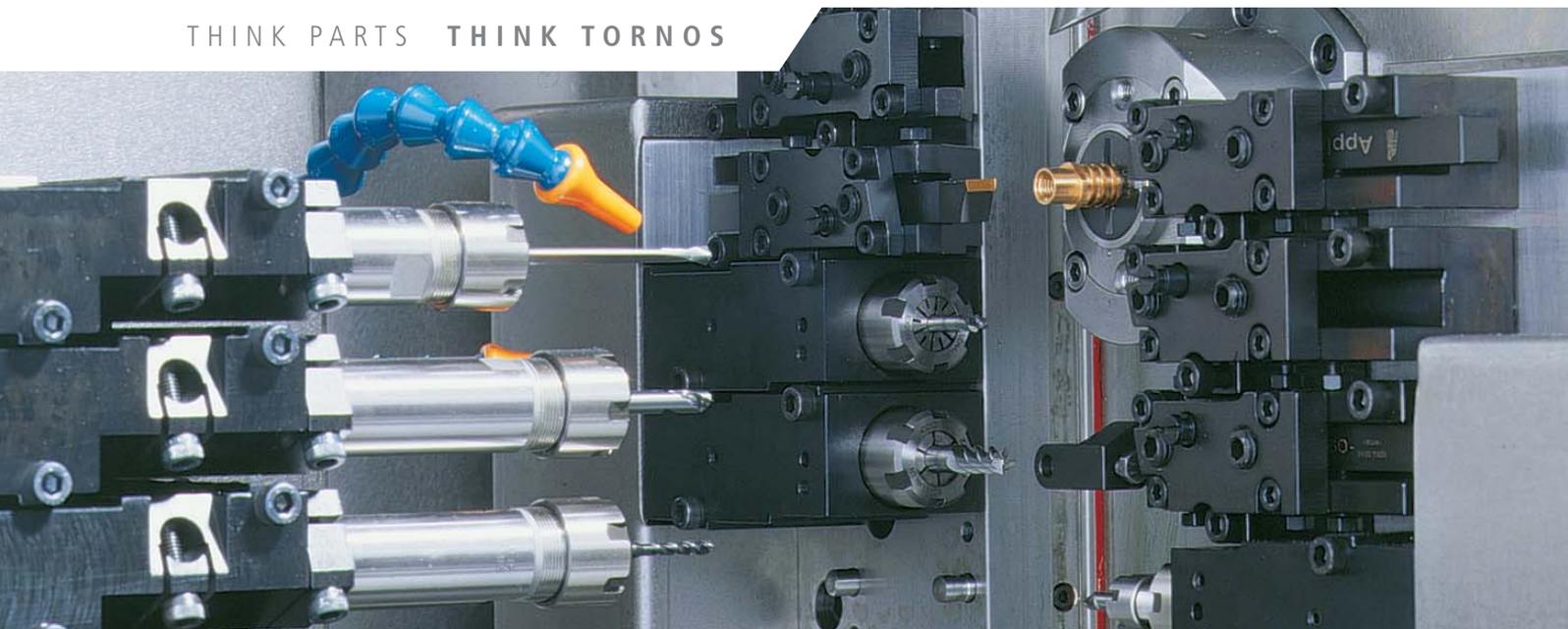




THINK PARTS THINK TORNOS



DECO 13a

The DECO generation
single spindle automatic lathe with sliding
headstock and parallel NC

