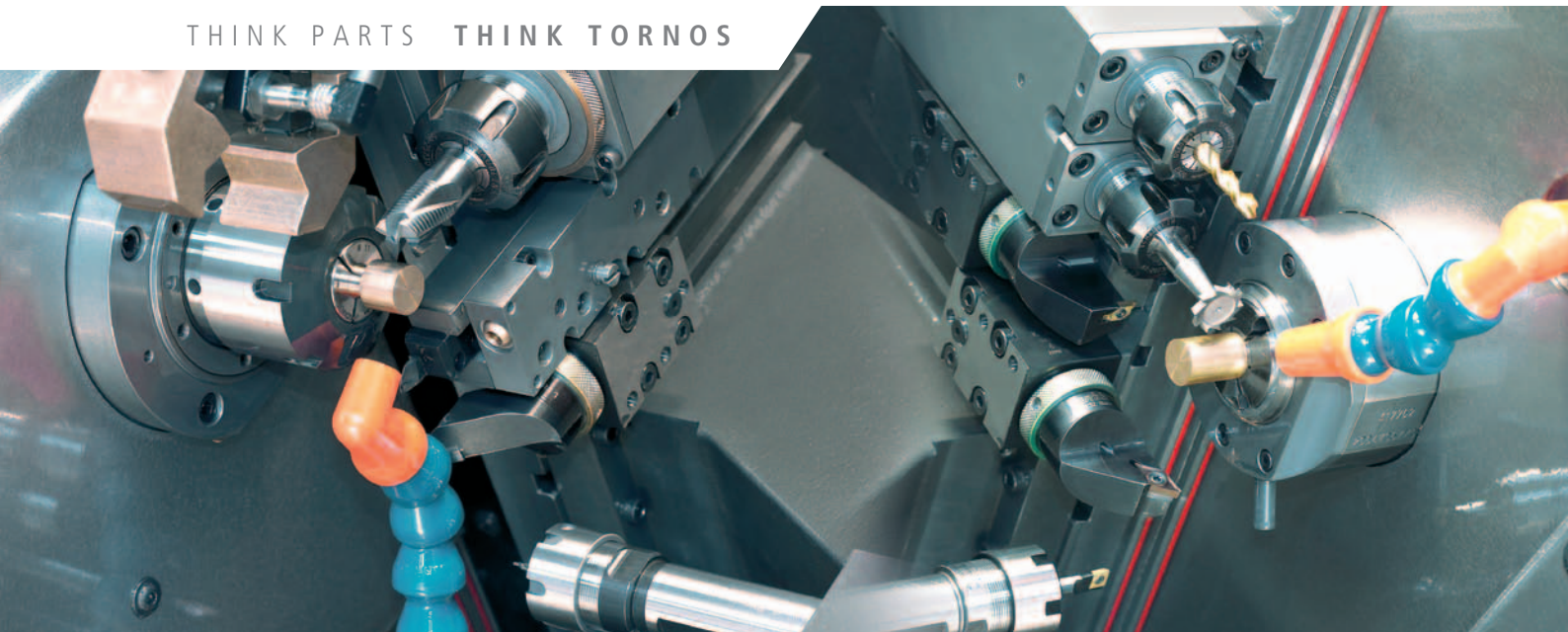




THINK PARTS THINK TORNOS



SIGMA 20 / SIGMA 32

Sliding headstock single spindle automatic lathe

TORNOS PROVIDES SOLUTIONS
TO HIGH-TECH INDUSTRIES
SPECIALISING IN THE FOLLOWING SECTORS

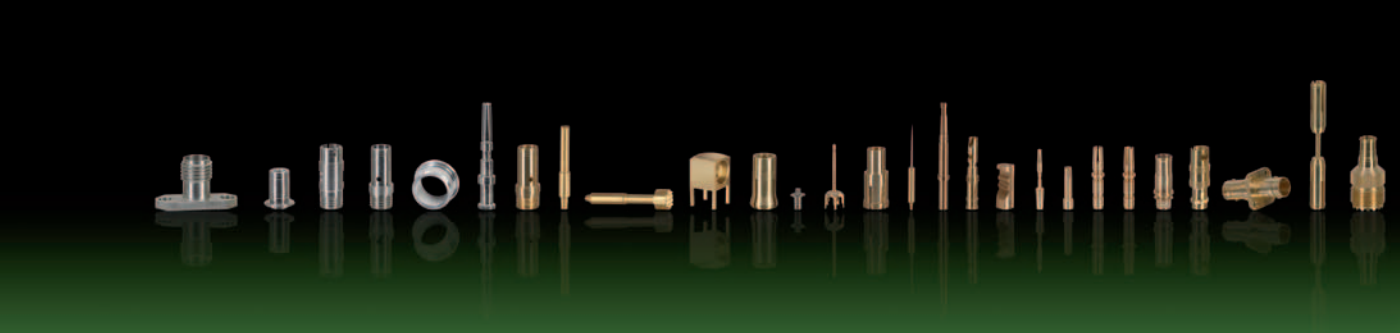
AUTOMOTIVE



MEDICAL



ELECTRONICS



MICROMECHANICS



SIGMA 20 / SIGMA 32 IN A FEW WORDS!

