*Merry Christmas and Happy New Year*

# DECO MAGAZINE

## Merry Christmas and Happy New Year

DECO MAGAZINE

Editorial
Forum
Interview
News
Presentation
Technical
The present

Editorial

# Dear Clients,

**Y**ou have probably seen and heard that our company has been much in the news over the last year or so.

**F**ollowing our launch on the stock exchange, the re-capitalisation of the company and changes at management level, we have been very much in the spotlight.

**U**nfortunately, this fact has been exploited to our detriment by some competitors who have regarded this situation as a godsend.

**T**hrough this last edition of DECO Magazine for the year, I would like to put you in the picture regarding the situation, since some of the information that has seeped through to the market would make it sound as if there were a certain degree of unease in the company.

**A**s a new public company, we are bound by rules – that are new to us – governing the dissemination of information. A lot of statements destined for different sectors have to be managed simultaneously and I must confess, our customers cannot always come first in this process, as much as we would like them to.

**T**he company has now stabilized financially. In terms of products, we launched the MULTiDECO 20/6hp this year, which for the first time means that a machine operating according to the DECO concept, can now achieve a production rate of up to 32 parts per minute. We also recently unveiled at the Prodex fair, DECO machines that have been adapted for the watch and medical sectors.

**T**hese developments clearly illustrate our desire and ability to be innovative and enjoy a very close relationship with our clients, so that we can provide them with the technological solutions that match their requirements.

**W**e have many competitors throughout the world and the mere mention of the company name or "Swiss made" is no longer sufficient – there are numerous criteria of importance to our clients that have to be met. We will now implement several projects aimed at even further improving the company's position in strategic areas, such as service or reliability. These will be major challenges bringing in results that will not be particularly spectacular in the short-term. We believe that we are now on the right track and would like to come back to these points in 18-24 months' time.

**D**ear customers, as for you, this year 2002 has been particularly trying for TORNOS. I would like to use this opportunity to thank you for the trust you placed in us and wish you all the best over the Christmas period and a successful 2003.

*Raymond Stauffer*
*Delegate of the board*

# Parameterized part,

## using
## the extended program

**An extended program greatly simplifies the work of programmers when they are called upon to execute part families. One program alone is sufficient for the entire family of parts. The program will contain a specific number of variables and calculations. When changing parts on the machine, the operator will have to change some variables and the system will automatically recalculate the different machining lengths or diameters.**

**H**owever, it should be pointed out that some variables can be modified by the user. These include:

the global variables **#3048 - #3063**

**O**ther variables can be used, but will be changed by the system using the calculation functions. These include:

the variables **#2032 - #2127**

**Reminder:**
◆ The scope of variables #3000 is the part. The value entered is saved when the dbp file is closed.

◆ The scope of variables #2000 is the program. This is why calculation of variables #2000 must be carried out at the start of the program (op. 1:1)

**Remarks:**
◆ In this example, the operator must change the contents of the global variables #3003 (part length) and #3048 (pivot diameter).

◆ Programming the contour in operation 1.7 is no longer carried out using values, but rather by using variables. (see page 5)

◆ The part pick-up distance contained in the global variable #3009, will also be calculated in operation 1.1.

## Part being executed
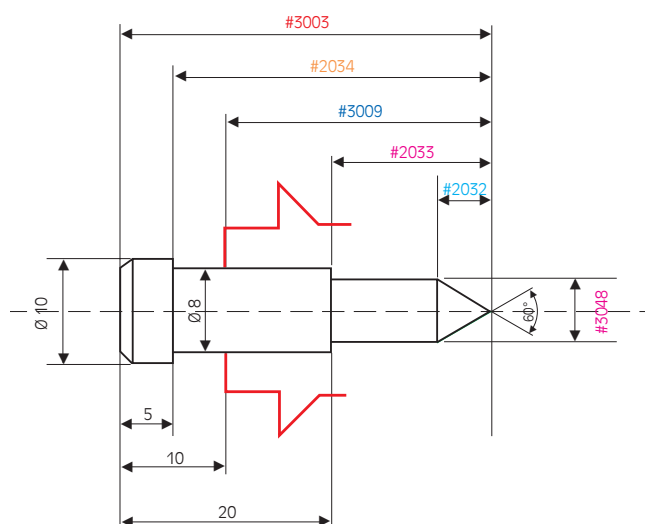


**Variables to be changed by the operator:**

#3003 : part length
#3048 : pivot diameter

**Variables calculated by the system in operation 1:1**

$$\#2032: \quad \frac{\#3048/2}{\text{TAN }30°}$$

#2033 : #3003 - 20
#2034 : #3003 - 5
#3009 : #3003 - 10

Forum
Interview
News
Presentation
Technical
The present
Tricks

Tricks

# TB DECO program



**ISO code of operation 1:7**

G1 G100 Z1=0.5
G1 G100 X1=0
G1 Z1=0 F.05
G1 Z1=#2032 X1=#3048 F.02
G1 Z1=#2033 F0.05
G1 X1=8
G1 Z1=#2034
G1 X1=10.2 F0.1
G1 G100 X1=20