TORNOS IS A SOLUTION PROVIDER FOR THE HIGH TECH INDUSTRIES INCLUDING

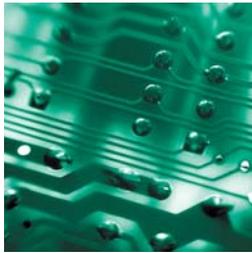
Automotive



Medical



Electronics



Watchmaking & Micromechanics



DECO 13a
THE DECO GENERATION SINGLE SPINDLE AUTOMATIC



LATHE WITH SLIDING HEADSTOCK AND PARALLEL NC



DECO 13a

- Very complex parts
- Efficient lights out machining
- Ideal for medical-dental

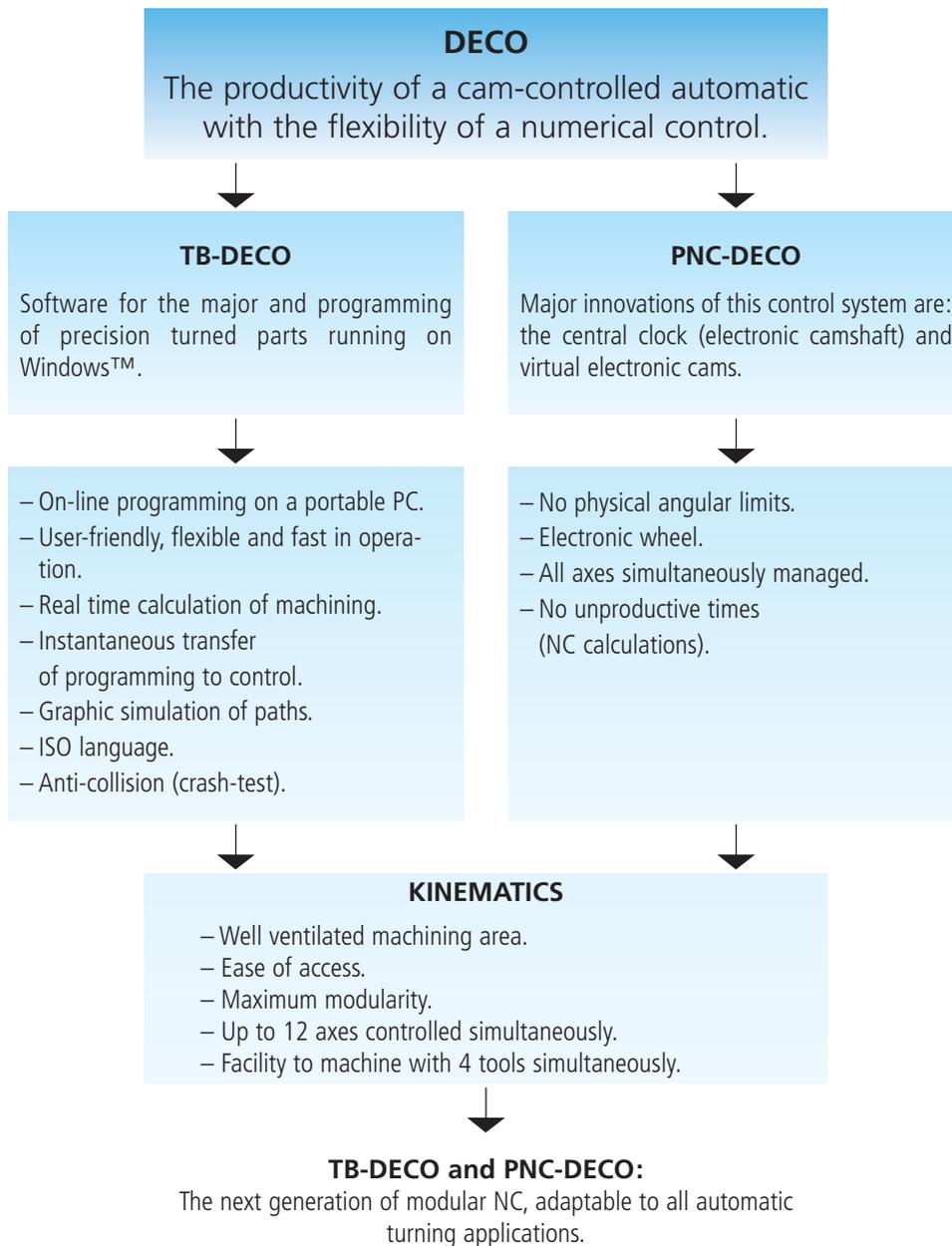
Joining together the advantages of both past and present conventional control systems in the same product

In re-affirming its status as an innovator, Tornos is capitalising on its glorious past, its vast experience with the DECO 2000 and the re-structuring of its company, so that you can now contemplate, in peace and quiet, the course of the 21st century with respect to small parts turning and machining of simple to highly complex parts.

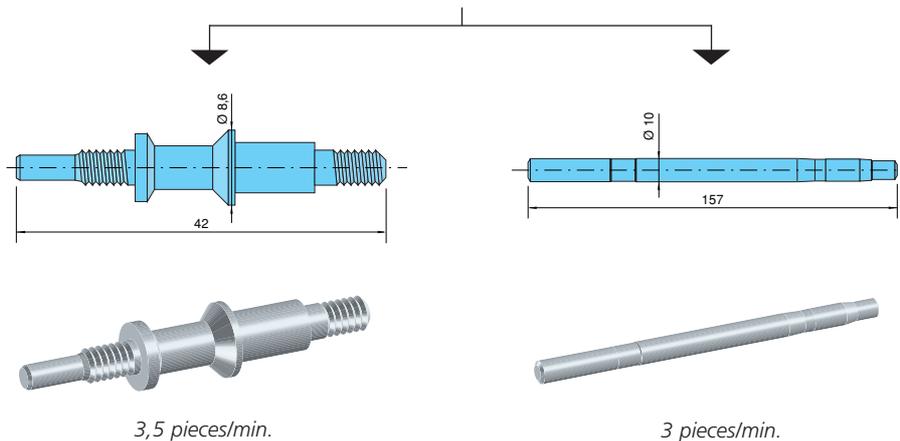
Discover DECO 13a, yet another revolution in small parts turning!

