

DECO MAGAZINE

2
98



DECO 2000 – 26 MM CAPACITY



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TORNOS-BECHLER SA
Rue Industrielle 111
CH-2740 Moutier, Switzerland
Internet: <http://www.tornos.ch>
E-mail: contact@tornos.ch
Phone +41 (32) 494 44 44
Fax +41 (32) 494 49 02

Editing Supervisor:
Francis Koller, Sales Director

Editing Manager:
Pierre-Yves Kohler
Communication Manager

Editor:
Jean-René Gonthier, journalist
Internet:
<http://www.home.ch/-spaw1116>
E-mail: jr.gonthier@pemail.net

Graphic & Desktop Publishing:
Georges Rapin
Ch-2603 Pèry
Phone +41 (32) 485 14 27

Printer:
Roos SA, CH-2746 Crémines
Phone +41 (32) 499 99 65

IMTS'98 – Could it be the year of the PNC?

With a 4,400 sq. ft. redesigned exhibit, the new DECO technology to talk about, and an economy that's going strong, we're excited about participating in the International Manufacturing Technology Show, IMTS'98.

Here are some facts you may find interesting about this spectacular event:

Size

◆ IMTS is the largest industrial exhibition in the Americas, second only to Hanover in the world.

◆ IMTS'98 takes place in the nation's largest exhibition complex: the East, North, and South buildings of McCormick Place in Chicago. The total exhibit area of the buildings is more than 1.9 million sq. ft.

◆ The entire show covers an area equal to 32 American football fields. Nine miles of carpeting, 10 feet wide, covers the aisles. A total 50,000 square yards of carpet will be used for aisles and public areas at IMTS'98.

Exhibits

◆ More than \$ 350 million worth of metalworking equipment, materials, accessories, controls, and component parts will be on display at IMTS'98.

◆ During the ten-day setup period, nearly 17,500 tons (35 million pounds) of equipment and materials will be installed in the exhibition halls. Some 2,000 skilled trade workers will be required to set up and tear down IMTS'98.

The facts are incredible. It's a significant investment for a company to participate in IMTS. All of the exhibitors will spend an estimated \$81 million to support their exhibits with rented furniture, exhibit materials, temporary help and hospitality. However, particularly for TORNOS, right now, it's a must. Although we officially introduced the first DECO 2000

7 mm Swiss-type automatic at IMTS'96 and have been promoting the DECO concept aggressively ever since, this will be the first IMTS to showcase the entire DECO family – the 7/10 mm, 20 mm, 26/32 mm, and MULTIDECO 26/6. It's a chance for those who have seen our ads and read our articles to see it in action for the first time. Historically, machine tool builders from around the world have always presented their most up-to-date equipment at IMTS. Indeed, the true ground breaking technology that has changed the course of our industry has been introduced at IMTS - NC and CNC, for example.

In the annals of IMTS'98 history, there just might be a note about PNC (our patented parallel numerical control that permits the DECO benefits). It certainly has revolutionized the way small turned parts are produced. It's much more than a tweak; It's much more than a refinement. It's completely new and, yes, ground breaking in our niche of the marketplace.

Further, the acceptance of these machines in the U.S. marketplace has been a tremendous success. Other more startling unveilings at IMTS, such as water jet and hexapod machines may have been ahead of their time, or perhaps people still aren't sure how to apply them. In the DECO case, the turning process is already familiar. The concept of blending the speed of a cam-driven machine with the flexibility of a CNC is filling a great void in the industry, and our customers know exactly how to get the most out of them.

Many of our customers said they were waiting for a machine like the DECO because the cam machines and the CNC machines by themselves never quite filled the bill for the work they were doing. Now, they are replacing both machine types with DECO PNC machines. Most of our new orders are repeat orders from existing customers. The breakthrough control system and the TB-DECO software, though completely new to first time users, is easy to hurdle. We're hopeful that prospects seeing the DECO 2000 and the MULTIDECO at IMTS'98 will be as equally receptive. We're hopeful

that the proverbial "light bulb" will illuminate in their minds as they realize the productivity gains DECO can offer in their operation.

One of the pleasant aspects of gathering every other year at IMTS is seeing old friends. Compared to a lot of industries, the machine tool industry is a small one. The companies may change names, they may merge, even new ones emerge, but many of the people remain the same. That holds true for the builders, distributors, and customers alike. So, please stop by our booth #8727 in the new McCormick Place South building. Say hello. Kick some "tires". Take a thoughtful look at what we're doing with the DECO 2000 and MULTIDECO. We can talk about old times, recent times, what's happening now, and what may lie ahead.

It just may be that IMTS'98 goes down as the year of the PNC.



Tom Durr

E

"Looking back on this highly successful craftsman".

The DECO 2000 concept

The DECO 2000 success hinges on this renowned concept. The basic idea is, of course, well known (coupling the benefits of cam machines with NC lathes) but how does this really work and what are the consequences?



As a reminder, the concept incorporates three components:

- ◆ Optimised mechanics
- ◆ PNC- DECO parallel numeric control
- ◆ PNC-DECO programming software

This new system enabled the company to offer a family of products combining the benefits of cam operated lathes, such as speed, reliability, productivity, with those of numerically operated machines, such as versatility, flexibility and precision.

Replacing the mechanical cams with (virtual) electronic cams and operating with parallel numeric control, guarantee unequalled flexibility and productivity.

The major features of this system are as follows:

- ◆ Programming takes place during masked time (one of our clients, it must be added, prefers to program at MacDonalds on a separate PC).
- ◆ The calculation capacity of the loaded NC has no bearing on the speed of the machine.

- ◆ The programming interface can develop at the same rate as information technology, with a useful life of 18 months (with a separate, evolutionary PC). Remember that when the DECO was launched you were still buying 386 / 25 Mhz technology. Now its Pentium II / 333 Mhz. Much faster.

All this means that a DECO 2000 of today will still be written about in 20 years time!

How can this be?

