



THINK PARTS THINK TORNOS



DECO 20a

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

TORNOS OFFERS A SOLUTION IN THE HIGH TECH INDUSTRY, PARTICULARLY IN THE FOLLOWING SECTORS

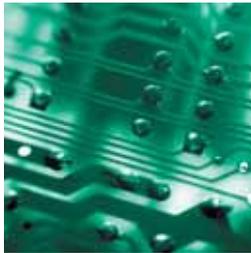
Automotive



Medical



Electronics



Watchmaking & Micromechanics



DECO 20a THE DECO GENERATION SINGLE SPINDLE AUTOMATIC



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

Once again, Tornos takes up the challenge of future, based on its invaluable experience of the

past and looking confidently towards the 21st century in the turned parts industry, from the simplest to the most complex workpieces.

Discover DECO 20a – capacity 20 (25.4) mm – a new revolution in high precision turning!

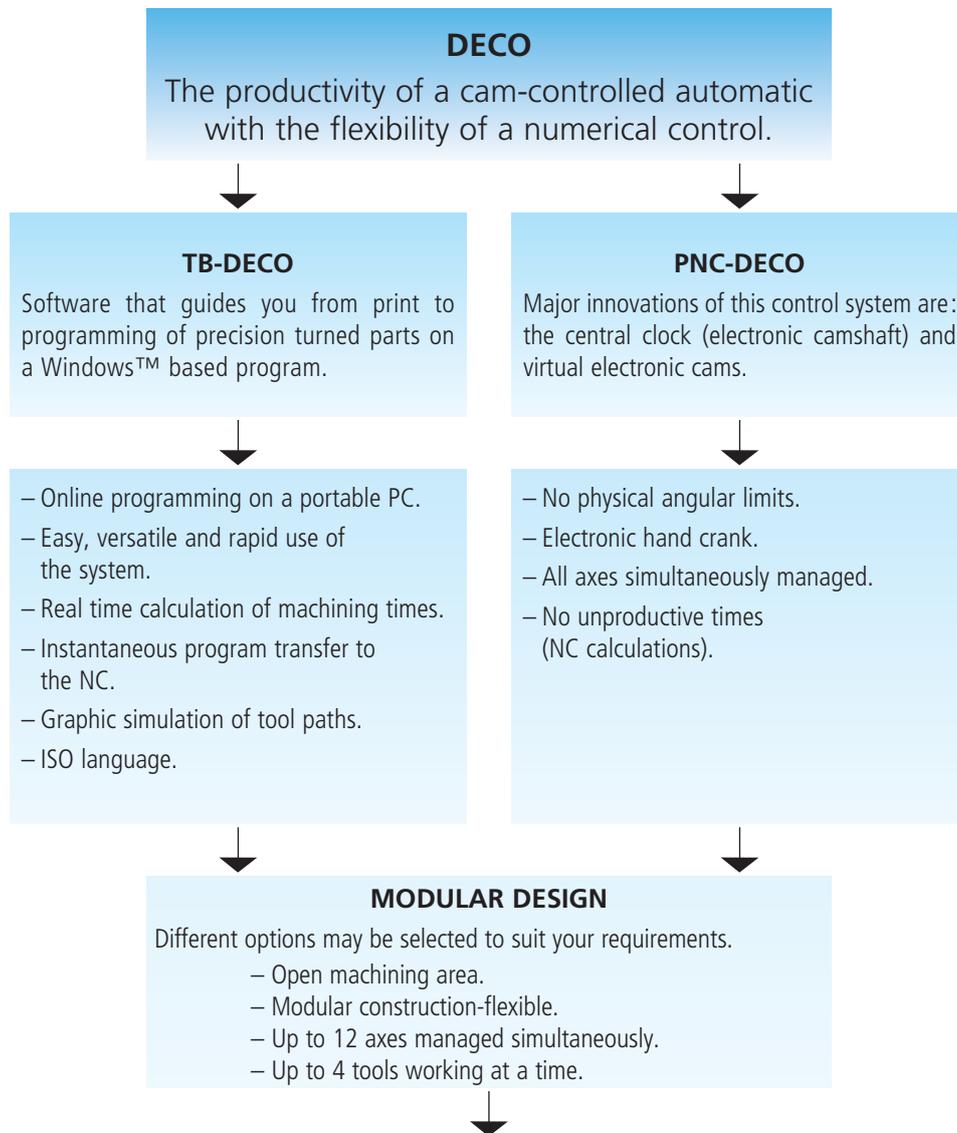
LATHE WITH SLIDING HEADSTOCK AND PARALLEL NC

**Coupled to the SBF-532 bar feeder,
the DECO 20a lathe provides a most efficient and
complete manufacturing solution**



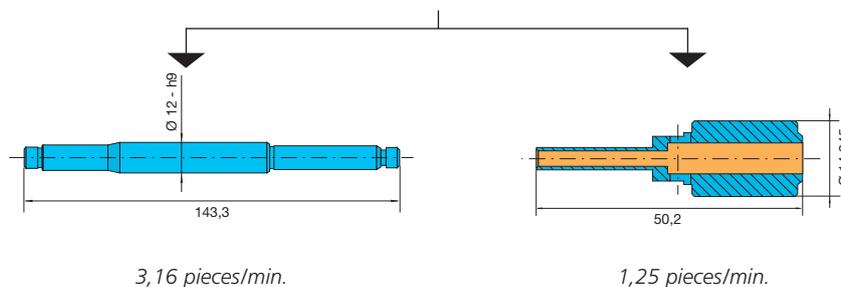
DECO 20a
FAST RELIABLE PRODUCTIVE FLEXIBLE
VERSATILE ACCURATE





PNC-DECO and TB-DECO:
The next generation of modular NC, adaptable to all automatic turning applications.

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



DECO 20a

PNC-DECO PARALLEL NUMERIC CONTROL

(concept patented by Tornos SA)

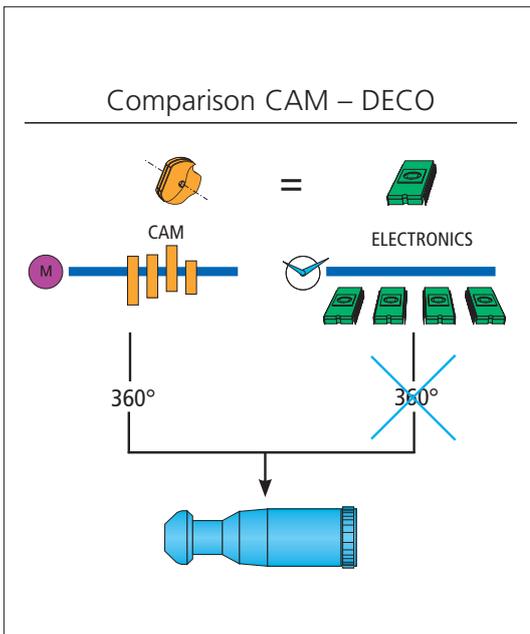


The only solution to match the high productivity of a cam controlled automatic on an NC machine.

- Axes paths are calculated by data processing and stored on tables (virtual cams).
- A clock synchronizes the reading of these paths (virtual camshaft).
- Tool correctors are selected automatically and can be adjusted by the operator from the machine's control panel.

This type of control, similar to all DECO, assures maximum reduction of non productive time.

Numerous positive experiences with smaller diameters have clearly proved the relevance of this concept. Do not hesitate to ask for detailed productivity figures.



Basic principles:

The cams are replaced by a stored calculation, so that the physical angular limits of 360 degrees are eliminated.

The measuring unit of the virtual cam is the millisecond, not the degree.

The total time of an operation corresponds to the contour of the cam i.e. theoretically an infinite number of degrees!

In addition with this electronic control you can manually feed new setups just as on a conventional feed new setups just as on a conventional cam-controlled machine (MPG or electronic handwheel function).

All the advantages of both cam control and numerical control perfectly match the present trend to reduce delivery times through versatility, productivity and constant quality improvement.



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.