The only sliding headstock automatic lathe on the market being able to produce parts using machining data of a fixed headstock lathe.



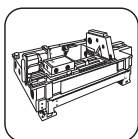
Simplicity

- Mirror like kinematic.
- Tool offsets 100% numerical.
- 2 independent tool systems: tooling completely compatible and interchangeable.



Performance

- High productivity.
- Identical main and counter spindles.
- Independent roughing tool.
- High power for optimum chip removal.
- Easy to set up.



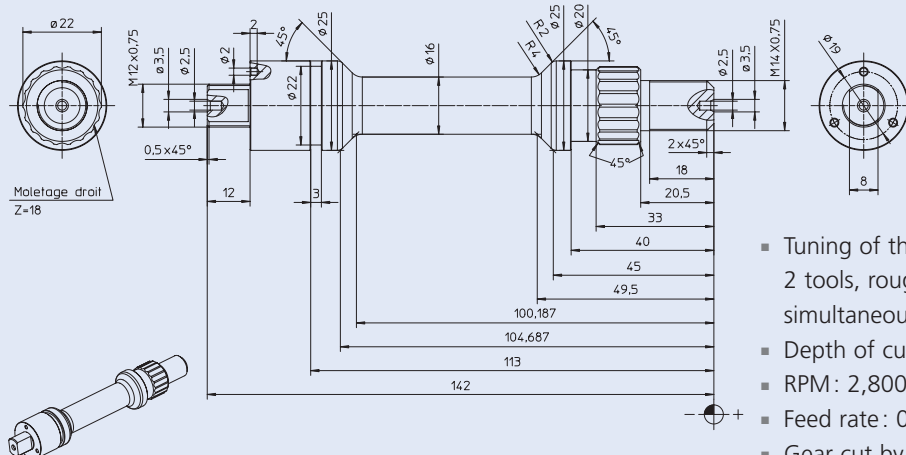
Rigidity

- High machine rigidity, identical in main and counter operations.
- Capable of machining parts using machine data of a fixed headstock machine.
- Construction verified with finished elements.

SIGMA 32 machining example

Material: 316 Stainless Steel Ø 26 mm

Cycle time : 83 seconds



- Tuning of the middle dia with 2 tools, roughing and finishing simultaneously.
- Depth of cut: 4,5 mm.
- RPM: 2,800.
- Feed rate: 0.2 mm/rev = 6.4 sec.
- Gear cut by polygoning: 12 seconds.

SIGMA 20 / SIGMA 32

A KINEMATIC GEARED TOWARD MULTI TASKING AND PERFORMANCE!



Polyvalent

- The majority of tool holders and accessories can be mounted on either tool systems.
- Wide array of heavy duty tool holders, allowing to efficiently machine added high value operations up to 28 tool positions.

Performance

- Great capacity of large chip removal.
- Including the roughing tool, it is possible to have 3 tools in the cut simultaneously.



Coupled with the Tornos SBF 532 bar loader the SIGMA 20/32 machines form a true and ideal machining cell from a single source supplier.