## Contents of operation 1.1

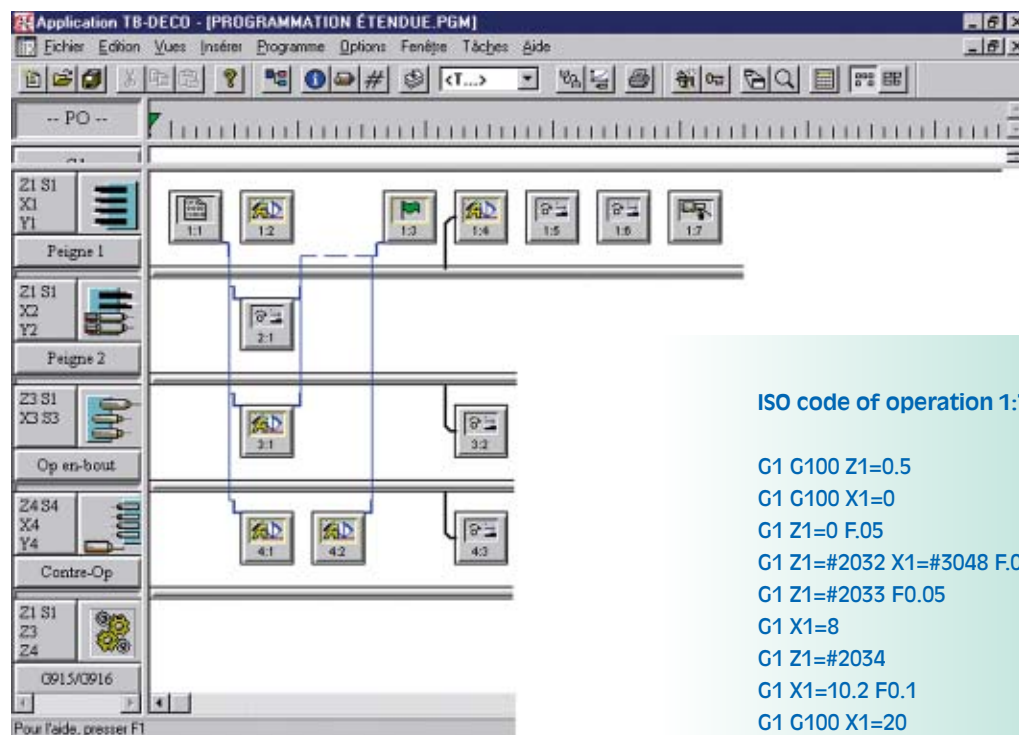| | |
|---|---|
| I@Move DX #3048 | (Stores the pivot diameter |
| I@Move DX 2 | |
| I@Key / | (Divides the pivot diameter by 2 |
| I@Move DX 30 | (Stores the angle value |
| I@Key TAN | (Calculates the 30° tangent |
| I@Key / | (Calculates the value of the length of the tip |
| I@Key NEG | (Reverses the sign (this length is shown as a negative in TB DECO) |
| I@Move #2032 DX | (Transfers the result (length of tip) to variable #2032 |
| | |
| I@Move DX #3003 | (Stores the part length |
| I@Move DX 20 | |
| I@Key – | (Calculates the pivot length |
| I@Key NEG | (Reverses the sign (this length is shown as a negative in TB DECO) |
| I@Move #2033 DX | (Transfers the result of the calculation (pivot length) to variable #2033 |
| | |
| I@Move DX #3003 | (Stores the part length |
| I@Move DX 5 | |
| I@Key – | (Calculates the length of diameter 8mm from the original part |
| I@Key NEG | (Reverses the sign (this length is shown as a negative in TB DECO) |
| I@Move #2034 DX | (Transfers the result of the calculation (length of dia. 8mm) to variable #2034 |
| | |
| I@Move DX #3003 | (Stores the part length |
| I@Move DX 10 | |
| I@Key – | (Calculates the length of part pick-up |
| I@Move #3009 DX | (Transfers the result of the calculation (length of part pick-up) to variable #3009 |

**IMPORTANT:** The syntax I@ must be strictly complied with. Note high and low cases.

### Errata

*A few minor errors slipped into the article on counter-operation milling using thread chaser 2 in DECO MAGAZINE No. 22.*

*These errors, which are marked in red below, are found in the description of the ISO code of operations.*

| | |
|---|---|
| Operation 2:2 | Indexing position **T60** support T24 |
| | G1 G100 Y2=0 **T60** |
| | G1 G100 X2=6 (In this example, the width over flats is 6 mm) |
| Operation 4:3 | Displacement of the counter-spindle opposite the end miller T72 |
| | G1 G100 X4=0 Z4=10 T72 |
| Operation 4:4 | Milling flats |
| Operation **2:3** | Indexing position T24 support T24 |
| | G1 G100 Y2=0 T24 |
| | G1 G100 X2=0 |
| Operation **4:5** | Displacement of the counter-spindle opposite the circular miller T70 |
| | G1 G100 X4=0 Z4=10 T70 |
| Operation **4:6** | Milling slits |
| Operation 1:6 | Front turning T11 |
| Operation 1:8 | Rear turning T12 |
| Operation 4:7 | Counter-spindle position for extraction |

*Well done to those who spotted these mistakes.*

# The MOTOREX
# industrial concept

**The optimization of processes, coupled with improved efficiency, feature more than ever before in the program for the metal machining industry. From its vantage point as an observer, which the company has occupied for many years in this sector, MOTOREX soon recognized the vast potential that can be achieved by optimizing several areas in the machining fluid sector.**



*In the near future, it will be possible for all machining fluids to be managed according to a bar code system.*

### Go straight to the heart of the matter with your concept

**H**aving a concept for machining fluids, machine maintenance and logistics, is not a matter of the size of the company. Rather, it is a question of where to place strategic points. If it is a matter of reducing costs, there are several ways of achieving this. Some are based on common sense and are more popular than others. Another option, for example, is to adopt saving measures affecting the fleet of machines or staff employment.

However, the consequences must always be weighed up with the overall picture in mind.

**B**y analyzing several items that have an impact on production costs, MOTOREX used its industrial concept to develop a range of measures from A to Z, which considerably help to reduce the costs of each machined part.

DECO MAGAZINE

Dossier
Editorial
Forum
Interview
News
Presentation
Technical

Dossier

## The MOTOREX industrial concept comprises four essential points:

### 1. Product range

**C**ooling lubricants and ultra-modern cutting oils with greater exponential power ($V$-max technology).

### 2. MOTOREX know-how

**A** technical-scientific customer services department for conducting laboratory analyses and research and development.

### 3. On-site infrastructure

**A** wide range of logistic and storage systems for the machining fluids and equipment and tooling used to maintain machines.

### 4. MOTOREX PROCESS FLUID MANAGEMENT

**A** modular package of measures, including valuable services in the areas of machining fluids, maintenance and machine operation.

## MOTOREX PROCESS FLUID MANAGEMENT

| | | |
|---|---|---|
| Fewer oil types | On-site customer training | Logistics |
| Lubrication schedules | Laboratory supervision | Electronic data input and archiving |
| Machine documentation | Technical support | Barcode system |
| Colour code system | Process optimisation | Maintenance schedule |

### Clearly lower production costs

**T**hanks to its MOTOREX PROCESS FLUID MANAGEMENT, MOTOREX usually succeeds in achieving a significant increase in production, from which every modern production plant could benefit. The package of measures of MOTOREX PROCESS FLUID MANAGEMENT is modular in structure and covers all the 12 areas of application, from the design of the lubricant to the maintenance program.

**W**hat is more, with its PROCESS FLUID MANAGEMENT, MOTOREX can even guarantee compatibility between all the products used.

### Small steps to the future

**T**he modular concept of the plan of measures, coupled with on-going research into the different sectors, means that once the analysis of requirements has been completed, it is possible to establish priorities and apply them according to a detailed script.

