

Shaft and gear cutting tools

New automatic center "key2edge" for edge preparations

PROFIN has introduced to the market a 6-axis machining center for micro cutting and final finishing operations on end mills and round tools.



Manual loading



Handling ECCO

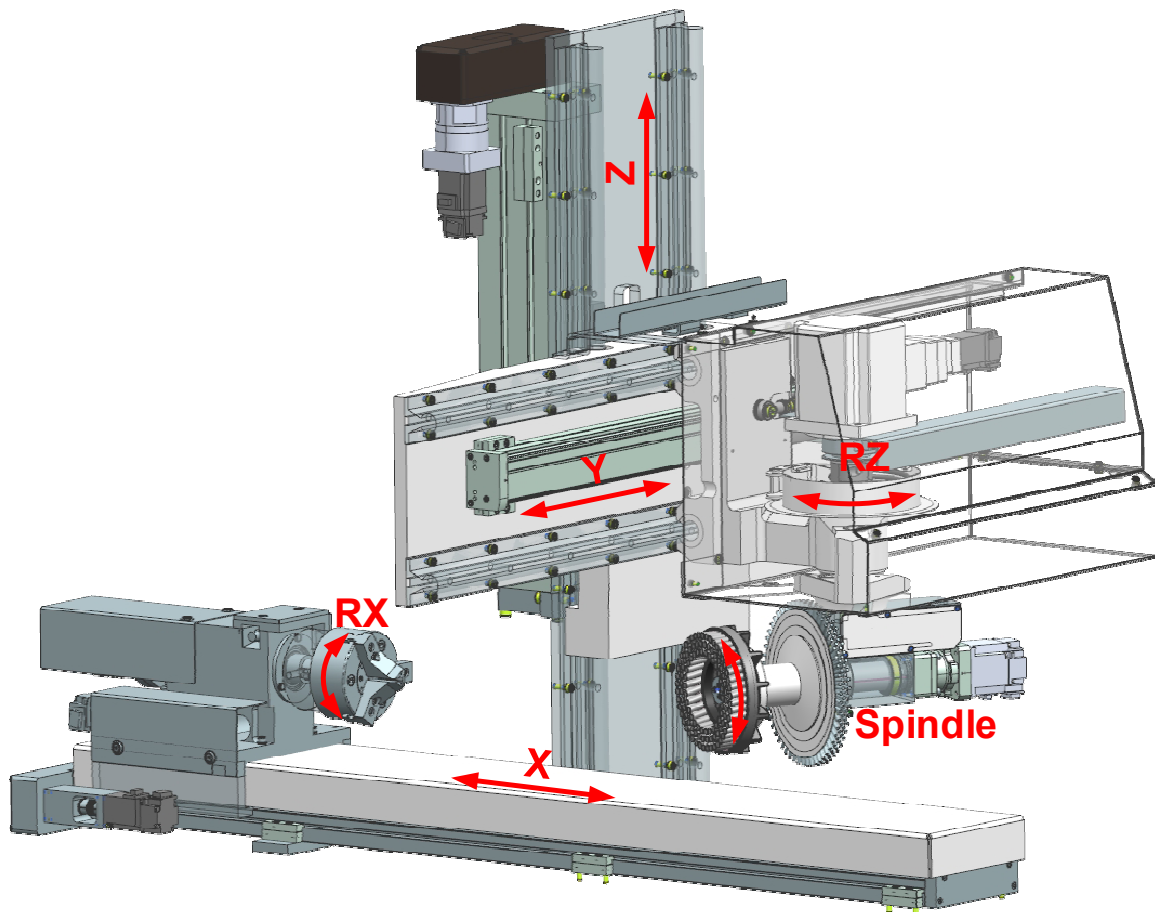


Handling ROBO



Handling SERIES

The 6-axis machining center is equipped for the production of micro cutting edges and final finish processing with many technical features.



- 6 controlled servo axes
- Automatic tool length measurement
- Automatic cutting edge alignment via vision system with graphic display
- Automated brush filament measurement via Acoustic-Emission-System AES
- Fully graphical program guidance in all machining programs
- Brush filament height-dependent power and compensation control
- Tool specific parameters (templates) within the PLC-supported program and data management system
- PLC-supported program and data management for the shank tools and round tools to be machined
- PLC-supported program and data management for the brushes and the brush packages
- Program-supported RFID control for the brush packs (Ability to program)

The center can be used to prepare the cutting edges of the cutting tools shown below and also to polish surfaces, flutes or coatings (also droplet removal):

Examples:

End mill



Drill



Tap



Ball endmill



Reamers



Dovetail cutter



Step drill



Cone drill



The following operations can be performed with the center:

- Micro cutting edges preparation on main edges



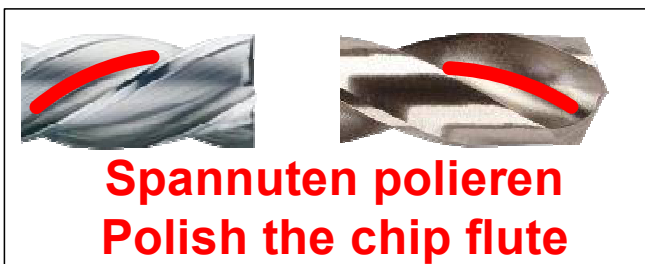
- Micro cutting edges preparation on corner edges



