



T04/L04
CNC AUTOMATIC LATHES



- ▶ precision
- ▶ Productivity
- ▶ Innovation

AFFOLTER

CNC Automatic Lathe

The CROWN line machines are CNC automatic lathes with sliding headstocks.

Equipped and configured for the watchmaking and micro-mechanics industry, they operate with guide bush. However, free-cutting with collet is possible, in which case the headstock acts as a guide bush. Models T04, R04, C04 and L04 have a maximum bar passage of 4 mm.

The CROWN line offers a version adapted to every application, from the very simple to the highly complex. Accordingly the machine can be equipped with 3 to 12 numeric axes.

The basic version is the CROWN L04 with 3 numeric axes. The transverse tools are totally adequate for the requirements of simple parts.

The CROWN T04 with 12 numeric axes manages 8 transverse tools simultaneously comprising 8 transverse tools activated by 2 numeric axes, a compound table with 5 frontal tools, also a withdrawal spindle on separate compound table with 4 frontal tools. The frontal tools can be fixed, rotating spindle or numeric spindle types. Rotating spindles and numeric spindles can also be mounted as transverse tools.

Turning, drilling/milling and withdrawal operations can be performed simultaneously to guarantee minimum machining time.

The headstock and the withdrawal spindle are numeric axes which can be indexed and interpolated with other axes for rigid tapping or milling. The frontal numeric spindles also permit off-centre rigid tapping.

The machine frame is a mineral casting providing excellent thermal stability and improved absorption of vibration, resulting in a longer tool life.

The feed of the headstock, compound table and the movement of the withdrawal spindle are driven by linear motors and are fitted with optical encoders with a resolution of under 1 μm .



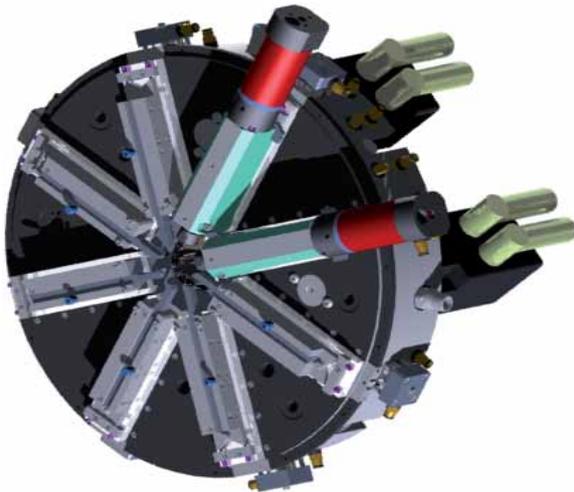


The Crown

The CROWN is based on an innovative concept, differing from the kinematics of chaser free-cutting machines whilst retaining their qualities and reducing the number of axes.

The angular movement of the crown is produced by a servomotor, via a toothed wheel with backlash elimination. The angular positioning is effected by an optical encoder.

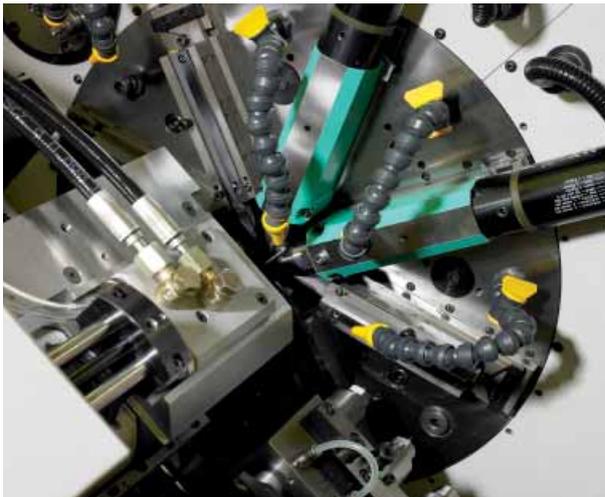
Via a linear cam this angular displacement generates the linear displacement of the tool selected by the control.