**T**he first stage consists in maintenance with an approved MOTOREX partner.

**W**hy not use tomorrow's technology today?

**I**f you require more information on "MOTOREX PROCESS FLUID MANAGEMENT", please contact the MOTOREX experts at the following address:

*MOTOREX AG LANGENTHAL*
*Customer Services*
*P.O. Box*
*CH-4901 Langenthal*
*Or send us an e-mail:*
*motorex@motorex.ch*

*The single product range ideally meets user requirements.*

# Options and

**The first one is not an option but is in fact a new development. The collet clamping arrangement in the counter spindle of the DECO 26a has been improved.**
**The second allows milling of very small components with smaller milling cutters.**
**These two innovations clearly show the company's intention of going out of its way to meet customer requirements.**

Old version

New version
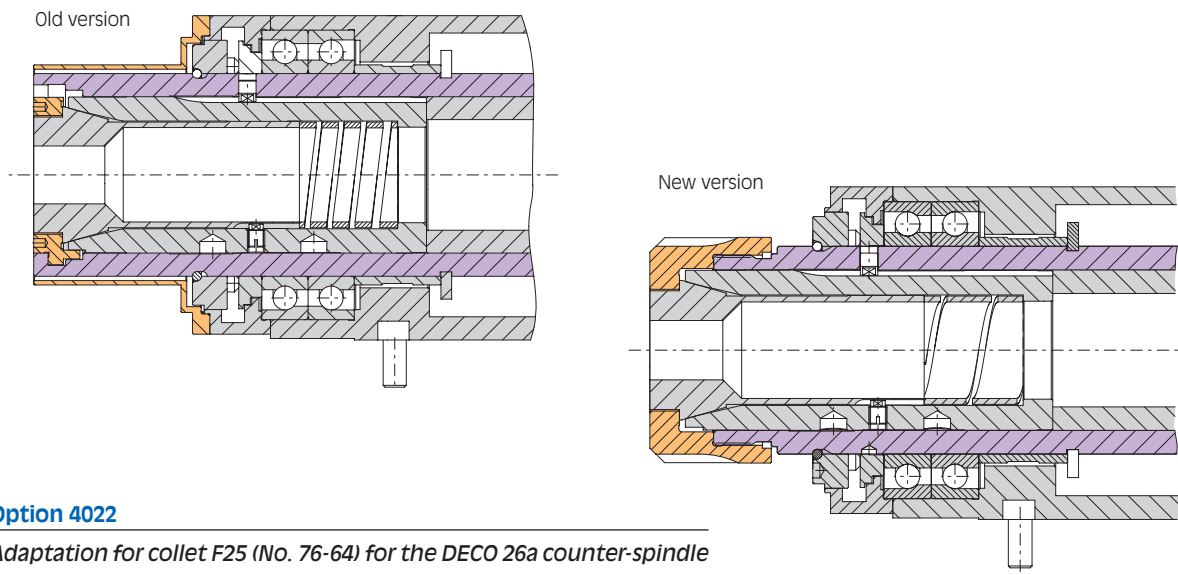
### Option 4022

*Adaptation for collet F25 (No. 76-64) for the DECO 26a counter-spindle*
*Max. diameter: 26 mm*

### Option 4032

*Adaptation for collet F30 (No. 76-101) for the DECO 26a counter-spindle*
*Max. diameter: 25.4 mm*

### Application

**T**he system for clamping the collet in the counter-spindle has changed to a new standard. A nut has replaced the bayonet system. The main spindle has always been equipped with the nut system and been fully satisfactory. With this development, both spindles have now the same universal system.

**C**onsequently, clamping is becoming more and more universal. The use of a nut eliminates any doubt about positioning – once the nut has been tightened, clamping is guaranteed.

**T**his system also increases the clamp bearing surface of the collet and hence the strength of the assembly. As positioning is ensured by a simple screw operation, repetition is ensured.
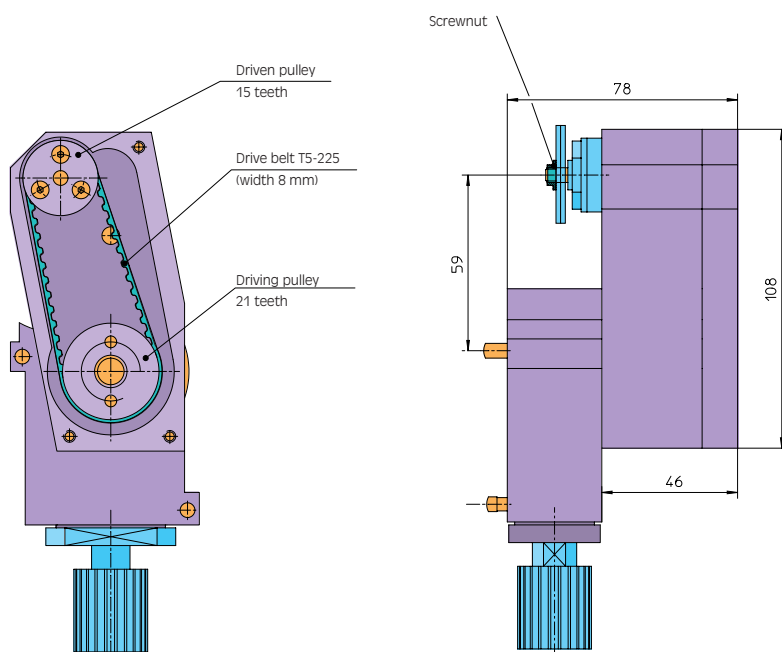
### Comment

**T**hese two new options replace options 4020 and 4030 "bayonet clamping". The collets and guide pins are absolutely identical to those used in the old versions of counter-spindle where clamping was by way of the bayonet system.

### Applicable

DECO 26a

# innovations

DECO MAGAZINE

| Editorial |
| Forum |
| Interview |
| News |
| Presentation |
| Technical |
| The present |

The present

E

## Specific request of client

*Milling unit for a circular cutter with a maximum diameter of 15 mm.*

Screwnut

Driven pulley
15 teeth

Drive belt T5-225
(width 8 mm)

Driving pulley
21 teeth

78

59

108

46

### Cycle time

**1.** On DECO 10, 5 axes : 28 PPM
Without milling the square (1) and the hooked groove (2).

**2.** On DECO 10, 9 axes : 42 PPM
Finished part

3 mm

Ø 2,3 mm

(2)

(1)
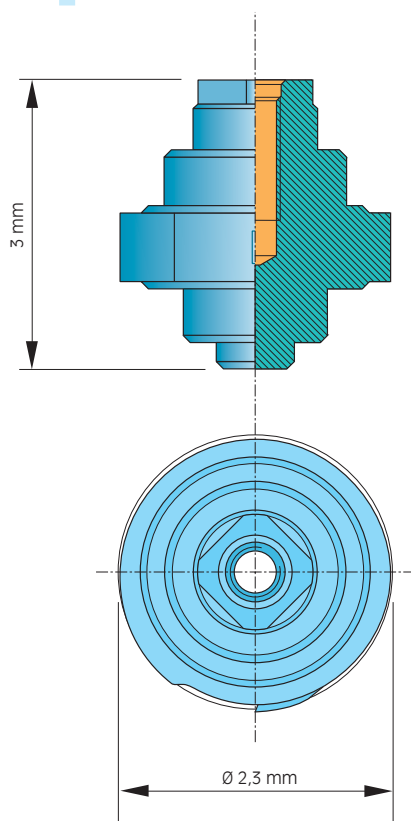
### Application

**T**his unit is intended to be used with small diameter circular cutters where machining takes place in the immediate vicinity of the guide bush. The unit is fed in front of the guide bush towards the two axes x and z, so that it is very close to the bar undergoing machining, thereby generating minimum overhang. This also guarantees exceptionally good strength.

