

# PICOMAX® 56 / 56 L *TOP*

The universal milling machines  
for manual and CNC operation



## FEHLMANN: The Brand



### Precision “Made in Switzerland” since 1930

Whether design, manufacturing, training, delivery, commissioning, or service and maintenance: FEHLMANN customers receive everything from a single source.

Each FEHLMANN product reflects the high quality standards applied to the entire production process.



As a partner of the Blue Competence sustainability initiative and an ISO 9001/14001 certified company, FEHLMANN strives to integrate sustainability into all aspects of the company. Our focus in this regard is on the entire life cycle of our machines.

FEHLMANN already ensures minimal CO<sub>2</sub> emissions during the production process, as energy consumption is already considered during product development. FEHLMANN also participates in the renowned Switzerland-wide EnAW (Energy Agency for Industry) model for energy optimization.

FEHLMANN is renowned in the industry for its superior precision, good ergonomics, ease of handling and reliability. FEHLMANN's understanding of quality also means developing machines that satisfy current and future workshop requirements.

With FEHLMANN you stay one step ahead of the competition!  
**Your Precision Advantage.®**

# PICOMAX® 56 TOP and PICOMAX® 56L TOP

## User-oriented from the ground up

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### Space-saving and clear design

The FEHLMANN PICOMAX 56 TOP machines ensure that workpieces can be seen perfectly at all times and the machining area is easily accessible. The doors can be opened smoothly with one hand. The machines are built very compact and can fit into any workshop. They can even be dismantled for complex installation.

\*Pictured with fully encapsulated machining area on top and other additional options

# The concept at a glance – save time thanks to the choice of CNC or manual operation

Use a CNC machine to efficiently process complex serial parts and perform a single manual operation here and there? With the TOP functions of the PICOMAX 56, you'll always be flexible and can save time as well.

The easy-to-operate, "Made in Switzerland" machine tools are suitable for both simple tool and mold manufacturing, as well as parts manufacturing, prototype and fixture construction, and training.



## CNC

Simple, dynamic machining center. Using the Heidenhain CNC controls, serial parts can be machined quickly and fully automatically in 3- to 4-axes simultaneously.



## TOP – manuell

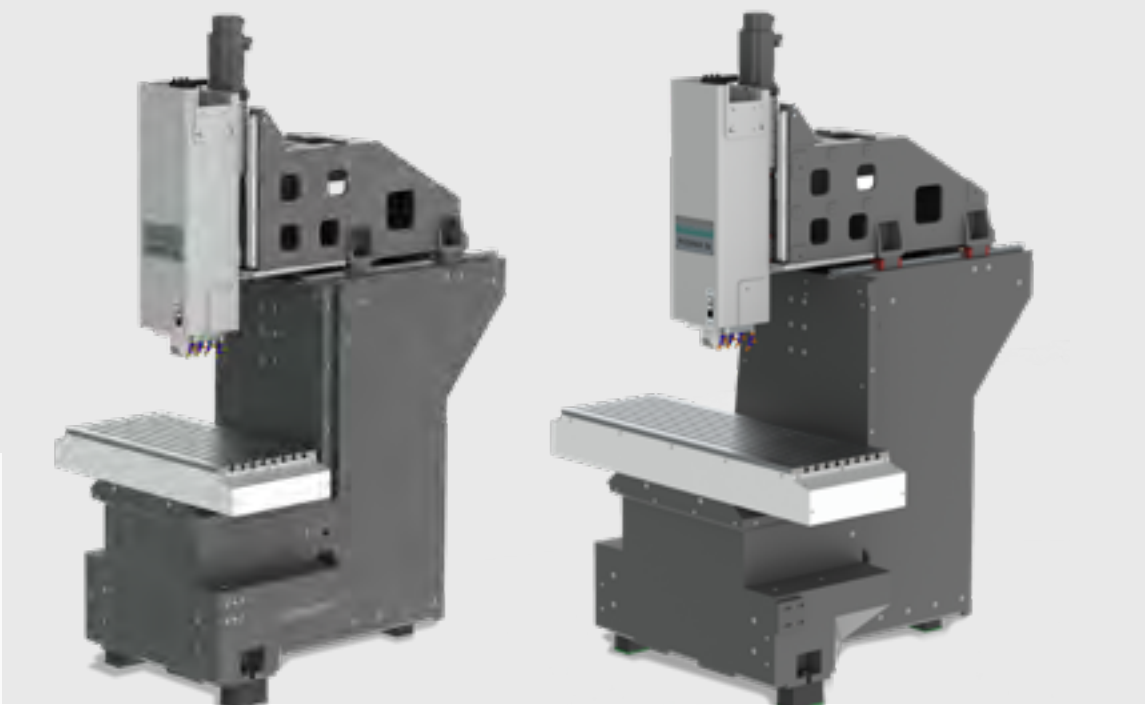
Thanks to the patented TOP operation concept (TOP functions – Touch Or Program™), the machine is also easy to operate manually. Using the drill lever and the two conventional handwheels, single operations are finished in no time and simple parts can be machined easily.