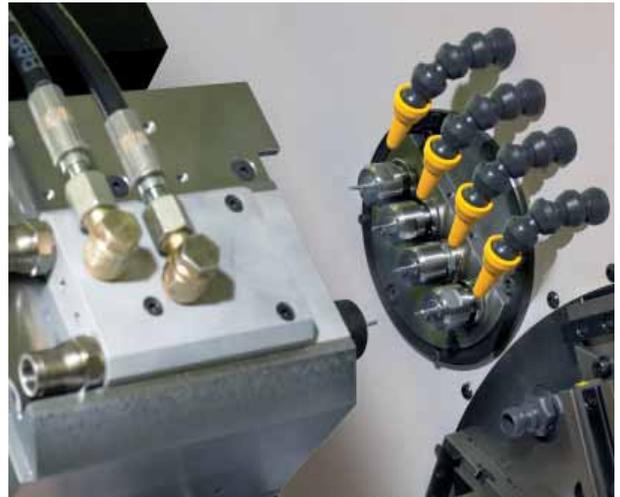
Two crowns each comprising 4 tools permit the simultaneous operation of two tools. The gravers are 8 x 8 mm. The tool holders can also be replaced by rotating or numeric spindles.



The compound table comprises 5 frontal tools which can be fixed tools (centre drilling), rotating tools (off-centre drilling) and numeric tools (off-centre drilling-tapping).



The withdrawal spindle with collet clamping permits the withdrawal of the part before free-cutting and the performance of the operations at the rear of the part.



The 4 frontal tools can also be fixed tools (centre drilling), rotating tools (off-centre drilling) and numeric tools (off-centre drilling-tapping).

Technical Characteristics T04

Headstock

Maximum bar passage	4 mm
Length of the part in headstock	50 mm
Headstock motor-driven spindle power rating	5 kW (6.7 hp)
Maximum rotation speed of the headstock	16'000 rpm
Free-cutting with barrel or collet (headstock acts as a guide)	

Transverse tools

Number of fixed and rotating transverse tools (on 2 axes)	8
Section of the gravers	8x8 mm

Compound table

Maximum number of frontal tools	5
Maximum number of rotating / numeric tools	4

Withdrawal

Motor-driven withdrawal spindle power rating	2.6 kW (3.5 hp)
Maximum rotation speed of the withdrawal spindle	16'000 rpm
Maximum clamping diameter	6 mm
Length of part with withdrawal	30 mm