- Micro cutting edges preparation on secondary edges



- Polishing of circumferential flutes



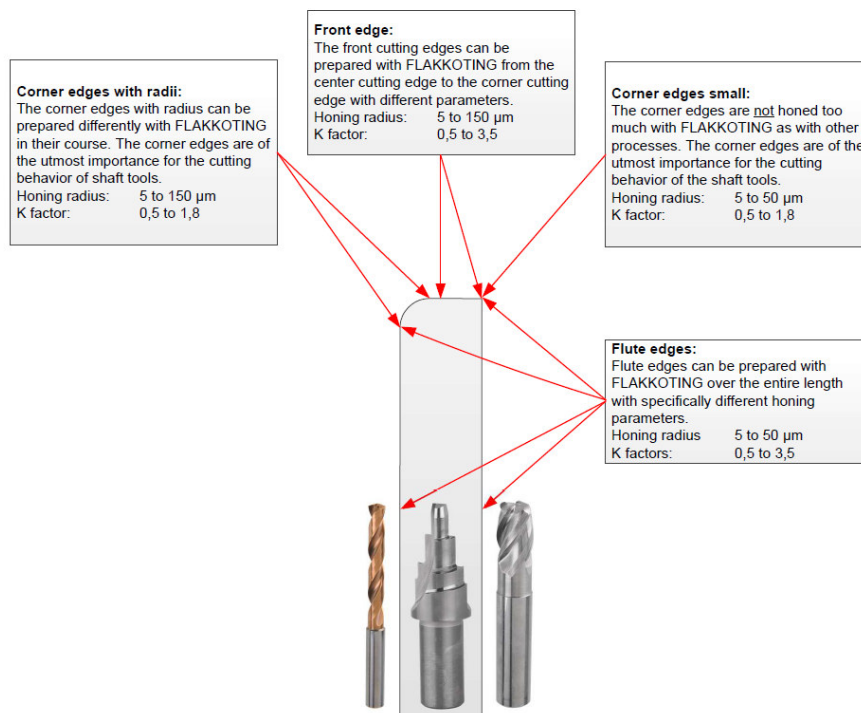
- Combined multiple machining on shaft tools



- Micro cutting production on tap



FLAKKOTING influences and improves machining processes with shaft tools sustainably

