Swiss lathe for what it really is, a lathe with a main and sub spindle with up to nine different types of milling possibilities, including polar interpolation on the face, cylindrical milling on the diameter, Y-axis milling on the diameter, C-axis indexing and so forth.

The second of PartMaker's patented technologies focuses on automating process synchronization, or the method by which operations that are running at the same time or simultaneously are handled. This Visual Synchronization approach lets a programmer quickly optimize a program graphically by choosing from a selection of pictorial diagrams that indicate the synchronized state in which he wants his machine to operate. From this, the software produces an optimized time study showing just how long the part will take to manufacture.

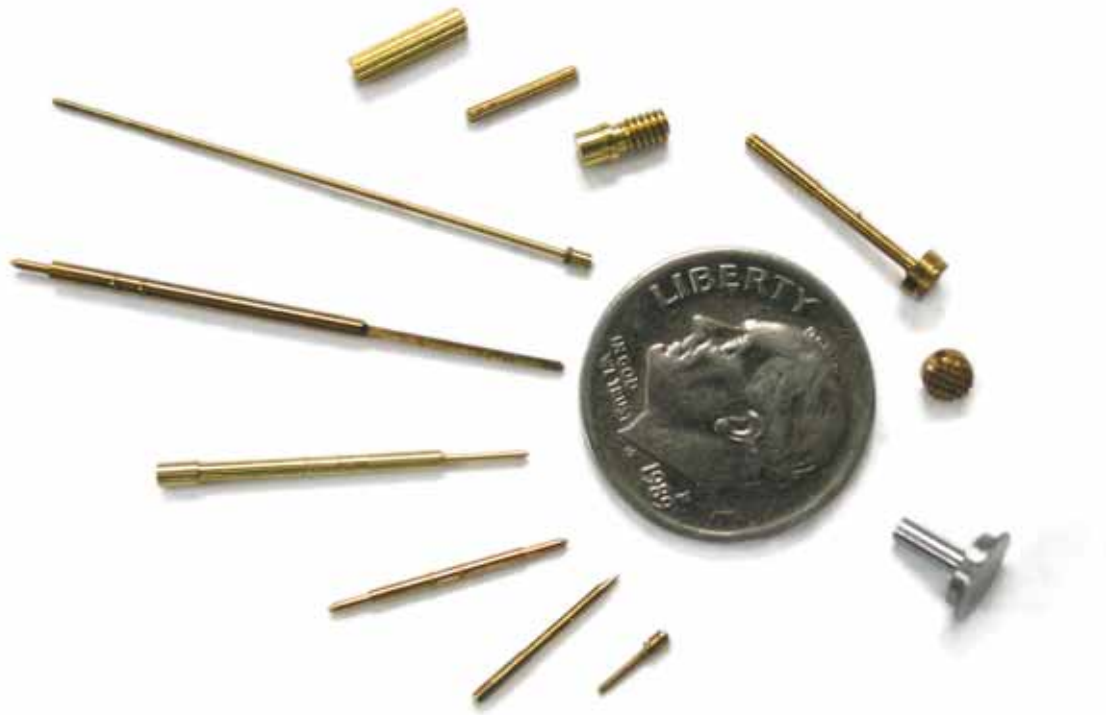
Once the tool paths have been defined and the process has been optimized, the user can simulate the process to check for any errors or tool collisions off line. Once the user is happy the part is running well, he chooses a post processor to generate an NC program his machine can understand.

A Unique Combination

A-line Tornos machines, like the Deco 7a at QA Technology, are not classical CNC machines, they are PNC machines, which means they are programmed through TB-DECO and not with the classical ISO codes. [1]In 2004, in an intensive collaboration between Tornos and the developers of PartMaker, Tornos opened TB-Deco to accept input from PartMaker via the import of a special file format called a TTFT (Tornos Text Format) file. The invention of this file format, which can be automatically generated by PartMaker and directly imported into TB-Deco,

[1] Standard ISO-based G-code programming is standard on the Tornos Sigma and Gamma lines of machines.

Dave Coe, Vice President QA Technology and Phil Pierce, programmer at QA Technology stand in front of the company's Deco 7a Swiss-type lathe.



An array of the parts programmed with PartMaker and machined on QA Tech's Deco 7a Swiss-type lathe.

allowed PartMaker to be able to directly interface to Deco machines the way it interfaced to other CNC machines previously. To interface PartMaker and TB-Deco, the user must have the TB-Deco ADV software along with the accompanying CAM Interface module. The partnership between Tornos and PartMaker benefits many parts makers.

"If it looks good in the simulation in PartMaker, it should look good when it comes off the machine," according to Phil Pierce, CNC programmer at QA Technology.