Unlike conventional NC, parallel numeric control does not perform the calculation; the electronic cams, which are real digitised axis paths, are generated by the TB-DECO; all the control does, is to interpret these digitised paths. There is no conversion process of the G code in machine language nor any correction calculations whilst the machine is executing its command.

All the calculation operations are carried out by the TB-DECO which programs, optimises, synchronises, controls and tests the axes. A visualisation program of movements in real time also enables a visual check of:

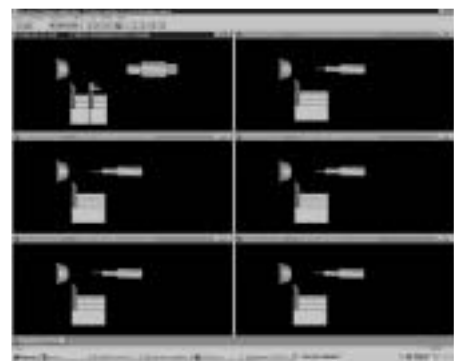
- ◆ Position
- ◆ Acceleration
- ◆ Movement
- ◆ Collision (or lack of)

This system will manage up to 24 axes simultaneously, will place 2 (or even more) axes in a master/slave relationship and perform many more operations which are

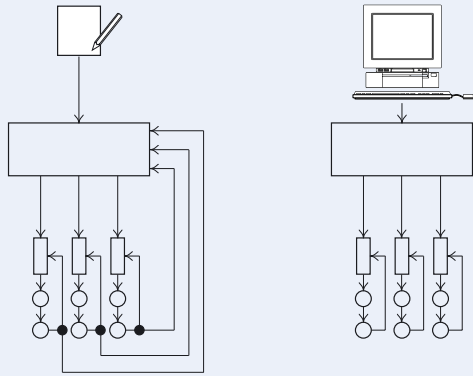
extremely difficult, if not impossible, to program on a conventional NC machine.

As you will have realised, PNC and CNC do not really have a lot in common: one is cunning and sharp but slow, whilst the other, which is less intelligent but is perfectly guided by the TB-DECO (it does as it is told), very quickly achieves its goal!

Compared with a cam-operated machine, the concept embodies all the benefits of versatility and flexibility of NC but the intrinsic operation of the system is identical; there is always a camshaft (either mechanical or virtual for DECO) which manages all the axes simultaneously.



The differences between PNC and CNC



CNC

- Slow control
- Rigid use of axes and channels
- Lack of advanced facilities
- Considerable limitations
- Poor programming ergonomics (only standing at the machine)
- ▶ **Much slower, less flexible, soon obsolete with the advent of new products.**

PNC DECO

- No unnecessary control
- Perfectly "moulded" for small parts turning
- Highly flexible use of axes
- A lot of potential (developments are guided by those of the TB-DECO)
- Freedom of programming
- Development of information technology; the machine functionalities are automatically taken into account during the development of the TB-DECO and DECO-2000 concept
- Machine potential is never exceeded
- The programming interface can develop at the same rate as information technology; it has a useful life of 18 months (using a separate open-ended PC).
- ▶ **Much faster and more flexible**

But why go for a PC which is not an integral part of the machine?

At first glance, it may seem strange to want to separate these two elements. However, it is technically desirable and necessary to make a physical separation between the PNC (electronic cam reader) and the PC itself (path generator). Therefore, with an integrated PC not associated with a PNC, it makes no difference whether a 30 cm connecting cable or a memory card is used !

Besides the fact that it is useful to be able to program a PC anywhere (in the office, during leisure times etc...), there are a considerable number of economic factors which must be considered (see frame opposite).

- ◆ *Programming convenience (large screen, brightness...)*
- ◆ *Facility of programming several machines with one single PC*
- ◆ *Simplified software updates*
- ◆ *Programming can develop at the same rate as information technology; the useful life is 18 months*
- ◆ *Internet and PC connection for transferring programs at world level (check, connection, agencies...)*
- ◆ *The machine is always the top of the range*

TB-DECO

The software, which is identical to that used for the DECO 2000, with 10, 20 and 26 mm capacities and for the MULTIDECO 26/6, is just one of the reasons underlying the success of the DECO 2000.

TB-DECO mode of operation

- ◆ Programming takes place in Windows in graphics mode.
- ◆ The various operations to be carried out are merely "slid or moved" along the interface.
- ◆ The operations are graphically synchronised in relation to one another.

- ◆ The programming in ISO language is carried out for each icon.
- ◆ Graphic assistants and part models will provide continuous guidance with your programming.

The programme is then optimised, tested and simulated before undergoing formatting for use through the machine PNC control.

A very significant element of this system is energy optimisation.

All paths are executed to the "just in time" principle. Why suddenly accelerate and brake hard if a smooth movement can conserve energy and mechanical parts of the machine? As La Fontaine said, "Rien ne sert de courir, il faut partir à point" [Nothing is gained by running if you do not start on time]. This optimisation gives a deceptive appearance of slowness when watching the machine operate. But do not allow yourself to be deceived : the DECO 2000 is at least 20% faster than a conventional NC machine! (depending on parts).



Limitations

To carry out its full range of measurements whilst executing complicated calculations, the TB-DECO has to be greedy! A PC fitted with a Pentium processor running at 200 MHz with 32 Mega Ram is recommended for maximum programming convenience.

Conclusion

Since it is quite obvious that this article cannot discuss each and every one of the functions offered by the TB-DECO and parallel numeric control, the remarkable increase in potential compared with conventional numeric control will be the subject of a future article. However, our engineers will be pleased to answer any questions...

MAKING THE SWITCH FROM CAM SCREW MACHINES TO NEW DECO TECHNOLOGY BOOSTS PRODUCTIVITY FOR CONTRACT MANUFACTURER.