DECO 13a
FAST RELIABLE PRODUCTIVE FLEXIBLE
VERSATILE ACCURATE



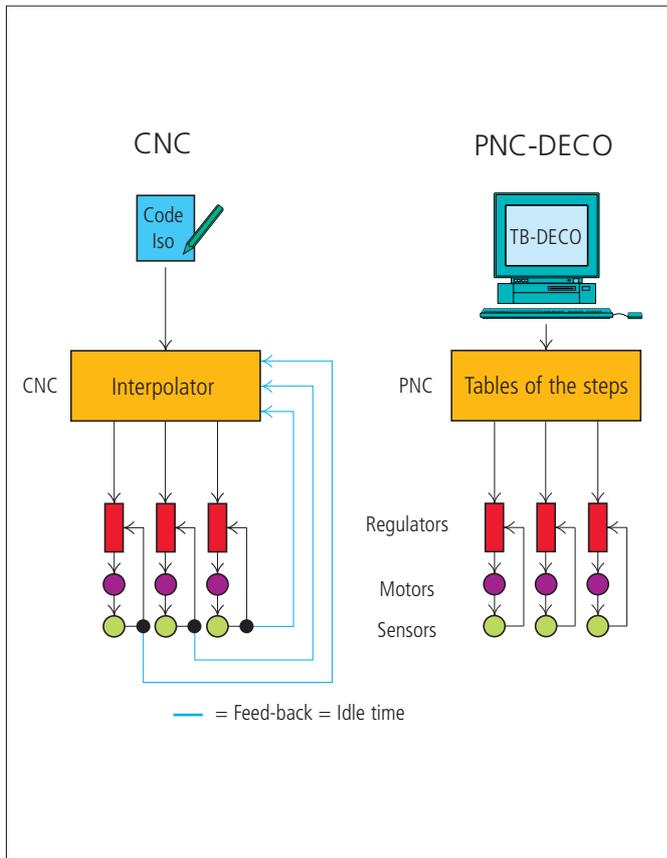


TB-DECO and PNC-DECO:
Highest productivity rates with simple or complex precision turned parts.



DECO 13a

PNC-DECO PARALLEL NUMERIC CONTROL



A major development in numerical control
The TB-DECO calculates the axes paths and stores these by computer, in tables (virtual cams).
A clock synchronises path reading (virtual camshafts).

As opposed to conventional NC which loses vast amounts of time in calculating and transcoding the G code into machine language, the machine control merely reads the tables generated by the TB-DECO and sends control pulses.

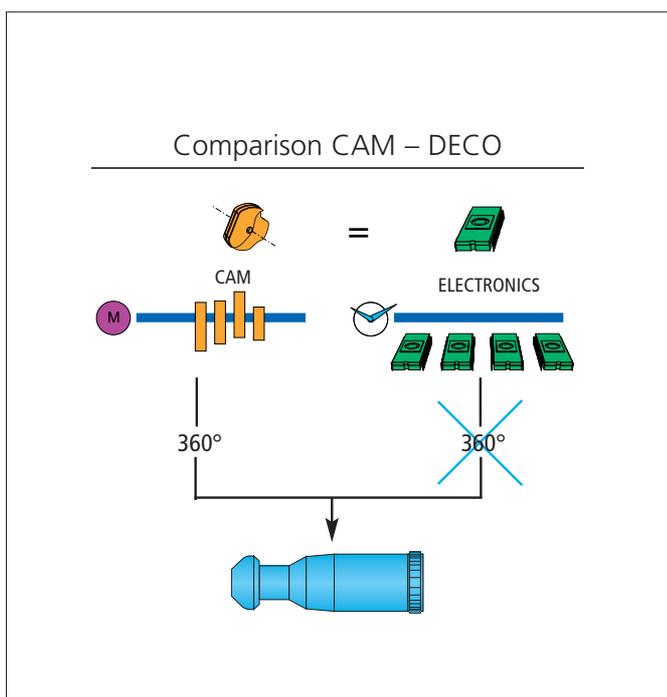
Added to the fact that this process now makes it possible to execute operations which are highly difficult, if not impossible with conventional NC machines, the TB solution also offers many other benefits:

- no unnecessary inspections
- maximum flexibility
- programming freedom
- machine speed not dependent on the machine processor
- rates of production similar to the best cam operated machines (depending on parts).

Hence, the inescapable passage of time and the rapid changes in information technology will not affect the performance of the DECO 13a. All calculations and improvements are performed "off-machine" on a single PC (which is only likely to undergo an increase in capacity) at the same rate as the computing system, the useful life of which is becoming shorter and shorter.

The process of energy optimisation is another aspect guaranteeing the long life of the DECO 13a.

All paths are executed "just-in-time". Why accelerate or brake suddenly, if smooth, flexible movement, which conserves energy and is kind to the machine, is possible? This optimisation gives a deceptive appearance of slowness when watching the machine operate. However, do not be fooled – the DECO 13a is at least 20% faster than a conventional NC (according to the parts).