Just Like They Imagined

Even though QA Technology is a first time Swiss user, they have found themselves using the integrated PartMaker SwissCAM-TB-Deco system exactly the way the products' designers imagined. The idea behind the partnership between PartMaker (and other CAM developers who followed) and TB Deco was to automate the programming of a part. For shorter running jobs, the user might not even make any adjustments to data imported from PartMaker into TB-Deco. For longer running jobs, where every fraction of a second counts, the programmer can use the unique optimization capabilities of TB-Deco to achieve the fastest possible cycle time.

Since PartMaker does the handle cranking work of creating the program and setting up a working program in TB-Deco, Mr. Pierce can use his expertise to wring additional cycle time out of the job in the TB-Deco environment, all of which is of course done on an off-line PC. On other Swiss-type lathes, additional optimization is typically done on the shop floor at the machine control, while the machine is down and not making parts.

For QA Technology, really it just comes down to how fast they can program and run the part.

"For me, its all about speed," says Pierce. *"It's easy for me to take a job that's come in, throw it into PartMaker, generate a program with PartMaker, send it right over to Deco and optimize the program in Deco and get parts running within a day. With the system we have in place, it's a very quick turnaround to have high quality parts coming off the machine."*

THE KEY TO YOUR SUCCESS!

Full equipment for automatic lathes (CNC- or cam-controlled)

Technical assistance

High quality and competitive prices guaranteed

Express service

WIBEMO SA
WILLY BENDIT
OUTILLAGE DE PRÉCISION

www.wibemo.ch

Wibemo SA | CH-2832 Rebeuvelier | téléphone ++41 (0)32 436 10 50 | fax ++41 (0)32 436 10 55 | info@wibemo.ch

THE KINGDOM OF THAILAND

Located in the heart of South East Asia, Thailand is bordered by Laos, Burma, Cambodia and Malaysia.

With its 3219 km of coastline and worldwide known beach resorts such as Phuket, the Kingdom of Thailand, as it is officially called, is a renowned tourist destination.

Thailand, however, is not only famous for its beaches and splendid sceneries. It also offers a rich authentic cultural heritage with plenty of magnificent temples and monuments to visit, delicious food and friendly population.

Known as Siam until 1939, it is the only South-East Asian nation that has never been colonized and is one of the most devoutly Buddhist countries in the world. The national religion is Theravada Buddhism which is practiced by more than 94.7 % of the nearly 66 million Thais. Muslims make up 4.6 % of the population and 0.7 % belong to other religions.

Totalling 513,120 square kilometres Thailand is the world's 50th largest country in land mass, while it is the world's 20th largest country in terms of population. It is comparable in population to countries such as France and the United Kingdom, and is similar in land size to France and California ; it is just over twice the size of the entire United Kingdom, and 12.5 times the size of Switzerland !

The local climate is tropical and characterized by monsoons. There is a rainy, warm, and cloudy southwest monsoon from mid-May to September, as well as a dry, cool northeast monsoon from November to mid- March. The southern peninsula is always hot and humid.

Bangkok is the largest city in Thailand, as well as being its capital and main port. It is the cultural, educational,

political and economic centre of Thailand, as well as being the only metropolis. Bangkok has grown and expanded to include the area of Thon Buri, which had at one point been the capital of Siam. Bangkok (City) has a population of approximately 9 million residents while the greater Bangkok (Metro) has a population of approximately 12 million (January 2008) for an area of 7,761.50 km^2.

Thailand is a constitutional monarchy with King Bhumibol Adulyadej, the ninth king of the House of Chakri, as the ruling monarch. The king has reigned for more than sixty-three years, making him the longest reigning Thai monarch and the longest reigning current monarch in the world.

Thailand experienced rapid economic growth between 1985 and 1995 and today is a newly industrialized country with an emphasis on exports and a flourishing tourism industry, thanks to various world-famous tourist destinations such as Pattaya, Bangkok, and Phuket.

The recent history of Thailand's economy is defined by more than a decade of sustained and rapid economic growth starting at the beginning in 1985, followed by a severe recession that started in late 1997. During the boom years, economic growth averaged more than 7 percent annually, one of the highest rates in the world. The crisis of 1997 and 1998 wiped out some of the gains of the boom and forced major adjustments in Thai industry and economic policy.

In the early 2000s Thailand made a full economic recovery, driven by strong growth in exports and by 2007 Thailand's per capita income reached $3,400, making it an upper-middle income developing economy.

The 2008 worldwide economic crisis put the country in recession again. This situation was exacerbated by politic instability towards the end of 2008 and beginning of 2009.

During the second quarter of 2009, however, Thailand's economy contracted at a slower pace, suggesting that an end is in sight to the country's second recession in over two decades. Real GDP fell by 4.9 % year on year in April-June, compared with a drop of 7.1 % in the previous quarter. More recently, Thailand, reported steady improvement in August export figures as signs of a gradual global recovery began to emerge (Wall Street Journal, September 18th 2009).