Genuine humility is a quality that usually gets developed from a painful experience that ultimately turns into a profound blessing. Roy Mendoza, president and owner of RM Precision has that quality. As the soft-spoken Mendoza shares his inspiring tale from the time the 15 year-old lad came to the U.S. from England as an apprentice toolmaker, to starting his own screw machining business 40 years later. Some of the lessons learned spurred an investment in new Swiss turning technology which has made a dramatic boost in productivity and RM Precision's financial health. Here is an excerpt from our conversation with Roy Mendoza, at his shop in Laverkin, Utah:

1. Roy and Scott Mendoza discuss a job running on one of their DECO 2000 PNC turning centers.



1

When did you establish RM Precision?

In 1985, after being in the Swiss screw machine business for 25 years.



2

2. All of the machined components on this medical caliper/ballpoint pen were produced on the DECO 2000 with productivity increases up to 40 times over cam machines.

3. A wide sampling of parts produced on the DECO 2000 machines. No secondary operations required.

Was business good from the beginning?

It was terrific! I had lots of customers and a constant flow of new work. Within a few years I had to purchase more TORNOS cam automatics, hire more people, add a second shift, and put an addition on my building. Then I almost went bankrupt.

How did that happen?

The problem was, after we ran a job once, many of our customers would bid it out again. If our competitors' guessed lower, we'd lose it. It's like losing money on every job because you never get to run it a second time and benefit from your mistakes on the first one.

You said you almost went bankrupt. What kept you in business?

The only thing keeping me in business was my word. I've always honored everything I've ever committed to. Fortunately, two of my vendors allowed me an open account.

What was the turning point?

The turning point came one morning when we were late making payroll. Two employees told me if I didn't pay they were going to leave. I decided then to close the doors. I called my banker who had just loaned me \$1.3 million a month earlier and said that I was closing the doors, and that I needed \$35,000 by that evening to pay everyone.

What did your banker say?

He asked me what my plan was, and I told him that I would keep running the machines myself to pay off my debts and start over. He said, "Roy, I have faith in you. The money will be in your account. Just go ahead and write the checks."

Then what happened?

Later that day, I called all the employees into the conference room and told them I was closing the doors and letting them go. After the meeting, 13 people came up to me and said, "we believe in you. We will work with you. Pay us when you can."

So the dedicated 13 employees stayed with you?

Most of the them are still with me, and that was five years ago. I have 27 employees now.



3

How did business build up again?

It wasn't so much building the business up, but getting productivity up and lowering expenses.

How did you do that?

I give my excellent crew and the new DECO 2000 PNC Swiss screw machines from TORNOS credit for helping me do that.

What led up to the purchase of the first DECO 2000?

That's a good question because I've always been a cam person, ever since I apprenticed at 15 years-old. I've tried CNCs, but they never lived up to the productivity of cam machines. However, I made a promise to myself that if I ever found a CNC that outperformed a cam machine, I would buy it. Also, my son, Scott, is in the business and will eventually take it over. I don't want to lag behind the times technologically. When I saw a demonstration of the DECO at Westec '97 in Tornos' booth, I knew I found what I had been looking for. It offers the speed and accuracy of a cam machine, with the flexibility of CNC.

Was it difficult making the transition from cam to the TORNOS PNC (Parallel Numerical Control) system and TB-DECO software?

For someone who has a familiarity with Windows® and basic CNC codes, I don't think it would be difficult at all. However, it was all brand new to me, and I did have a learning curve. Thankfully, the people at TORNOS went above and beyond helpfulness. One of their technicians would stay on the phone with me all day, if necessary, and he even gave me his home phone number in case I needed him over the weekend.

How long did it take you to get up and running?

I was producing parts within a few days. Now that we are more familiar with them, we can uncrate them and have them setup and running the same day.

And what were the results compared with cam machines?

The very first part I put on the DECO was one that I averaged 700 pieces per day on a cam machine. Within the first week of running it on the DECO, I averaged 4,000 per day – a productivity improvement of 500 %!

What is the average productivity increase?

Probably three times, however I can give many examples where the increase is 40 times. You have to look at the whole picture, though. A "day" on a DECO with a Robobar automatic bar loader is 24 hours. A "day" on a cam machine is one 10 hour shift.

That must certainly make you a more competitive bidder.

Yes it does. We are offering lower prices now to our customers.

How else has the DECO affected the way you produce parts at RM Precision?

We are using labor and equipment much more efficiently. It seems the more complex the part geometry, the greater the productivity rewards of the DECO. A case in point is a ballpoint pen part which used to be produced in a machining cell. The cell is comprised of five machines – three CNC lathes, one drilling and tapping machine, and one CNC milling machine. We used to produce 200 parts per day in the cell. Now, on the DECO we produce 600 per day, consuming one machine. Not five.

How many DECO 2000 do you have now?

We currently have five 10 mm machines and two 20 mm machines. Nineteen more 10 mm are on order. As I said before, these machines combine the best of cam and CNC. It's just what I was looking for.

Any closing thoughts?

I feel lucky to be in business today. I learned how quickly a business can go under, and I don't want to go through that again. With good people, good customers, and applying the latest technology, like the DECO 2000s, I'm sure I won't.