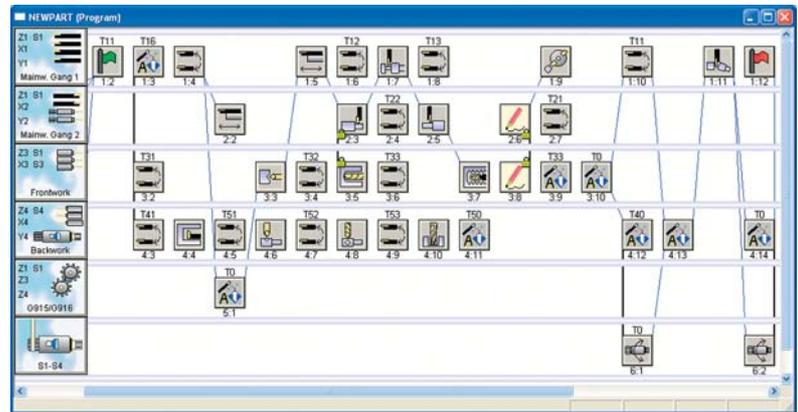
TB-DECO PROGRAMMING SOFTWARE

The patented TB-DECO interface has been entirely developed by Tornos. It takes into account all the aspects of the specific programming and machining methods of sliding headstock automatics. Running on Windows, it also offers the easy use of that well known interface. The system is ergonomic and permits simple, logical and rapid programming. The (SIM-DECO) simulator provides a rapid display of paths and programme control. Once the programme has been prepared with the software, it can be transferred immediately to the PNC-DECO control. All the programming operations are effected automatically. It is possible to programme in any place, on any PC.

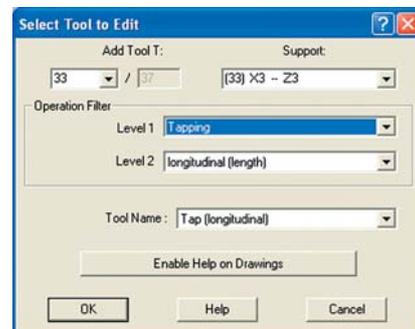
The physical link is a cable connected to a computer next to DECO 13a or by Memory Card. The computer may be a work-station or a portable PC. Direct programme transfer from the programming office is, of course, possible if the office is connected on-line. The Tornos training centre allows the operators and future operators to discover all the fine points, allowing them to benefit from all the power of the DECO 13a.

Programming an automatic lathe on PC!

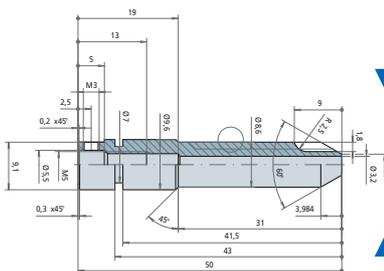
Using a design whereby the PC is separate from the numerical control of the machine, Tornos has introduced full work management flexibility. With programming carried out 100 % in hidden time, e.g. on a notebook, parts can be planned at any time anywhere.



Programming the operation sheet of a DECO



Selecting the tool to be edited



DECO 13a

A VERSION AVAILABLE FOR EVERY APPLICATION, FROM THE SIMPLEST TO THE MOST COMPLEX

With a view to presenting a most highly efficient machine whilst retaining the flexibility to meet customer requirements, the DECO 13a is based on market and customer needs, especially of those clients already operating a DECO.

