

**ISO G 22**



# Outside overview

**Automation (optional)**  
robot loading system

**Automation (optional)**  
chain loader KL155 / KL310  
and pickup system



**Control**  
NUM Flexium+ or  
Fanuc 31iB5

**Control panel**  
with 21.5" screen,  
industrial keyboard  
and trackball mouse

**Software**  
NUMROTOplus® or  
MTS Professional TOOL-KIT

**Drip pan**  
integrated for machine  
and chain loader





**Coolant nozzle ring**  
firmly installed on the grinding head  
with 14 adjustable nozzles

**Loading hood**  
separates the processing space from the  
chain loader – tools can be removed for  
measuring during the grinding process  
(DIN EN ISO 16089:2016-06 compliant)

**Grinding spindle**  
peak power 27 kW up  
to 8,000 rpm

**Wheel changer**  
8-fold with maximum wheel diameter 150 mm or optionally  
10-fold with maximum wheel diameter 100 mm

**Tool gripper**  
with automatic  
bushing change

**Electronic measuring probe**  
records all essential tool data

**Interface for workpiece holder**  
for all common clamping systems  
with ISO 50 interface

**A-axis**  
direct drive with 9.5 kW and infinitely  
variable rotation speed up to 850 rpm

# The basic machine

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## The ISOG 22

**Flexibility:** This is what many users of the ISOG 22 value the most. It is especially useful for small to medium batch sizes due to its vertical principle – even with only one piece.

### **New standards in CNC tool grinding**

The ISOG 22 complies with all requirements of the EU Machinery Directive. The maximum tool length for automatic machining has grown significantly – to over 300 mm, whereas previously it was a maximum of 180 mm.

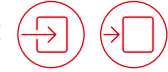
### **Use in different technology areas**

Classic tool grinding is a matter of course for the ISOG 22. But it still knows a lot more: As a high-quality grinding centre, it also provides outstanding service in medical technology, aerospace, drive technology or in tool and mould making. Wherever complex and highly accurate parts or components need to be processed economically and with the highest precision.

### **Clamping systems for ISOG 22**

Nobody likes restrictions. So the ISOG 22 can work with all common clamping systems. They can be integrated into the ISO-50 interface with a hydraulic control unit.





## Highlights of ISO G 22

### Vertical system

The special feature of the ISO G 22: It works according to the patented vertical system, and its tool spindle is perpendicular. This means: The tool is optimally accessible from all sides. Its repeatability in the  $\mu$  range is also incomparable. The extremely high flexibility also benefits from this machine concept.

### Stable and compact

A solid base is the stable cast mineral machine stand made of polymer concrete. With its large mass, it ensures good damping.

### Highest radius accuracy

The very small distance from the grinding point to the pivot point of the C-axis guarantees the highest radius accuracy.

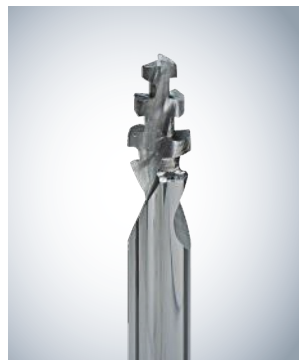
## Maximum working sizes



full radius roughing cutter



profile milling cutter



profile milling cutter



profile milling cutter

# Automation (optional)

## Perfectly matched

The ISOG 22 series has a modular structure. As a result, the automation can be set up exactly as it is needed – individually and in detail. You can choose from the chain loader system, the pickup loader, a robotic cell or customer-specific solutions. Automation systems from specialised manufacturers can also be combined with the single cabin solution.