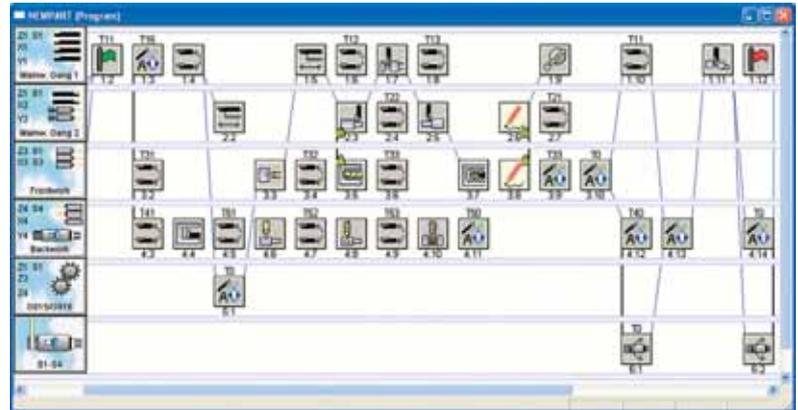
The system is ergonomic and permits simple, logical and rapid programming.

A simulator permits a fast display of the paths. 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.

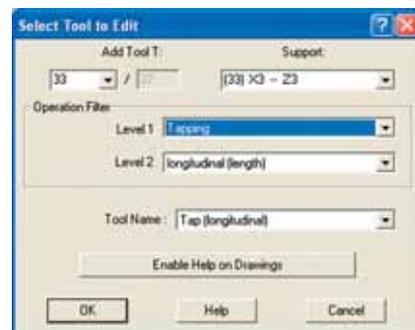
It is possible to programme in any place, on any PC.

The physical link is Ethernet connected to a computer next to DECO 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.

To guarantee the optimal performances with the TB-DECO programming software, it was determined that additional learning tools were needed.



Programming the operation sheet of a DECO

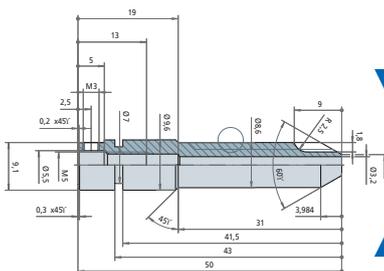


Selecting the tool to be edited

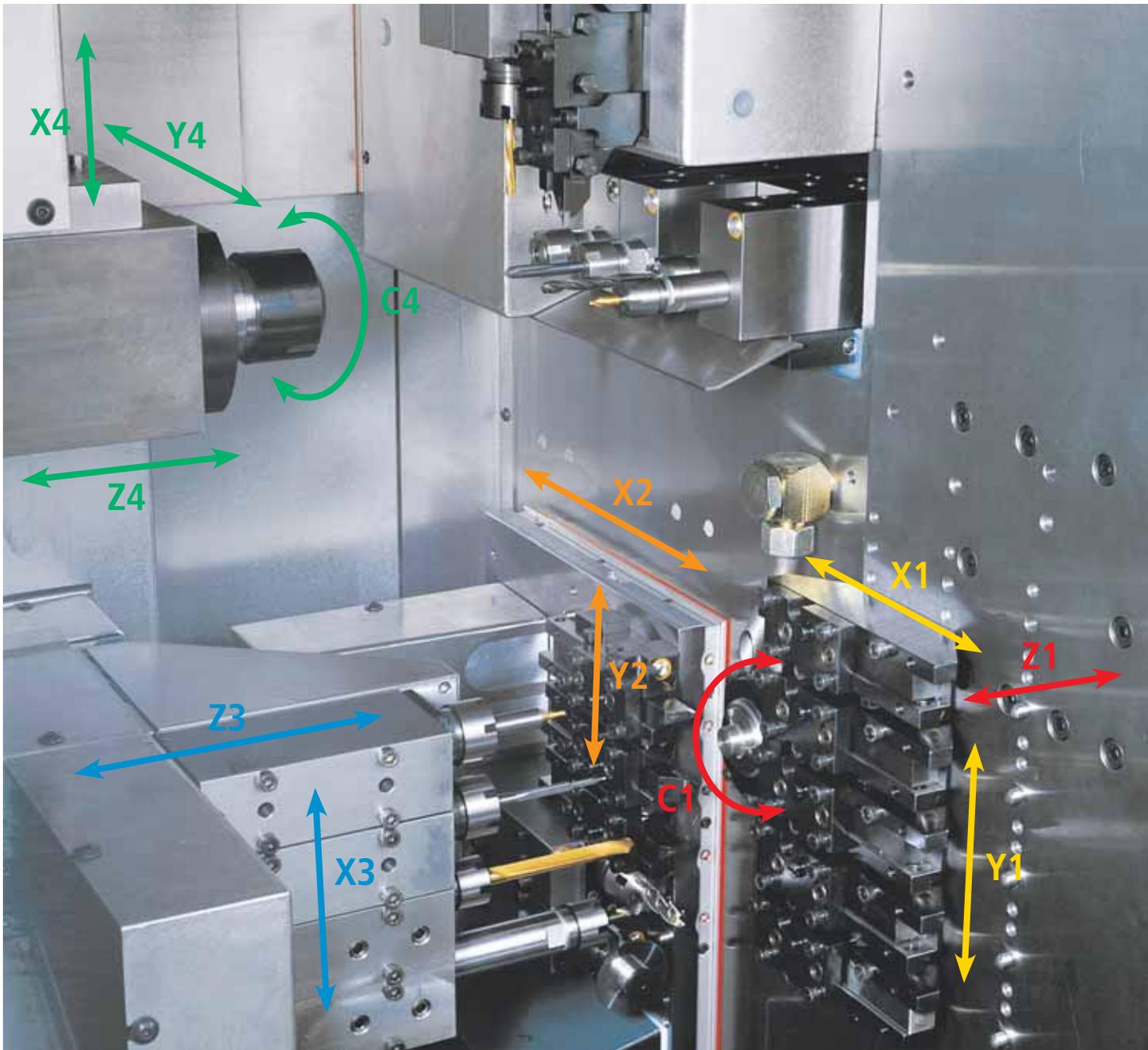
Programming an automatic lathe on PC!