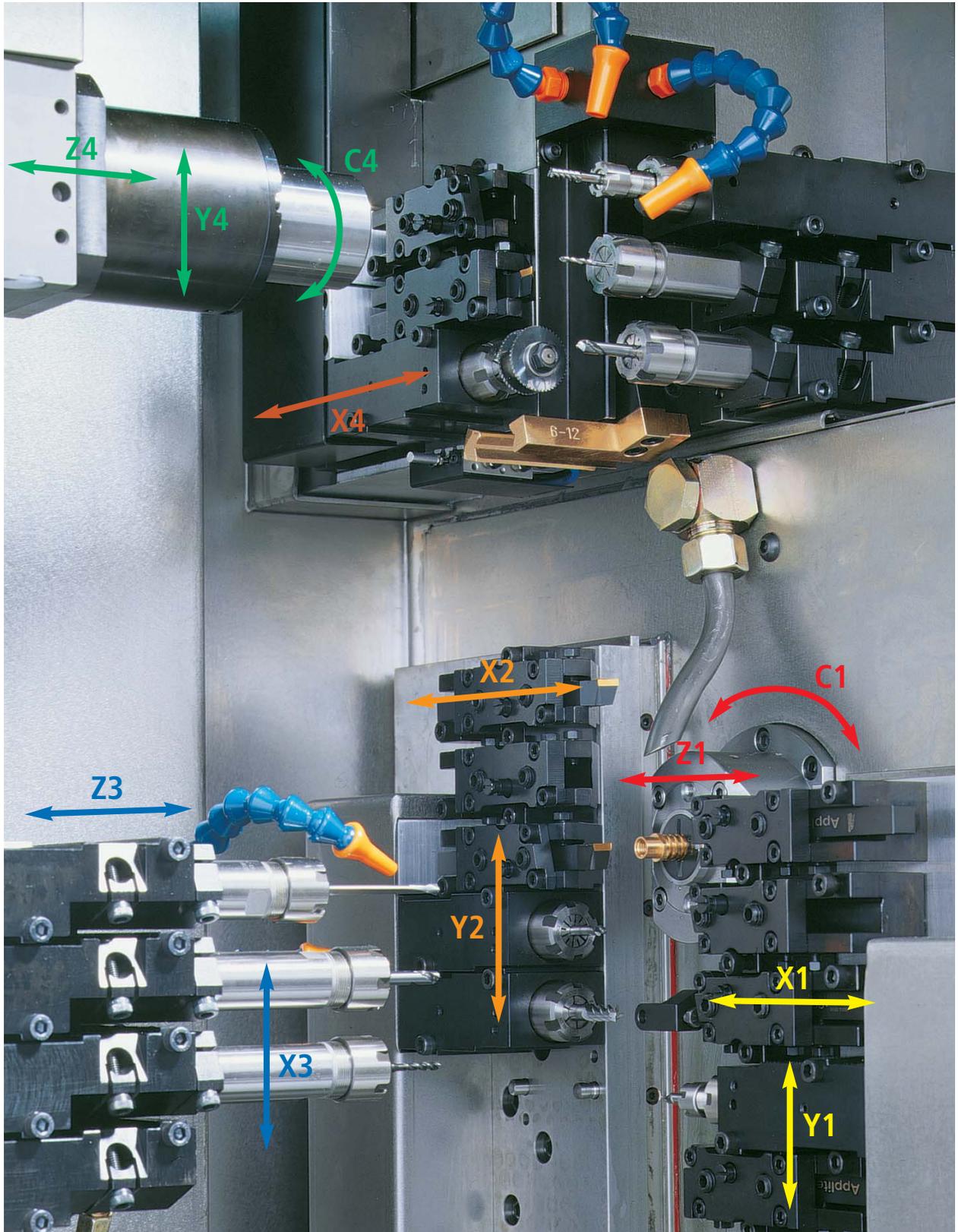
The well equipped machine has 10 axes with independent combination and counter-spindle and 20 tools, 15 of which rotate. The machine can also be fitted with axes C1 (spindle) and C4 (counter-spindle) as an option, which will further enhance its potential.

A system with interchangeable tools

The modular tools system further increases the machine's conviviality:

Tools	Can be used on platen 1	Can be used on platen 2	Can be used on end attachment	Can be used for counter-operations
Turning tool holder	X	X	X	X
Turning spindle unit	X	X	X	X
Fixed spindle unit	–	–	X	X
Polygoning tools	–	X	–	X
Internal whirl cutter	–	–	X	X
External whirl cutter	–	X	–	–

DECO 13a KINEMATICS



THE DECO 13a LATHE AND ITS 10 AXES

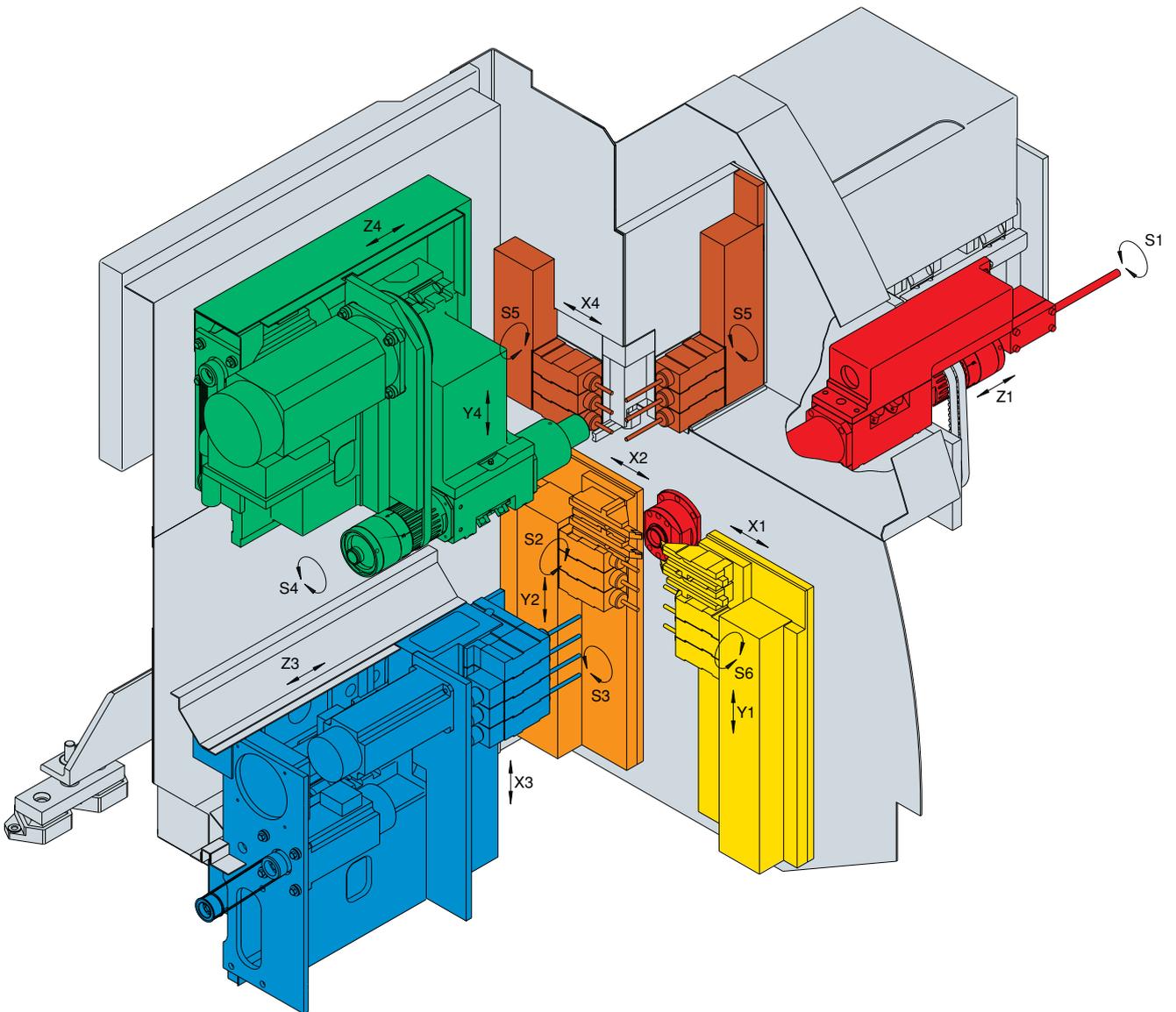
10 axes (+ 2 C-axes as an option) and 15 turning tools for 4 independent tool systems enable parts to be machined within a minimum time, using very simple tooling.