Rigidity

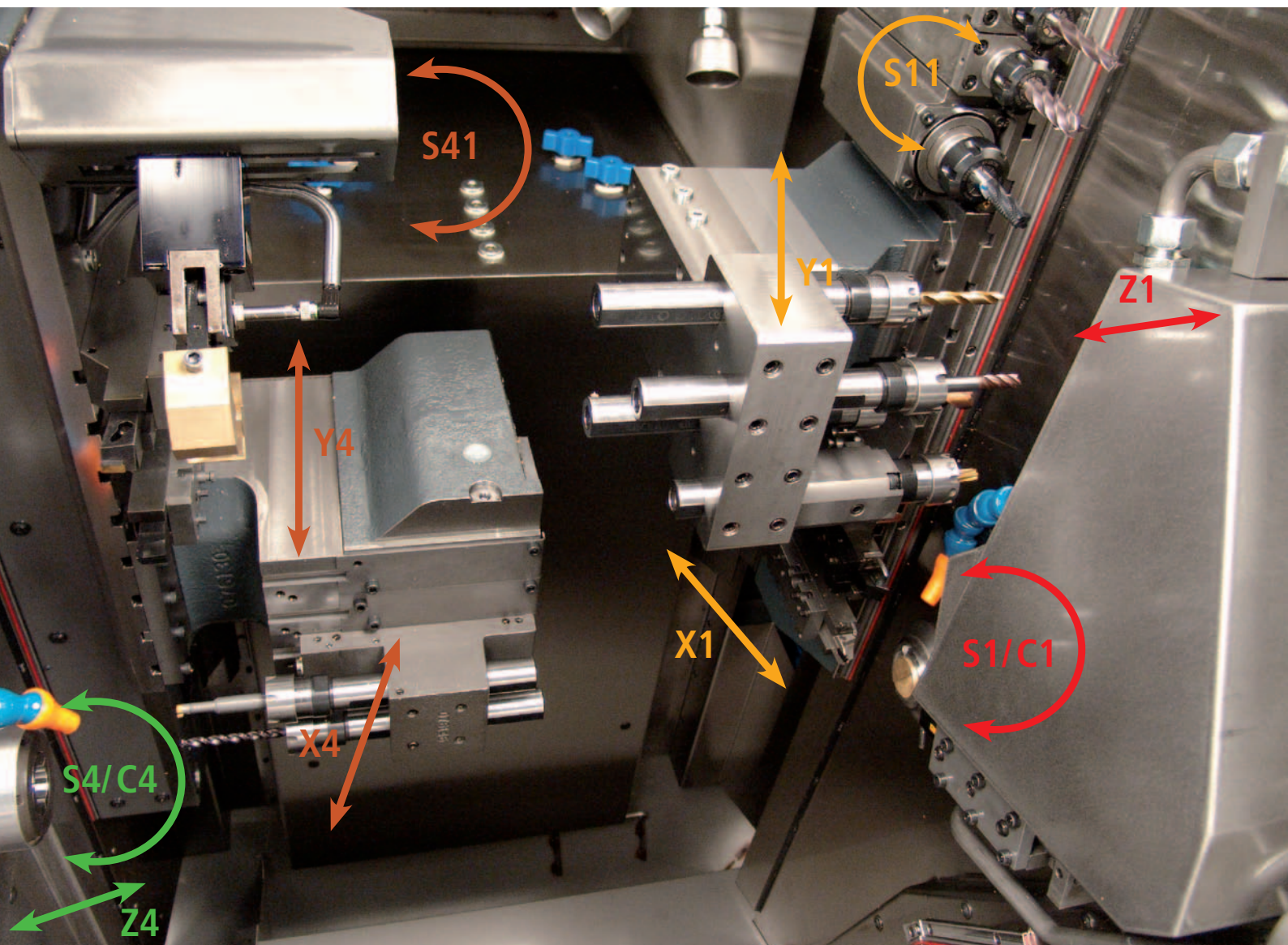
- The SIGMA 20/32 is the only lathe on the market offering identical rigidity in main and counter operations.
- Identical spindle in main and counter operations with the same great power (6.0/7.5 kW).

Simplicity

- Programming choice, ISO or TB-DECO (optional).
- ISO programming is very simple thanks the 2 independent channels concept.
- Optimal ergonomic to facilitate the changing and setting of the tools (option).
- Tool pre-setting system.

SIGMA 20 / SIGMA 32

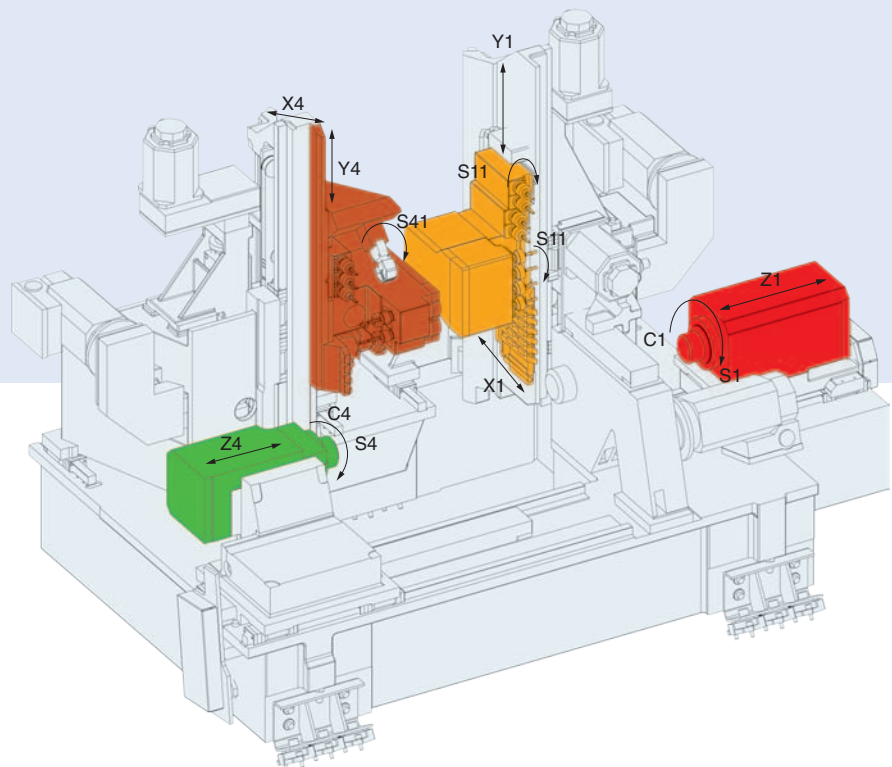
A KINEMATIC ORIENTED TOWARD PERFORMANCE AND PRODUCTIVITY



- Kinematics with two completely independent tool systems.
- Open machining area provides optimum chip removal.
- Very easy access to tooling.
- Fully independent counter-spindle.
- Mirror-like kinematics providing complete flexibility for front and back operations.
- Tool offsets completely numerical.
- High pressure preparation.