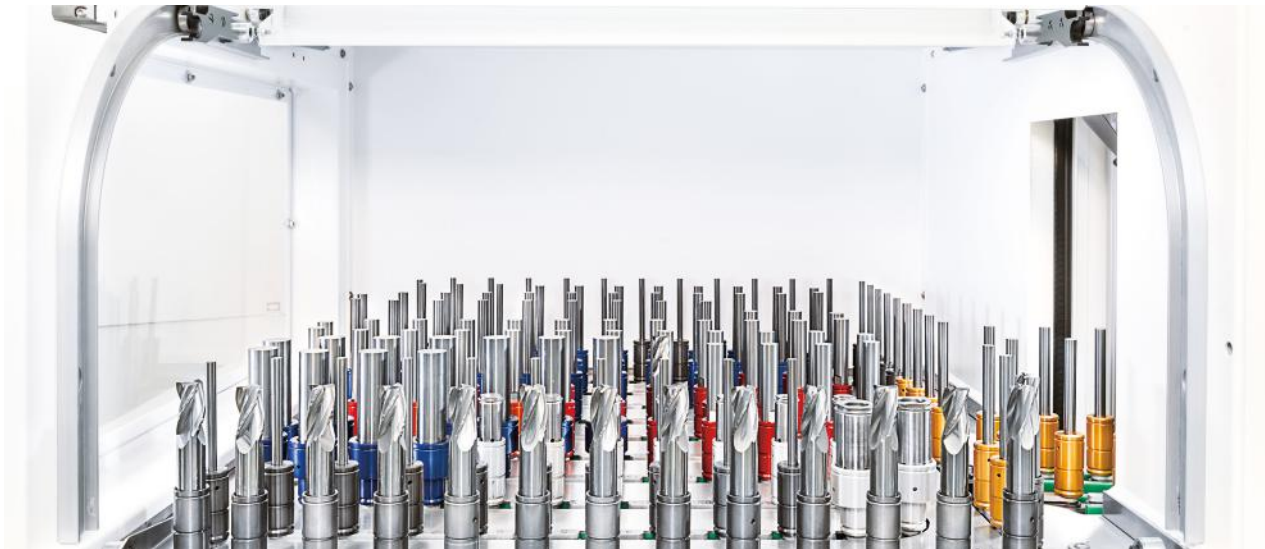
### The chain loader system

- attached to the machine in a space-saving way
- 155/310 workpiece places, individually encoded
- tool change time less than 12 seconds
- loading/unloading possible during automatic operation

### The pickup loading device

The pickup loading device with adapter plate offers 16 places for standard chain loader sleeves with diameter 3 to 32 mm.

- 
- ⊕ chaotic loading possible with different tool diameters
  - ⊕ tool gripper with diameter 6 to 32 mm without modification; further gripper pair for diameter 3 to 16 mm
  - ⊕ with the chain loader, loading/unloading of tools is possible without interrupting the grinding process
  - ⊕ maximum tool length for automatic loading 305 mm
  - ⊕ standard cabin solution for all automations



# Automation (optional)

## Simply practical

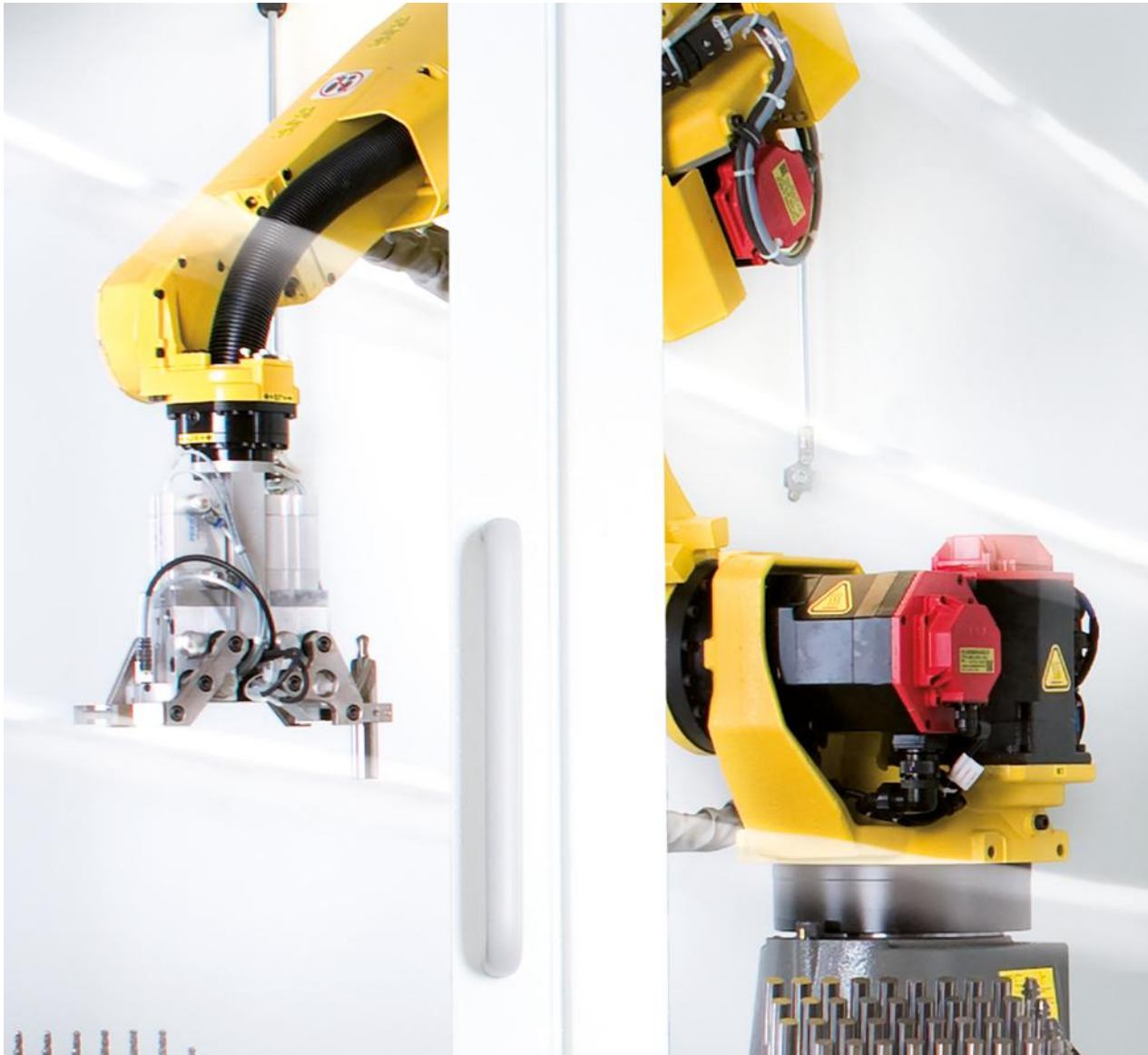
The ISOG 22 is available as standard with a standardised machine cabin and robotic loading cell. In conjunction with a double gripper system, the tool changing times can be reduced to a minimum. Unmanned operation is possible for many hours because sufficient blanks can be provided.