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.



DECO 20a KINEMATICS



In order to comply with our customers' needs for optimal flexibility we offer the DECO 20a in 2 basic versions:

- 8 axes with independent pickoff spindle, 17 tools, 13 of which can be revolving.
- 10 axes with end attachment and independent pickoff spindle, 21 tools, 17 of which can be revolving.

In all versions, the axes C1 (spindle) and C4 (counter spindle) optional equipment, enlarge, the machining scope of the machine.

DECO 20a LATHE AND ITS 10 PNC AXES

Z1	C1	S1
Sliding headstock	C-Axis sliding headstock (option)	Main spindle
X1 / Y1		S6
Platen 1		Rotating tool at the bushing
X2 / Y2		S2
Platen 2		Rotating tool at the bushing
X3 / Z3		S3
End working		Live end attachment spindle
X4 / Y4 / Z4	C4	S4
Counter spindle	C-Axis counter spindle (option)	Counter spindle
		S5
		Live counter operation spindle

A version available for every application, from the simplest to the most complex

The interchangeable and modular tool system for the four versions is very user-friendly:

Tools	For use on platen 1	For use on platen 2	For use on end attachment	For counter-operations
Turning toolholder	X	X	X	X
Revolving spindle unit	X	X	X	X
Stationary spindle unit	–	–	X	X