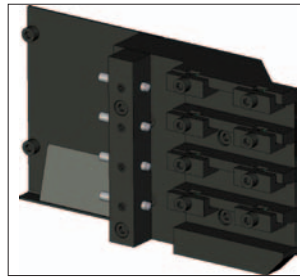
SIGMA 20 / SIGMA 32 LATHE WITH 6 LINEAR AXES

Z1	C1	S1
Sliding headstock	Axis C sliding headstock (option)	Main spindle
X1 / Y1		S11
Platten 1 (main operations)		Motorisation of tools – main operations
X4 / Y4		S41
Platten 2 (back operations)		Motorisation of tools – back operations
Z4	C4	S4
Counter-spindle	Axis C counter spindle (option)	Counter spindle

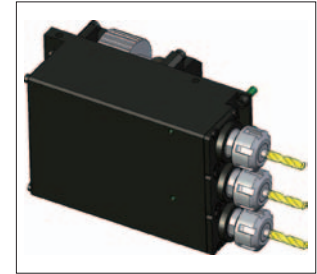


SIGMA 20 / SIGMA 32

MULTI TASKING: THE GUARANTEE OF HIGH FLEXIBILITY!



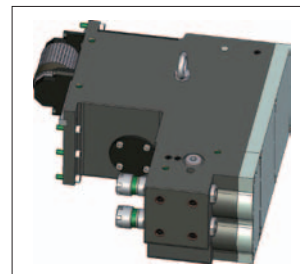
Thread whirling attachment. Can be mounted in main or counter operations.



Double rotating drilling or milling attachment, with spindles for ESX-20.



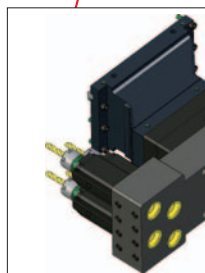
External thread whirling attachment with high speed rotation. Machining in main and counter operation.



Double ended 2 spindles rotating attachment with spindles for ESX-16 collet.



Radial polygon attachment.



Support for 4 steady end tools Ø 25 mm (cop).

- The tool holder system combines accuracy with flexibility and interchangeability.
- Attachments for operations such as polygon turning and thread whirling are easily integrated on the main spindle.
- A total of 28 tool positions allowing the machining of multiple operations. Depending on the machine configuration, we can have up to 12 rotating tools.
- All tool holders are designed with a quick change system.

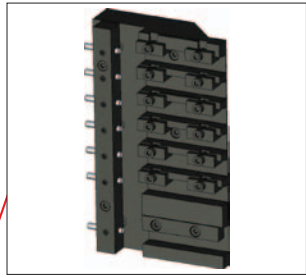
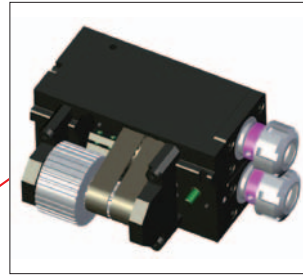
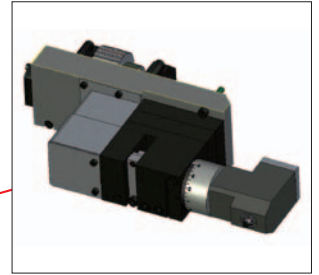


Plate for 7 tools 16 x 16 (cop).



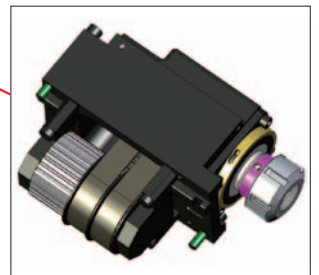
Pre-settable turning tool holder for work in main or counter operations.