**T**his unit was specially designed to mill the axis hooks of drums on the DECO 7 and 10. It is, therefore, fully adapted to the execution of extremely small, precision parts, as used in horology.

**T**he milling operations are contouring. The unit can be used to make components such as cams parts without problem.

### Comment

**T**his unit has a fine axial setting, so that the tool position in z (axial) can be more refined.

**T**he design of this unit is very similar to a polygon system. It acts in exactly the same way as the latter, without encroaching on another position.

### Applicable

DECO 7 and 10

### Technical characteristics

- maximum cutter diameter :
  15 mm

- min. cutter diameter : 6 mm

- axial setting of the tool : 5 mm

- assembly in position T24

# TB-DECO

## A tool that never stops developing.

**Since 1996 we have spoken a lot about the TB-DECO and the DECO concept. The years have passed and IT has made enormous strides. The calculation capacities of PCs, as well as operating systems have followed this trend.**

**The TB-DECO has, of course, also progressed considerably.**

**Numerical controls as well as interface systems between PCs and the machine have also become more sophisticated during this period.**





From the first DECO 2000, 7 mm capacity, which only had an RS-232 link, to the latest DECO 13a, which can quite simply recover the data from an RS-232 cable, a memory card or even a compact flash ATA card, these machines can cope with these changes, bringing about even better user-friendliness and speed of transfer!

The major development in the capacities of PCs allowed TORNOS to present new versions of the TB-DECO, whilst clearly drawing from these developments. From 1999 onwards, the year version 5 came out, we have witnessed a notable improvement, with the software mainly being matched to specific market demands.

Nowadays, the strong points of version 6 include in particular:

### User-friendliness

The operator's interface is highly intuitive and fully incorporated in Windows® software. This makes it easier to use.

Compatibility is guaranteed with Windows 2000 and Windows XP.

### Speed

The speed for calculating parts is without parallel compared with the nineties. The new nucleus used since version 5 completely maximizes the 32 bit technology.

### Universality

The current version of TB-DECO is still fully capable of programming

DECO MAGAZINE

Editorial
Forum
Interview
News
Presentation
Technical
The present

News

parts for a DECO machine, which was supplied as far back as 1996! By a mere change in programming software, this machine is now in direct competition with present-day machines. It is still well on course. The distinguishing feature of our concept mainly lies in separating the PC from the numerical control – a fact that has been more than demonstrated to date!

**T**hanks to TB-DECO, this client will enjoy the same benefits of speed and potential as if he were purchasing a new machine …without the drawbacks of familiarization and acceptance – the only operation that has to be completed is installing the new software version.

**T**B-DECO version 6 is, of course, fully compatible with all the DECO and MᴜʟᴛɪDECO machines and with all the bar-feeders provided by the company.

### Developed properties

**T**he TB-DECO version 6 was essentially optimized "retrospectively" to allow for the subsequent input of a unicode language so that user interface can be carried out in any language.

**F**rom now onwards, programming aids will be in HTML (Internet type) format, which will enhance their simplicity of use and user-friendliness.

### TB-DECO communication system

**T**he PC->PNC communication systems on DECO have developed, as have also the numerical controls and different operating systems installed in the PCs. Two communication systems are currently distinguished:

◆ Communication via interface RS-232 using a serial cable.

◆ Communication via interface PCMCIA using a PC memory card.

### The technology of the memory cards used is as follows:

◆ SRAM / storage in volatile memory. The information is stored by way of a stack.

◆ ATA Compact Flash / non-volatile memory. The information is programmed in the memory in a static manner.

*Warning: these cards are only compatible with the DECO machines supplied from 2002 onwards.*

**W**ith respect to the PCMCIA interface, it is up to the manufacturer of the PCMCIA memory support to provide the driver corresponding to the operating system used. However, in practice, this is not always the case and installation can sometimes be somewhat risky.

**A**ccount should also be taken of the fact that the SRams are an exotic product compared with the standard ATA Compact Flash, which is used in equipment with multimedia numeric acquisition and is, therefore, fully adapted to the latest Windows operating systems (WIN XP /2000).
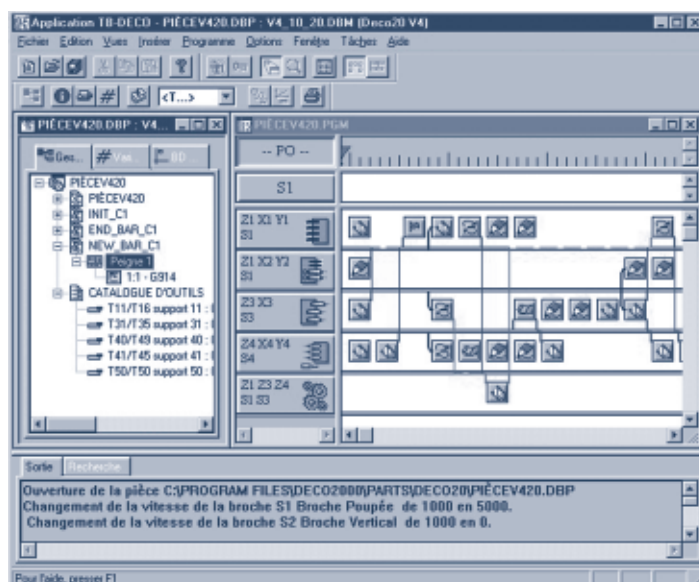
**T**hey do not function in theory under windows NT.

*The use of that kind of numerical support is exclusively dedicated to the machines sold since 2002.*

**W**orking with these new cards on older models can generate problems and in worst case go until damaging the numerical control. In case of doubt, don't hesitate to contact the TORNOS specialists.