Z1	C1	S1
Headstock	C-Axis headstock (option)	Main spindle
X1 / Y1		S6
Platen 1 (cross slide 1)		Turning spindle on guide bush – axes X1/Y1 (option)
X2 / Y2		S2
Platen 2 (cross slide 2)		Turning spindle on guide bush – axes X2/Y2 (basic)
X3 / Z3		S3
End unit		Turning spindle on end attachment (option)
Z4 / Y4	C4	S4
Counter-spindle	C-Axis counter-spindle (option)	Counter-spindle
X4		S5
Counter-operations		Turning spindle – counter-operation (transverse and longitudinal) (option)



- Maximum modularity.
- Possibility to machine with four tools simultaneously.

Presetter



DECO 13a

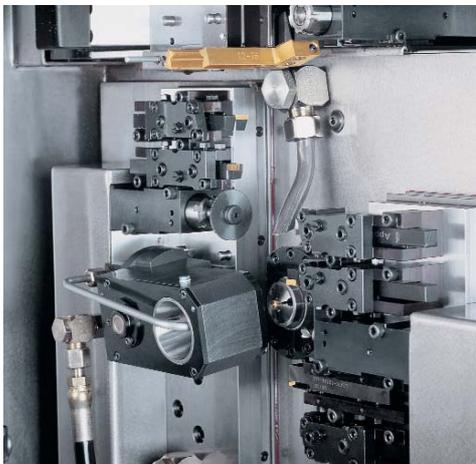
KINEMATICS

Tornos guarantees an excellent machine configuration to fit our customers needs.

Optimal machining conditions are offered by the machine's ergonomics and simplicity; with good visibility of the machining area.

The unique features of the numerical control permit the following operations with the high productivity of a cam controlled machine:

- Turning with 2 simultaneous tools which can be separately interpolated so as to achieve rough turning and finishing at the same time.
- Transverse operations at the guide bush with 6 turning spindles (2 x 3) and axes Y1/Y2 so as to achieve cross milling, eccentric drilling, slitting etc., frequently simultaneously.
- Polygoning flats or contours (synchronised speed of rotation).
- Facility of interior/exterior thread whirling.
- Independent end unit (2 numeric axes) with 4 spindles, one of which is fixed and three which rotate.
- Threading and tapping by way of the differential principle so as to optimise productivity.
- Simultaneous turning and drilling (optimum feed and speed control).
- An independent counter-spindle with 2 numerical axes and 6 counter-operation stations on one numerical axis, thus multiplying the services provided by the DECO 13a. These three axes enable centering of the work positions, they provide the facility of having 6 counter-operation stations, they provide 100 % counter-operation optimisation in masked time, linear and circular interpolation on 2 or 3 PNC axes to authorise turning, thread chasing, milling, milling with C-axis, interior thread whirling, polygoning etc...
- Main spindle and opposite spindle have programmable spindle positioning for all kinds of milling operations or other machining requests.
- Optimized management of feeds and speeds (no excessive efforts on material). Tools enter the material at the ideal moment, no waiting time.



Thread whirling attachment.



Radial polygon milling attachment, max. rotation speed 8000 RPM.