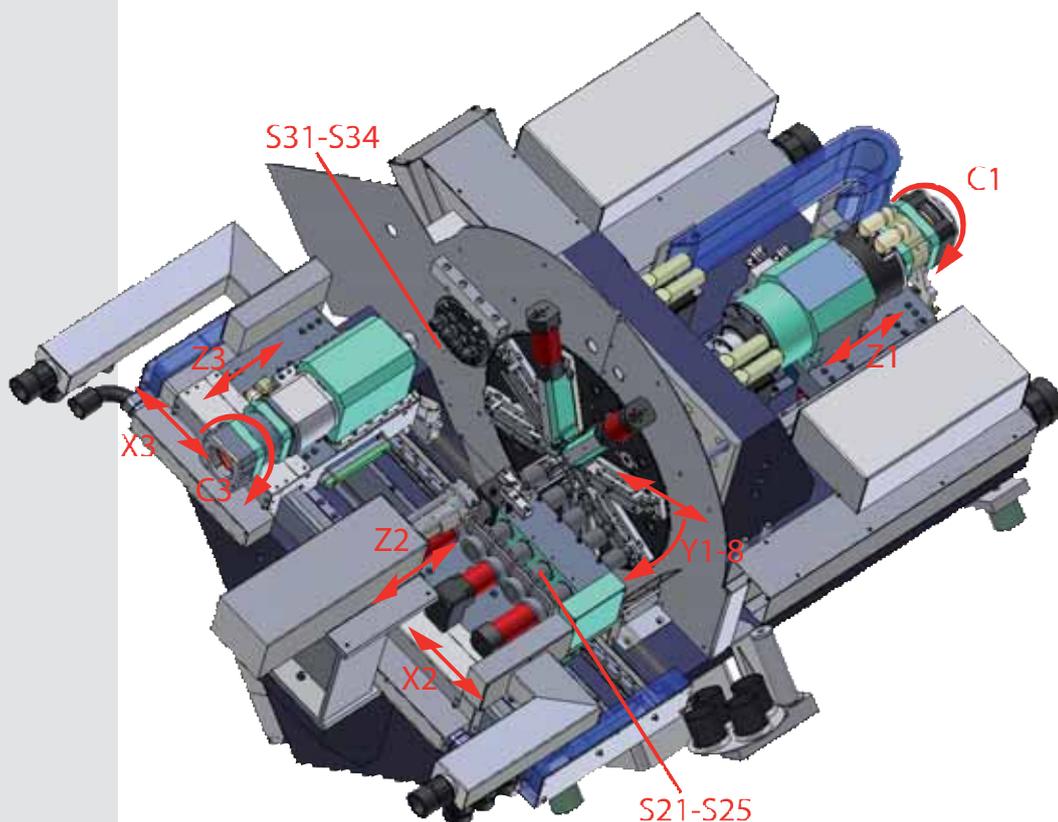
Counter-operations

Maximum number of tools for counter-operations	4
Maximum number of rotating / numeric tools	2

General points

Height of spindle	1220 mm
Weight	1200 kg (2650 lb)
Installed power	13 kW (17.4 hp)
Capacity of the coolant reservoir	60 l
Rate of flow of the adjustable coolant spray pump	40 l/min
Capacity of the chip recovery container	62 l
Centralised lubrication for all axes	

Kinematic T04





Designation of the T04 axes

C1: headstock	
Nominal torque:	4.2 Nm
Maximum power:	5 kW (6.7 hp)
Maximum speed:	16'000 rpm
Optical encoder, resolution:	4'096 impulse
Indexing accuracy:	0.09°
Z1: headstock displacement	
Linear motor, maximum force:	800 N
Maximum feed speed:	15 m/min
Absolute optical rule, resolution:	0.1 µm
Y1 - Y8: radial displacement of the 8 transverse tools	
Nominal torque:	1.9 Nm
Maximum feed speed:	20 m/min
Resolution :	0.335 µm
X2, X3: displacement of the compound table and the withdrawal spindle	
Linear motor, maximum force:	800 N
Maximum feed rate:	15 m/min
Absolute optical rule, resolution:	0.1 µm
Z2: displacement of the compound table	
Linear motor, maximum force:	929 N
Maximum feed rate:	10 m/min
Absolute optical rule, resolution:	0.5 µm
Z3: displacement of the withdrawal spindle	
Linear motor, maximum force:	929 N
Maximum feed rate:	20 m/min
Absolute optical rule, resolution:	0.1 µm
S21-S25: frontal tools	
According to application: fixes, rotating or numeric	
Nominal torque:	0.705 Nm
Nominal speed:	5'900 rpm
Optical encoder, resolution (numeric spindles):	2'000 impulse
C3: withdrawal spindle	
Nominal torque:	1.5 Nm
Maximum power:	2.6 kW (3.5 hp)
Maximum speed:	16'000 rpm
Optical encoder, resolution:	4096 impulse
Indexing accuracy:	0.09°
S31-S34: counter-operation tools	
According to application: fixed, rotating or numeric	
Nominal torque:	0.705 Nm
Nominal speed:	5'900 rpm
Optical encoder, resolution (numeric spindles):	2'000 impuls

Technical Characteristics L04

Headstock

Maximum bar passage	4 mm
Length of the part in headstock	50 mm
Headstock motor-driven spindle power rating	5 kW
Maximum rotation speed of the headstock	16'000 rpm
Free-cutting with barrel or collet (headstock acts as a guide)	

