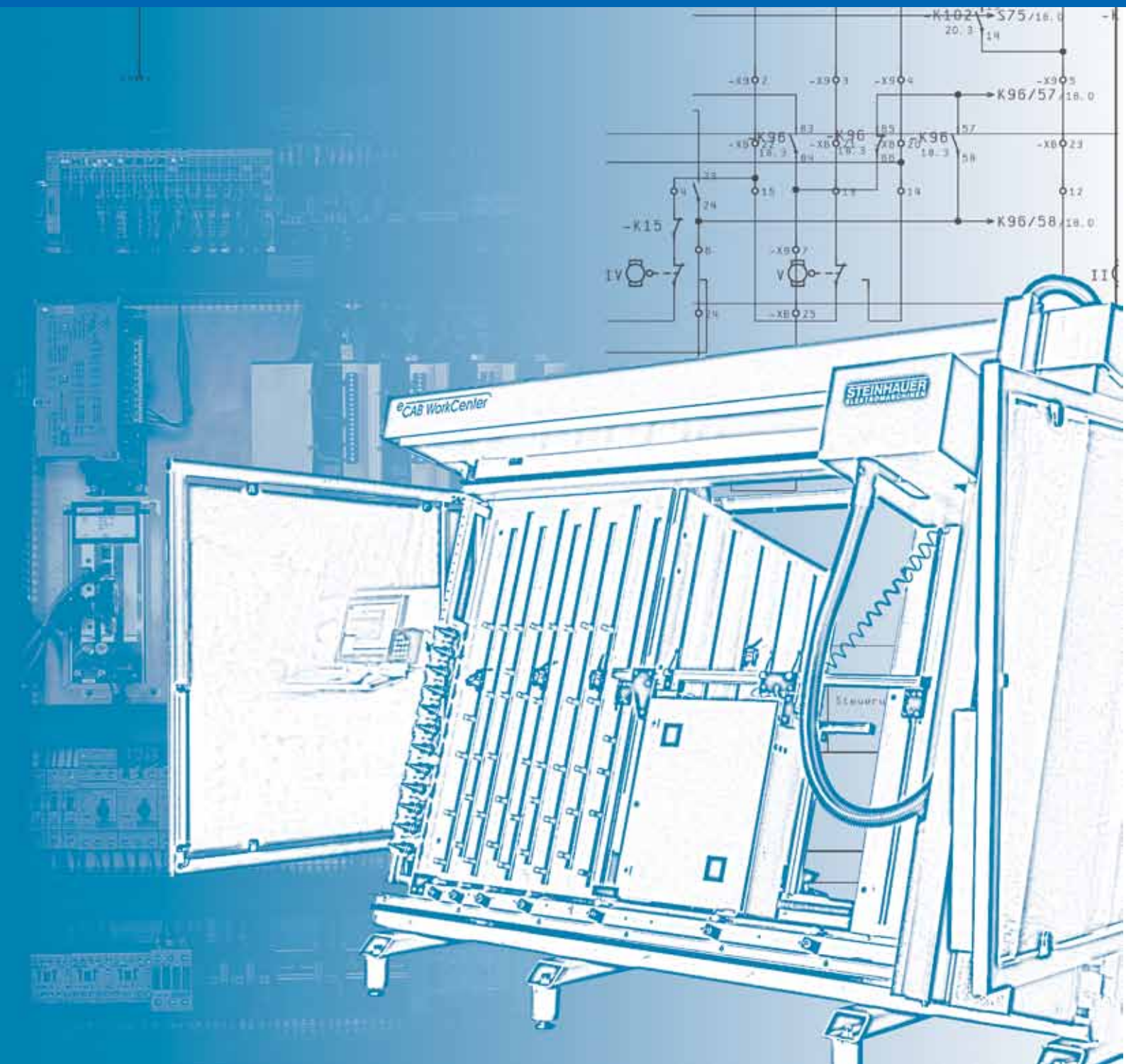


STEINHAUER eCAB WorkCenter

Innovative production systems for the control cabinet industry
The flexible standard for one-off enclosure production



From CAD layout right into sheet metal

Automatic one-off production for panel builders

If one compares the requirements of sheet metal processing in the control cabinet industry with the requirements of industrial metal processing one finds certain parallels in techniques but also major differences.

Normally panel building is no volume production. A machine must have the ability to economically do typical one-off as well as small series production.

Enclosures can be very big - or very small. They can be made up of assembled flat or folded plates or they can come in the form of small or large non dismountable cubes, like control boxes or switch cabinets.