4. Inside the DECO 2000, up to 4 tools can machine simultaneously.

5. Gary Woolsey closely performs inspection operations in RM Precision's quality control lab.

6. Arthur Blood and Leannah Bistline examine parts at SPC stations.



4



5



6

Cross tapping with a thread milling cutter on the T24 tool

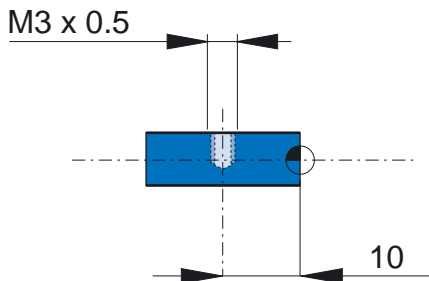
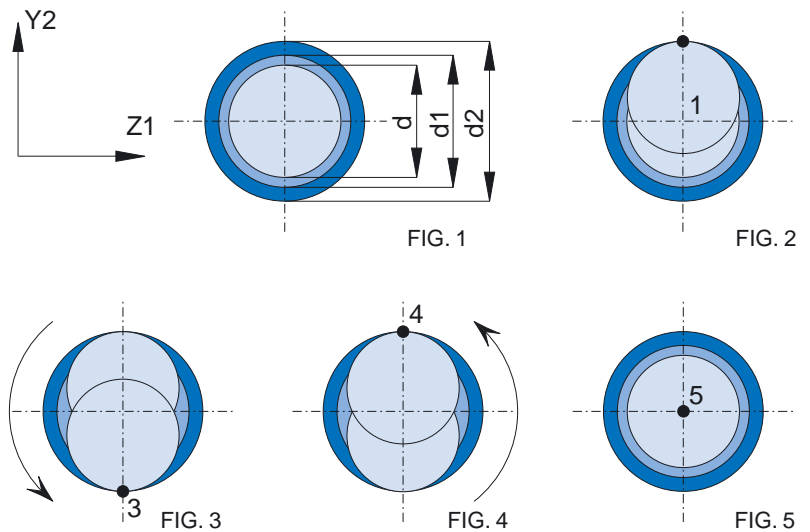
Production problems encountered by conventional tapping – such as the use of materials which are very difficult to machine, tapping blind holes with special machining requirements, i.e. flat-bottom holes, or untimely breakage – can now be easily overcome by the thread milling cutting method by interpolating axes Y2 and Z1.

Besides coping with the above, this method also results in a far longer tool life and, in spite of a succession of operations, production times are quicker than with conventional tapping.

The condition required for successful tapping is a lathe capable of interpolating axes X, Y and Z. The TB-DECO fitted to the DECO 2000 is able to interpolate all axes simultaneously and in a way which the user can parameterize fully. Consequently, an operation like the one described below, can be carried out with very simple programming!

Cross M3 tapping executed as follows:

Description of the movement seen from above:



In order to machine the above part, a thread milling cutter with a 2.1 mm diameter and pitch of 0.5 mm is used.

Technical data:

Milling speed:	3200 rpm
Machined material:	9SMnPb28 steel
d	= milling cutter dia. 2.10 mm
d1	= drilling dia. 2.50 mm
d2	= external threadcutting dia. 3.00 mm

Milling takes place in 5 stages:

- FIG. 1 = STARTING POSITION OF THE MILLING CUTTER AT THE CENTRE OF THE HOLE
- FIG. 2 = APPROACH TO 3mm EXTERNAL THREADCUTTING DIA.
- FIG. 3 = MILLING 1/2 CIRCUMFERENCE OF AXES Z1/Y2 AND MOVING X2 BY 1/2 THREAD
- FIG. 4 = MILLING 1/2 CIRCUMFERENCE OF AXES Z1/Y2 AND MOVING X2 BY 1/2 THREAD, RETURN TO POINT OF APPROACH
- FIG. 5 = REMOVAL OF MATERIAL FROM MILLING CUTTER, END OF MILLING

ISO code – Milling operation:

1. G1 Y2=0 Z1=-10 X2=8 G100 T23 G94
2. G1 X2=-1.5 G100 M150
3. G1 Y2=0.45 F160 G191
4. G3 Y2=-0.45 Z1=-10 X2=-1 F145 R0.45
5. G3 Y2=0.45 Z1=-10 X2=-0.5 F145 R0.45
6. G1 Y2=0 Z1=-10 X2=8 G100
7. G1 X2=8 G100 M150 G190

Next edition:

Deburring
a transverse bore
using axis C

Let us now take a closer look at this programming, using only simple commands provided by the advanced features of the DECO 2000

Line 3: Milling dimension Y2 = (threadcutting dia. – milling cutter dia) / 2 i.e. (3 - 2.1) / 2 = 0.45

Line 3: G191 contour mode which is essential to guarantee a fault-free thread

Lines 4 and 5: At the same time as the circular interpolation Y2/Z1 executes one complete turn, axis X2 must go back by 1 thread. Warning! Programming axis X 2 is at the diameter

Lines 4 and 5: The direction of circular movement (G3) as well as the direction of movement X2 determines right or left thread-cutting.

Lines 4 and 5: Feed is programmed (F145) according to the material being machined and the manufacturer’s technical data for the milling cutter.

Comments

1. In order to carry out thread cutting, all that is required is a new operating line containing axes Y2

and Z1 as masters and X2 as the slave.

2. The new operation is then programmed.



Configuration de la ligne d'opérations

Nom de la ligne d'opérations:

Nom de la bitmap:

Axes principaux: Axe auxiliaire:

How is an operation line added?

As with all operations on the TB-DECO and more generally, with Windows™, there are several ways of achieving this. Here we shall explain in detail how to use the menus.

1. With the right button of the mouse, click on a box the left section of the screen (where the axes are named on the operation lines)
2. In the menu which now appears, click on “ Create operation line ”
3. A dialog box appears. All you need do now is specify the characteristics required (the name will only accept up to 10 characters)
4. In the event of modification, re-edit this dialog box.



New Options

The positive feedback received when "New Options" was introduced, has encouraged us to continue using this particular method. It is good that so many users of DECO 2000, 20 mm are so interested.



More details of some of the innovations for April/May:

Option 5010 – High precision drilling device at variable pressure from 35 to 140 bars machine ex-works)

Application – This device will drill deep holes, using SIG or Botek type tools. Because the pump pressure is variable, other types of bore bit requiring lower pressures, may also be used.

Characteristics

Mounting position: combined and counter-operations

Drilling diameter: 1.2 to 12 mm

Adjustable rate: 1 to 25 l/min.