DECO 20a

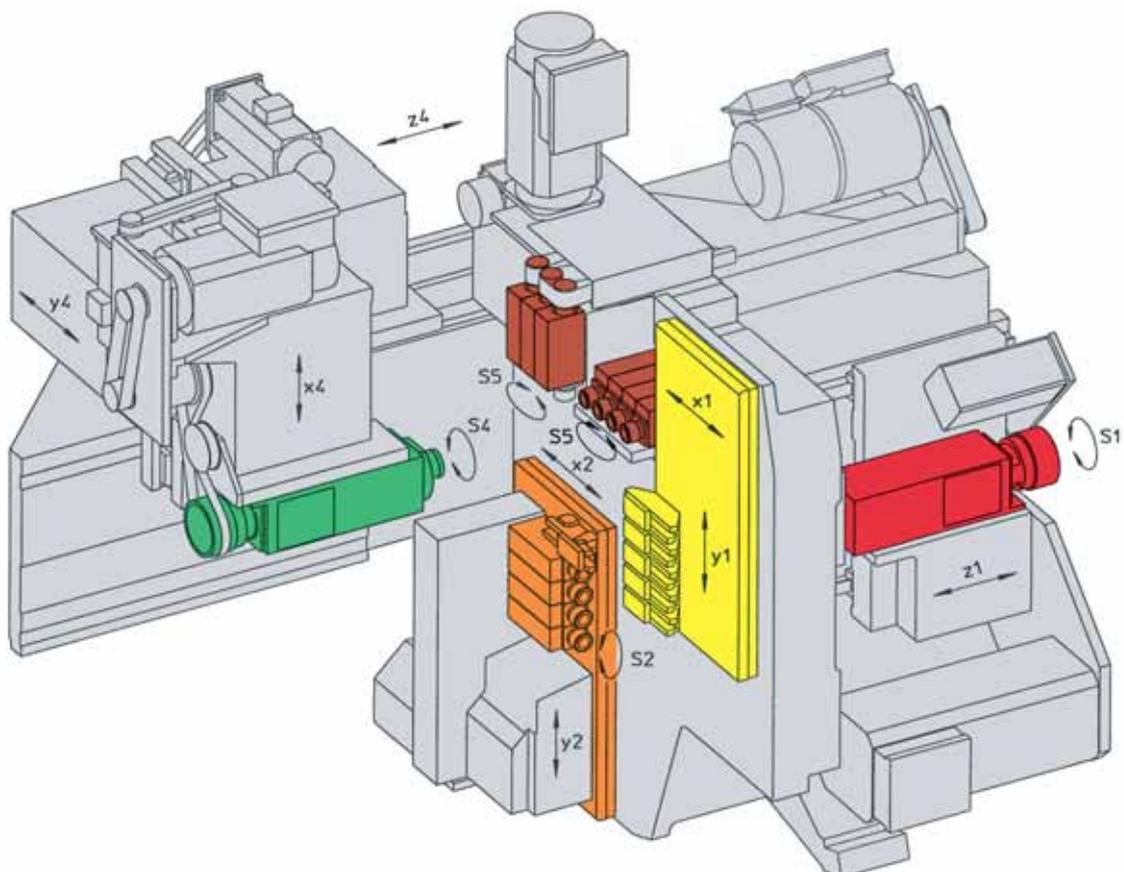
KINEMATICS

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 two tools at the same time, the tools being separately interpolated. Rough turning and finishing in the same operation.
- Cross operations interpolated with 6 driven spindles and Y-axis for cross-milling, eccentric drilling, slotting, etc.
- Polygon milling of flats or contours at the guide-bush (rotation speed synchronized).
- End attachment (2 numerical axes) working independently with four fixed or driven spindles.
- Threading and tapping operations by the differential threading principle, without any loss of productivity.
- Simultaneous turning and drilling (with optimised programmed speeds and feeds).
- An independent pickoff spindle with 3 numerical axes, allowing the centering of the working positions, the availability of 7 counter-operations (100 % in hidden time), the linear and circular interpolation on 2 or 3 PNC axes for operations like turning, threading, milling, milling with axis C, increases the range of possibilities offered by DECO 20.