Another advantage: The chaotic loading of different diameters is also easily possible by robot.

### Processing of special profile inserts

What used to be possible to automate only in the special solution with FLEXUS Invader, is possible today with the ISOG 22 basic equipment: The ISO 50 serial interface is compatible with a wide range of clamping systems and can therefore also process inserts.

- 
- ⊕ pallet system for a large stock of blanks
  - ⊕ double tool gripper minimises tool changing times
  - ⊕ chaotic loading, just as with the chain loader, thanks to bushing change
  - ⊕ high efficiency in large series as well as flexibility for special requests





# Wheel changer

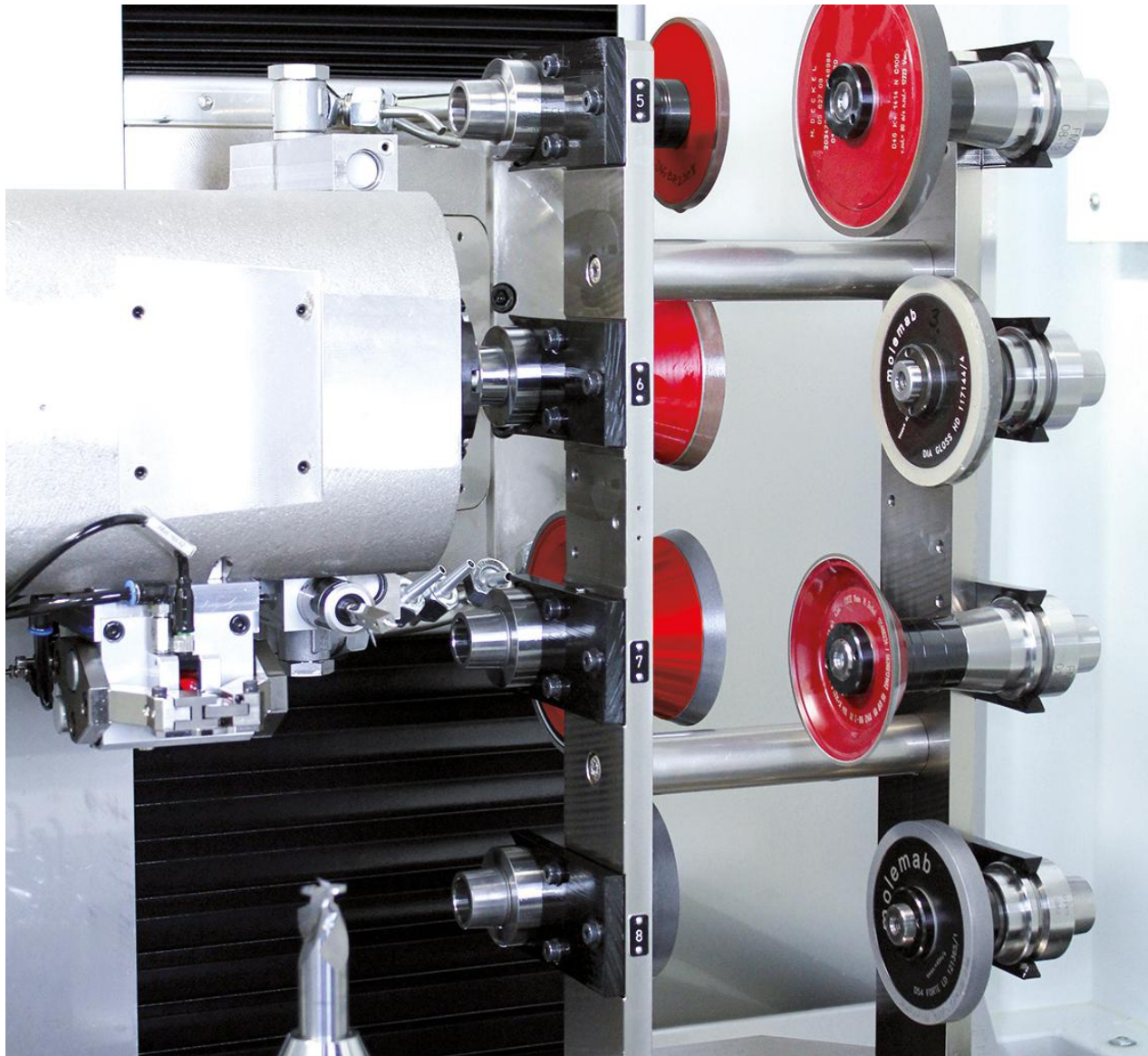
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## Many variants