Thailand exports an increasing value of over $175 billion worth of goods and services annually. Major exports include Thai rice, textiles and footwear, fishery products, rubber, jewellery, automobiles, computers and electrical appliances. Thailand is the world's no.1 exporter of rice, exporting more than 9 million tons of rice annually. Rice is the most important crop in the country. Thailand has the highest percentage of arable land, 27.25 %, of any nation in the Greater Mekong Subregion. About 55 % of the available land area is used for rice production. Substantial industries include electric appliances, components, computer parts and automobiles, while tourism in Thailand makes up about 6 % of the economy.

Like in the rest of the world, the medical device market generates a mounting interest in Asia, due to its consistent growth and recession-proof characteristic. In Thailand, the Department of Export Promotion reported 250 manufacturers producing medical parts and devices, exporting for around 317 million USD in value.

Tornos SA Thailand Representative Office

Tornos SA Thailand Representative Office, was opened in 2007 to provide local support to its customers, especially in terms of the support provided to companies when choosing turning solutions most suited to their needs and the technical assistance provided by its After-sales service.

With an install base of more than 350 machines (both Single and Multi-spindle machines) Tornos is well represented in Thailand. It's customer base consisting of International as well as local companies, supplying the Automotive, Hard Disk Drive, Electronic, Watch, Dental and Orthopaedic industries.

The office, located in Sukhumvit is the base for a team of one Application Manager and 3 Application/Service Engineers. This highly qualified team of engineers provide professional support to our customers in Thailand and in addition provide technical support for the rest of South East Asia and India.

Tornos Thailand also organizes specialized seminars to further promote its products and solutions, helping existing and potential customers to develop their business and identify potential opportunities. In addition, Tornos also regularly participates at the annual Thai Metalex, which remains the largest Machine Tool exhibition in South East Asia.

Since the beginning of 2008, Tornos purchased the Almac company based in La Chaux de Fonds. Almac is highly renowned in the Swiss watchmaking industry for the manufacture of high precision machining centres.

Thailand is home to a number of companies working in the watchmaking industry for which Tornos and Almac products perfectly complement each other in this challenging market and enforce our 'solution provider' identity.

"Tornos Thailand", explains Darren Way, Application Manager at Tornos Thailand *"has developed a flexible and capable team of engineers able to respond quickly wherever problems may arise. Thanks to the skill of our personnel, we are self-sufficient and capable of supporting our customers, from initial troubleshooting though to resolution. Our team of engineers undergo regular training programs at the headquarters, on new machines and on the most recent features and technological innovations.*

At the factory in Switzerland, our personnel are carefully trained by representatives from the various Product management departments who also have the role of supporting our company by looking into our customers' specific turning problems".

KS Sek is the sales coordinator for the region:

"Our philosophy is to ensure that we remain constantly on hand to deal with any problems that our customers may face. To do this, we ensure we are always available to our customers, giving rise to a true partnership. One of our major advantages is without doubt our technical/sales service, and is available to the regional sales coordinators.

Thanks to them and to our agents, we are able to cover the whole of the country to fulfill our strategy.

For any requirement, whether it relates to checking the feasibility of machining normal or special parts, technical problems, spare parts, or technical

assistance, we can always respond in the shortest possible time and with the highest level of skill. We can study the part and determine the optimum machining solution."

For Tornos Thailand, customer satisfaction is the principal aim and a true benchmark, and KS Sek emphasizes that time and again a customer buying their first machine will go on to become a loyal customer.

"In Thailand, it is quite common for workshops to have a number of Tornos machines… Our customers know that at any point in time they can count on us to help them with both set-up and new features/options. We keep them regularly informed to ensure that they are able use the most technologically advanced machines to create parts of an exceedingly high quality.

We have noticed that our regular visits and dedicated services are very important for our customers, who really appreciate this support".

One of the many areas of activity offered by Tornos Thailand, is the technical support service provided by the team of engineers, offering a technical "hotline". This service, covering areas such as tooling, programming and processes is always fast and efficient. This also applies to the after-sales technical assistance.

Tornos Thailand therefore offers a reliable presence to the Thai market. Thanks to its expertise and know how, which is continuously being developed, the company is able to reinforce its presence in the fields of application for different markets to offer customized solutions which fulfill the specific requirements of these sectors.

The experience acquired encompasses a range of sectors, such as Automotive, Electronics, HDD, Watch making, Jewellery and Medical.

Darren Way/Gerald Musy

THREAD-WHIRLING WITH 12 BLADES

Thanks to the 12-blade thread whirler from Utilis, the medical technology firm Stuckenbrock Medizintechnik GmbH was able to almost halve the machining time for the production of bone screws. The increased number of blades and high-pressure cooling means that the service life has been almost doubled and the surface finish improved.

In recent years, the whirling of threads for manufacturing high-quality screws for the medical technology industry and other sectors has become established. This manufacturing process is particularly suitable for long workpieces with small diameters, e.g. bone screws.