How exactly does manual and CNC machining work? Watch the video on our YouTube channel:



The clamping table is bigger than the path of travel in both versions. This means that the path of travel is not restricted, even when using a 4th axis. The solid machine base has three legs for optimal stability.



**In-house spindle production**  
FEHLMANN motor spindles fulfill the highest requirements – direct drive ensures low vibrations and high power, thereby guaranteeing excellent surface quality and tool life.

## Low on space requirements, big on possibilities. And the L version is even larger.

With the PICOMAX 56 TOP, FEHLMANN offers an economical machine for:

- small series
- individual parts
- simple 3D machining

These requirements were consistently taken into account for both the patented, unique TOP operating concept and for machine assembly. Safe and efficient machining is guaranteed, thanks to a large safety door pane that allows for an optimal overview of the machining area. With or without cooling lubricant. The clamping surface is located at an optimal working height so that workpieces and clamping tools are always within convenient reach. The generously dimensioned clamping surface allows for clamping of multiple devices, as well as machining of bulky workpieces. This significantly reduces non-productive time by allowing different clamping devices to be on the machine simultaneously, thereby eliminating the need for re-clamping.



**Direct measuring system**  
All axes are equipped with a direct measuring system in a closed loop. This guarantees:

- High level of precision in hole spacing
- Optimal contour accuracy in milling (3D machining)
- Reduction of thermal impact from mechanical elements
- No backlash with circular milling
- Long-term precision

## High-end spindle technology for machining with the most demanding requirements

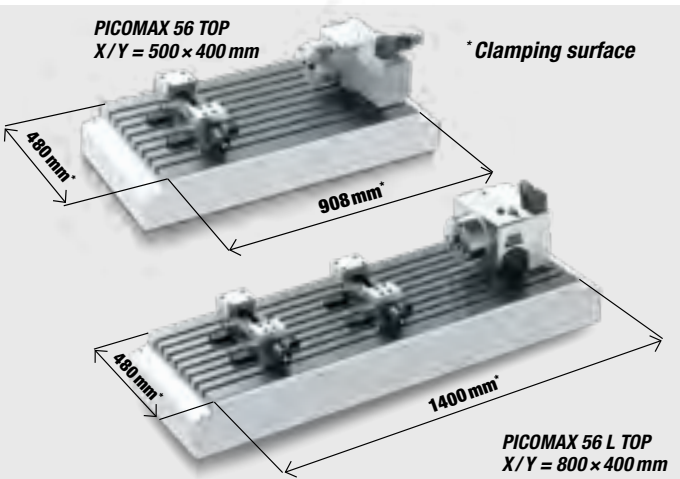
**Long-lasting and always available**  
The motor spindles are made by Fehlmann. This guarantees high quality, long lifespan and excellent availability. High grade balancing across the entire range of speed also ensures very smooth operation, even at high speeds.