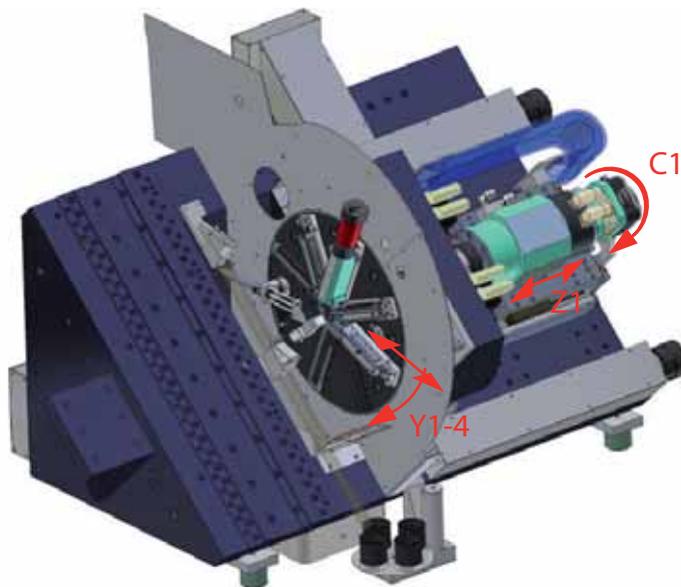
Transverse tools

Number of fixed and rotating transverse tools (on 2 axes)	4
Section of the gravers	8x8 mm

General points

Height of spindle	1220 mm
Weight	1000 kg (2'200 lb)
Installed power	5 kW (6.7 hp)
Capacity of the coolant reservoir	60 l
Rate of flow of the adjustable coolant spray pump	40 l/min
Capacity of the chip recovery container	62 l
Centralised lubrication for all axes	

Kinematic L04



Designation of the L04 axes

C1: headstock

Nominal torque:	4.2 Nm
Maximum power:	5 kW (6.7 hp)
Maximum speed:	16'000 rpm
Optical encoder, resolution:	4'096 impulse
Indexing accuracy:	0.09°

Z1: headstock displacement

Linear motor, maximum force:	800 N
Maximum feed speed:	15 m/min
Absolute optical rule, resolution:	0.1 µm

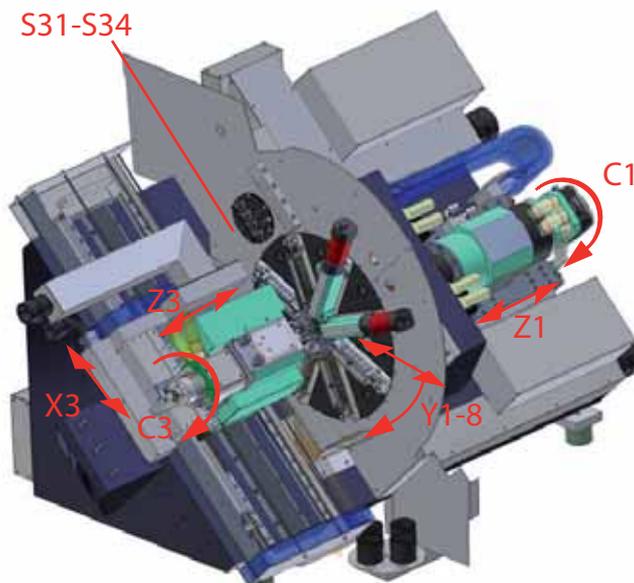
Y1 - Y4: radial displacement of the 4 transverse tools

Nominal torque:	1.9 Nm
Maximum feed speed:	20 m/min
Resolution:	0.335 µm

Technical Characteristics R04

Identical to T04
Without compound table

Kinematic R04



Designation of the R04 axes

C1: headstock

Nominal torque:	4.2 Nm
Maximum power:	5 kW (6.7 hp)
Maximum speed:	16'000 rpm
Optical encoder, resolution:	4'096 impulse
Indexing accuracy:	0.09°

Z1: headstock displacement

Linear motor, maximum force:	800 N
Maximum feed speed:	15 m/min
Absolute optical rule, resolution:	0.1 µm

Y1 - Y8: radial displacement of the 8 transverse tools

Nominal torque:	1.9 Nm
Maximum feed speed:	20 m/min
Resolution:	0.335 µm

X3/Z3: displacement of the withdrawal spindle

Linear motor, maximum force:	929 N
Maximum feed rate:	20 m/min
Absolute optical rule, resolution:	0.1 µm

C3: withdrawal spindle

Nominal torque:	1.5 Nm
Maximum power:	2.6 kW (3.5 hp)
Maximum speed:	16'000 rpm
Optical encoder, resolution:	4096 impulse
Indexing accuracy:	0.09°