8 axes with counter spindle



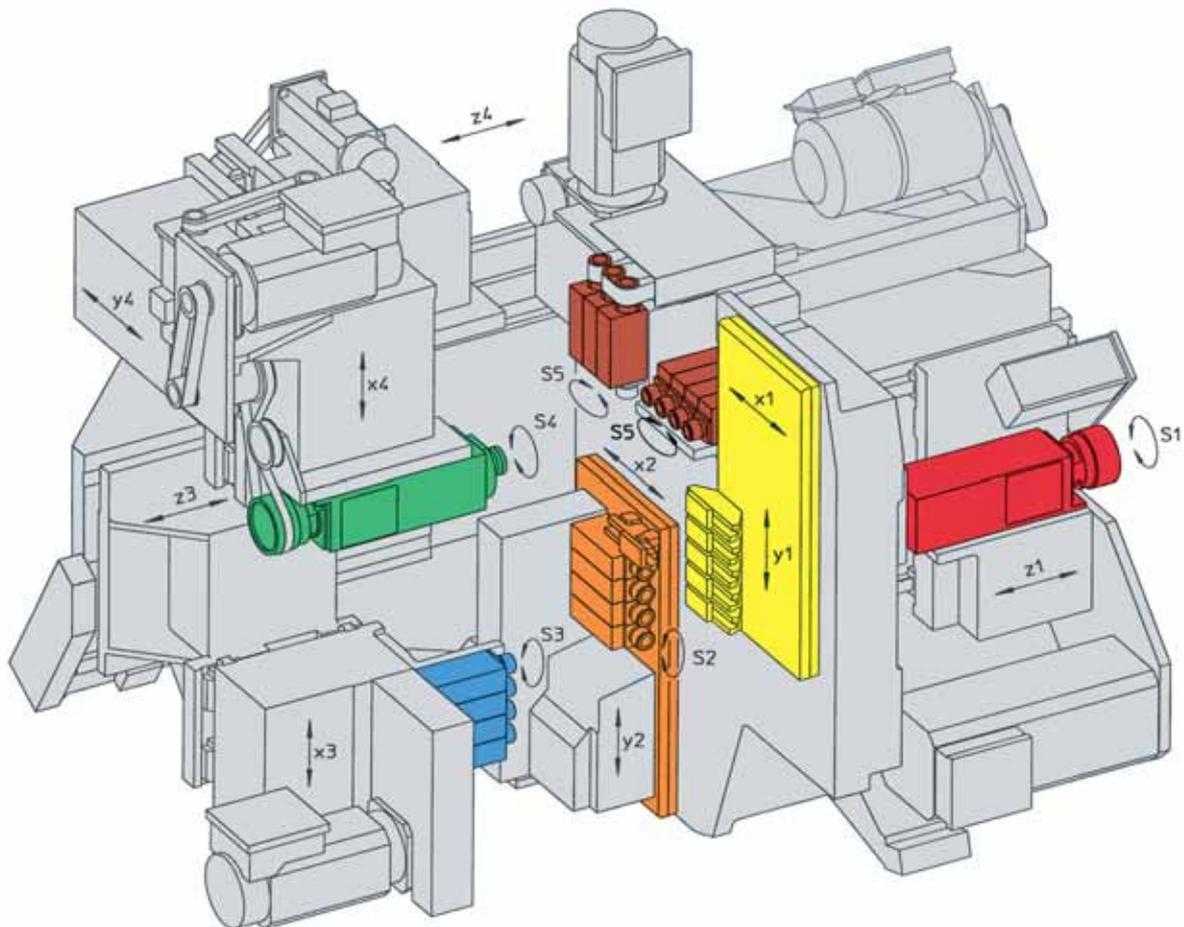
- Main spindle and counter spindle have programmable spindle positioning for all kinds of milling operations or other machining requests.
- Optimized management of feeds and speeds (no excessive efforts on material). Tools enter the material at the ideal moment, no waiting time.
- C-axis function at main and counter spindle. Permanent indexing will permit to produce very specific shapes.

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 20a a very productive tool.

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

10 axes with end attachment and counter spindle



DECO 20a

TECHNICAL CHARACTERISTICS

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

Max bar diameters	Ø 20 mm (25,4)
Max length of workpiece varies with guide bush (one clamping)	200 mm
Programmable spindle speed	100 – 10000 rpm
Spindle index increments	0,1 degree
Max output of motor kW	5,5 (7,5) kW

MAIN SPINDLE (X1/Y1) (X2/Y2)

Max number of tools	2 x 5
Tool section	16 x 16 mm
Max number of cross drills, cross milling cutters	4+2
Programmable rotation speeds	100 – 8000 rpm
Max output of motor kW	1,5 (2,2) kW

END ATTACHMENT (COMBINED ATTACHMENT) (X3/Y3)

Max number of end tools (stationary or revolving)	4
Spindle speeds	100 – 6000 rpm
Max output of motor kW	1,5 (2,2) kW

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

Max clamping diameter	20 mm (25,4 mm)
Max workpiece length	200 mm
Programmable spindle speed	100 – 10000 rpm
Spindle index increments (option)	0,1 degree
Maximum power of the counter spindle	1,1 (3,7) kW
Max number of counter operations	7
Fixed and driven spindles	7
Programmable spindle speeds	100 – 8000 rpm
Max output of motor kW	1,5 (2,2) kW