Thread-whirling: Efficiency, quality and short chips

If the length is more than three times the diameter, unstable conditions arise when long workpieces are machined – the workpiece starts to bend. Because of the unfavourable length to diameter ratio, the conventional processes, such as thread cutting, become problematic, or the workpiece can no longer be machined at all. With thread-whirling on the other hand, the cutting point is close to the guide bush of the Swiss-type automatic lathe, and is produced in a single operation from bar stock. This provides for a stable cutting situation, short machining times, high surface quality and long service life.

Thread-whirling also creates short, well-defined chips, which means that materials that are normally difficult to machine pose no problem at all. During turning, the materials frequently used in medical technology, e.g. titanium, produce long chips that are difficult to control and remove. The short chips that are created by whirling are expelled from the machining area during whirling, thanks to the centrifugal forces, or evacuated using high-pressure cooling.

Higher number of blades for longer service life

Instead of conventional whirling tools with the usual 3 or 6 blades, Utilis AG supplies tools with 9 or 12 blades. Using these innovative tools allows you to profit from shorter machining times, longer service life and higher cutting speeds, as the example of Stuckenbrock Medizintechnik GmbH clearly shows.

Stuckenbrock, a shareholder company in the KLS Martin Group, based in Tuttlingen in Germany, is a manufacturer of orthopaedic implants and wrist prostheses. The company considers itself as a technological trailblazer, wanting to make full use of a machine's potential, and therefore decided in favour of the 12-blade whirling tool from Utilis. Jürgen Klemm, Technical Operations Manager at Stuckenbrock, explains their decision: *"We already had a 6-blade tool, but the leap in productivity made possible by the 9-blade tool was still not enough for us"*.

High-pressure cooling for chip removal

To produce their bone screws, Stuckenbrock uses a Deco 20 from Tornos. The Swiss-type automatic lathe did, however, have to be fitted with a high-pressure cooling system. The spaces between the teeth on the 12-blade thread-whirling heads are very narrow, which means that chips are not so easily removed if there is insufficient pressure. *"We tried, but it just wouldn't work at all",* says Jürgen Klemm. He goes on: *"The chips were not removed, and some of the workpieces were completely destroyed. It was not until we obtained the new unit that the head was even able to move, but once it did, its action was very powerful."*

In the end, the results exceeded Stuckenbrock's expectations. They were able to almost halve the machining time – from 29.9 to 17 seconds. At the same time, the service life was also increased from 4 to 7 shifts, leading to an improvement in the finish.

Design and mode of operation of the whirling tool

One advantage of the new whirling tool from Utilis is its increased number of blades. There is a direct link between productivity and the number of teeth. The efficiency of the tool increases noticeably, without having to change the feed of each tooth on a blade.

In addition, the increased number of blades leads to fewer vibrations, which in turn leads to lower wear. This enabled Utilis to substantially increase the service life of the cutting edges. The selected basic substrate

INTERVIEW WITH MATTHIAS FILIPP, PRODUCT MANAGER AT UTILIS AG

SMM: What are the advantages of having a 9-blade whirler, when there is a more productive tool with 12 blades?

Matthias Filipp: Only if the Swiss-type automatic lathe has no high-pressure cooling, is a head with 9 inserts to be recommended - because of chip evacuation.

What effect does the coating on the whirling tool have on the quality of the thread?

Filipp: In general, coatings provide for a longer service life thanks to their high wear resistance, but they also have an effect on temperature development in the form of friction and heating, on the reduction in the cutting force through the decrease in the friction coefficient and on more stable cutting edges through the decreased impact sensitivity.

What effect does the workpiece material have on the choice of whirling tool?

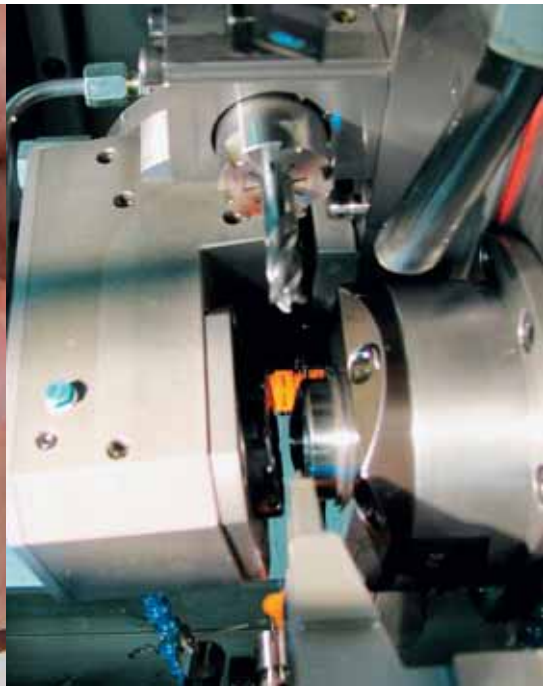
Filipp: The properties of the workpiece material are decisive for the machining process, and are taken into account when selecting the substrate, cutting geometry and coating of the insert.