---

**T**he importance of numeric control is seen in the development of communication systems for the DECO.

**A** summary is shown below:

| | Year | RS-232 | SRAM | Compact Flash |
|---|---|---|---|---|
| DECO 7/10 1st version | 96-01 | Yes | - | - |
| DECO 13/13b/20/26/MᴜʟᴛɪDECO | 97-01 | Yes | Yes | - |
| DECO - All | From 02 | Yes | Yes | Yes |

DECO
MAGAZINE

Editorial
Forum
Interview
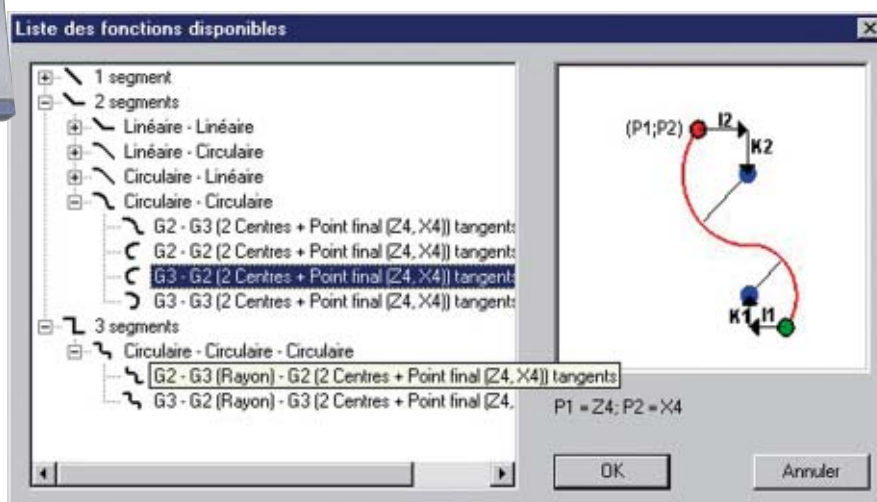News
Presentation
Technical
The present

News

# TB-DECO

## A tool that never stops developing.



SRAM



It may transpire that some incompatibility could occur, for example, some of the current portable PCs on the market no longer have an RS-232 interface!

Consequently transferring a program to an old DECO 10 is now impossible! (See table above). There are, of course, many converters, such as the USB (universal serial bus) port, which makes it possible to simulate the RS-232 interface. However, it was found that installation and, above all, operation could create problems during transmission. This is why, in this particular case, when purchasing a new portable PC, always ensure that a true RS-232 interface is provided.

For the new machines, we recommend a PCMCIA interface with ATA Compact Flash and Windows 2000.

In all cases, a newly purchased PC has enough capacity with respect to RAM and processor.

TORNOS clients are therefore spared the obsolescence of CNC machine fleets thanks to the DECO concept!

**Minimum configuration**

PC compatible with CD reader

Processor: Pentium 400 MHz

Disk space required: 60 Mb

RAM: 128 Mb

Screen: SVGA 256 colors

Communication ports:

RS-232 for the "old machines" (see table)

PCMCIA interface

ATA
Compact flash

DECO MAGAZINE

Editorial
Forum
Interview
News
Presentation
Technical
The present

Presentation

E

# Saving time

## thanks to the pre-adjustable tool-change system for automatic single and multi-spindle lathes!

**Tool changes are still the main reason for long and expensive times when the machines are not in production. This is particularly the case with automatic multi-spindle lathes, where tool changes represent an enormous waste of precious production time. Any cutting back of this unproductive time loss by the corresponding investments, represents an immediate gain. The Göltenbodt company of Leonberg offers a pre-adjustable tool-change system appropriate to automatic lathes, in particular multi-spindle lathes, which provides numerous benefits to its users.**



*Tool system*

### Price competition

**M**ore and more companies in the small parts turning trade are finding themselves trapped in a downward-spiralling price trend. The prices paid by customers placing orders are going down whilst quality requirements are going up and batches are getting smaller, in line with the "just in time" production concept. All this sorely tests the profitability of companies.

**O**ver the last few years in the small parts turning trade, a 30% drop in prices was recorded as a result of the competitive war in Europe in particular, with its pressure on prices. The introduction of statistical quality control methods coupled with ever tighter production

tolerances are forcing companies to over-reach themselves. The tolerance range of the part being executed frequently corresponds to the acceptable wear of the cutting tool. It would now be expedient to proceed with particularly fine tool adjustment.

**B**ut this is no longer the case, as no production plant can hold enormous stocks. The parts forming the series runs are often undergoing development, meaning that the company has to show greater flexibility.

**D**espite this, a considerable number of small parts turning companies reverted to storing parts at their cost, so as to enable them to continue manufacturing large

series runs. This way, they can compete within the tight price range demanded by their clients. With this in mind, long machine downtimes must be avoided. A change in series run can result in one third of the time being unproductive, purely on account of tool-changes. Setting up a cam operated automatic lathe often requires one working day, if not more. It goes without saying that the automatic NC lathes offer numerous advantages, but unfortunately, the tools used hardly provide the same savings in flexibility.

**T**he Leonberg company has developed a tool change system – GWS – specially designed for automatic multi-spindle lathes. This system provides real benefits in terms of precision, flexibility and tool changing.



*Tool pre-adjustment equipment*

# Saving time

## thanks to the pre-adjustable tool-change system for automatic single and multi-spindle lathes!



*Tool collet with internal cooling*

### A flexible tool system

**T**his system is built on basic plates specific to each lathe, which are available for all types of automatic lathe currently available on the market.

**T**he basic plates accommodate the quick-change tool holders, which hold the actual cutting tool. These latter operate independently for all types of cutting tools, irrespective of their origin.

**B**ecause the mobile section is secured to the base plates by way of two semi-spherical ribs, the manufacturer can also guarantee extremely high tip precision up to a value of 5 mm. Clamping is achieved by eccentric cams or tension elements in the form of a rhombus.

**T**his system has also proved to be very strong, so that extreme production conditions can also be overcome. The feature of this system is a pre-adjustment facility of the tooling, located away from the machine on a dedicated unit. When changing a series run, all that needs to be done is to fit this facility onto the automatic lathe. In this way, tool pre-adjustment takes place in hidden time – in other words, whilst the lathe is in production. This applies both to a single change in cutting tool and to changing entire series of tools, when setting up the machine for a completely different part.

### Produce rather than shut-down

**T**he setting up work involved when changing production to a completely new part, usually takes between 8 and 10 hours. In this specific case, the GWS system can reduce down-times by as much as two hours. Changing one tool alone takes around 1 to 2 minutes. On average, the time to change the tooling has been reduced by more than 60 % compared with a conventional system. If we consider the fact that the portion of time for changing a tool when setting up automatic multi-spindle lathes takes about one third to three quarters of the total tool-change time, this must be regarded as quite a significant advantage.

**W**ith this system, the manufacturing plants can now satisfy customer requirements more quickly and with greater flexibility.



*Tool collet with change head for ISO plates, cut-off systems, 4 kt and rough columns, complete with internal cooling.*

DECO
MAGAZINE

Editorial
Forum
Interview
News
Presentation
Technical
The present

Presentation

E

*Fast drilling spindles with internal cooling, up to 80 bar*

## Conclusion

**W**ith this pre-adjustable tool change system, operators of automatic multi-spindle lathes can now enjoy the facility of producing more whilst reducing machine down-times when changing series runs. Attach these to the benefits of TB DECO and changeovers can be minutes instead of hours.