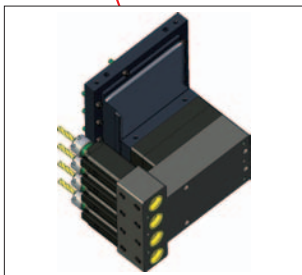
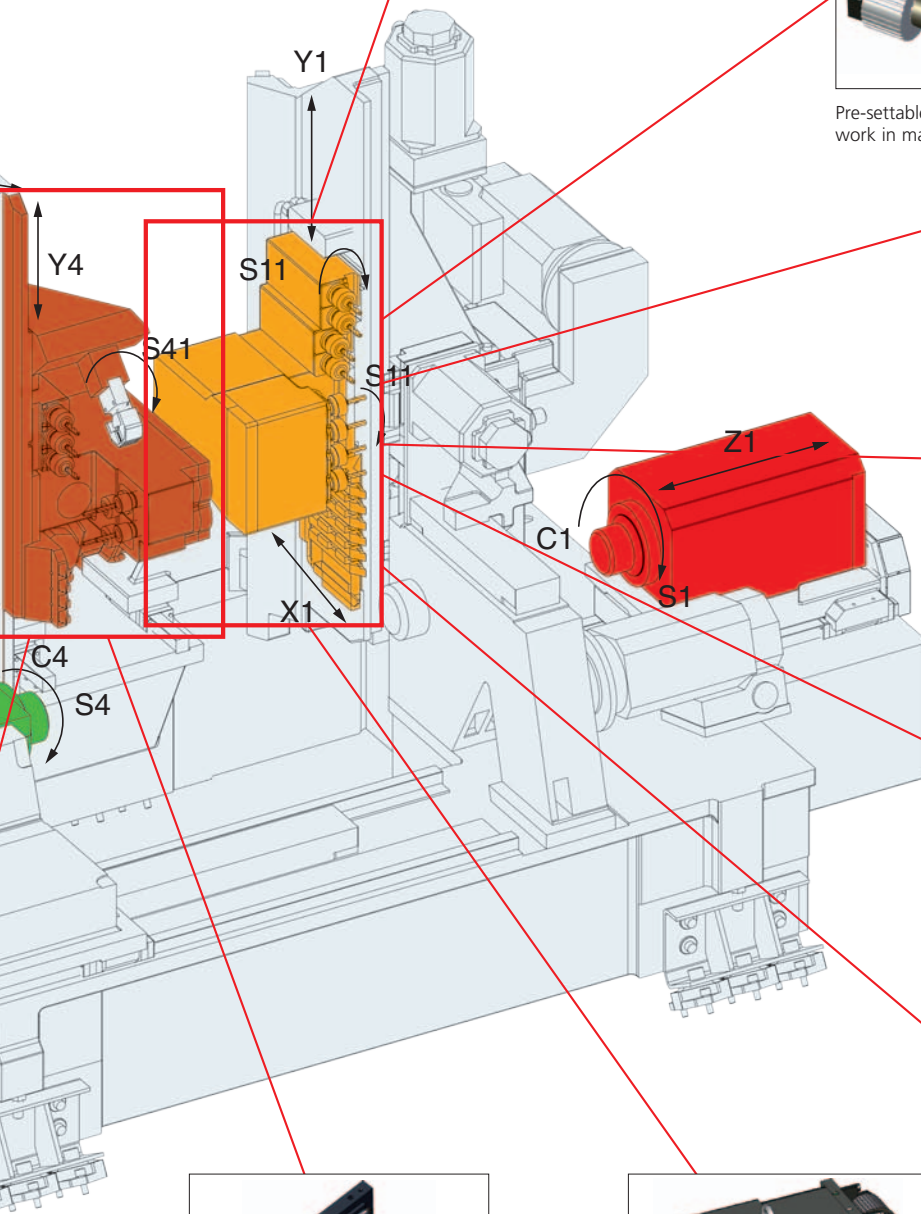
Adjustable angle drilling or milling attachment. Can be mounted in main or counter operations.



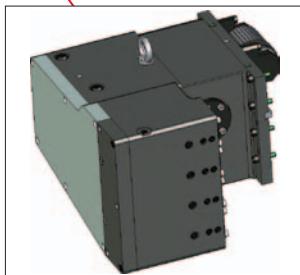
Double cone collet for headstock.



Rotating milling or drilling attachment, with spindle for ESX-25.



Motorized end working tool block for up to 4 rotating or steady tools.



End working tool block with 7 positions, Ø 20 mm bores, for steady tools.



Roughing tool, activated by M codes. (SIGMA 32 only).



working

SIGMA 20 / SIGMA 32

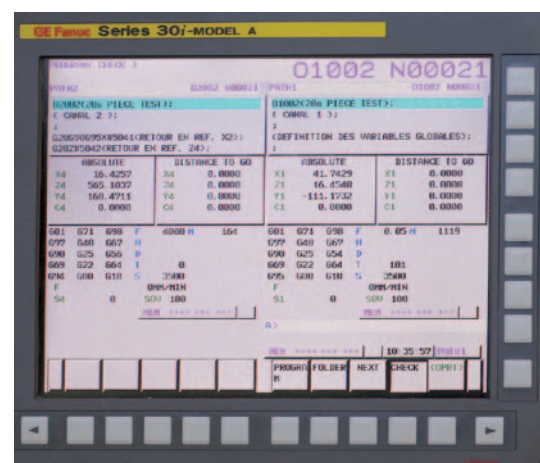
SIMPLICITY: THE GUARANTEE OF USER-FRIENDLY OPERATION!



The new Tornos innovations coupled with tried and tested solutions will very quickly enable the operator to successfully use the Sigma 20 & Sigma 32.

- Rapid tool changing systems.
- Entirely numeric tool setting and adjustment (all tools are fitted on 3 axes with no mechanical adjustments).
- Very easy programming in ISO language thanks to the kinematic concept that uses two completely independent tool systems.