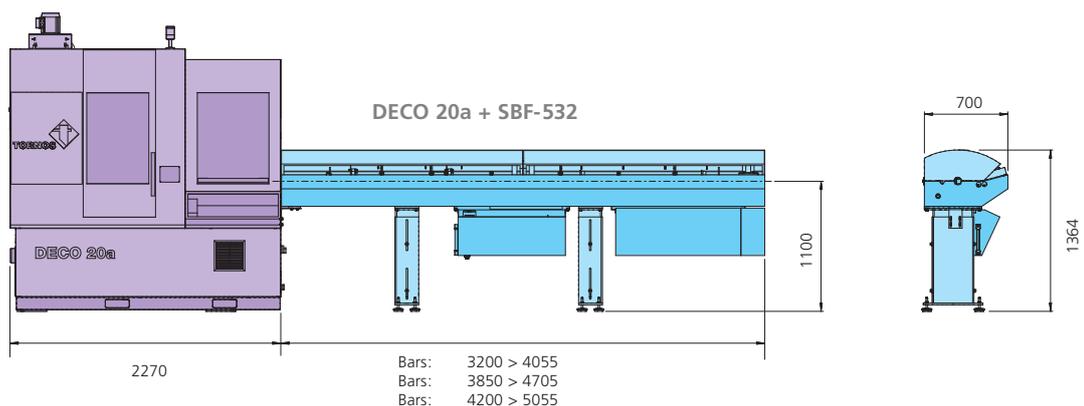
PARALLEL NUMERICAL CONTROL PNC – DECO

Number of simultaneous axes	all axes
Number of interpolated axes	all axes

MACHINE IN 2 VERSIONS

8 axes with counter spindle
10 axes with end attachment and counter spindle

CONFORMS TO THE EUROPEAN CE/CEM SAFETY STANDARDS



GENERAL CHARACTERISTICS

Max length	2270 mm
Max width	1650 mm
Max height	2200 (2500) mm
Height at spindle center	1100 mm
Weight	from 3000 to 3500 kg
Coolant capacity	200 litres
Output of adjustable pump	9-59 litres/min
Swarf tray capacity	130 liters
Installed power	14 kVA
Pressure of pneumatic unit	6 / 87 bars/PSI
Ambient working temperature	5-35 °C
Paint grey RAL 7035 and blue RAL 5013	
EC/CEM certificate	

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 / X4 - Z4 - Y4 (C1 / C4 optional)
Max number of revolving spindles	11
Designation of the spindles motors	S1 - S2 - S3 - S4 - S5
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
Synchroneous 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
commercial.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
italia.contact@tornos.com

**TORNOS TECHNOLOGIES
US CORPORATION**

840 Parkview Boulevard
US - Lombard, IL 60148
Tel. +1 630 812 2040
Fax +1 630 812 2039
info-us@tornos.com
www.tornos.us

**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 TECHNOLOGIES
POLAND Sp. z o.o.**

Ul. Brukselska 44 lok. 21A
PL - 03-973 Warszawa
Poland
Tel. +48 226 72 91 81
Fax +48 226 16 55 81
poland.contact@tornos.com

**TORNOS TECHNOLOGIES
(Shanghai) LTD**

Hui Feng Creativity Garden
Feng Yu Building, 1-2F
No. 239, Xitai Rd, Xu Hui District
CN - Shanghai 200232
Tel. +86 21 6235 1235
Fax +86 21 6235 1938
china.contact@tornos.com

TORNOS BEIJING OFFICE

Rm.1706, Tower A
Dongyu Office Building
Jia #1 Shuguang Xili
Chaoyang District
CN - Beijing 100028
Tel. +86 10 5979 8583
Fax +86 10 5822 0483
beijing.contact@tornos.com

**TORNOS TECHNOLOGIES
ASIA LTD**

Unit 4, Ground Floor, 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

**TORNOS S.A. THAILAND
REPRESENTATIVE OFFICE**

Flat 1B, The U.N. Residence
27/28 Sukhumvit Soi 33
Bangkok 10110
Thailand
Tel. +66 2 662 3908
Fax +66 2 662 3910
thailand.contact@tornos.com

**TORNOS TECHNOLOGIES ASIA LTD
MALAYSIA**

REPRESENTATIVE OFFICE
K-7-1, Lorong Bayan Indah Dua,
Bay Avenue, 11900 Pulau Pinang,
Penang, Malaysia
Tel. +6 04 642 6562 / 642 6563
Fax +6 04 642 6561
malaysia.contact@tornos.com

Conforms to the European CE/CEM Safety Standards

This document is based on information available at the time of publication. While every effort has 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.