**W**ould you like further information? The specialists at Göltenbodt and TORNOS are available at the following addresses.

*GÖLTENBODT*
*Präzisionswerkzeugfabrik GmbH*
*Röntgenstrasse 18-22*
*D-71229 Leonberg (Höfingen)*
*Tel. +49 (0) 71 52-9 28 18-0*
*Fax +49 (0) 71 52-9 28 18-18*
*E-Mail: info@goeltenbodt.de*
*Homepage: www.goeltenbodt.de*

*TORNOS SA*
*Rue Industrielle 111*
*2740 MOUTIER*
*Tel. 032 494 44 44*
*Fax 032 494 49 03*
*E-mail: contact@tornos.ch*
*www.tornos.ch*

**A**nother major benefit of this system is the following: whilst still in production, the tool holders can be fitted and pre-adjusted with the cutting tools for the next order, irrespective of the type of tool.

**I**t is therefore possible to store an already equipped support, ready for the frequent repetitions of series-produced parts. In such cases, the total setting up time can be reduced even further. Based on the construction principles of a tool change system, this would lead to greater repeat accuracy, as well as consistent quality of series-produced parts.

**D**epending on circumstances and the production parameters, it is possible to achieve a return on the investment of the system within a year or even less.

**G**öltenbodt offers three standard sizes, with which it is possible to equip more than 40 types of automatic lathes. Specific tool holders may also be supplied on request.

**A**part from offering customer consultancy services, Göltenbodt will also be pleased to assist during the setting up work, at workshops, during tests or when presenting an automatic multi-spindle lathe in its product presentation centre at its head office.



*Product presentation centre*

# Contract shop
## evolves from conventional CNC machines
## to advanced Swiss technology
## to grow business

*With a machinist's background and an entrepreneurial spirit, Ron Hunt always wanted to go into business for himself. He established Hunt Design and Manufacturing, Inc. in 1976 in Arab, Alabama out of his carport with one Bridgeport milling machine. Next came the purchase of a CNC milling machine that allowed the company to compete with bigger shops and earn its share of aerospace and defense industry work available from nearby Huntsville in the mid-1980s. Hunt Design grew to 30 employees, more CNC machines, and larger quarters. But when the defense work fell off, Ron Hunt knew his company was at a turning point.*



*The Hunt family, from left to right, Barry, Brent, founder Ron, and Chris Hunt.*



*Hunt Design's purchase of four DECO machines has enabled the company to reposition itself among the competition.*

Ron Hunt had seen many jobs come across his desk that his company couldn't bid on because they didn't have the right equipment: small, complex parts suitable for Swiss-type machines. He first saw a Swiss-type machine in the early 1990s and was familiar with its capabilities. In 1999, Ron and his management team started comparison shopping and decided to buy a TORNOS DECO 2000 single spindle, Swiss-style CNC sliding headstock machine from their distributor, C & S Machine Tools. According to Ron, buying the DECO 2000 was really a "leap of faith" because they didn't have any jobs it could be used for, but he believed there was a need that could be filled with it.

"What sold me on the DECO 2000 was its uniqueness due to the twelve independent axes and counterspindle that allows you to do simultaneous machining operations," said Ron.

Vice President Barry Hunt agreed, adding, "the DECO 2000 can't be beat in terms of setup and cycle time. And even though the pro-gramming is a bit different from a conventional CNC, anyone can learn to program a machine. The technology is much more important."

The TORNOS DECO technology is a complete system that consists of the machine, the PNC (parallel numerical control) control, and TB-DECO software. The system is designed to slash as much idle time as possible to minimize overall cycle time. A central clock functions as an electronic camshaft – virtual cams. Just as a camshaft synchronizes operation of individual cams on a cam-operated Swiss automatic, the PNC-DECO control's synchronized the tool movements. Thus, according to TORNOS, this is the only computerized Swiss type machine that can produce parts as fast or faster than conventional cam-types.

Together, the Hunt team spurred the company's progression to DECO technology. Barry, for example, knew that Swiss technology was crucial to the company's long-term success, and that they needed to buy a machine versatile enough to

DECO MAGAZINE

Editorial
Forum
Interview
News
Presentation
Technical
The present

Presentation

E

handle any work that came into the shop. "One of our favorite stories is about a customer who had a very complex part that needed to be made," said Barry. "Several shops in the Southeast had tried to make it, all with no success. The customer then asked us to try it. After two months and a lot of hard work, we produced it with the DECO 2000 and met the customer's expectations. That customer is one of our largest customers today."

**A** specific case in point is a family of parts Hunt produces for the semiconductor industry. These are "glands" that have to be of ultra-high purity, and high finish is the name of the game. The parts range in size from $\frac{1}{2}$" to $\frac{3}{16}$" and have various structural designs. There cannot be any scratches or burrs on the inside diameters, no voids or contaminants that could cause damage to the semiconductor chip. The DECO 2000 allows them to produce this part with a high degree of precision due to its centering capabilities. It also makes them competitive with multispindle machines because of the independent axes – one-half of the part can be run on the top spindle and the other half on the bottom. Barry stated that they have produced between 200,000 and 300,000 of these parts
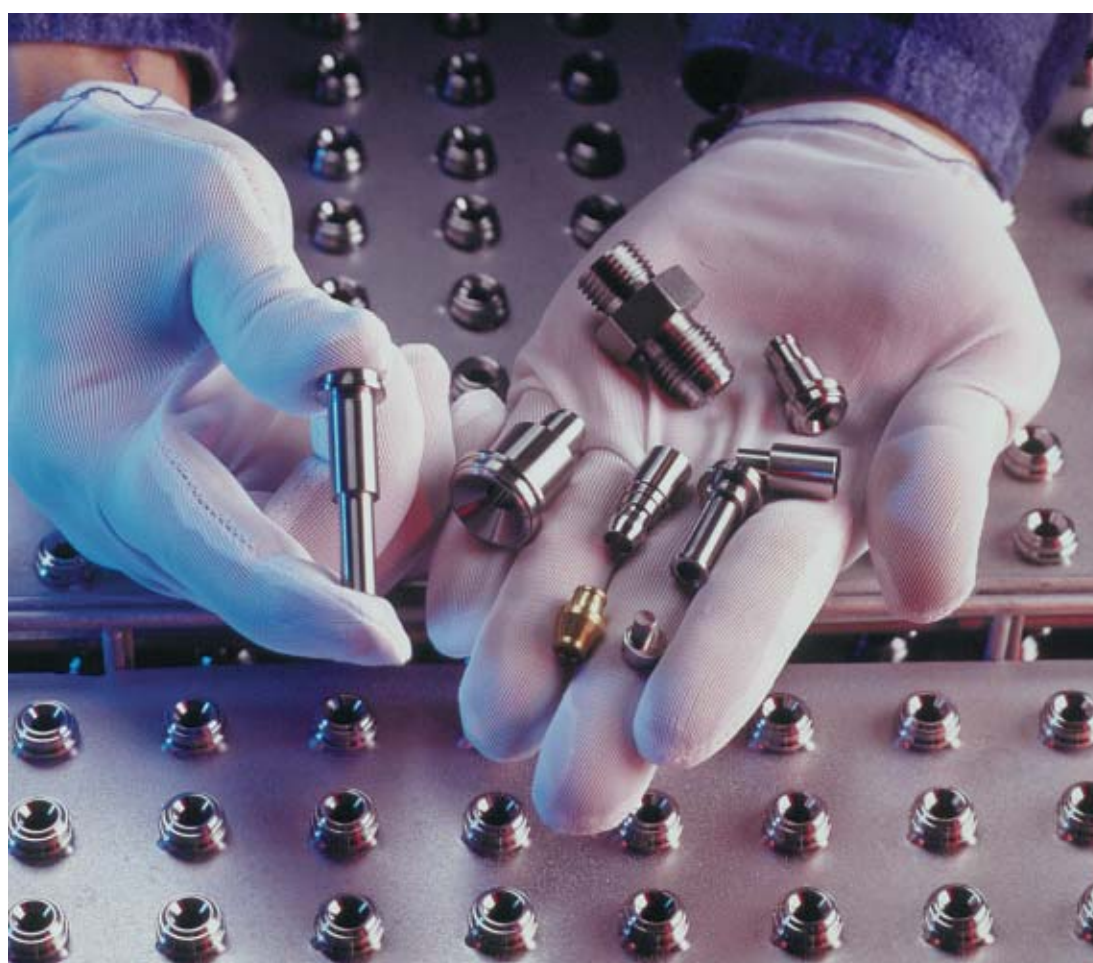