S31-S34: counter-operation tools

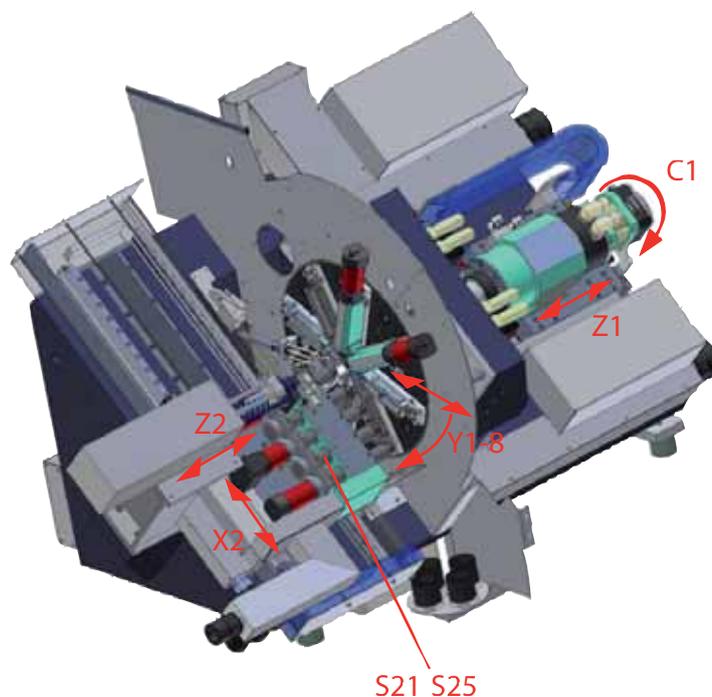
According to application: fixed, rotating or numeric

Nominal torque:	0.705 Nm
Nominal speed:	5'900 rpm
Optical encoder, resolution (numeric spindles):	2'000 impulse

Technical Characteristics C04

Identical to T04
Without withdrawal

Kinematic C04



Designation of the C04 axes

C1: headstock

Nominal torque:	4.2 Nm
Maximum power:	5 kW (6.7 hp)
Maximum speed:	16'000 rpm
Optical encoder, resolution:	4'096 impulse
Indexing accuracy:	0.09°

Z1: headstock displacement

Linear motor, maximum force:	800 N
Maximum feed speed:	15 m/min
Absolute optical rule, resolution:	0.1 µm

Y1 - Y8: radial displacement of the 8 transverse tools

Nominal torque:	1.9 Nm
Maximum feed speed:	20 m/min
Resolution:	0.335 µm

X2: displacement of the compound table

Linear motor, maximum force:	800 N
Maximum feed rate:	15 m/min
Absolute optical rule, resolution:	0.1 µm

Z2: displacement of the compound table

Linear motor, maximum force:	929 N
Maximum feed rate:	10 m/min
Absolute optical rule, resolution:	0.5 µm

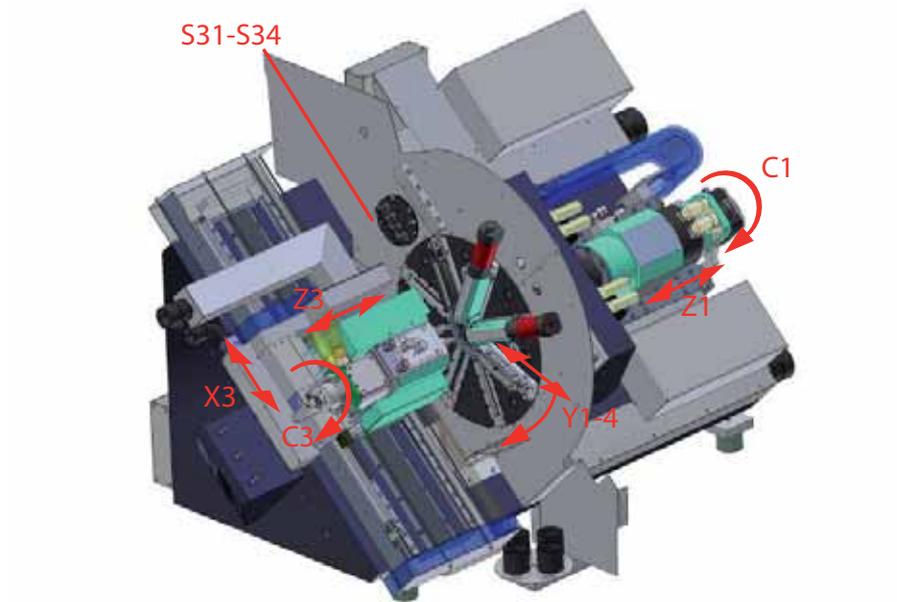
S21-S25: counter-operation tools

According to application: fixed, rotating or numeric	
Nominal torque:	0.705 Nm
Nominal speed:	5'900 rpm
Optical encoder, resolution (numeric spindles):	2'000 impulse