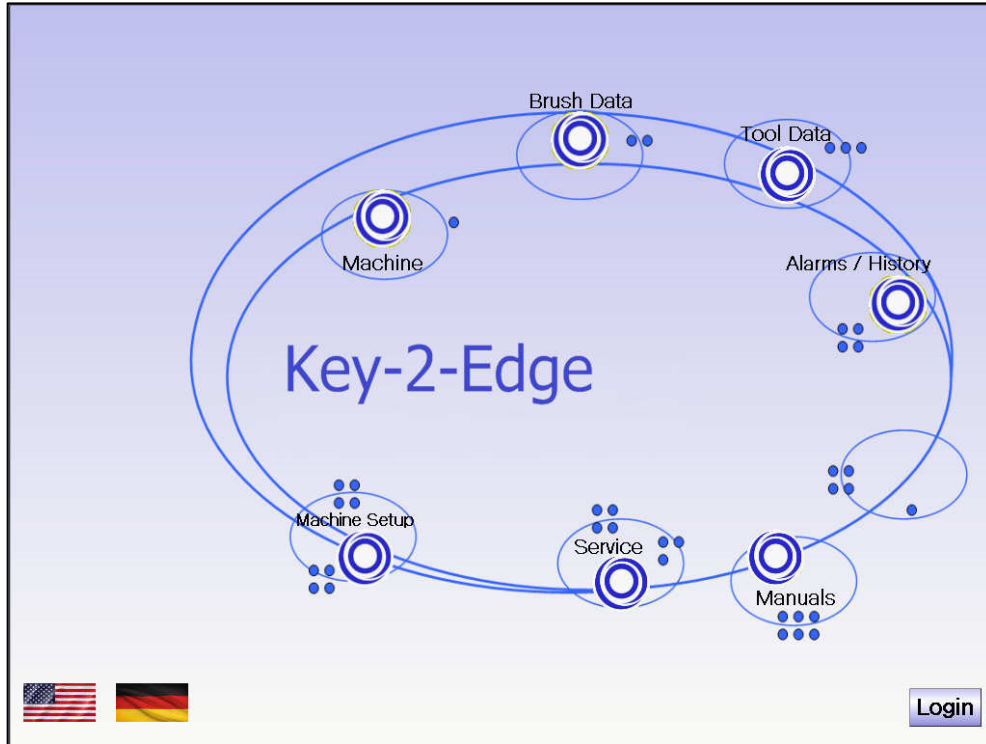


Advantages of micro-cutting edge preparation by **FLAKKOTING**

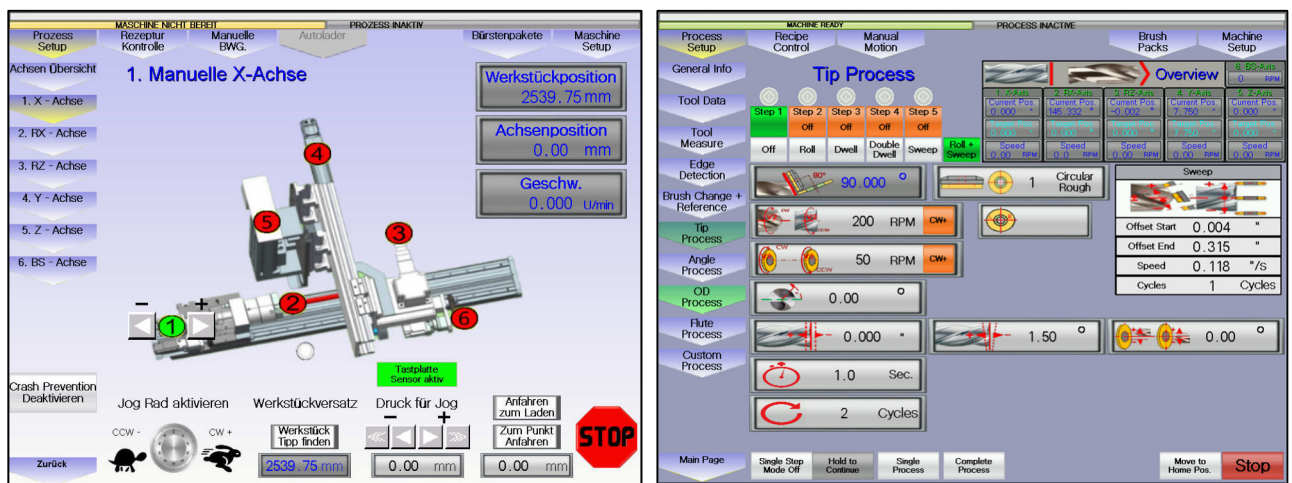
- Different micro cutting edges can be produced on the face cutting edges from the center to the corner cutting edge.
- Different K-factors up to KF 3.5 (radii, trumpet, waterfall) can be reliably produced on all cutting edges.
- K-factors up to KF 3.5 are possible on the peripheral cutting edges.
- Corner cutting edges are not machined more by **FLAKKOTING** than by all other processes.
- Flutes can also be polished
- Polishing of hard coatings with droplet removal.
- Optionally also available for wet machining.



Modern and user-guided graphical interfaces enable fast and individual program creation.



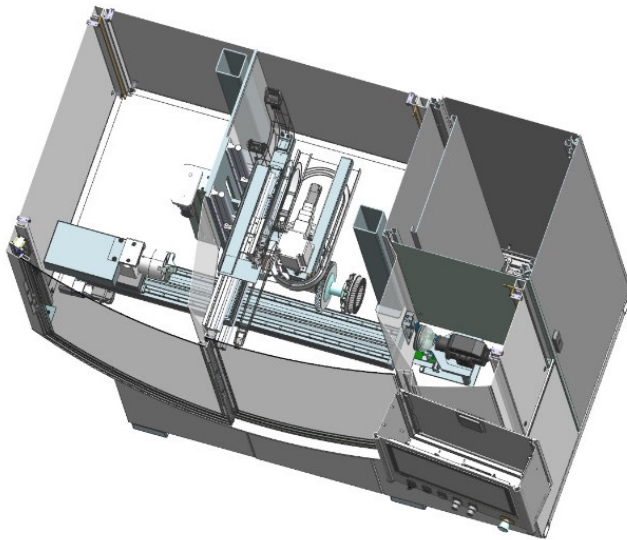
Structured and clearly arranged pages enable simple and efficient optimizations in the programs for offset values such as immersion depths, angle settings, travel paths and speeds and much more.



Machining center "key2edge"

Basic version with manual loading

Mainly suitable for development purposes in development laboratories and universities.



In the basic version, the workpieces are manually clamped individually in the chuck.

Control Interface



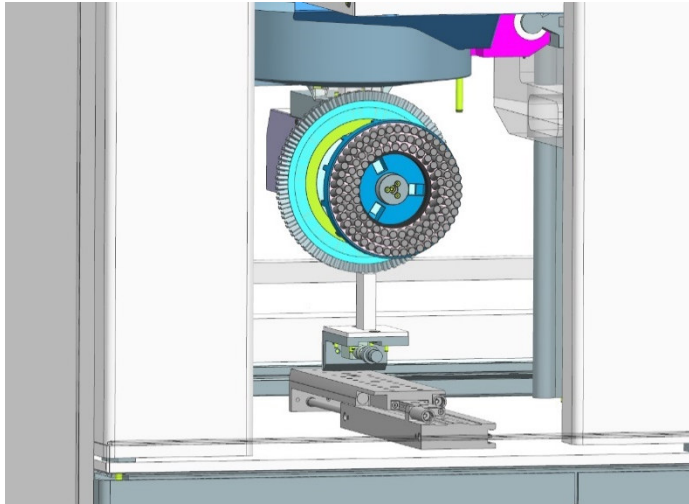
The operator interface provides an easy visual guidance to help guarantee quick and easy programming.

Mitsubishi L series control LABCPU-PBT is installed.

The control system is equipped with PLC-supported management of workpieces.

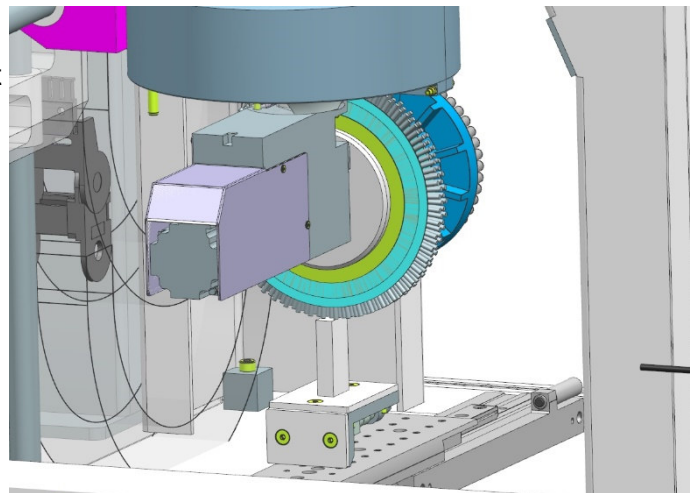
It is also equipped with a PLC-supported management for tool and mandrels that can be selected and edited directly.