Oil tank capacity (external): 170 litres

Device for filtering and cooling the cutting fluid: yes

Variable pressure: 35 to 140 bars

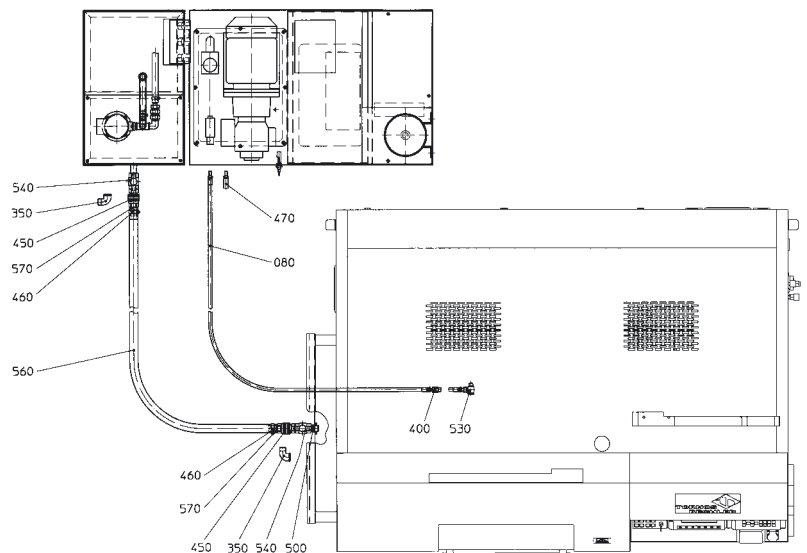
A few explanations on the process:

This process, allowing drilled holes up to 50 times the hole diameter using very small diameters (1.2 mm), in materials which are extremely difficult to machine, has

been made possible by continually cooling the tool head and by instantaneously removing all microscopic chippings using pressurized oil.

The high cutting yield coupled with the precision and surface finish obtained also make it possible to drill deep holes and to execute simple, rapid and economic drilling operations.

Some parts undergoing small parts turning require deep boring operations. Generally these machining operations are carried out during 2nd operations or even have to be sub-contracted.



Machining process:

In order to carry out quality deep bores, certain parameters must be complied with:

- ◆ Rough drilling of a hole for guiding through the calibration bit so as to achieve perfect tool guidance.
- ◆ Switching on the pressure once the bit is engaged in the hole.
- ◆ Machining the entire length of the hole in one pass and without scraping.
- ◆ On completion of machining, removing the tool from the hole; the spindle and washing operations having come to a stop.



(Hole Ø 1,2 mm)

Benefits of the principle:

- ◆ The part is completely machined on the lathe.
- ◆ The guide bush acts as the steady guide for the bit.
- ◆ Minimum axial drift of the bit (excellent concentricity).
- ◆ Dispenses with reworking operations on long holes (2nd operations).

A further interesting innovation for May:

Option 1800

Gear hobbing unit

Application

Continuous cutting of spur gears and gear profiles. This option provides some interesting possibilities.

Characteristics

Assembly position: In position T25 only (comb No. 2) and depending on spindle angle (the milling cutter must be inclined to work correctly). Position T24 cannot be used.

Max. unit number: 1

Angular adjustment: +/- 10°

Transferable torque: 7 Nm

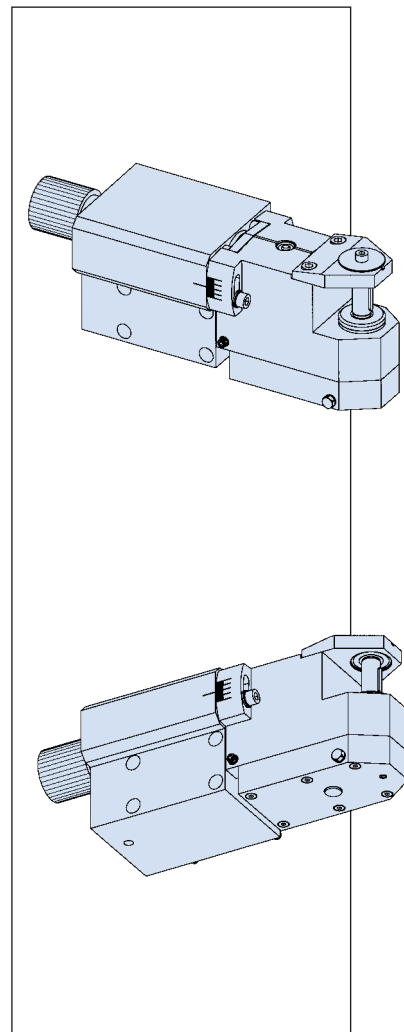
Max. milling cutter diameter: 32 mm

Max. width of milling cutter: 25 mm

Bore: 13 mm

Module (m) max: 1

Quality to DIN: 7-8



Summary table showing innovative features:

Option	Description	DECO-Mag. No
1650	Unit for revolving spindle for ESX 25 collet	1/98
2100	High frequency revolving drilling spindle – 15000 rpm	1/98
3240	Triple end tool holder	1/98
5010	High pressure drilling device	2/98
1800	Gear hobbing unit	2/98

PREVIEW:

DECO 2000 – 26 mm capacity



The DECO 2000 concept is spreading and the range of single-spindle parallel NC lathes is expanding! From now, small part turners involved in diameter ranges up to 26 mm (32 mm with bar preparation) have the facility of benefiting from the advantages of the DECO 2000 concept (see article entitled "DECO 2000 concept" in this edition).

This latest member of the family of the future will be exhibited for the first time in the world at the

**METAV exhibition
in Düsseldorf
from 16 to 20 June 1998
on TORNOS-BECHLER's stand
(hall 7 - stand C23).**

Our engineers will be pleased to help you discover the details of this new product.

General characteristics

Bar passage	: 26 mm (32 mm)
Length of part in one feed	: 240 mm
Spindle speed	: 0-8000 rpm
Max. spindle power	: 7,5 kW
Max. number of tools at guide bush	: 10
Max. number of tools on combination attachment	: 4
Speed of counterspindle	: 0-8000 rpm
Max. number of tools in counter-operation	: 7
Max. number of axes	: 10 (12 / axis C)

Interview with Pierre-Yves Kohler, in charge of setting up the Internet at TORNOS-BECHLER.