**Cooled motor spindle**  
Outstanding precision is always guaranteed, even at high cutting capacity.



**Robust**  
The sturdy design makes it easy to master milling work with heavy material abrasion.



**Laser measuring system**  
Before delivery, all machines are measured by laser interferometry and other state-of-the-art methods.



**Low vibrations**  
The smooth operation of the spindle guarantees flawless surfaces and also allows for microprocessing.



**Synchronous**  
During reaming, the machine synchronizes the feed motion with the turning of the spindle (Z/S interpolation).



**Dynamic**  
Designed for CNC operation from the ground, the PICOMAX 56 TOP offers outstanding dynamic properties.

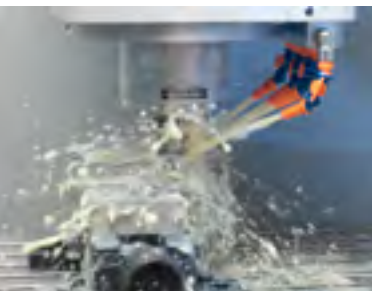
## Dynamic and flexible – for demanding tasks



Whether it's for 3D machining, thread milling or simply drilling with precise hole spacing – you've made the right decision with the PICOMAX 56.

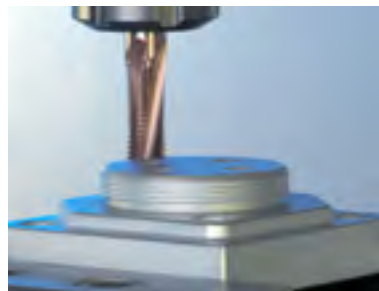


Also available with "only" an electronic handwheel.



### Clean, safe, and efficient

The speed and torque curve are designed for modern milling and drilling tools and the machine housing ensures clean, safe and comfortable work.



### Thread milling

Various graphically supported cycles are available for thread milling. Inner and outer threads can be milled with 3D interpolation.



### 3D milling

Digital drive technology and fast record processing for optimal 3D machining results.

## Extensive CNC possibilities

All the possibilities of a 3- to 4-axis CNC machine are available when machining in CNC mode. Complex serial parts can be machined efficiently, quickly and safely. The workshop-compatible, universal digital Heidenhain TNC 620 controls can be programmed with simple dialog (Heidenhain Klartext) or DIN ISO. The multi-touch controls also make work easier and save time during production.

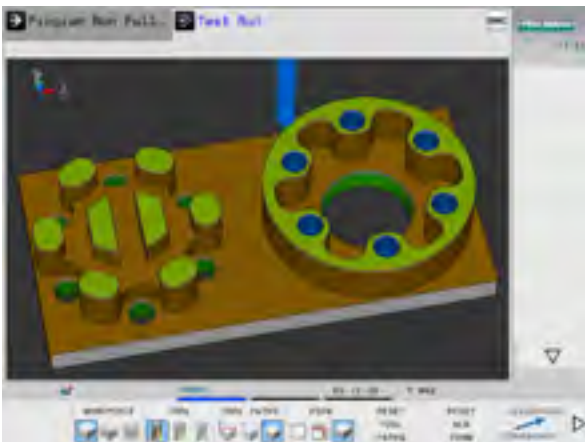
Load CAD/CAM data via the Ethernet interface or the USB port directly to the controls of the machine and use a number of functions:

- Extensive choice of cycles
- DFX converter
- USB keyboard mouse function
- 3D workpiece graphic
- Electronic handwheel as standard on the operating panel



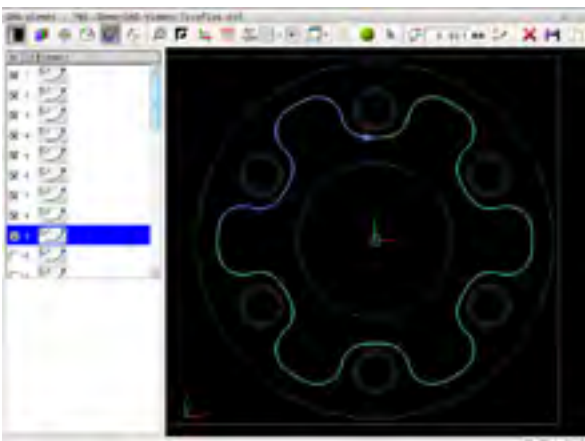
### Cycles

Fast, logical programming with graphically supported machining cycles. Along with the classic cycles for milling, drilling, thread cutting and coordinate transformation, the operator can also use cycles for engraving, among others.