AES (Acoustic Emission System) for tool height measurement



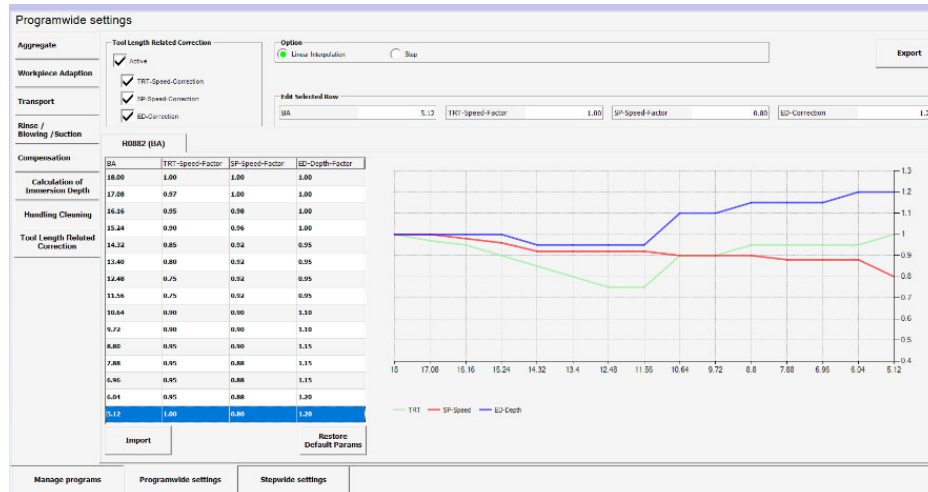
With the AES system, the filament heights of the FLAKKOTING tools are automatically measured and the programs automatically adjusted. The travel positions and travel paths are updated according to the current filament height. The measurements are carried out as programmed in preselected cycles.

The measuring sensor is moved with a drive axis to and forth from the measurement position to the parking position.



Optional equipment

Compensation control



The changing filament height of the brushes during the process are automatically compensated for by programmable process parameters. This guarantees that the specified preparation values are achieved and maintained regardless of the brush heights in the individual programs.

The compensation control can only be operated with AES.

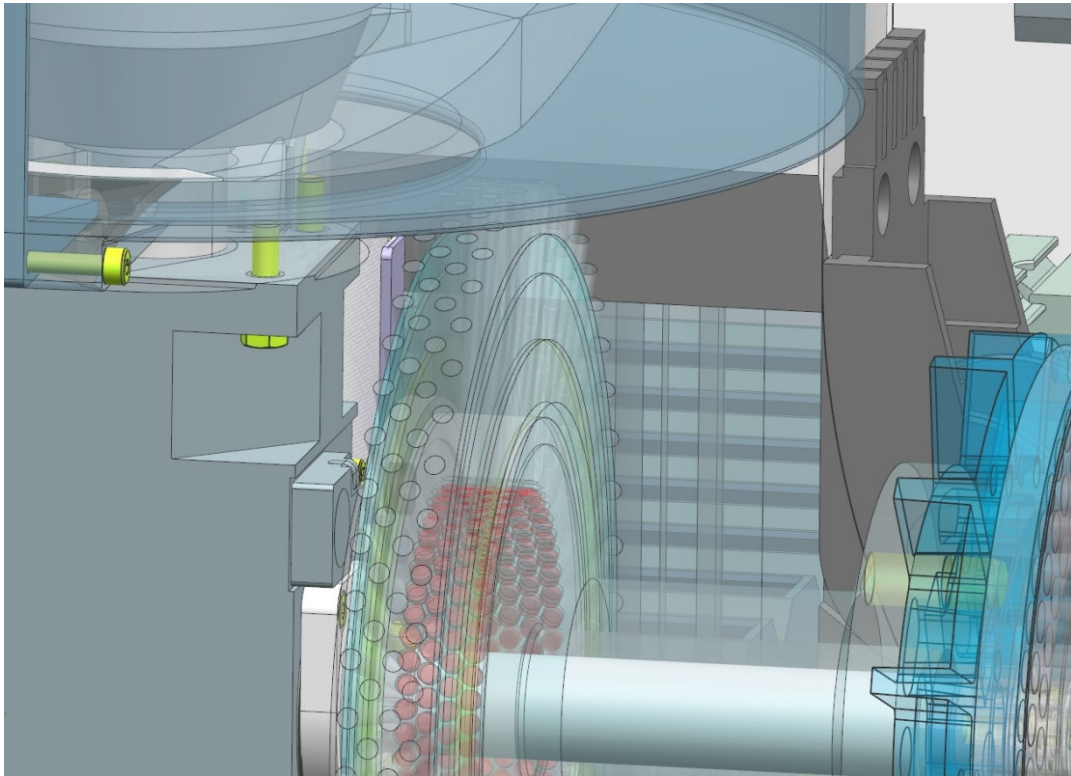
Processing modules

Within the basic version, the cutting edge preparation is designed for main cutting edges, corner cutting edges and secondary cutting edges on drills and end mills.