Reviewing this new media.

DECO Mag: When was reference first made to the Internet at TORNOS-BECHLER?

PYK: In the autumn of 1995, when our site, referred to as www.utopix.ch/tornos was put on line. With its single interface (see picture) it was primarily intended to provide product information to all our existing and potential customers throughout the world and to make it easy to contact us by E-mail.



In 1996, a year later, we proceeded with a complete reconstruction of the site, including the visual aspect and contents, with the aim of providing better information.

Today, our site is undergoing its third major change, with the tricks of the trade and advice offered for our products now featuring alongside the above information.

DECO Mag: How often is it visited?

PYK: Since it was formed, the Tornos site is being called up by more and more visitors and the contacts generated by this medium are also growing.

The following countries are the most frequent visitors:

Switzerland	33 %
USA	29 %
Italy	3 %
Germany	3 %
Japan	3 %
France	2 %



The origins vary quite considerably, since more than 30 countries regularly visit us, for example: Mexico, Israel, Hungary, Canada, Brazil, Australia, Pakistan, Denmark...



DECO Mag: In concrete terms, what is the interest in visiting the Tornos site?

PYK: A distinction must be made between those countries with Tornos subsidiaries and the other countries. Regarding the latter, it goes without saying that all the basic product information is available. For an initial contact, the site has the addresses of all our agencies and subsidiaries (with direct hypertext links soon being available to their sites and E-mail addresses). For these members of the public, the site has already created numerous contacts, which we would otherwise not have had.

DECO Mag: *And what about the other customers – those who are relatively near – what is their interest in visiting the site?*

PYK: The interests are, in fact, quite varied – the main ones that spring to mind are:

- ◆ Discovering the latest innovations (both technical and economical)
- ◆ Seeing in detail all the technical information
- ◆ Seeing all the information on the trade fairs attended by TORNOS-BECHLER
- ◆ Reading all the press releases
- ◆ Taking part in our permanent competition.
- ◆ Being able to contact us directly and quickly by E-mail.

DECO Mag: *We have seen your “service on the Internet” publicity, but what is this about?*

PYK: When in operation, the DECO 2000 can transfer programs via the Internet.

Our after-sales assistance service (ASAS) is already using this

elements have to be sent whilst others don't...). This is why we ask that you should only use the ASAS contact form on our site if you have any programming problems or questions.

DECO Mag: *What about the future?*

PYK: Our site is undergoing constant modification - we are always trying to improve things and you can now even find offers of employment, for example, on the site.

In the medium term, the after sales service will be fully integrated and we shall also create a “reciprocal links” section which, by a mere click directly from our site, will enable our visitors to gain

of such a vast movement. It provides our customers with far-reaching value-added services which explains the priority of this project for Marketing and Communication.

To conclude, I can only urge people to visit the TORNOS site and make any criticisms or requests using the “contact” line form.

Thank you Mr. Kohler, for this interview.



access to other sites providing additional information to that supplied by TORNOS. We are also assessing the feasibility of a newsletter via E-mail which would provide even more rapid information to those interested.

DECO Mag: *What conclusions can you give our readers?*

PYK: Internet is a far-reaching phenomenon and has been installed on a long-term basis. I believe that TORNOS-BECHLER, like the majority of world-wide companies, must be at the forefront

medium a lot to help customers who are having difficulties with their programs!

However, this service requires that enquiries sent to the ASS (after sales service) must be formulated in a specific way (some program

More MULTIDECO 26/6

Having launched the "DECO 2000" single-spindle products in 1996, TORNOS-BECHLER is now offering a new range of automatic lathes combining the benefits of the DECO 2000 concept and multi-spindle turning, under its "MULTIDECO" label (see DECO Magazine No. 3/97).

Multi-spindle productivity coupled with greater flexibility.

Seen as a whole, the changes in the design of the MULTIDECO 26/6 machine are only limited to a few visible items compared with a conventional cam operated machine. Even an astute operator would initially only notice a few modifications, in the working area e.g. the barrel – the heart of the machine – is unchanged.

However the experienced small part turner finds himself working with a high-performance automatic lathe combining the known and legendary flexibility of TB-DECO and PNC DECO control. Axis movement is motorised. The cutters and turning tools are no longer moved by cam but by the action of the centrally controlled PNC motors. The maximum length of the parts machined is 120 mm.

Cam and numeric control - an impossible match!

In order to reduce unproductive times to less than one second, the MULTIDECO 26/6 retains the conventional camshaft for certain

operations, such as locking/unlocking, numbering, bar-feeding and clamping/unclamping i.e. all actions which do not change. This "hybrid" concept means that several seconds of downtime "chip to chip" can be saved.

The sight of the cam shaft coming to a stop whilst the axes continue to turn, is quite an impressive experience.

Modifications to the essence of the job

TORNOS-BECHLER is tending to change the work of the small part turner by eliminating all repetitive work whilst maintaining the creative and "skill" aspect, which, in fact, remains an essential part. With the advent of this machine, the observer can see that nothing in small part turning is shielded from progress.

The era of modernisation of small part turning jobs has already begun! With the DECO 2000 range, we have now encountered a high-tech small parts turning concept, with such jobs becoming more and more attractive to the young. We would like to bet that the

MULTIDECO 26/6 will also contribute towards this change which will affect the entire trade.

This sector is tending towards simplifying adjustment work, some of which is now being replaced by programming.

The software used for programming and simulation has already proved itself in the programming of the DECO 7, 10 and 20 mm range. The TB-DECO software used on the multi-spindle machine is obviously the same as that for the entire DECO 2000 range. This provides an absolute guarantee of interchangeability between the multi- and single-spindle machines.

The TB-DECO in brief

The software is not purely limited to programming turned parts, which in itself is admittedly an achievement, but it also comprises on-screen simulation functions. Programming the PNC can take place anywhere. It does not necessarily have to take place at the machine.

What is required, is a PC running on Windows. The minimum configuration required is a Pentium 120.