### 3D graphics

After creating an NC program, the test graphic can already display a realistic impression of the workpiece, before actual machining.



### DXF data

CAD data can be opened directly on the controls in DXF format with the DXF converter. Convenient contour extraction not only saves effort in programming and testing, it also ensures that the finished contour matches the specifications perfectly.





**Handwheels and drill levels**  
Actual, conventional handwheels for manual operation of the X/Y axes. Can also be switched to drive the Z axis or a 4th axis, if needed.

# Extensive manual possibilities

Mill away a bit of remaining material after a CNC program, add threads to some drilled holes or quickly and easily create a clamping device: The TOP functions (Touch Or Program™) turn the PICOMAX 56 into a full-fledged conventional milling and drilling machine, while still providing the advantages of a CNC machine.

The TOP package offers the following operating elements and functions that are also helpful for aligning and probing:

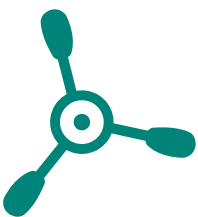
- TOP software from FEHLMANN
- Drill lever in Z direction
- Handwheels in X/Y direction
- Load cell for plotting the Z-axis zero point on a resting spindle



**The TOP functions make it possible to:**  
Enter zeros and depths, drill by hand – entirely without a full CNC program.



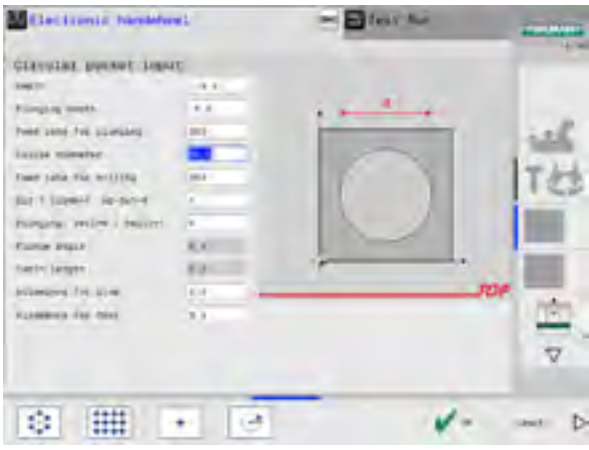
## TOP functions: Manual machining without giving up the advantages of a CNC machine



Patented FEHLMANN TOP functions – work manually at the push of a button.



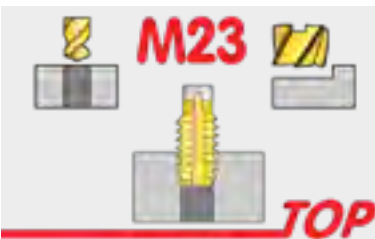
The TOP package includes: Tool setter for manually plotting the Z-axis zero point on a resting spindle.



**Circular pocket**  
Even simple circular and rectangular pockets can be defined and executed directly from the TOP functions at the push of a button.



**Manual drilling:**  
Simple and efficient, with or without automatic feed. The drill lever allows for precise and fast chip removal. The drilling depth can be read on the screen or set quickly and precisely using an electronic depth stop, just as with a mechanical stop.



**Manual thread cutting:**  
During thread cutting, feed is synchronized with the speed. There is no need for a compensation chuck, and even the smallest thread can be cut easily in tough or soft material. The operator does not have to conduct complex programming.



**Manual milling:**  
The electronic handwheels are operated exactly like conventional handwheels and allow for manual milling work. The milling depth can be restricted, if needed, with the use of an electronic stop.