In addition, the machining center can be equipped with the following machining modules:

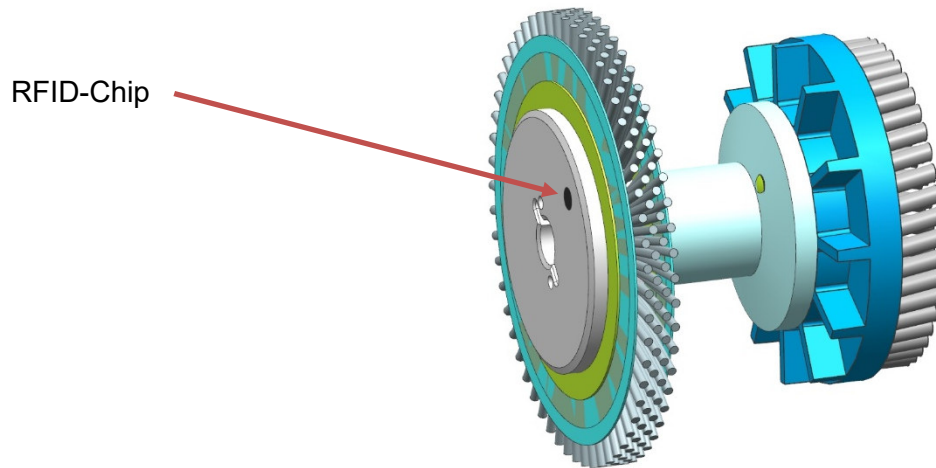
- Flute polishing
- Ball endmill processing
- Stepbit processing

RFID-Tool-Control for checking the mandrels and tools



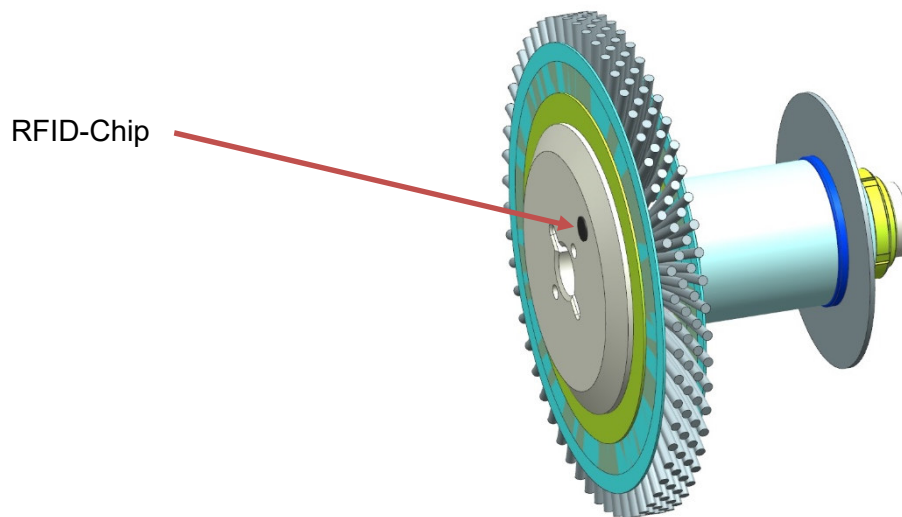
RFID-Tool-Control automatically checks whether the correct tool mandrel with the appropriate tools is present in the machine for the currently selected machining program.

Tool mandrel equipped with a circular tool and planer tool



The figure shows an example of a tool mandrel equipped with a circular tool and a planer tool. A wide variety of tool sets and grit combinations can be used with this layout.

Tool mandrel with two circular tools



The figure shows an example of a tool mandrel equipped with two circular tools. A wide variety of tool sets and grit combinations can be used with this layout.

Machining tools



Planer tool Ø 150mm



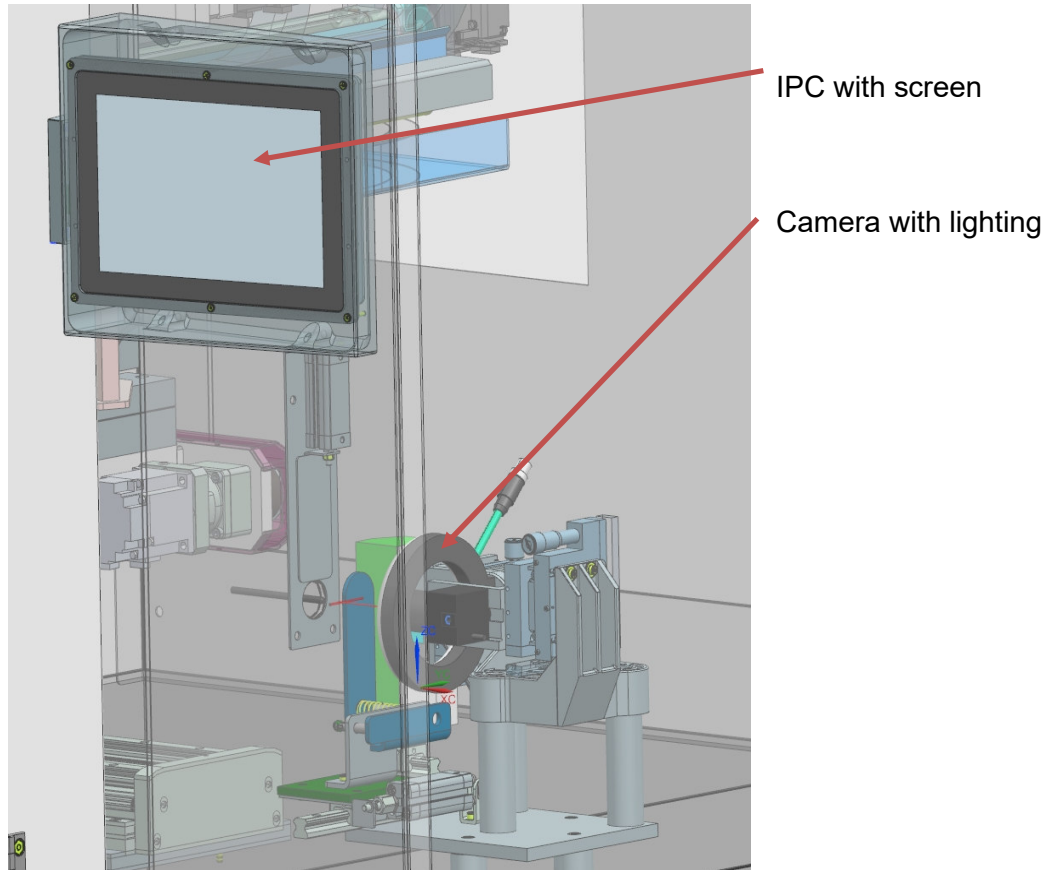
Circular tool Ø 200mm



Circular tool Ø 110mm

For the different types of machining, different types of tools with corresponding filaments and grit sizes are offered for equipping the tool mandrels. This allows the various processes to be designed differently and optimized for best results and performance.