- C-axis function at main and opposite spindle. Permanent indexing will permit to produce very specific shapes.
- Transverse operations at the guide bush with 6 turning spindles (three on X1 and three on X2) and axes Y1/Y2 for cross milling, eccentric drilling, slitting or gear cutting by generation.
- Milling of inner/outer threads by whirling (applications in medicine and dentistry).
- Milling of threads by interpolation of 3 axes (including cross tapping).
- Milling in polar co-ordinates (function Transmit).
- Devices for the machining of long workpieces.
- Device for deep drilling with high pressure 140 bar and 350 bar.



Each of these characteristics linked to the basic design offer:

- Powerful and efficient motor drives
 - Outstanding thermal stability
 - Large swarf bins
 - A continuously adjustable coolant flow
 - Clamping of the headstock and counter operation with variable adjustment
- make the DECO 13a a very productive tool.



Unit with revolving drilling / milling spindle.



Presettable tools holders.

A BARLOADER, 100 % DESIGNED AND DEVELOPED IN HARMONY WITH THE MACHINE FOR WHICH IT WAS PLANNED!

ROBOBAR SBF-216

- Reduced space requirement.
- Optimum integration.
- Guaranteed bar guide.
- Machine incorporated control.
- Easy handling and programming.
- Joint development.
- Only one supplier for machine and bar feeder.



The total DECO 2000 solution includes peripherals specially developed for the lathe which guarantee perfect total compatibility.

The performance of the DECO 13a is increased by the auxiliary equipment.

- Your guarantee that the feed system complies exactly with the capacities of the lathes for which they were designed!
- Adopt a dedicated bar feeder! This new complete machining solution is your performance guarantee of your DECO lathe.

TECHNICAL CHARACTERISTICS ROBOBAR SBF-216

Machine	DECO 7/10a DECO 13a
Minimum bar passage	2 mm
Maximum bar passage	
- without preparation	14 mm
- with preparation	16 mm
All capacities as a single bar guide	2 – 4 mm (5.5 mm) 4 – 5.5 mm (7 mm) 5.5 – 8 mm (10 mm) 8 – 14 mm (16 mm)



System	oil bath
Round, hexagonal and square bar change-over	yes
Bar length	3 m, 12' (3 m 65), 4 m
Chute extraction	from rear
Slope capacity	18 bars with Ø 16 150 bars with Ø 2
Max. bar speed of rotation	16,000 rpm
Electrical power required	1.5 kW
Lubrication tank	50 litres
Adjustable guide steady	yes
Incorporated extension	yes
Complies with CE/CEM standards	yes
Weight	720 / 850 / 900 kg

DECO 13a

TECHNICAL CHARACTERISTICS

SLIDING HEADSTOCK (AXIS Z1) (+C1 AS OPTION)

Max. bar passage	Ø 13 (16) mm
Length of parts – revolving guide bush	180 mm
RPM of programmable spindle	100 - 10,000 rpm
Positioned stop and indexing, increment	0.1 degree
Max. spindle power	2.2 (3.7) kW

GUIDE BUSH HOLDER (X1/Y1) (X2/Y2)

No. of tools in the guide bush (fixed or turning)	2 x 5
Tool section	12 x 12 mm (12.7 x 12.7)
No. of drillers/cross millers at guide bush	6 (2 x 3)
Programmable rpm	100 - 8,000 rpm
Max. turning spindle power	0.55 (1.1) kW

END UNIT (X3/Y3)

Max. no. of fixed end tools	4
Max. number of turning end tools	3
Programmable rpm	100 - 8,000 rpm
Max. power of turning spindles	0.55 (1.1) kW

COUNTER-SPINDLE (Z4/Y4) AND COUNTER-OPERATIONS (X4) (+C4 AS OPTION)

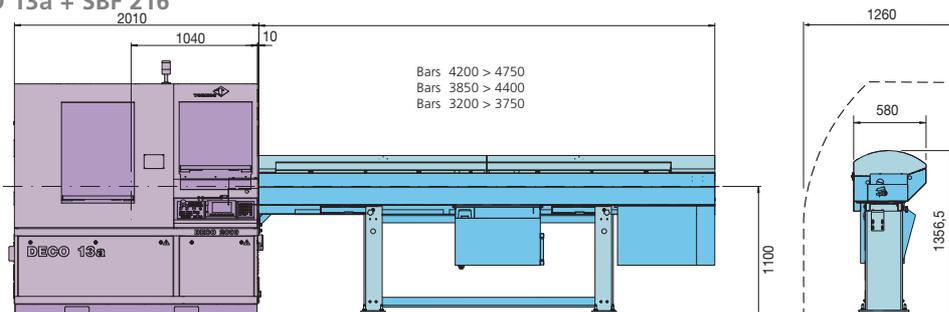
Max. diameter clamping capacity	13 (16) mm
Standard part length	180 mm
Programmable rpm	100 - 10,000 rpm
Positioned stop and indexing, increment	0.1 degree
Max. power of counter-spindle	1.5 (2.2) kW
Max. number of counter-operations	6
No. of fixed and turning spindles	6
Spindle rpm	100 - 8000 rpm
Max. power of turning spindles	1.5 (2.2) kW