Perfect accessibility

**Full flexibility with the TOP functions**  
Drill by hand or start drilling cycles without writing a program. If the end stop is set, or the drilling cycle is defined, the position can be approached by hand, directly in the drilling cycle or using the MDI function – lightning fast and precise.



**Manual tool change**  
Any time, fast and effortlessly.

# Versatile options and practical accessories



**Splash and compressed air guns**  
For easy, efficient cleaning of the machine and the workpiece. The compressed air gun attached to the control panel prevents loose compressed air hoses lying around and is always within reach.



**3D probe**  
Use the probe to plot zero points precisely and save time. The signal is transmitted by cable or infrared transmission.



**3D probe with infrared transmission**



**Touch probe on table**  
The tools are automatically measured or checked for breakage. The values determined are written automatically into the tool table by the controls.



**Laser system**  
For contact-free tool measurement and breakage monitoring directly on the machine.



**Table**  
Optimal, handy table for measuring tools, drawings and personal tools.

**Chip drawer**  
Included in standard delivery, the chip drawer can be conveniently cleaned and emptied. The coolant can also be filtered optionally through a bag filter system.

**Cabinet with drawers**  
The cabinet is integrated into the machine to save space. It's perfect for storing tools and instruction manuals. The housing on the side is also available with a viewing window.

**USB keyboard**  
With integrated mouse function, including telescopic drawer on the operating unit for conveniently entering alphanumeric text and DIN/ISO programming.



## Versatile use



**Four axes simultaneously**  
The FEHLMANN dividing units are fully integrated into the controls. Even complex machining operations can be programmed on the machine – Two models are available.



**AT 100**  
Compact dividing unit with 100 mm center height for 4-axis positioning or simultaneous milling. Can also be mounted on a manual swiveling device\* (see pictures on bottom left) for a manual 5th axis.



**AT 125 DD**  
Dividing unit with 125 mm center height for 4-axis positioning or simultaneous milling. With direct measuring system and pneumo-hydraulic clamping it is ideal for machining outside of the rotational center.

**Restriction of functions**  
With the additional key switch, functions and operating options can be deliberately restricted. This allows the use of a simplified interface for operation – for example for training or operators who only occasionally work with the machine.





## Even more efficient operation with automatic tool changer

### Tool changer

For higher productivity, the machines can be equipped with automatic tool changers. Depending on the version, there is space for 20 or 30 tools in the magazine. The tools are automatically changed in and out by a double gripper. The additional doors with viewing windows allow for optimal monitoring and tool maintenance.



### Tool changer for 20 tools

The basic version provides space for 20 tools.



### Tool changer for 30 tools

An optional 30 spaces are available in the larger version.



### Flexible and efficient tool management

The expanded tool management allows tools to be loaded in and out quickly and easily. Even special tools (such as compressed air spindles) can be managed.

## Chip flow and cooling – matched to your needs

### Coolant and chip management

Depending on your requirements, FEHLMANN offers a wide range of solutions for coolant supply and chip removal. The machines are available with a roof if desired, which seals off the machining area from above. Air extraction allows fumes from coolant to be separated.

### Standard tank, optional bag filter



### Standard coolant system

The chips are flushed through the machine bed into a drawer, which can be conveniently and easily emptied manually. A bag filter is optional.

### 40 bar cooling through the spindle and 340 liter tank



### Coolant system with cooling through the spindle, 40 bar

Consists of a coolant tank with 340 l capacity. A high-pressure pump with 40 bar allows the use of internally-cooled tools.

### Only for PICOMAX 56 L TOP



### Coolant system with chip conveyor

For large quantities of chips, the use of a coolant system (700 l volume) with chip conveyor is recommended. This allows bigger batches to be machined without interruption. A high-pressure pump with a choice of 40 or 80 bar is available for internally-cooled tools.



### Coolant system with chip conveyor and compact filter

The use of a closed belt filter (compact filter) allows for longer productive periods without having to clean the filter. The high-pressure pump with 80 bar for internally-cooled tools is included in delivery. Coolant tank volume is 950 l.