Vision Position detection with workpiece length measurement



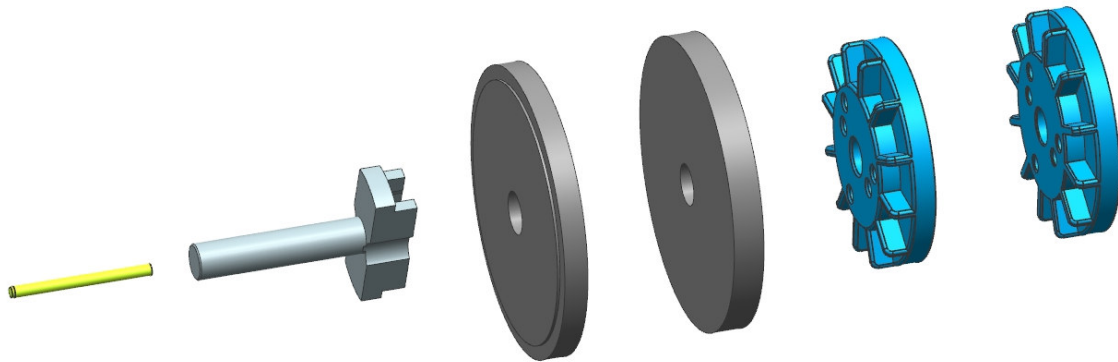
In the basic version of the basic machine, the cutting edge alignment is performed by means of a sensor. This takes approx. 8-10 seconds and is without visual display.

As an option to the main cutting edge alignment, vision cutting edge alignment is also available. With the vision system, blade alignment takes only 1.5 seconds.

With the vision camera, the main cutting edges are aligned quickly and precisely for edge preparation. The image recognition is displayed real time on the screen with the required correction value.

Teach-Gauges

With the teach gauge set, the exact travel positions can always be adjusted back to the original position during subsequent revision work (e.g. motor or gearbox change) in the travel axes by means of stake-out positions on all axes and with the aid of the teach gauges.



Program security:

This guarantees that the machining programs, once created, are retained securely and with repeat accuracy.

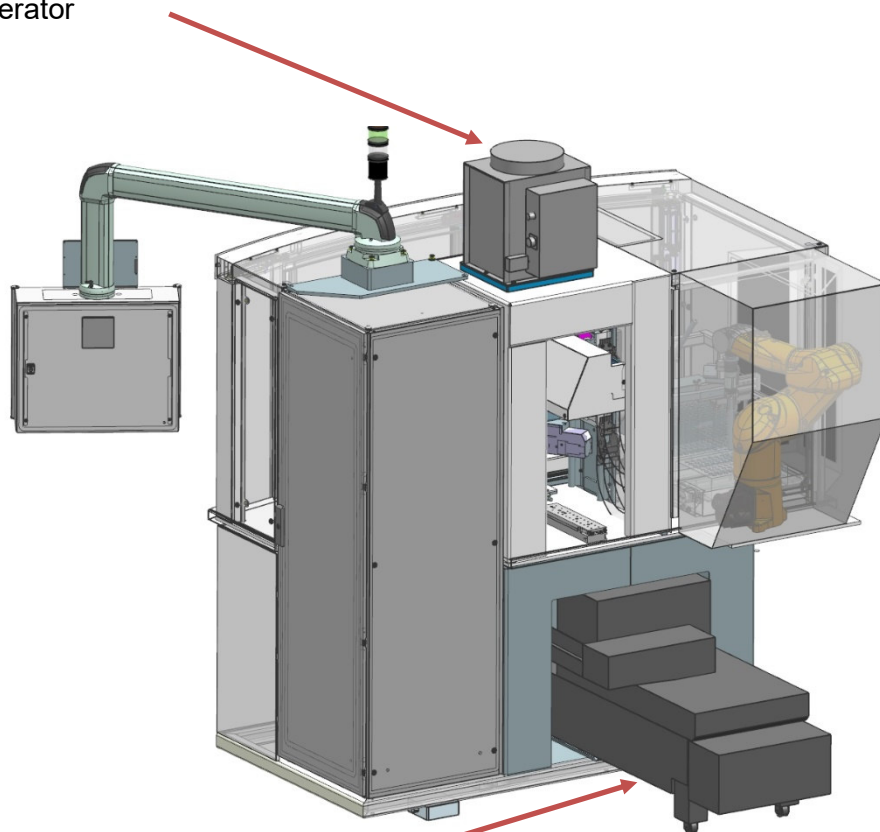
Wet processing

The machines are also available for wet machining with process medium oil. The same grinding oil can be used as process medium by the customer as in the customer's grinding machines.