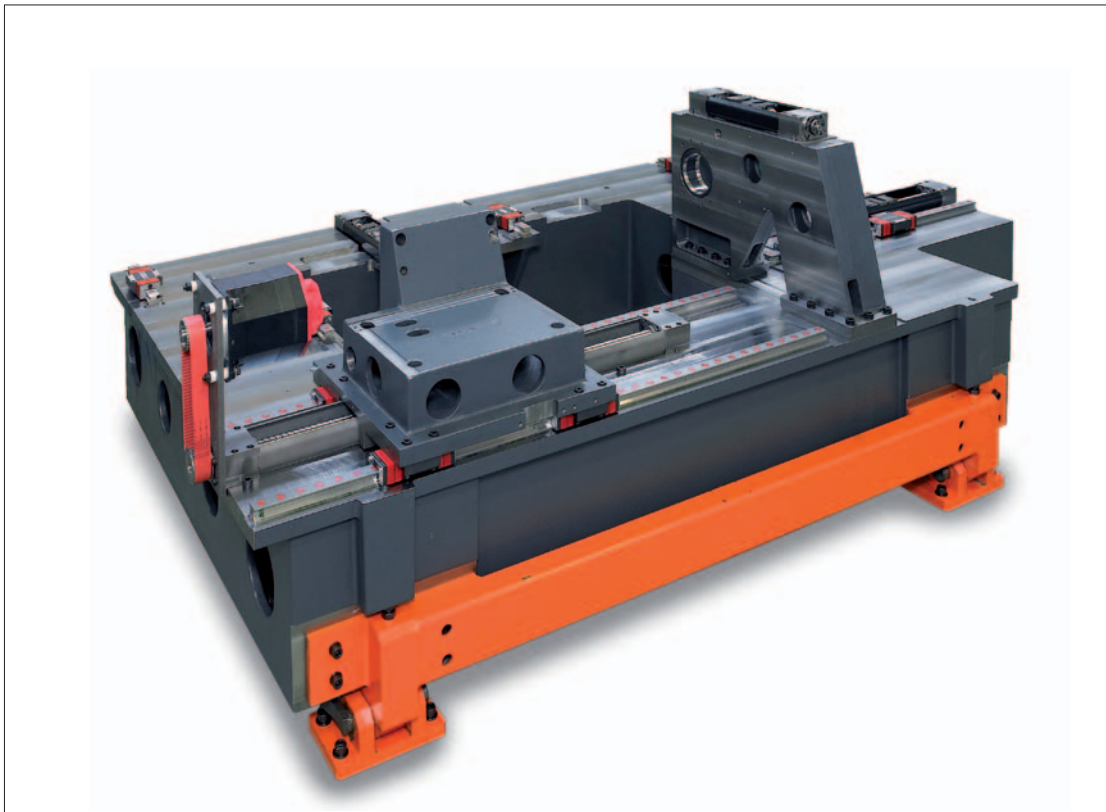
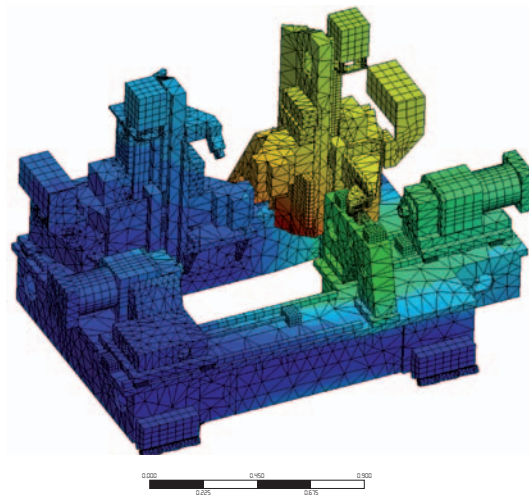
- TORNOS macro assistant simplifies cutting, bar feeding and bar end operations.
- ISO programming and TB-DECO as an option.
- Manual Pulse Generator (setting of the tools + scrolling of part program).