SMM: When thread-whirling bone screws or other threads for the medical technology industry, are there any particular issues to be borne in mind?

Filipp: It is important to keep the distance to the guide bush as small as possible. In addition, the angle of the driven tool must be precisely adjusted, and the cooling system must be properly aligned. To achieve high levels of precision, careful installation of the thread-whirling head and blades should go without saying.

Where do you see further possible applications for thread whirling?

Filipp: Every possible type of thread is suitable for thread whirling.



possesses high wear resistance, is more resistant to the repeated impacts that occur during a milling operation, and thereby also more resistant to abrasion.

Further improvements expected

The new 12-blade thread-whirling head is being used by Stuckenbrock on a trial basis, and has not as yet been tested to its limits. The tool may be working well, but not well enough for the needs of Stuckenbrock. The blades of the thread-whirling head do not work close enough to the guide bush.

To provide a remedy, a spacer ring is to be installed, which Stuckenbrock expects to provide yet another increase in productivity: *"Once we are working with the spacer ring and getting ever closer to the bush, then I can see us getting even more out of the tool"*, affirms Jürgen Klemm.

Matthias Filipp
UTILIS AG

Information:

UTILIS®
Tooling for High Technology

Utilis AG, precision tools
Kreuzlingerstrasse 22
8555 Müllheim, Switzerland
Tel. +41 (0) 52 762 62 62
Fax +41 (0) 52 762 62 00
info@utilis.com
www.utilis.com

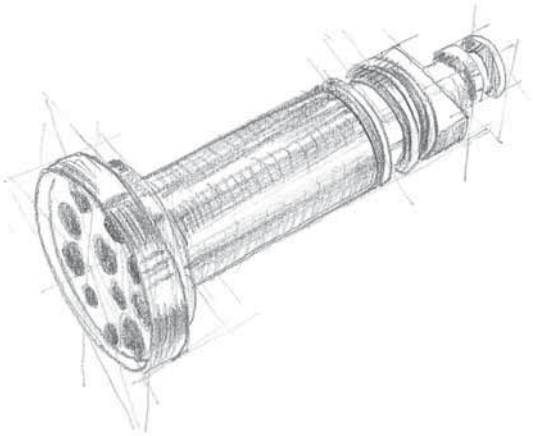
Tornos S.
Rue Industrielle 111
2740 Moutier, Switzerland
Tel. +41 (0) 32 494 44 44
Fax +41 (0) 32 494 49 03
contact@tornos.com
www.tornos.com

Stuckenbrock Medizintechnik GmbH
Lessingstrasse 50
D-78532 Tuttlingen, Germany
Tel. +49 (0) 7461 161 114
Fax +49 (0) 7461 4194
www.stuckenbrock.de

DIXI 4

Tungsten carbide and diamond precision tools

Turning-screw cutting



Our know how compliments your experience

DIXI POLYTOOL S.A.
Av. du Technicum 37
CH-2400 Le Locle
Tel. +41 (0)32 933 54 44
Fax +41 (0)32 931 89 16
dixipoly@dixi.ch
www.dixi.com

MEAG AG GRETZENBACH:
LUBRICANT MONITORING PAYS OFF

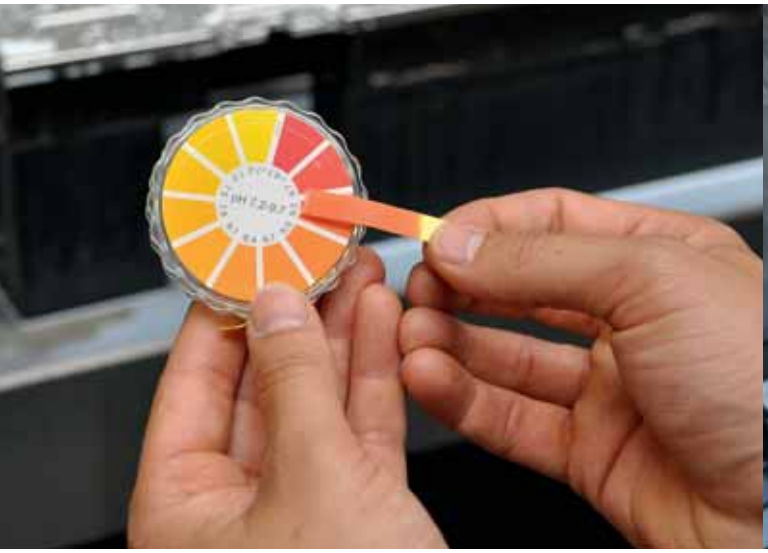
MEAG AG, based in Gretzenbach in the canton of Solothurn, has been specialising in high-precision manufacturing and system engineering for over 50 years. Part of the role of the 100 plus, qualified employees is to provide services to all sectors of the machine industry. The manufacturing process, using chip removal and a single cooling lubricant (CL), covers all operations and parts sizes. By cooperating closely with Motorex, we were able to keep maintenance costs to a minimum and thereby optimise productivity.