ISOG 22 includes as standard a grinding wheel changer with 8 packages. This allows the machining of tools with the highest requirements. The maximum wheel diameter is 150 mm.

Alternatively, it is also possible to install a changer with 10 packages. Then the maximum wheel diameter is 100 mm.

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- ⊕ integrated into the machine
  - ⊕ grinding wheel change in less than 17 seconds
  - ⊕ highest clamping precision through HSK
  - ⊕ program-controlled







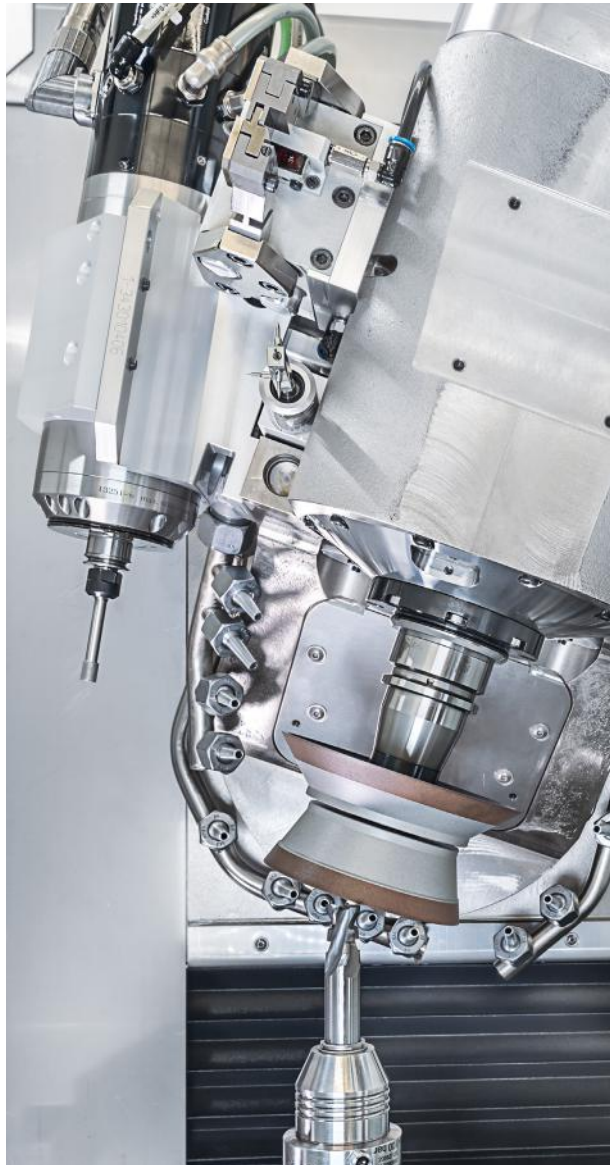
## Automatic bushing change

The ISOG 22 has been relying for years on the proven loading system via the CNC axes, which enables an absolutely  $\mu$ -precise loading with the best concentricity. The standard tool gripper can load shank diameters from 6 to 32 mm continuously. For smaller tool diameters, there is a gripper pair of 3 to 16 mm.