SIGMA 20 / SIGMA 32

RIGIDITY: THE GUARANTEE OF QUALITY MACHINING

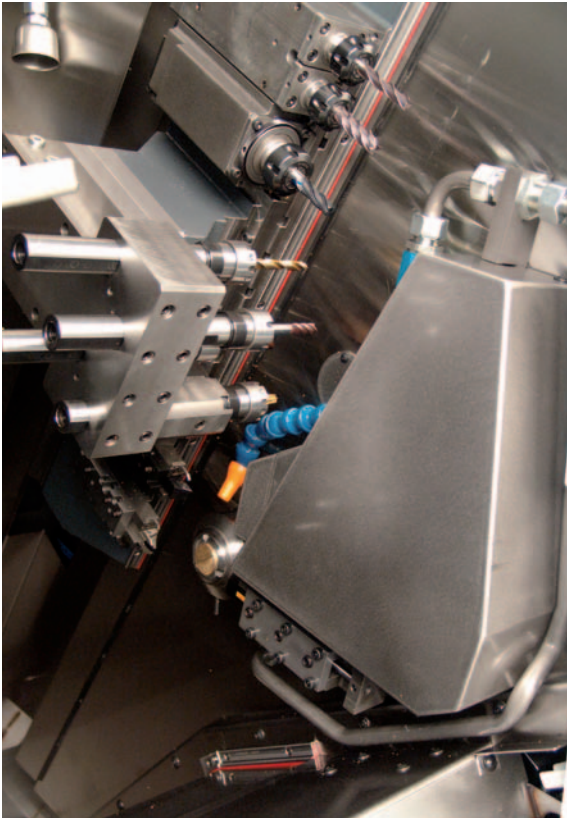
- With 3 times more rigidity in counter operations than its competitors, the SIGMA 20/SIGMA 32 enable a profitability of up to 30% better for parts requiring balanced machining in main and counter operations.
- Identical rigidity and identical spindles in main and counter operations.
- The tool wear and the machining quality are directly connected to the machine rigidity. On the SIGMA 20/SIGMA 32 there is longer the need to favor the machining operations at the bushing so to optimize quality and the machining autonomy of the machine.
- Main and counter spindle on the same plane.
- Damping system to absorb the rapid moves.



SIGMA 20 / SIGMA 32

PERFORMANCE:

THE GUARANTEE OF OPTIMUM PRODUCTIVITY



- The power of the SIGMA 32 main spindle (6.0/7.5kW) added to the roughing tool grants the SIGMA the capacity of substantial chip removal.
- The spindles have a very strong clamping force. It is also possible to use double cone collets in main operations and a large opening collet in counter operations if needed.
- SIGMA 20 and SIGMA 32 have identical power and rigidity in main and counter operations.
- All machining operations such as turning, drilling, radial milling, axial drilling can also be done in counter operations.
- Machining in counter operations is 100% overlapped.



AC. Inox 303
Ø 15 mm



42 CR MO S4
Ø 22 mm



Inox 303
Ø 20 mm



Inox 316L
Ø 26 mm



ETG 88
Ø 15 mm



S35PbK
Ø 21 mm

SIGMA 20 / SIGMA 32

TECHNICAL SPECIFICATIONS

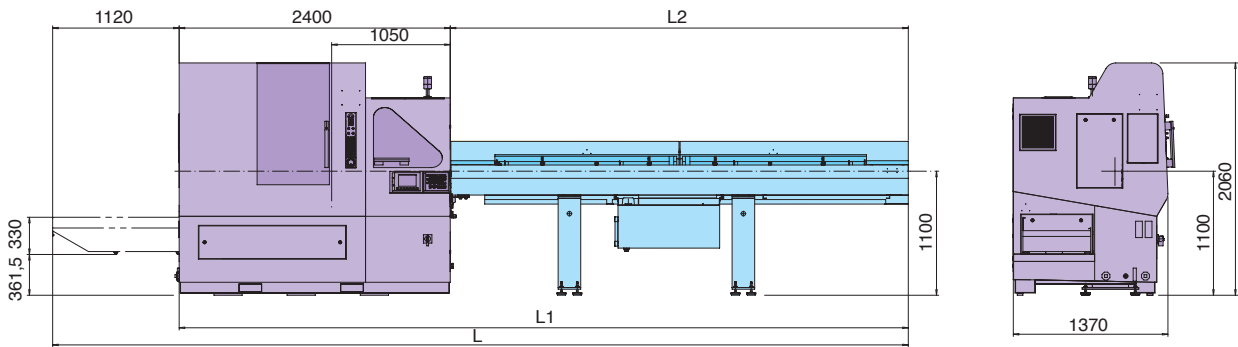
MAIN OPERATIONS		SIGMA 20	SIGMA 32
Z1 axis travel (sliding headstock)	mm / Inch	230 / 9.06	230 / 9.06
Bar capacity	mm / Inch	20 (25.4) / 1	32 / 1.26
Main spindle speed max.	rpm.	10'000	0-8'000
Main spindle power	kW	3.7 / 5.5	6.0 / 7.5
Clamping collets		F20; F25; F30	F25; F30; F37
Guide bush		Fixed; turning; Habegger	Fixed; turning; Habegger
Number of tools for main operations		14	14
Speed of S11 rotating tools	rpm.	10'000	10'000
Rotating tool section	mm / Inch	16 x 16 / 0.63 x 0.63	16 x 16 / 0.63 x 0.63
Number of radial rotating tools		4 max.	4 max.
Number of axial rotating tools		4 max.	4 max.

COUNTER OPERATIONS			
Clamping range of the counter spindle	mm / Inch	20 (25.4) / 1	32 / 1.26
Counter spindle speed max.	rpm	10'000	0-8'000
Counter spindle power	kW	3.7 / 5.5	6.0 / 7.5
Clamping collets		F20; F25; F30	F25; F30; F37
Number of tools for counter operations		8	8
Speed of S41 rotating tools (optional)	rpm.	10'000	10'000
Rotating tool section	mm / Inch	16 x 16 / 0.63 x 0.63	16 x 16 / 0.63 x 0.63
Number of radial rotating tools		4 max.	4 max.
Number of axial rotating tools		4 max.	4 max.