On the first Wednesday of every month, the Production Director and his colleagues responsible for the various machining departments of MEAG AG can be found at a team meeting with the regional manager from Motorex. Since the introduction of Motorex Magnum UX 200 and the targeted monitoring measures 2 years ago, all talk at the meeting has revolved around cooling lubricant.

Very little additional expense

In discussions with the various departmental heads, it becomes very apparent that the actual inspection costs are much less than first assumed. *„If the few KSS ground rules are observed and the concentration of the cooling lubricant is consistently monitored, then 90 % of the optimum function of the emulsion has already been ensured",* Reto Rettenmund from Motorex advises the interested practitioners from MEAG. From the smallest turning machines to the large 2-pallet boring machine, the cooling lubricant is monitored as follows:

1. The machine operator measures concentrations using a refractometer and enters the results into the machine log book at least 3 times a week (Monday, Wednesday and Friday)
2. Depending on machining process used, the average target concentration is 5 to 7 % CL
3. Reconstruction rate (concentration adjustment) < 1 % CL – the higher the machining temperature, the more often inspections should normally take place and the concentration adjusted if necessary
4. Never top up using pure water or undiluted concentrate.



The pH value (acid-base ratio, see image) and the water hardness can be measured on site by the MOTOREX regional managers. This provides meaningful information on the state of the emulsion.

The concentration (proportion of CL concentrate in % and the amount of water) can be determined easily and precisely with an optical refractometer or electronic measuring device, and entered into the machine logbook.

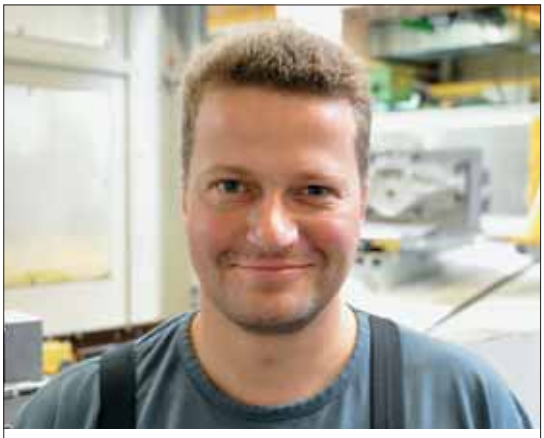
5. Once a month, the Motorex regional manager also inspects the water hardness and pH value of the emulsion in the various machines.
6. Keeping the emulsion absolutely pure (hygienic) and free from all impurities is essential

Preparing the emulsion correctly

Here too, there are a few (but even more important) rules to observe. To prepare the emulsion, a reliable mixing device must be used. It is extremely important that the water pressure in the tap is high enough (always open the tap fully, minimum pressure 2 – 4 bar). This is the only way to ensure that the mixer's injector mixes the concentrate with the water in the correct ratio. When adjusting the concentration, never use pure water or neat CL concentrate. This will ensure that the emulsion in the machine mixes immediately with the adjusted concentration, because they "recognise" each other and combine.

Any leaked oil must be removed

In addition to conscientious inspection of the concentration, removing the ever more frequently recurring oil leaks, e.g. from the hydraulics or the contact surfaces, is very important for maintaining the optimum quality of the cooling lubricant. Motorex Magnum UX 200 has the favourable property of preventing the leaked oil from emulsifying. The floating leaked oil must therefore be removed using a tape skimmer, disc skimmer or Quicksep®. If you neglect to do so, the leaked oil can have a negative effect on tool service life, surface finishes and bacterial stability of the cooling lubricant.



Our success proves us right

"Those responsible for production in each department of MEAG are agreed that the monitoring costs have been worth it so far. Since we have been working with the universal cooling lubricant UX 200 from Motorex, and been making a conscious effort to monitor it, the total costs for the machining fluid have reduced considerably. On certain machines, it has allowed us to work for up to a year with just one filling!"

Martin Fischer,
Head of the turning shop
Meag AG, Gretzenbach

Discussion and exchanging information – only in this way can every participant use the cooling lubricant in the best way possible and thereby achieve high-quality manufacturing results over a long period.

The leaked oil is skimmed off using the tape skimmer and the finest swarf and metal particles are filtered out by the tape filter. The compact, ever-necessary KSS mixing device is clearly visible on the mobile Motorex drum.

Universal Magnum UX 200

Motorex Magnum UX 200 is a universally applicable, water-soluble, high-performance cooling lubricant which has impressive, above-average stability and excellent coating qualities – it guarantees optimum cooling and lubrication, even for challenging machining processes. This is why Magnum UX 200 is used at MEAG AG on all machine types and for the most varied of operations. This includes machining the most varied types of steel, including stainless steel, cast iron, aluminium and plastic. Thanks to the formation of a resistant corrosion protection film, the machine, tools and workpieces are given sustained protection.