Another positive effect, in addition to the high precision (concentricity) during loading, is the low wear of the intermediate sleeves. Due to the vertical design of ISOG 22, the dead-weight of the tool has a self-centring effect. The grippers for the bushing change can be easily installed to ensure an efficient machine utilization even in small quantities - thanks to chaotic loading. That makes the ISOG 22 very flexible.

- ⊕ safe loading into hydraulic expansion chucks and sleeves possible
- ⊕ highest concentricity because  $\mu$ -exact loading is achieved via the CNC axes
- ⊕ higher flexibility due to chaotic loading
- ⊕ less wear of intermediate sleeves and hydraulic expansion chucks
- ⊕ universal tool gripper with a diameter range from 6 to 32 mm without prism change

# Grinding spindle

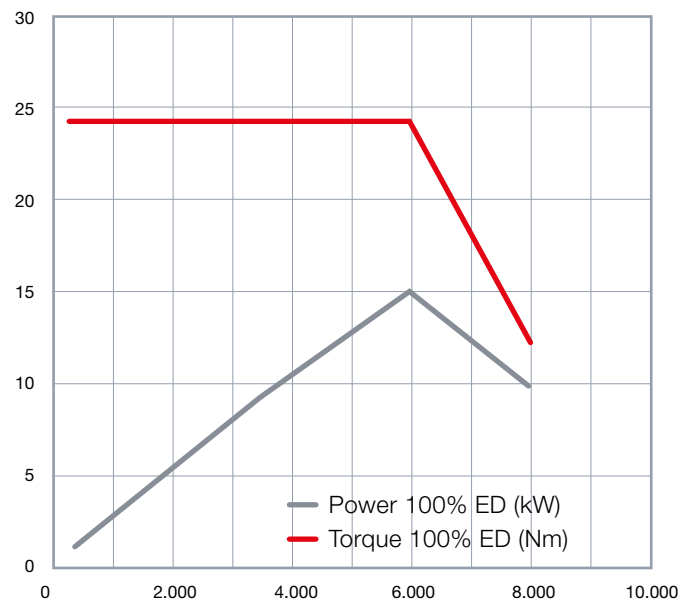


## Main spindle

The direct grinding spindle drive of the ISOG 22 has a peak power of up to 27 kW. With the standard interface HSK and the exact spindle stop, an extremely high repeatability is ensured.

## High-frequency spindle

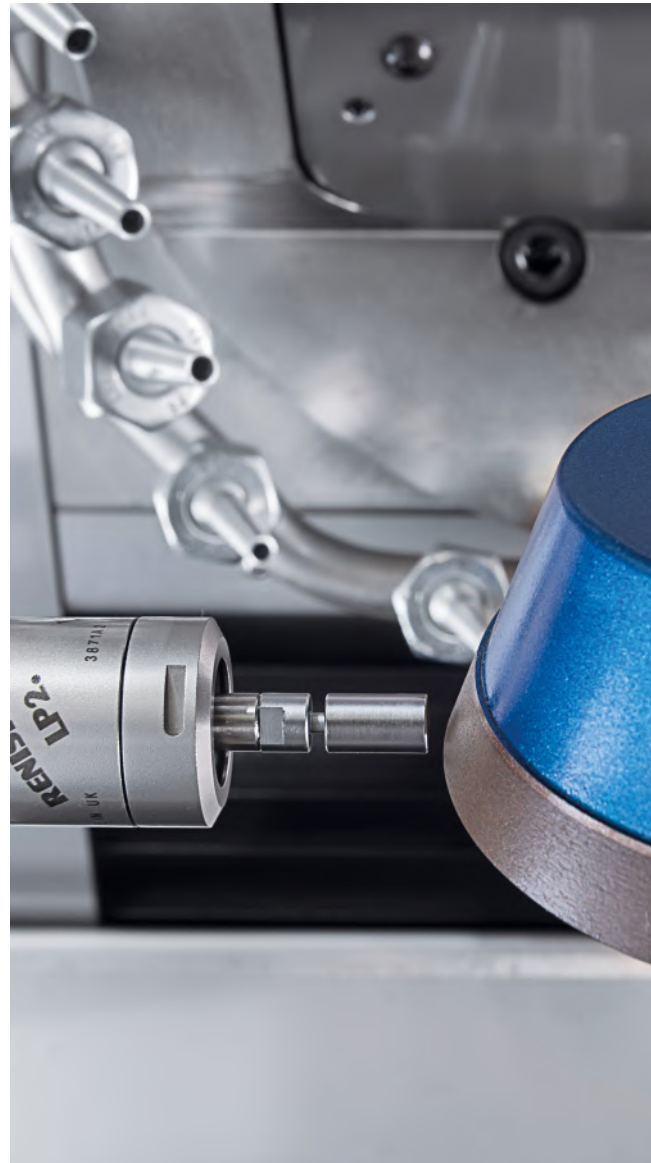
The ISOG 22 series offers further options that can contribute a lot to flexibility and cost effectiveness: The HF spindle has a maximum speed of 60,000 rpm and a peak power of 4.4 kW. Combining this with an automatic grinding pin change, it is possible to stock up to three grinding pins with ISO-10 receptacles in one station. This allows to process complex PCD tools completely. In addition, you can work unmanned for a very long time.