For machining, it is only necessary to transfer the data to the control via a single RS 232 cable or a memory card which is inserted in the PNC.

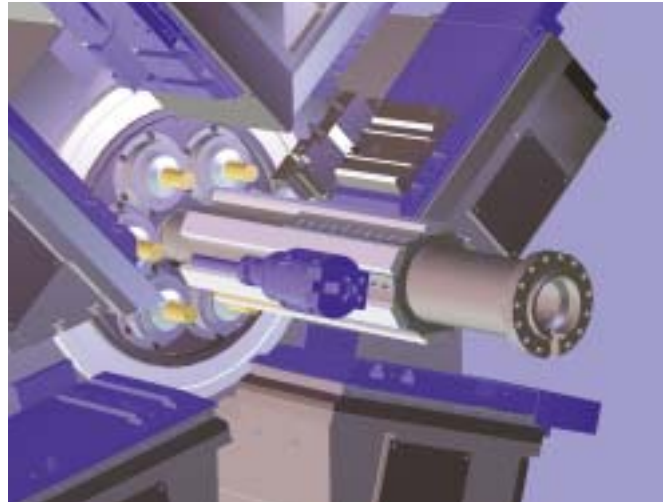
Description of the versions

The machine is fully numeric and comprises up to 19 axes all managed simultaneously.

The new MULTIDECO 26/6 is available in three versions ranging from those dealing with the most



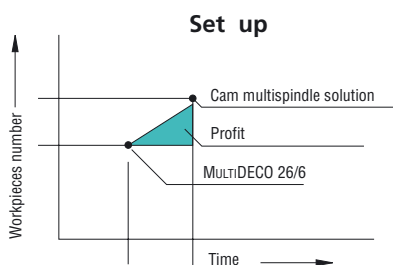
simple to the most highly complex demands. From a 13-axis machine – the plunge machine, a 17-axis machine – the slide machine, to a 19 axis machine – the slide machine with multiple counter-operations, the MULTIDECO 26/6 offers numerous possibilities comprising numerical cross slides, spindle locking and single or two-speed spindles etc..



Increased profitability

The combination of the legendary productivity of the small part turning machines coupled with their flexibility and rapid changeover is the challenge that has been set. This is a challenge affecting the still highly conservative multi-spindle sector.

In fact, it is becoming very fast and easy to change from one batch of parts to another. The cam reworking times or gear changes to adapt to the various cutting speeds have now been completely eliminated (see diagram below) – a contributory factor towards increasing the profitability of the machine.



What properties make it possible to achieve such results?

A few more properties

Programming thus takes place with the TB-DECO and control is of the PNC-DECO type (with all the benefits of the concept which this entails – see the article entitled “Concept” in this magazine). The working area is well ventilated and spacious. The machine has an integral coolant system thus ensuring lubrication of the tool.

The machine was designed for working with emulsion. The large 700 litre cooling tray can be removed to facilitate maintenance. The chips are evacuated from the

outside of the machine. As an option, the machine may also be fitted with an additional, 450 litre tray, a high-pressure pump and cooler.

Peripherals

The search for perfection is not purely limited to the great CNC revolution adapted to multi-spindle small parts turning but also extends to bar feeding. The new integrated MSF 832 bar feeder fitted to the MULTIDECO 26/6 reduces the space required compared with a bar feed with conventional stock reel.

Productivity and flexibility – an explosive mix!

To summarise, this is a multi-spindle machine comprising 6 spindles designed for the machining of cylindrical bars between 8 and 26 mm. It can feature 6 infeed slides, 1 counter-operating slide, 5 end units and one counter-spindle. It is possible to add up to 4 crossed-axis (compound) slides to this basic version. Fitted with an 18 kW motor, spindle speed can be as high as 5000 rpm. A Hirth toothed system positions and locks the barrel in place.

Time scale and the future

The 13-axis version was unveiled at EMO 1997. This option has filled the gap in the simple machines and is now directly competing with the cam-operated multi-spindle machines.

A new 17-axis version was presented at the Simodec trade fair (March 1998). This is a machine capable of executing form turning, tool threading as well as machining complex parts such as external and internal contours.

The second half of 1998 will see the launch of a 19-axis version. This machine will have 17 axes and a barrel with 4 counter-spindles. This will be a “total option” machine designed to produce highly machined parts (multiple counter-operations).

Of the three versions mentioned above, there is a choice from amongst the following three options: single speed, 1 speed and stopping and finally 2 speeds and stopping.

Let it be said that this lathe has an undeniable advantage: it is totally universal. What is more, batch change takes place very quickly.

MULTIDECO 26/6: Main technical characteristics

Number of spindles	: 6
Bar pass	: 8 - 26 mm diameter
Length of part	: 120 mm diameter
Max. spindle power	: 18 kW
Number of numeric axes	: 13 to 17 (19)
Spindle stops	: yes
Number of infeed slides	: 6
Number of counter operation slides	: 1
Locking	: Hirth toothed system
Compound slides	: max. 4

PLATIT BY BLÖSCH

A top reference in hard coating domain. TORNOS-BECHLER and other big businesses in Switzerland and foreign countries are convinced about.

The machine tool industry has experienced fundamental changes within the last 20 years. The modern technologies did permit to considerably improve the performance and productivity of the machines in this sector. TORNOS-BECHLER manufactures, in the product assortment of DECO 2000 and Multispindles, parts getting more and more complicated and having more and more difficult tolerances and surfaces.

Also the tool manufacturers had to adapt to the demand because of these technical advances. The indexable inserts, form tools, stepped drills and further tools used by these machines have to be manufactured with specified material with a suitable geometry and high precision.

HIGH TECHNOLOGY SWISS MADE

The PLATIT process is the result of 10 years research and development at Blösch AG in Grenchen, SO.

This exceedingly successful technology, 100 % SWISS MADE is represented by hard coatings, obtained through PLATIT hard coating equipment. The PVD arc process by PLATIT is unique in the domain of functional hard coatings.