# High quality thanks to in-house manufacturing and qualified customer service



In our climate-controlled production halls, we manufacture high-precision components that comply with the quality standard ISO 9001.

Modern machine-tools have a key function in the manufacturing process. Thus, it is vital that our customers can rely 100% on their availability. Even more important are fast and cost-effective solutions in case of technical malfunctions.

Development, production, assembly, training and service: At FEHLMANN, you will receive everything from a single source

Complete in-house manufacturing ensures not only high quality, but also long-term availability of spare parts. On-going investments in the latest production and environmental technologies together with lean and efficient processes, long-standing expertise and, last but not least, our committed and competent employees stand for quality, reliability and safety. These are the features that distinguish FEHLMANN high-precision milling machines.

### Short response times

Highly-qualified hotline employees actively offer support to our

customers during troubleshooting. A malfunction can be efficiently narrowed down through telephone assistance and, in some cases, directly solved on the phone with advice from an expert. Furthermore, modern means of communication allow remote diagnosis of your machine, if required. This considerably reduces not only down times, but also costs.

### Immediate spare parts supply

Due to our high level of in-house production, we have the required spare parts in stock and are able to deliver them to our customers at short notice, even with express delivery, if required. Moreover, our efficient ticketing solution through our free hotline minimizes problem-solving time.

### Comprehensive solutions for maintenance, service and spare parts delivery

The delivery of pre-parameterized electronic modules, such as CNC control units, drives, etc. whenever possible, considerably reduces the repair time on site. EU customers can return defective spare parts to our office in Germany at their convenience, without customs formalities. Our in-house repair service can supply you with as-good-as-new reconditioned replacement units or rental equipment for the duration of the inspection work, which also keeps costs low.

### Personal and competent

We provide our customers with personal and highly qualified advice. Please contact our customer service at:

### Fehlmann AG Maschinenfabrik

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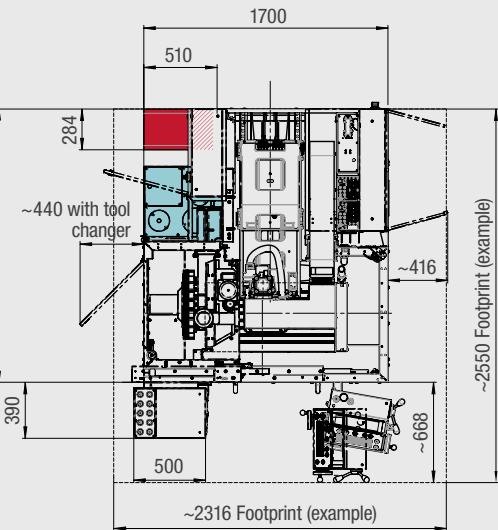
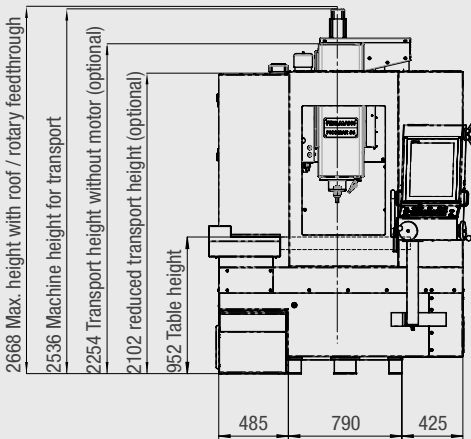
E-Mail [service@fehlmann.com](mailto:service@fehlmann.com)

or on [www.fehlmann.com](http://www.fehlmann.com)