*Hunt Design machines this family of parts, which require fine finishes, for the semiconductor industry using the DECO 2000.*

# Contract shop

## evolves from conventional CNC machines

## to advanced Swiss technology

### to grow business



*Parts are machined simultaneously on the top and bottom spindles of the DECO 2000 and many machining operations are performed at the same time also, virtually eliminating idle time and boosting productivity.*

during the past 18 months, and have never had a part rejected due to ID finish, the most critical aspect of the job.

**B**rent Hunt, who runs the TORNOS department, stated, "you can run a mirror image part in half the time that you could run it on any other Swiss machine." He described the process for machining the most complex semiconductor gland, a part that is 1.700" long. On the main spindle, the first face is parted off on the center drill, and a small chamfer is left on the front edge of the part. It is then drilled to a .167" hole, which is a blind hole, then rough reamed to a .176" diameter. Two different diameters are turned on the OD: .251" and a .346". Both are then roughed and finished. A relief groove is turned on the face, and then parted off.

**S**imultaneously, on the counter spindle, the backside of another part is machined. The end is center drilled and turned on the OD to a diameter larger than .346". The finish ream is put on (181 ream) to a 5 micro finish. "The finish is the big challenge," added Brent, "and it took a lot of ingenuity to get this high a finish." The part then goes to a toroid insert where it is formed and sealed. The tolerance for this part is .002".

"**T**he TB DECO programming software has helped increase our productivity and eliminate the need for secondary operations," explained Brent. All jobs are run on-screen and the program performs a simulation to identify any problems before it downloads. The DECO program also differs from conventional CNC software; it is set up in blocks of programs instead of

lengths. Each axis has it's own program. It increases productivity because it performs several functions simultaneously, as opposed to conventional programs, which can perform only one function at a time. The program is able to accommodate alternative ways of doing things to make parts run more quickly, or even unattended."

**T**B-DECO runs on Microsoft Windows®. In essence, a programmer selects the required tool for each operation and enters its geometry. Then he or she writes a corresponding machining program for the tools using standard, CNC G-codes. The software then calculates and recommends the optimum sequence, enabling the programmer to get the best use of the DECO's several tool holders and avoid crashes. The software incorporates canned cycles that speed up the programming process, such as part cut-off and pick-up by the counter spindle, and advancing bar stock.

"**T**hen it shows you the production time," adds Brent. "The programming sounds more complicated than it actually is, and it's difficult to make mistakes. There are a lot of safeguards built in. It's just different, that's all, and the learning curve is worth it when you see just how fast it operates. It really does eliminate idle time!"

DECO
MAGAZINE

Editorial
Forum
Interview
News
Presentation
Technical
The present

Presentation

E

*Andy Isom examines the parts for finish and purity.*

**C**hris Hunt, who has been with Hunt Design for eight years, heads up Purchasing and Inventory Control. He explained how the DECO machines have impacted his job. "Because we run the same tools day in, day out, it is critical to have the tools in here to maintain productivity. Certain tools, such as the toroid insert, are specially engineered and designed for us for the semiconductor job by a single manufacturer. Very minute amounts of tolerance in the toroid insert can affect the running of parts. For instance, some of these tools will run 100 parts before they wear out, whereas another might run three parts and then wear out."

**P**articularly for large jobs that run about 250'000 pieces, inventory control can be a challenge. Because Hunt is a small operation, they can buy only 4,000 to 5,000 pounds of material at a time. "But the upside is that," adds Chris, "with 250'000 piece jobs in the house, the company's financial condition has improved significantly, thanks to the DECO 2000 machines and our team."

**B**uying the DECO 2000s (they now have four) has enabled Hunt Design to reposition itself among the competition and change its long-term marketing strategy. According to Barry, they can attract different types of work, especially high-precision jobs, because of the technology and versatility of the machine. They have increased job size (over 1'000 pieces) and evolved from a job shop into a high-capacity manufacturer of precision parts. Building on its reputation for quality products, Hunt Design is able to attract the type of customers it wants: companies interested in high-quality production, reliability, and on-time delivery, not just the bottom-line. And Ron has been able to step back and leave the day-to-day operation of the company to his sons, Barry, Brent, and Chris, and a skilled and loyal staff.