The equipment for wet processing includes

- Process medium collecting trays in the process area
- Splash guard equipment inside the machine
- Filter system for separating process abrasion (can be pulled out for maintenance)
- Electrostatic precipitator for air pollution control and separation of oil mist from the exhaust air
- Process medium circuit with program-supported oil flushing of the FLAKKOTIER tools

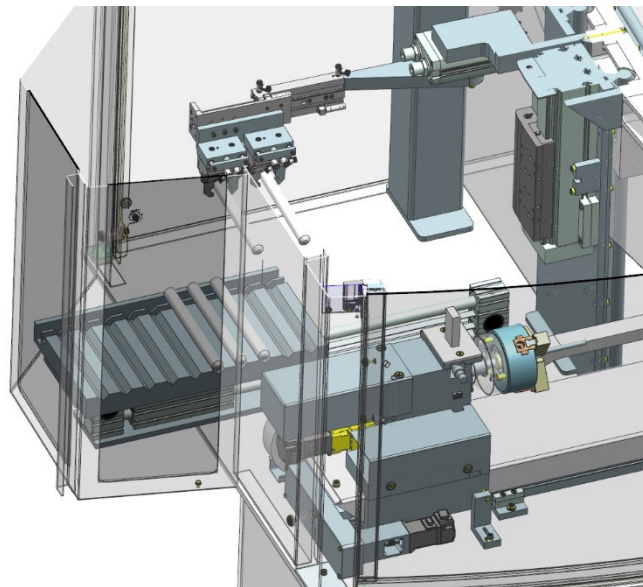
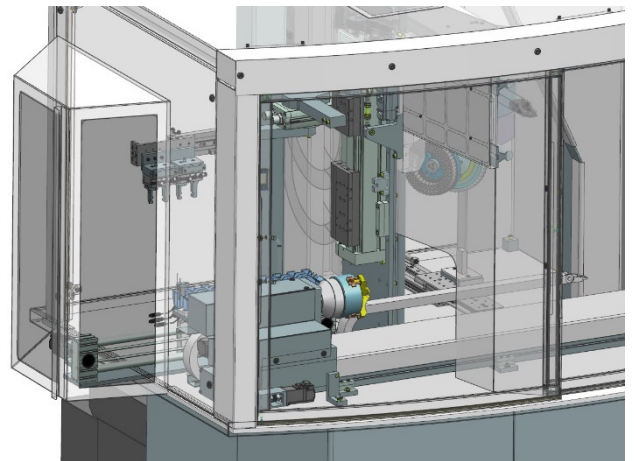
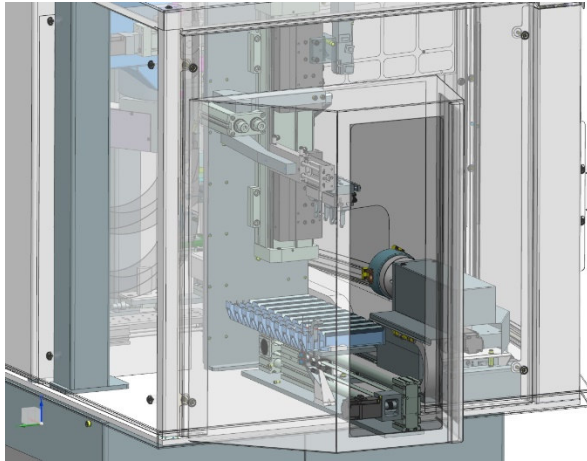
Electrostatic separator



Filter unit

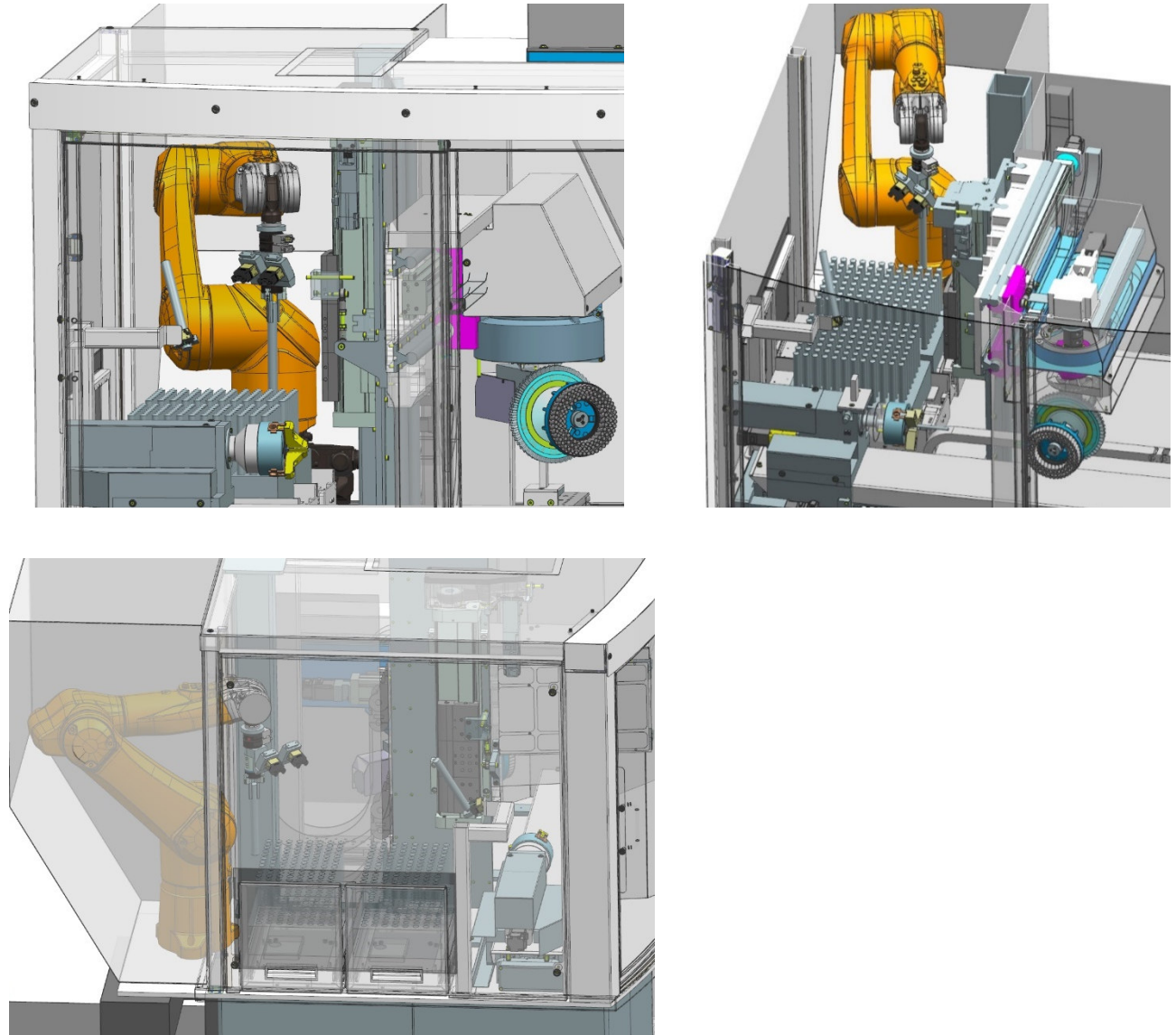
Automations and handling variants for "key2edge"