Moreover, Magnum UX 200 combines benefits such as the following:

- freedom from bactericides
- can be used with all water hardnesses
- high emulsion and biological stability
- kind to skin
- minimal foaming tendency
- high pH stability
- low disposal costs thanks to its long service life
- conforms to TRGS 611 and is listed according to REACH legislation

MEAG AG: from XXS to XXL

MEAG AG produces parts from a few millimetres in size up to 4000x2650x2000mm, offers an extremely wide range of products and demonstrates a high level of competence in system engineering. The metalworking shop and assembly of components and devices are proof of the universal capabilities of the company.

This means that the specialists in this plant, with its many certificates, not only work very efficiently, but are also fully aware of the significance of all the other services associated with the cooling lubricant and other operational fluids. Thanks to proactive regional managers and the technical after sales team at Motorex, continuous information exchange and optimisation takes place at every level. *"Because of the commitment of Motorex and the targeted monitoring measures, we were able to carry out rationalisation in the field of cooling lubricants, but also improve the working environment and reduce costs,"* claims Max Strickler, Managing Director at MEAG AG.

We would be happy to provide you with information about the current generation of Magnum cooling lubricants and the scope for optimising their usage in your company:

MOTOREX AG LANGENTHAL
Technical Aftersales
Postfach
CH-4901 Langenthal
Tel. +41 (0)62 919 74 74
Fax +41 (0)62 919 76 96
www.motorex.com

MEAG AG
Parts manufacture and
system engineering
Bodenackerstrasse 11
CH-5014 Gretzenbach,
Switzerland
Tel. +41 (0)62 858 46 46
Fax +41 (0)62 858 46 06
www.meagag.ch

PRACTICAL SOLUTIONS AT AN AFFORDABLE PRICE

The perfect solutions to technical problems have a reputation for being costly, which often stops companies investing in them. Bimu is trying to show that the reverse can be true by offering quality products at prices made affordable by the rationalisation of production methods and technical innovations.

ER-EP "Extra Precision"

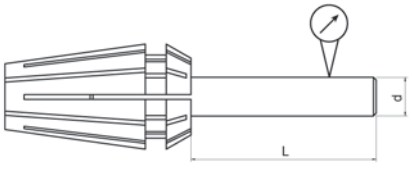
B8

1. B8 precision and ER-EP "Extra Precision" grippers

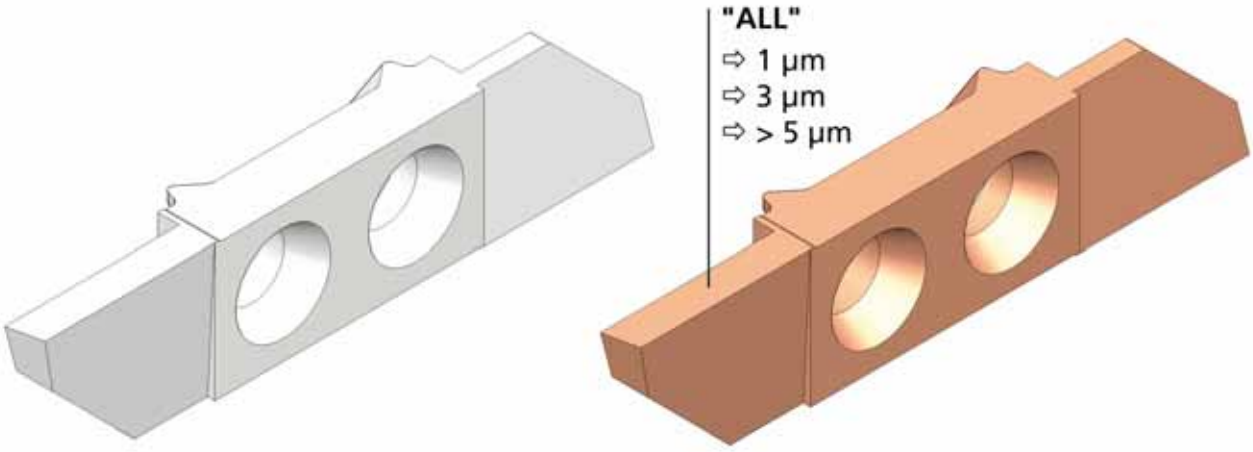
Bar turning workpieces are ever more complex and require an ever-increasing level of precision when they are worked; selecting a quality tool is therefore of key importance. To meet this demand, Bimu is now offering 2 new ranges of precision tools: *ER-EP "Extra Precision"* and B8 precision grippers.

ER grippers are widespread in the bar turning industry but their price – for precision operations – is often very high. The grippers manufactured by Bimu are an attractive solution as they guarantee ultra precise gripping (see the table below) at a much lower cost. They are available for sizes ER11, ER16, ER20 and ER25.

B8 grippers are designed to fulfill the line of gripper holders which can already be found in the catalogue.