PNC-DECO PARALLEL NUMERICAL CONTROL

Number of simultaneous axes	all axes
Number of axes that can be interpolated	all axes

COMPLIES WITH CE/CEM STANDARDS

DECO 13a + SBF 216



GENERAL CHARACTERISTICS

Max. length	2000 mm
Max. width	1260 mm
Max. height (window open)	1950 (2250) mm
Height at spindle centre	1100 mm
Weight	~ 3000 kg
Cutting oil tank capacity	195 l
Control pump flow rate	14-58 l/min
Chippings tank capacity	78 l
Installed power	11 kVA
Pneumatic group pressure	6 bars
Ambient working temperature	5-35 degrees
Colours: grey RAL 7035, blue RAL 5013	
CE/CEM certified	

NUMERICAL CONTROL AND PROGRAMMING SOFTWARE

Type of control	PNC-DECO
Programming software	TB-DECO
Encoder Axes Motor	serial, absolute
Motor type (axes and spindles)	synchron, AC
Max number of axes	10 (12)
Designation of the axes	Z1 / X1 - Y1 / X2 - Y2 / X3 - Z3 - Z4 - Y4/X4 (C1 / C4 optional)
Designation of the spindles motors	S1 - S2 - S3 - S4 - S5 - S6
Min incrementation of program	1 µ
Min resolution of axes	0.1 µ
Number of tool correctors	31 per axis
Override for spindles and axes	0-120%
Computation of real production time	
Graphic simulation of program	
Programming language on TB-DECO	ISO
Function Transmit	

TB-DECO SOFTWARE PROGRAMMING LANGUAGE

Management of tool offsets
Chamfering functions
Cutter compensation
Management of origin offsets
Function "lag" and "differential"
Spindle synchronization
Synchronous feeds (mm/rev)
Thread chasing with constant, increasing, decreasing thread
Polygon milling in the guide-bush
Programming in Inch mode
Operations with C axis

**TORNOS S.A.**

Rue Industrielle 111
CH-2740 Moutier
Tel. +41 (0)32 494 44 44
Fax +41 (0)32 494 49 03
contact@tornos.com
www.tornos.com

**TORNOS TECHNOLOGIES
DEUTSCHLAND GmbH**

Karlsruher Str. 38
D-75179 Pforzheim
Tel. +49 (0)7231 / 910 70
Fax +49 (0)7231 / 910 750
contact@tornos.de

**TORNOS TECHNOLOGIES
FRANCE**

Boîte postale 330
St-Pierre en Faucigny
F-74807 La Roche
s / Foron Cedex
Tel. +33 (0)4 50 038 333
Fax +33 (0)4 50 038 907
contact@tornos.fr

**TORNOS TECHNOLOGIES
IBERICA**

Pol. Ind. El Congost
Avda. St Julia, 206 Nave 8
E-08403 Granollers
Tel. +34 93 846 59 43
Fax +34 93 849 66 00
comercial.tti@tornos.com

**TORNOS TECHNOLOGIES
ITALIA SRL**

Via Cesare Pavese 21
I-20090 Opera / MI
Tel. +39 02 57 68 15 01
Fax +39 02 57 68 15 230
contact@tornos.com

**TORNOS TECHNOLOGIES US
CORPORATION**

840 Parkview Boulevard
US - Lombard, IL 60148
Tel. +1 203 775 4319
Fax +1 203 775 4281
info-us@tornos.com

**TORNOS TECHNOLOGIES
UK LTD**

Tornos House
Whitwick Business Park
Coalville
UK-Leicestershire LE67 4JQ
Tel. +44 (0) 1530 513100
Fax +44 (0) 1530 814212
sales@tornos.co.uk

**TORNOS SHANGHAI
REPRESENTATIVE OFFICE**

Room 512-513, Tower B
Far East International Plaza
No. 317 Xianxia Road
Shanghai 200335, PRC
Tel. +86 (0)21 6235-1235
Fax +86 (0)21 6235-1938
china.contact@tornos.com

**TORNOS TECHNOLOGIES
ASIA LIMITED**

Unit 4, G/F, Transport City Building
1-7 Shing Wan road
Tai Wai, Shatin.N.T.
Hong Kong
Tel. +852 2691 2633
Fax +852 2691 2133
asiapacific.contact@tornos.com

Conforms to the European CE/CEM Safety Standards

This document is based on information available at the time of this publication. While efforts have been made to be accurate, the information contained herein does not purport to cover all details or variations in hardware and software, nor to provide for every possible contingency in connection with installation, operation and maintenance. Tornos S.A. assumes no obligation of notice to holders of this document with respect to changes subsequently made. Tornos S.A. makes no representation or warranty, expressed, implied, or statutory with respect to, and assumes no responsibility for the accuracy, completeness, sufficiency or usefulness of the information contained herein. No warranties of merchantability nor fitness for purpose shall apply.