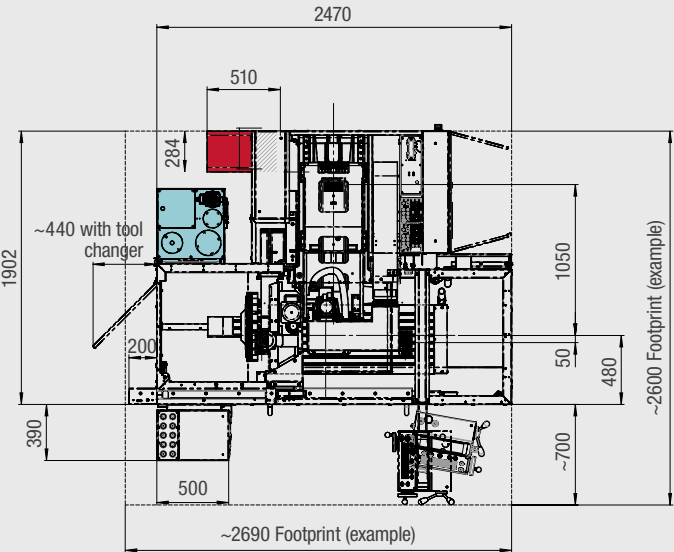
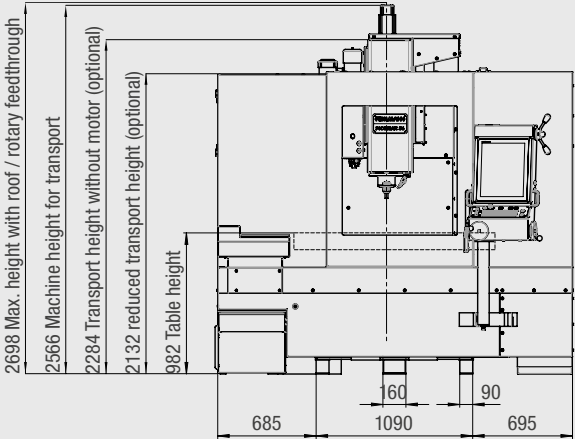


Fehlmann AG center of excellence in Seon: development, planning, production and administration under one roof.