Technical Characteristics LR04

Identical to R04
Whit 4 transverse tools

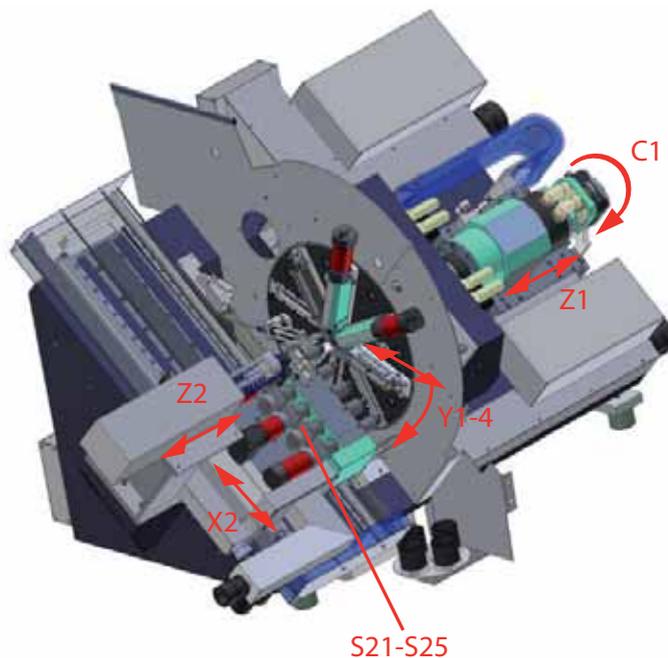
Kinematic LR04



Technical Characteristics LC04

Identical to C04
Whit 4 transverse tools

Kinematic LC04



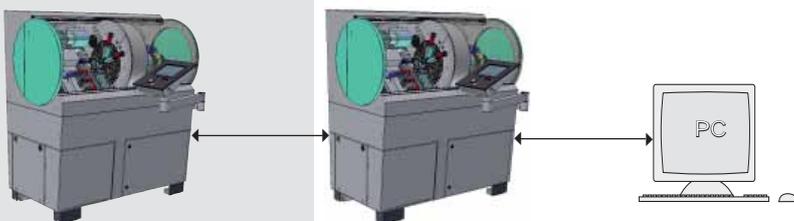
Computer Numeric Control CNC

The CROWN CNC automatic lathes are fitted with Affolter LESTE series CNC-controls with the following characteristics:

- Microprocessor PowerPC
- 12 axes, simultaneous interpolation for all axes
- High-speed interpolation: processing cycle 70 ns
- Execution of 4 part-programs in parallel
- Man-machine interface with touchscreen and 15" LCD colour graphics display
- Simple, user-friendly operating
- Operator requires no CNC knowledge
- Ethernet 10/100, CAN, RS232, RS485



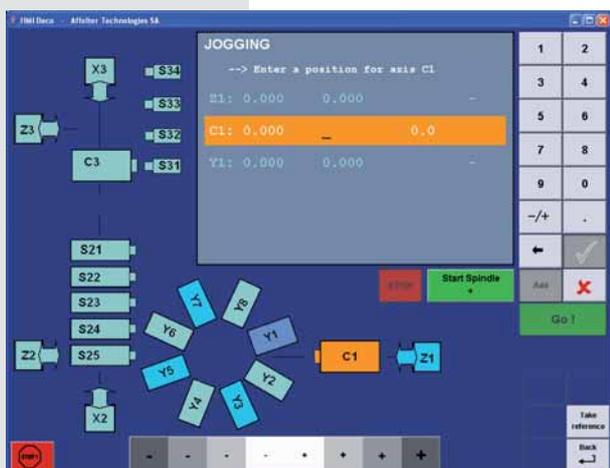
Workshop Network



It is possible to install workshop networking controlled by the Affolter LesteHMI software. This guarantees the centralised management of production and parts programs.