- ⊕ powerful grinding spindle with 27 kW peak power
- ⊕ high repeatability due to HSK interface and exact spindle stop
- ⊕ direct drive with infinitely variable rotation speed of 1,000 to 8,000 rpm
- ⊕ complete machining of tools by means of an HF spindle for PCD insert seat



# Measuring probe



## Automatic detection of tool data

With the ISOG 22, a standard electronic measuring probe captures all essential tool data - especially those that are important in automatic mode. For each workpiece, the following data are recorded:

- clamping length
- diameter
- tooth position
- helix
- flute depth
- flute length
- flute form
- unequal division
- cooling channel position

During the grinding process further data can be read out and checked. Two additional vertical needles help with this, in conjunction with the NUMROTO option "Measuring in the process".

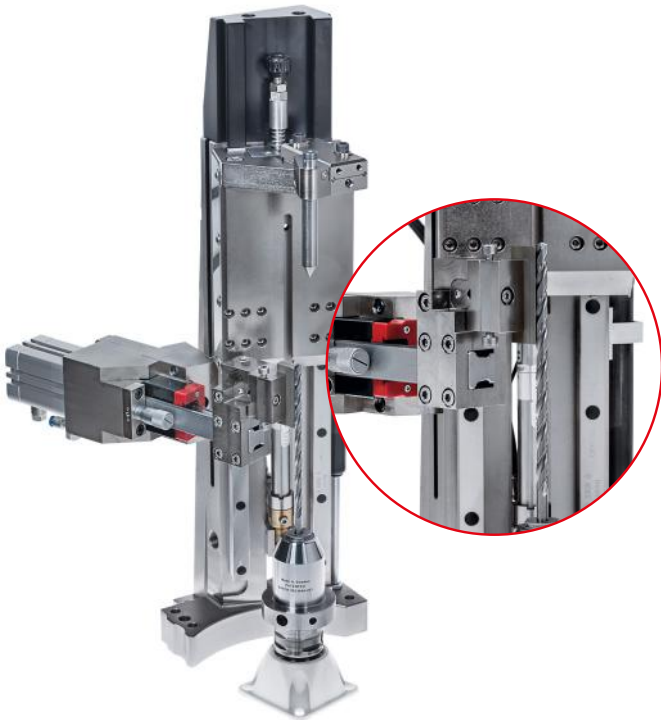
### Second measuring probe for grinding wheel data

The second measuring probe is useful in many respects. In conjunction with dressing and regeneration of grinding wheels, it allows to machine even large batch sizes fully automatically. The basic dimensions of the grinding wheel can be determined.

# Optional accessories

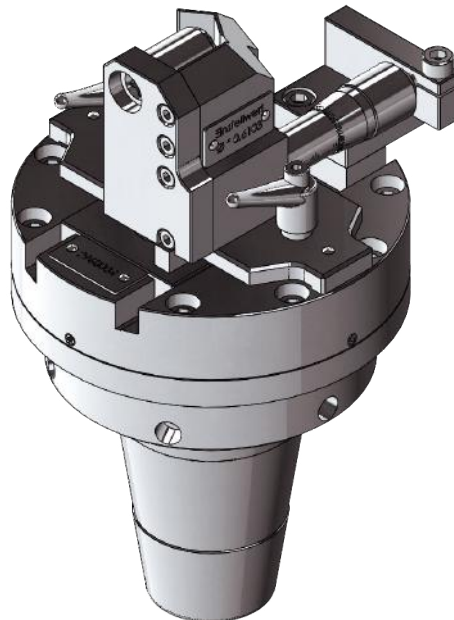
## Tailstock and lunette

- secure clamping of long and slender tools between spikes
- machining in fully automatic operation possible
- end face grinding possible due to halved tip
- support via automatically adjustable lunette