## PICOMAX® 56 TOP

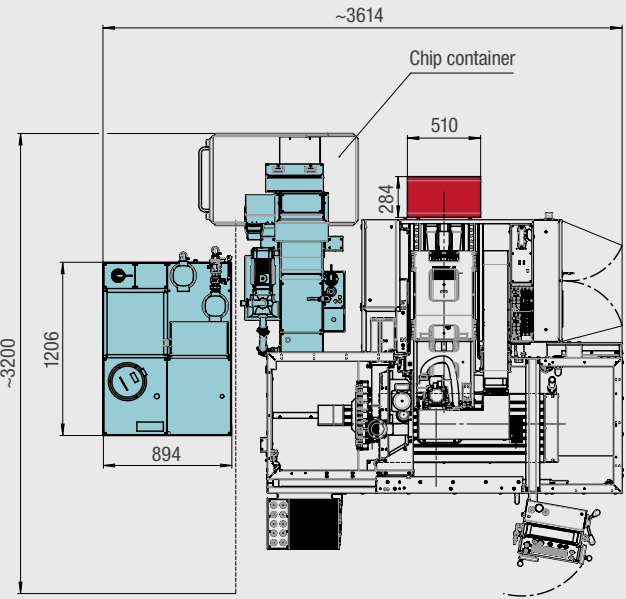


## PICOMAX® 56 L TOP



PICOMAX 56 L TOP with 80 bar coolant system 700 l and belt filter

- Coolant system
- Cooling unit



## Technical Data

|                                                                        |            | PICOMAX 56 TOP | PICOMAX 56 L TOP |
|------------------------------------------------------------------------|------------|----------------|------------------|
| <b>Travel</b>                                                          |            |                |                  |
| X travel                                                               | mm         | 500            | 800              |
| Y travel                                                               | mm         | 400            | 400              |
| Z travel                                                               | mm         | 400            | 400              |
| <b>Table / work area</b>                                               |            |                |                  |
| Clamping surface (L x W)                                               | mm         | 908 x 480      | 1400 x 480       |
| T-slots (width / distance / number)                                    |            | 12-H8 / 50 / 8 | 12-H8 / 50 / 8   |
| Distance between table and spindle nose                                | mm         | 120–520        | 120–520          |
| Max. permissible table load                                            | kg         | 250            | 350              |
| ISO / SK30                                                             |            |                |                  |
| <b>Tool Changer (optional)</b>                                         |            |                |                  |
| Magazine pockets                                                       |            | 20 / 30        | 20 / 30          |
| Maximum tool diameter without free spaces                              | mm         | Ø 63           | Ø 63             |
| Maximum tool diameter with free spaces                                 | mm         | Ø 130          | Ø 130            |
| Max. tool length (from spindle nose)                                   | mm         | 240            | 240              |
| Max. tool weight                                                       | kg         | 3              | 3                |
| Tool changing time                                                     | sec        | approx. 3      | approx. 3        |
| Chip-to-chip time ISO 10791-9                                          | sec        | approx. 8      | approx. 8        |
| <b>Feed rates</b>                                                      |            |                |                  |
| Axis X                                                                 | mm / min   | 1–20 000       | 1–30 000         |
| Axis Y                                                                 | mm / min   | 1–20 000       | 1–20 000         |
| Axis Z                                                                 | mm / min   | 1–20 000       | 1–20 000         |
| <b>Position accuracies according to ISO 230-2 resp. VDI / DGQ 3441</b> |            |                |                  |
| Position tolerance A                                                   | mm         | 0.006          | 0.006            |
| Position variation range R                                             | mm         | 0.004          | 0.004            |
| <b>Measurement systems</b>                                             |            |                |                  |
| Direct measuring system with linear scale                              |            |                |                  |
| Resolution in X / Y / Z                                                | mm         | 0.001          | 0.001            |
| <b>Connection data</b>                                                 |            |                |                  |
| Operation voltage and frequency V / Hz                                 |            | 3 x 400 / 50   | 3 x 400 / 50     |
| Recommended pre-fusing A                                               |            | 25             | 25               |
| Pneumatics operating pressure bar                                      |            | 6              | 6                |
| <b>Weight (excluding coolant)</b>                                      |            |                |                  |
| Without tool changer                                                   | kg approx. | 3050           | 3750             |
| With 20 pockets                                                        | kg approx. | 3250           | 4000             |
| With 30 pockets                                                        | kg approx. | 3350           | 4050             |

Subject to technical modifications

# Spindle

|                                      |            |                 |
|--------------------------------------|------------|-----------------|
| <b>Speed range</b>                   | <b>rpm</b> | <b>50–12000</b> |
| Tool holder                          |            | ISO / SK30      |
| Output at S1 (100% ED)               | kW         | 7.1             |
| Output at S6 (40% ED)                | kW         | 9.7             |
| Max. torque at S6<br>and rated speed | Nm         | 61              |
| Nominal rated speed                  | rpm        | 1530            |



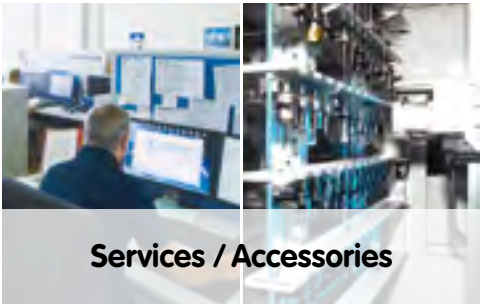
Machining centers  
in portal design



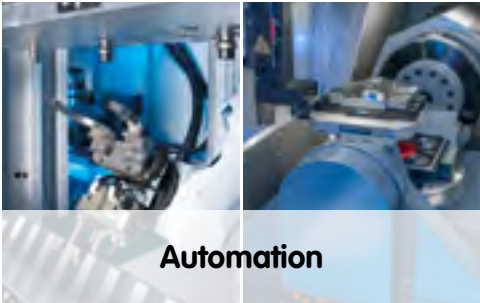
Machining centers



Milling / Drilling machines



Services / Accessories



Automation

Protective equipment may have been removed for better illustration.

Subject to technical modifications



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