Up to 255 machines can be networked. Backup for the parts programs can be provided on the CNC or on PC (directly via RS232, via RS485 or Ethernet network or by WLAN wireless link).

Programming



The jogging page is for setting the machine to work. A drawing symbolises the machine axes which can easily be selected using the touchscreen.



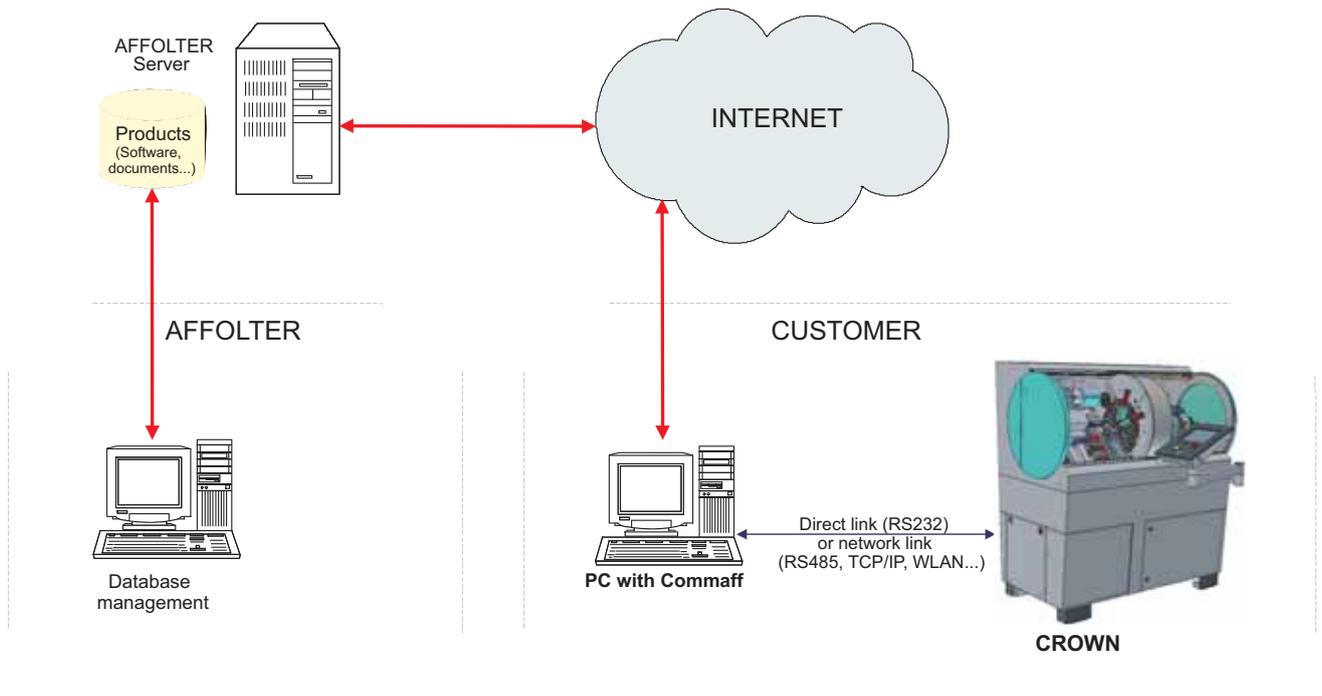
The part-programming is carried out directly on the HMI of the CNC or on a PC. The part-program can be created and modified using Affolters plain language programming dialogue APD (Affolter Plaintext Dialog). A simulation shows the different operations.

Commaff

The Commaff software permits downloading of software updates or technical documents from the internet.

The AF100 is identified on the Affolter server which draws up a list of all the files available for downloading.

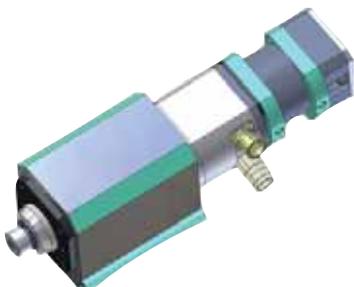
The selected products are easily downloaded and then installed on the PC or the numeric control.