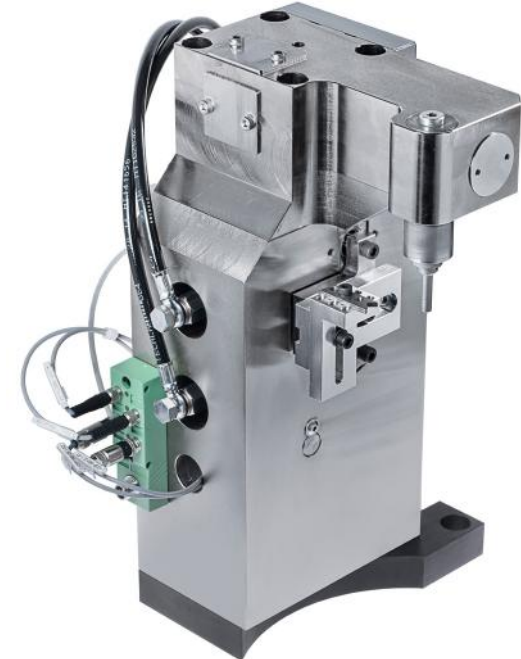
## Clamping device for deep hole drills

- for clamping deep hole drills up to a maximum length of 650 mm
- with the micrometer screw, the position of the tool can be set exactly
- the clamping device is designed for tool diameters from 2 to 20 mm
- the maximum shank diameter of 25 mm can be loaded through
- best accessibility to the tool tip
- only possible for manual loading



## Direct clamping device

- for clamping profile and special inserts without boring
- great holding power of inserts by hydraulic tension
- pneumatic stop slider for a high repeatability during loading
- sensory monitoring of positions
- adaptation on the Z-axis possible (possible for retrofitting)





# 21.5" control panel

## ***Clear and functional***

The control panel of the ISOG 22 has many functions that are popular among customers: height adjustment and rotation of the screen supported by gas spring. This allows each operator to choose their own setting for ergonomic work.

The large, high-resolution 21.5" flat screen is very comfortable for the operator, especially when programming on the machine. The powerful machine computer allows fastest simulations in high resolution quality. All specifications for a screen workstation are met.

The control panel includes an ergonomic, space-saving trackball mouse and a half-stop keyboard. So the desk looks very tidy. And it's designed for durability, as all components are oil resistant.

- 
- ⊕ large screen for programming work
  - ⊕ oil resistant mouse and keyboard
  - ⊕ integrated storage compartment
  - ⊕ holder for compressed air gun





## NUM Flexium<sup>+</sup>

The scalable, modern control NUM Flexium<sup>+</sup> controls all CNC axes and the grinding spindle of the ISOG 22. With the built-in drives and motors from NUM as well as the comprehensive NUMSafe safety concept for hard and software, the ISOG 22 fulfils all the important standards for safety-related motion functions. The entire system, from control to grinding software, drives, motors and safety is perfectly coordinated and promises maximum success.

- complete, digital system (CNC, drives, motors)
- open and powerful system - allows optimal adaptation to customer needs
- internal control position calculation in the sub-nano range for high accuracy and protruding surfaces
- fast data interface (TCP / IP) for probe and grinding data
- Integrated, comprehensive security management (EN ISO 13849-1 und EN 61800-5-2)
- worldwide service and customer support



## NUMROTOplus<sup>®</sup>

- extensive software for almost every grinding task
- exact and fast 2D-section simulation in any position
- 3D simulation with collision check and QW analysis
- flexible, logical and user-friendly programming
- help images for almost every input value
- job Manager for unmanned operation, also with measuring in process
- regular program updates and extensions with full compatibility

# FANUC

## FANUC 31i-B5

The tried-and-tested FANUC 31i-B5 control offers decisive advantages for the ISOG 22: Accuracy, speed, reliability and a very user-friendly operation. The controller supports the complex and exceptionally fast processes during manufacture and re-sharpening. With its features like "Nano Interpolation" or "Nano Smoothing" the machine achieves a higher accuracy and better surfaces. Safety technology is an integral part of the FANUC 31i-B5.

- Quick-Start
- short adjustment times
- convincing reliability
- improved surface quality
- shorter machining cycles
- improved performance
- easier maintenance
- short shelf control cycles
- high resolution of the control system
- integrated technology from the CNC to the robot
- worldwide service



## tool-kit PROFESSIONAL from MTS

- for production and re-sharpening of almost all tools
- modular design for individual geometry machining
- simple input and programming
- fast program generation by default function
- simple tool and grinding wheel management
- integrated 2D simulation
- new 3D simulation, which can also map ISO programming
- link with collision monitoring as standard



## Commissioning

During commissioning, we examine all functions in great detail and, if necessary, make integration tests for options and accessories. We train and instruct your operating personnel individually and in detail. If required, we grind a workpiece you have defined.