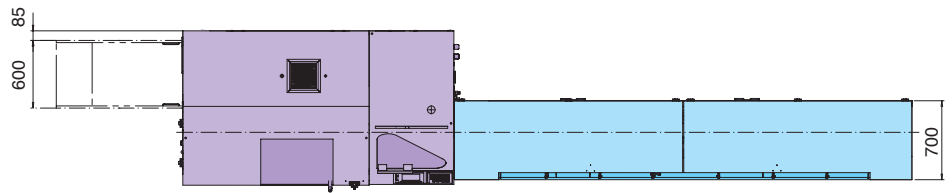
GENERAL SPECIFICATIONS			
Number of linear axes		6	6
Rapid traverse rate	m/min.	30	30
Weight	kg	3'000	3'000
Dimensions (length x width x height)	mm Inch	2'400 x 1'380 x 2'050 94.5 x 54.5 x 80.8	2'400 x 1'380 x 2'050 94.5 x 54.5 x 80.8
Installed power	KVA	14	14

SIGMA 20 / SIGMA 32

TECHNICAL SPECIFICATIONS



Max bars length (mm)	L	L1	L2
3200	7575	6455	4055
4200	8575	7455	5055
length (Inch)			
12 ft	324	280	185



NUMERICAL CONTROL

FANUC 31i numerical control

10.4» colour screen

Manual Pulse Generator (setting of the tools + scrolling of part program)

Ethernet interface, RS232, Flash memory card

ISO programming

64 KBytes program memory

32 tool geometries and 32 tool correctors

Tool radius compensation

Loading and editing of part program as a background task

Display of work hours and part counter

Display of the component cycle time or a specific operation

Standard basic cycles: initialization, new part, new bar

Tool adjustment cycle

Standard tool threading cycle

Rigid tapping function

G96 constant surface speed function

S1 indexing by increments of 0.001 degree on the main spindle

Simple stop function on counter spindle

NUMERIC CONTROL MEMORY AND SOFTWARE OPTIONS

C1 axis operation on main spindle

S4 indexing by increments of 0.001 degree on the counter spindle

Function of axis C4 on counter-spindle

Up to 8 MBytes of memory for part programs

64 tool geometries and 64 tool correctors

Inch/metric

Chamfer or radius at stop + angle programming

Interpolation in polar co-ordinates (Transmit function)

Helicoidal interpolation (X, Y, and Z with G2 or G3)

Cylindrical interpolation

Polygon function with two spindles

Graphical view of the tool's trajectory

Factory operations: drilling/stripping

Customer B macro

Management of Tool Service Life

Linear increment of the tool wear in X

Numeric control interface for automatic correction of dimensions by RS232

Automatic machine warm-up cycle

Ethernet interface for production control (OEE)

TB-DECO programming

STANDARD ACCESSORIES

Part catcher

Removable chip tray

Oil tank

Coolant pump

Work light

Electrical interface for bar loader

Electrical interface for fire prevention system

OPTIONAL ACCESSORIES

Additional coolant pump for cooling via the inside of tool holders (Sigma 20)

Swarf conveyor

Tool breakage detector

Part conveyor belt

Device for long parts

Mist collector

20 and 120 bar high-pressure device

Device for regulating cutting oil temperature

Fire prevention system

Tool presetter

Automatic bar loader

COMPLIES WITH CE AND CEM STANDARDS

TORNOS S.A.
Rue Industrielle 111
CH - 2740 Moutier
Tél. +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
Tél. +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
Tél. +33 (0)4 50 038 333
Fax +33 (0)4 50 038 907
contact@tornos.fr

TORNOS TECHNOLOGIES
IBÉRICA
Pol. Ind. El Congost
Avda. St Julià, 206 Nave 8
E - 08403 Granollers
Tél. +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
Tél. +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
Tél. +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
Tél. +44 (0) 1530 513100
Fax +44 (0) 1530 814212
sales@tornos.co.uk

TORNOS TECHNOLOGIES
POLAND Sp. z o.o.
Ul. Spółdzielcza 37-39
55-080 Kąty Wrocławskie
Poland
Tél. +48 71 33 85 618
Fax +48 71 33 85 617
poland.contact@tornos.com

TORNOS DO BRASIL, Ltda
Av. Dr. Cardoso de Melo,
1470 Conj. 606
CEP - 04548-004 Vila Olímpia
São Paulo - Brasil
Tél. +55 11 3045 6695
brazil.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
Tél. +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
Tél. +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
Tél. +852 2691 2633
Fax +852 2691 2133
asiapacific.contact@tornos.com

TORNOS S.A. THAILAND
REPRESENTATIVE OFFICE
7th Floor, 19, Bangna -Trad Soi 34,
Bangna -Trad KM. 3 Road.
Bangna, Bangkok, 10260
Thailand
Tél. +66 2746 8840-1
Fax +66 2746 8842
thailand.contact@tornos.com

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

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