*Tony Clark is about to download the program of the part, which is done on a desktop PC with the TB DECO software and stored on a magnetic card.*
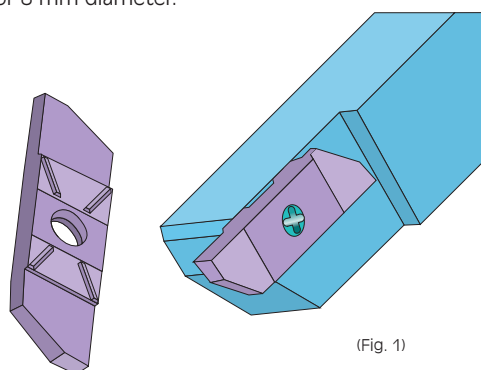
# Tooling

## for small parts turning
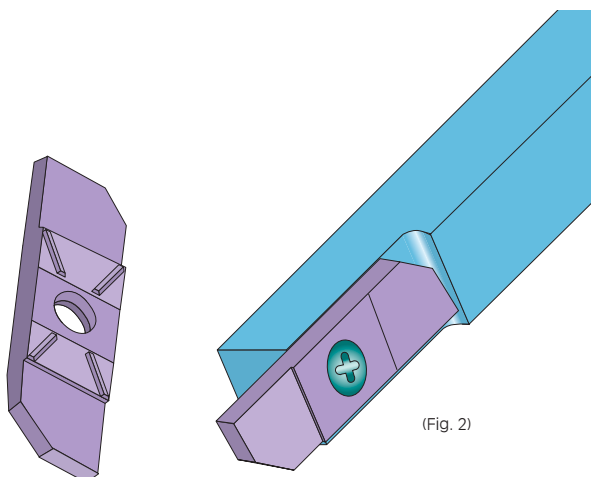
## New X-centering 400 – 800 line.

**New market requirements encouraged BIMU to develop a new line of tools for automatic lathes.**

**X-centring 400** (figure 1) is designed to cut parts up to a maximum of 8 mm diameter.



(Fig. 1)

**X-centring 800** (figure 2) is designed to cut parts up to 20 mm diameter.



(Fig. 2)

**T**he innovative feature of this system lies in the insert fixing system (patent applied for). Around the fixing screw is a cross in the shape of an X, which is positive in the insert and negative in the tool holder, thereby making it possible to obtain auto-centering around the fixing screw.
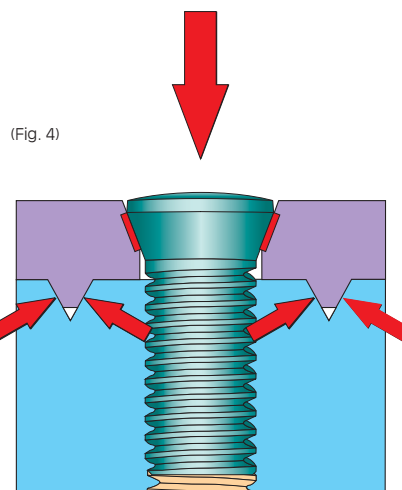
### Insert positioning.

**T**he cross in the shape of an X ensures insert positioning in all axes (figure 3). The shape of the cross, which was specially designed, guarantees perfect contact with the four branches and therefore, a good insert fit.
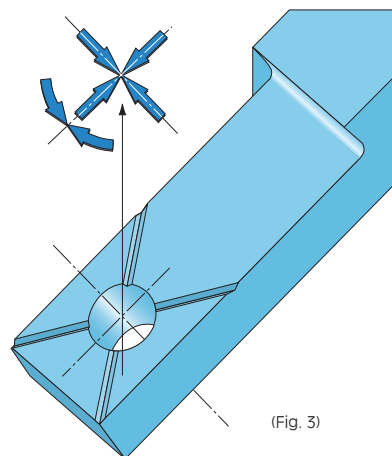


(Fig. 3)

**W**ith this new style of fixing, the screw is not subject to any shearing stress. The entire clamping force is available to hold the insert in the tool holder (figure 4).

(Fig. 4)

**DECO**
**MAGAZINE**

Editorial
Forum
Interview
News
Presentation
Technical
The present

Technical

E

**Advantage of the new system:**

◆ Repetitiveness of the cutting edge + 0.01mm (figure 5)

◆ Positioning in all axes ( X )

◆ The screw is free of all radial stress

◆ Accessibility to the clamping screw.

◆ Insert turning without having to remove the screw

◆ Faster change of inserts using only one screw

◆ Two cutting edges available.

± 0,01

± 0,01

± 0,015

(Fig. 5)
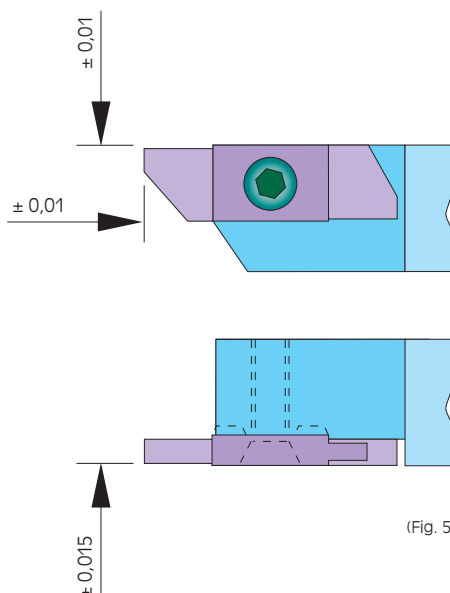
# TTS Tecko super rapid change system
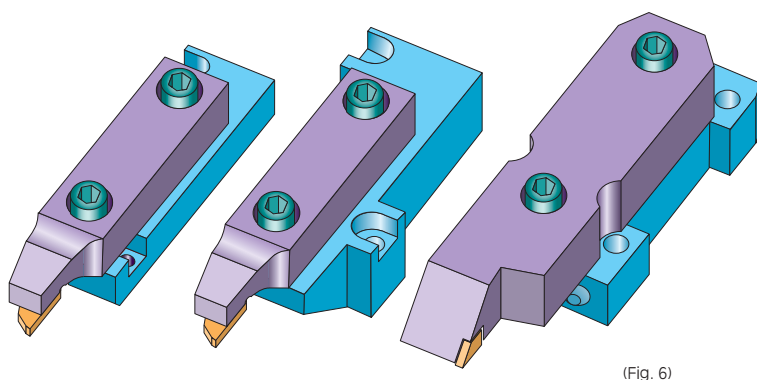
DECO 10          DECO 13          DECO 20 – 26

(Fig. 6)

Application example on the DECO 13a

**R**apid change tool holders are designed to be fitted to the DECO 2000 lathes, capacities 7 mm to 26 mm (Figure 6). A base plate for fixing the insert holder is required for each type of machine.

**T**TS Tecko is designed to accommodate the cutting inserts most commonly used.

**T**he rapid change consists in turning the clamping screws twice with a spanner to remove and replace the insert holder.

**T**he Quicklock screw is used for clamping and positioning a standard size DIN screw (Imbus screw).

**Advantage of the system:**

◆ Rapid change

◆ Extreme strength

◆ Tool section increased by 15 x 20 for DECO 7, 10, 13

◆ Easy chip removal

◆ Repetitiveness of tool holders + 0.005 mm.

◆ Only two sizes of insert holders required for the DECO program.