## Training

We offer individually designed customer training that we can carry out at your production site and on your machine. Our course categories range from general grinding to operation and programming through to special courses.

## Updates

At our production site, we maintain our own overhaul department with experienced employees. We will gladly advise you on site about overhauling your machine and carry out an inventory.

## On-site Service

Our qualified service technicians are stationed worldwide and, if required, quickly with you. They identify faults, repair, measure, assess and restore, if necessary, the machine geometry and take stock.

## Online Service

A team of six works in our online service center. The experts are happy to assist you by phone. We also offer help at the touch of a button. For this we connect your equipment to the Internet and establish an online connection between your machine and our service center. That's secure, because we use the protected online connection solution VPN. The access allows us to quickly analyse the situation and diagnose malfunctions. Together, we find solutions. To ensure that the connection works immediately, we check the signal quality during regular connection checks if necessary. You benefit from our on-line machine documentation and also from our diagnostic and reporting tools.

## Maintenance

We carry out maintenance systematically by means of a detailed checklist with machine-specific work steps and inspection points. You choose between recurring maintenance (possible interval: 12 months) and a one-time maintenance.



# Technical data

Control	
type	NUM Flexium+ or Fanuc 31iB5
operating system	Windows 7 Ultimate

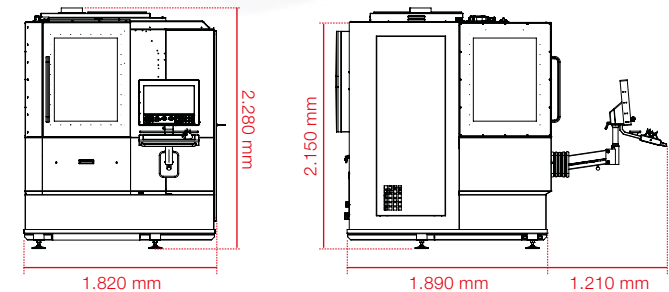
Clamping and grinding range	
max. workpiece diameter <sup>1)</sup>	250 mm
max. workpiece length <sup>2)</sup>	900 mm
max. workpiece length face grinding <sup>3)</sup>	400 mm
max. workpiece weight <sup>4)</sup>	50 kg

Wheel changer	
pneumatically supported	8-times or 10-times

Grinding spindle	
drive motor	asynchronous direct drive
rated power	15 kW at 100% ED
peak power <sup>5)</sup>	27 kW
cooling medium	Oil
direction of rotation	right and left
rotation speed	1,000 to 8,000 rpm infinitely variable

Dimensions	
weight	3,800 kg
dimensions	1,890 x 1,820 x 2,280 mm

Movement range / measuring system		
X-axis	traversing range	400 mm
	feed rate	20 m/min
	drive	digital controller with AC motor
	measuring system	direct
Y-axis	traversing range	310 mm
	feed rate	20 m/min
	drive	digital controller with AC motor
	measuring system	direct
Z-axis	traversing range	305 mm
	feed rate	20 m/min
	drive	digital controller with AC motor
	measuring system	direct
A-axis	rotation range	continuous
	feed rate	850 min <sup>-1</sup>
	drive	digital controller with torque motor
	measuring system	direct
C-axis	rotation range	224°
	feed rate	60 min <sup>-1</sup>
	drive	digital controller with torque motor
	measuring system	direct
C-axis	rotation range	224°
	feed rate	60 min <sup>-1</sup>
	drive	digital controller with torque motor
	measuring system	direct
C-axis	rotation range	224°
	feed rate	60 min <sup>-1</sup>
	drive	digital controller with torque motor
	measuring system	direct
C-axis	rotation range	224°
	feed rate	60 min <sup>-1</sup>
	drive	digital controller with torque motor
	measuring system	direct



## Automation (optional)

Chain loader	
dimensions	850 x 1,500 x 900 mm
drive	digital controller with AC motor
feed rate	30 m/min
max. workpiece dimension	ø 32 x 180 mm
max. workpiece weight	1.0 kg
magazine places (chain)	155
weight	350 kg

### Explanations:

- 1) depending on the tool type
- 2) max. clamping length from upper edge of tapered sleeve
- 3) depending on workpiece position, wheel mount and grinding task
- 4) depending on the moment of inertia
- 5) up to 30 seconds

Subject to changes in the interest of technical progress and error. Illustrations and descriptions in this document contain partially paid options.