Motor Spindles



Headstock with Affolter motor spindle MB16S420b



Tailstock with Affolter motor spindle MB16S150a

The CROWN is equipped with high-dynamic, high-precision motor spindles, specially developed for profile turning by electronic synchronisation:

- Maximum speed : 16'000 rpm
- Torque: 4.2 Nm (headstock), 1.5 Nm (withdrawal headstock)
- Radial and axial run-out < 2 µm
- Synchronous motor
- Hydraulic collet clamping system F10 (headstock)
- Hydraulic collet clamping system F7 (withdrawal headstock)
- Clamping and releasing whilst the part is rotating
- Hybrid ball bearings (ceramic balls)
- Lifetime lubricated bearings
- Closed circuit water thermal control system
- Optical encoder measuring system

The benefits of the CROWN



Precision

- ▶ Precision machining with a high quality finish

Rigid

- ▶ Thermal and mechanical stability guarantee constant dimensions of parts right through the production cycle.

Rapid

- ▶ Spindle with direct drive at 16,000 rpm for speeds always adapted to optimal cycle times

Flexible

- ▶ Numerous configurations possible for different applications



Compact

- ▶ Reduced floor surface to improve cost-effectiveness of your production areas

Ergonomic

- ▶ Design is optimised for production and maintenance

Ecological

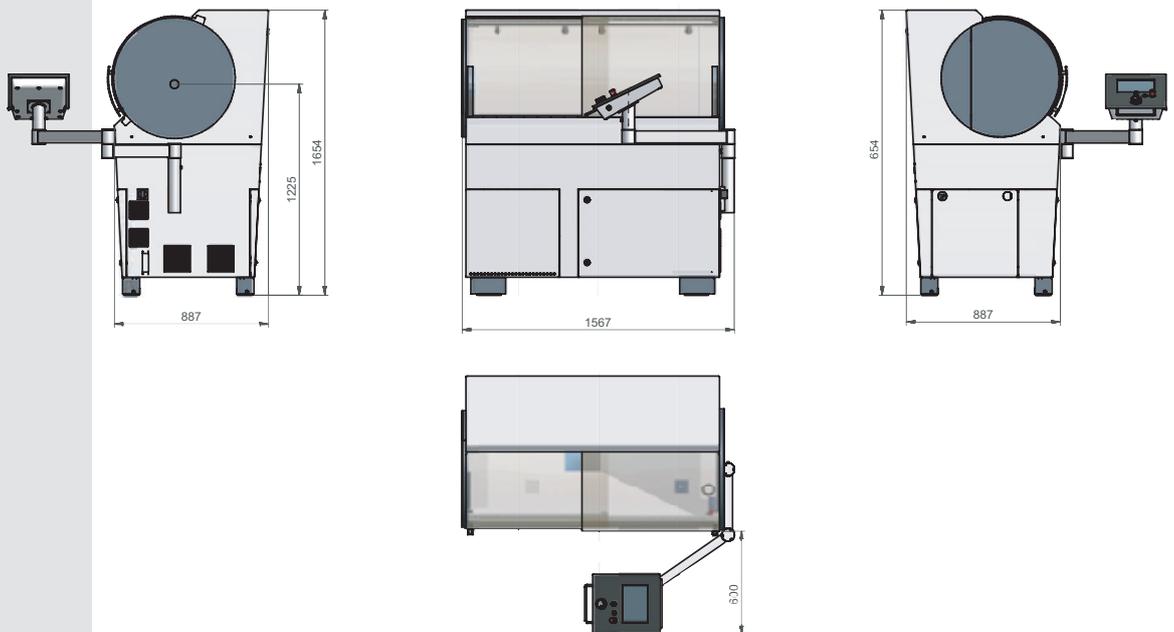
- ▶ Integral cladding for the working zone to confine oil mist and reduce noise



Unique

- ▶ A single manufacture guarantees a service and level of flexibility suited to your needs (mechanical components, numeric control and softwares)

Dimensions



In conformity with the CE safety directives currently in force



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