Handling ECCO - Pick and Place



With ECCO handling, up to 10 workpieces of the same type but unequal length can be manually loaded into and removed from a V-grid workpiece carrier. The loading and unloading of the individual workpieces into the chuck is carried out automatically with the "Pick and Place". The workpieces can be inserted and removed individually or the entire V-grid workpiece carrier can be changed.

Handling ROBO Suitable for medium production series (Stäubli)



The ROBO handling unit is loaded with one empty and one loaded workpiece carrier. The workpiece carriers are inserted into the handling system via two separate magazine drawers. For a high loading capacity, the workpieces are positioned upright in the workpiece carrier. The workpieces are removed from the carriers, gripped around at the gripping station and, after removal of the machined workpiece, a raw one is inserted into the chuck for machining. While a workpiece is being machined, the machined one is placed back into the workpiece carrier and another raw one is placed in the waiting position at the chuck. This allows the workpieces to be changed in very short changeover times of approx. 3-4 seconds. The workpiece carriers are loaded by type, so that only one program with the corresponding process parameters can be run per workpiece carrier.

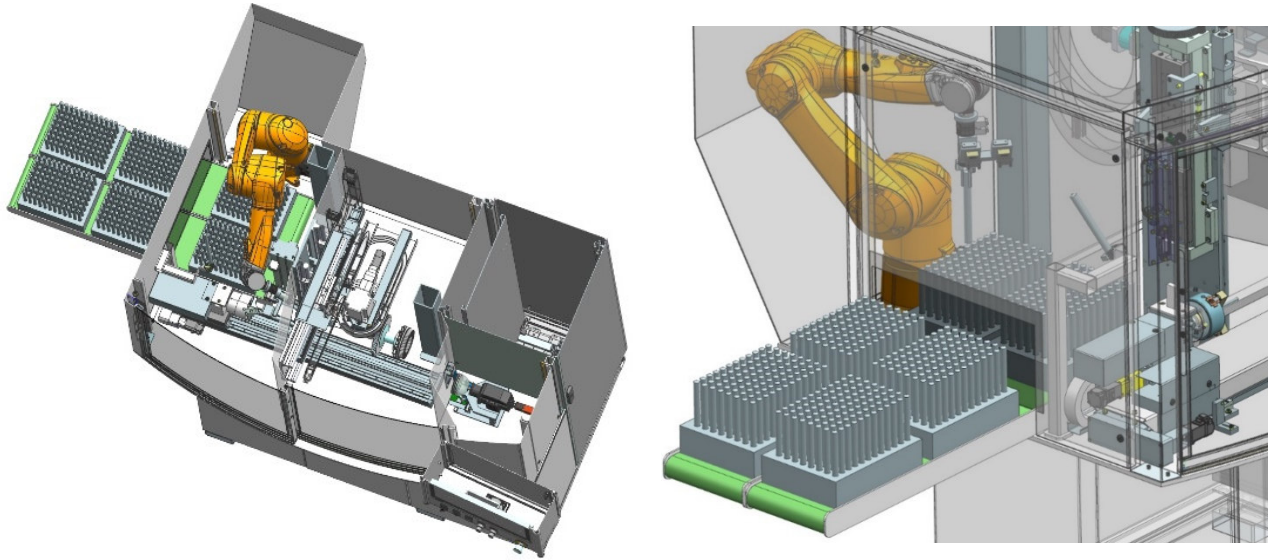
Optional ROBO mix mode

Different workpiece types can also be loaded in the workpiece carriers. Which tool is located at which place can be communicated to the program management via RFID/barcode information or data interface.

According to the stored and existing programs, the corresponding program is automatically loaded and applied in the process.

Mixed operation for different workpiece types according to grouping.

Handling SERIES Suitable for large series production (Stäubli)



The internal handling processes are the same as in the "ROBO" handling version. The only difference is that the workpiece carriers are not fed into and out of the processing machine via slide-in units but via a transfer system.

The loading of the workpiece carriers must be of the same type.

The connection to a customer-side transfer system is very individual and must be planned and offered on an order-specific basis.

Optional mix operation SERIES

The workpiece carriers within the transport system can be loaded in different ways. However, the carriers in themselves are of the same type. Via RFID/barcode information or data interface the corresponding program can be applied to the workpiece.