Gripping [mm]		Concentricity tolerance [mm]	
D	l	DIN	ER EP
1.0 - 1.6	6.0	0.015	0.005
1.6 - 3.0	10.0		
3.0 - 6.0	16.0		
6.0 - 10.0	25.0		
10.0 - 18.0	40.0	0.020	0.005
18.0 - 26.0	50.0		
26.0 - 34.0	60.0	0.025	0.010



2. Tools for complex profiles

Whatever the field of activity, the bar-turner will one day need to use a form tool for machining operations such as creating a groove, thread chasing or even an axial recess. Since the start of 2009, Bimu has been providing solutions for this by offering inserts for complex profiles designed to meet the specific needs of its customers.

In addition to the care taken when machining the profile of the actual insert, Bimu has also studied all the factors that allow the tool to be fully optimised, such as, for example, the cutting angles. The tool is therefore guaranteed to be perfectly suited to the customer's needs. Offers start at a 5-piece set, and there is a sliding scale of prices for larger quantities.

3. New PVD coating

"We have found a universal coating that provides perfect results on all materials!" This news is something we have long dreamt of announcing to our customers. Of course, it must be recognised that, unfortunately, the effectiveness of a coating depends on various factors – such as the material used and the variations in batches of the material, the use of a standard or high pressure lubricant or even the stability and precision of the machines – to such an extent that creating a unique and universal coating seemed almost impossible.

This did not mean it was not worth searching for new coatings, and so, for just under a year, Bimu has been testing a new surface treatment, using a TiAlN composition as a base. This coating, known as "ALL", is now being rolled out in a multitude of applications. It can be found in a fine layer (1 µm) on our inserts for complex profiles, in a standard layer (3 µm) for straightforward operations, and even as a thick layer (above 5 µm) – providing greater resistance – for work that requires the removal of large amounts of swarf, in particular for rear turning.

The "ALL" has already received approval from many bar turners and is already proving highly promising. If you wish to benefit from this technological advance, please do not hesitate to contact Bimu who will be pleased to offer you a trial.

Technical Managers: *Y. Meyer*
Graphics by: *A. Jeandupeux*

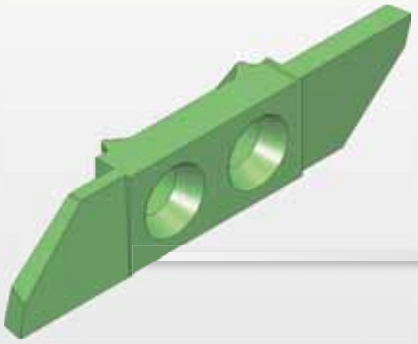
Bimu
cutting tools & accessories

Rue du Quai 10
CH-2710 Tavannes
t. +41 32 482 60 50
f. +41 32 482 60 59
e. info@bimu.ch
i. www.bimu.ch

Bimu
cutting tools & accessories

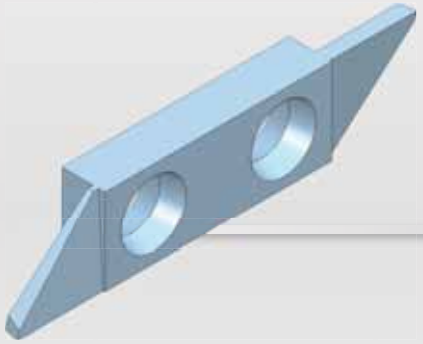
www.bimu.ch

Swiss made inserts

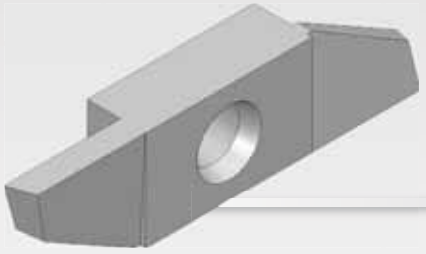


oxoline
Very high rigidity inserts 1000

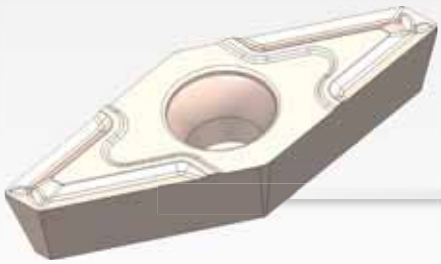
Line with free tool-holders



700 line
Compatible line with Precitool's inserts



040 line
Very rigid / Large variety of geometries



VPGT Multiturn-Dec
Universal turning inserts

New to the United Kingdom !

Bimu GB Bimu
e. gbbimu@btconnect.com
i. www.bimu.ch
t. +44 (0) 1302 750 770
f. +44 (0) 1302 751 010

APPLITEC

SWISS TOOLING

Applitec Moutier SA
ch. Nicolas-Junker 2
CH-2740 Moutier - Switzerland
Tel.+41 32 494 60 20 Fax +41 32 493 42 60
info@applitec-tools.com www.applitec-tools.com