The aim of PLATIT coatings: improve the productivity

You in sense of user can enable your tools having a 10 to 100 times longer live time or efficiency with one of these coatings.

The PLATIT system disposes a high quality standard in hard coating domain, because it is guaranteed by an incomparable ionization arc process.

This process runs with a permanent control of the arc confinement (Modular Arc Confinement). This electronic arc control guarantees a constant coating characteristic and meets in particular with one of today's most important factors: the reproductivity.

Advantages of PLATIT coating on your tools:

- ◆ Improvement of cutting conditions
- ◆ Better wear resistance
- ◆ Prolongation of live time
- ◆ High resistance to heat
- ◆ High application safety
- ◆ Improvement of quality

The manufacturing in branch of industries as: machine tool, mechanic, automobile, medicine, aviation, space industry or watches is

more and more confronted with Machining complex materials. In this matter the hard coatings and other coatings form unavoidable an alliance to fulfil the daily actual and decisive criterions of productivity and quality.

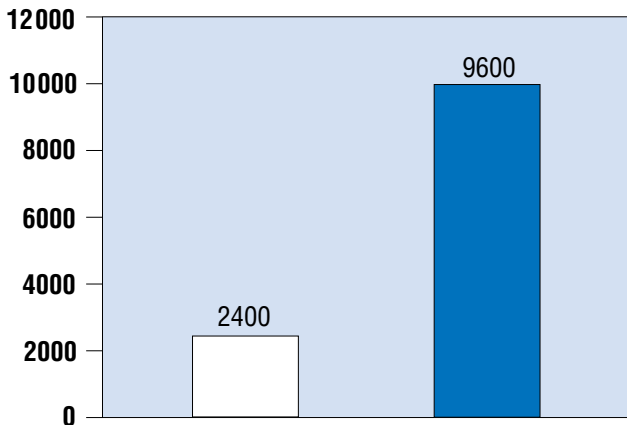
TORNOS-BECHLER SA, is again thanks its quality of machines and products in the top of the machine tool industry sector. Blösch AG is proud contributing to this success, being partner in sense of coating the tools for the different machines delivered and installed world wide by TORNOS-BECHLER.

The diverse coatings recommended by the hard coating center Blösch AG are:

- Beta PLATIT	- TiN
- Alpha-PLATIT	- TiCN
- Gamma-PLATIT	- Ti2N
- Alpha-MP-PLATIT	- TiCN (Gradient)
- Delta-PLATIT	- CrN
- UniversAl-PLATIT	- TiAlN
- MOVIC	- MoS2 (solid lubricant based coating)

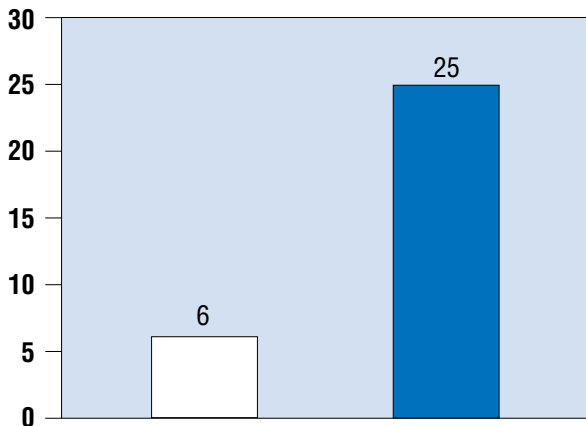
For further information:

BLÖSCH AG
Hard Coating Center PLATIT
 Moosstrasse 68 - 78 – CH-2540 Grenchen
 Phone 032 654 26 26 – Fax 032 654 26 36



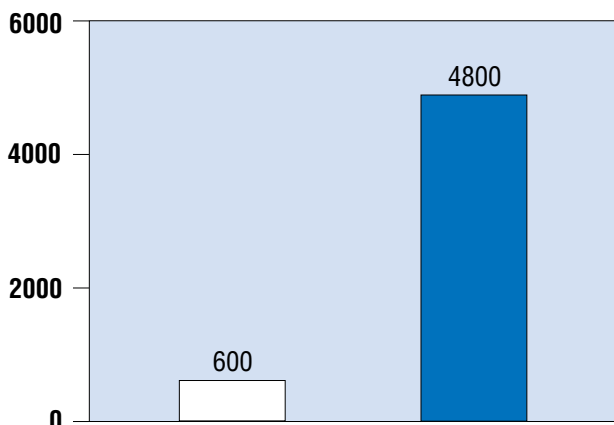
Sample: Beta-PLATIT (TiN) coating

Tool : Carbide stepped helical drill MD diameter 2.80 mm
 Material : Steel inox 305 / X 12 Cr Ni S 18.8. diameter 10 mm
 Cutting speed : 60 m/min.
 Feed : 0.035 mm / rev.
 Depth of cut : 7 mm
 Operation : Drilling and chamber with lubrication
 Machine : SAS 16.6
 Result : Uncoated tool 2400 pcs
 : Beta-PLATIT coated tool 9600 pcs



Sample: Gamma-PLATIT (Ti2N) coating

Tool : Carbide cut-off insert MD
 Material : Steel 70 S20 Pb (1.0759) Steel trempable diameter 4 mm
 Cutting speed : 100 m/min.
 Feed : 0.03 mm / rev.
 Operation : Lubricated cut-off
 Machine : DECO capacity 10 mm
 Result : Uncoated tool 6 h
 : Gamma-PLATIT coated tool 25 h



Sample: Alpha-PLATIT (TiCN) coating

Tool : Carbide stepped tube bit drill diameter 14 mm
 Material : Steel inox 1.4435, AISI 430 F
 Cutting speed : 70 m/min.
 Feed : 0.126 mm / rev.
 Cutting length : 17 mm
 Cut depth : 0.10 mm
 Operation : Reaming
 Machine : MULTIDECO 26/6
 Result : Uncoated tool 600 pcs
 : Alpha-PLATIT coated tool 4800 pcs

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