The wide material diversity does not make life easier. Whether painted or unpainted steel plates, stainless steel, PVC or GRP, aluminum or copper - material is defined by the task, and a machine must be able to process them all. Machining itself has a wide variety too. Drill holes and threads of different diameters are needed, cut-outs must be made to mount parts into housing panels and often even engravings have to be applied.

Among these duties a machine must be economically presentable and affordable for a medium-sized panel builder. Or even better, it should offer a striking savings potential compared to manual manufacturing methods.

In the following we would like to present a machine, which was developed by the Steinhauer AG exclusively for the use in the control cabinet industry and which settles all resulting tasks of daily practice fully automatic.

The control cabinet machining center

eCAB WorkCenter

The STEINHAUER Software

One-off production in panel building only can be believable economical if the setup time for automatic production is distinctively lower than the time needed for manual production. This can only be achieved if no CNC program has to be written.

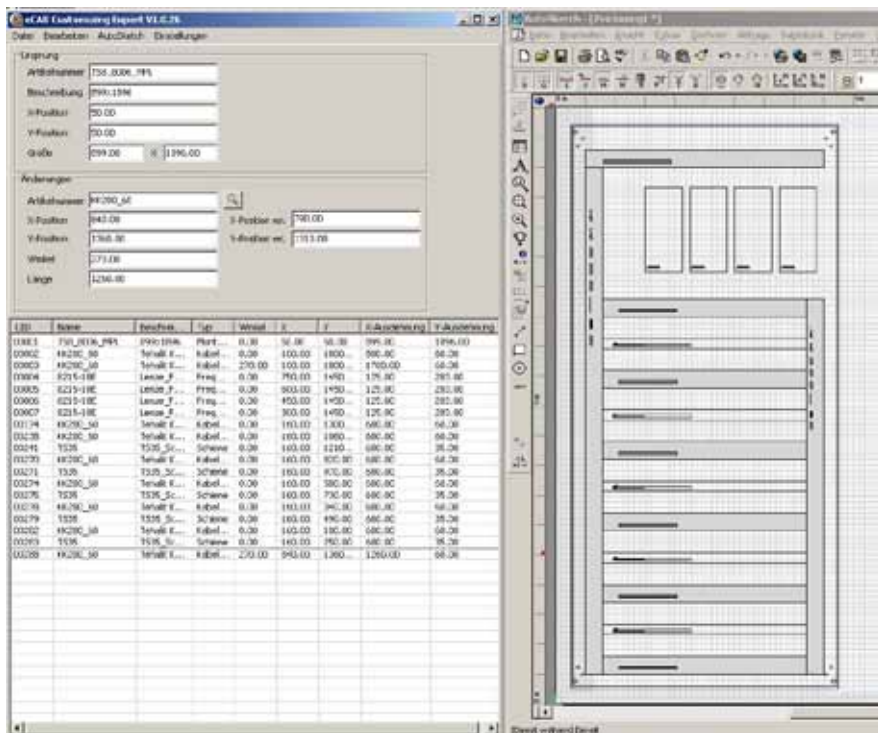
STEINHAUER software is divided into two main areas. The CAD software eCAB Sketch creates the construction drawing for the switchgear, which is to be manufactured. The post-processor eCAB PP automatically generates an NC-program from the CAD drawing.

We use AutoSketch from Autodesk as a basic CAD kernel, an intuitively usable 2D CAD software which meets the needs of panel builders in a perfect manner. For the layout plan no drawing tools have to be used.

Instead of drawing lines predefined symbols, which correspond to real parts, are placed on virtual mounting plates, doors, enclosures and switch panels - blindingly easy using drag & drop with the mouse. A multitude of automatic placement tools facilitates the job. So complex and even multispan assemblies can be designed fully graphically without the need for entering measures.

The CAD software allows the planning of all parts of an electric enclosure (like mounting plates, doors, side panels, roofs or base plates) within one drawing. By means of a multi-document interface parts from other drawings, like a complex array of switches, can be used by cut & paste.

Getting there faster



Each missing part or component can easily be defined with familiar tools to be used in further projects.

For a complex electric enclosure with 200-300 drill holes and threads the use of this software cuts human part of labor to 15-20 minutes for designing a layout. By using variations of older projects design times further can be reduced considerably.

After completion of the layout drawing the postprocessor, second part of Steinbauer's software, handles the rest. First it performs some plausibility checks on the drawing to avoid human mistakes, then it adjusts all machine parameters to predefined settings for the material used and generates the DIN standard

machine code. A preview function visualizes the program before machine operation and a cutting-list for cable ducts, mounting rails and bus bars is generated automatically.

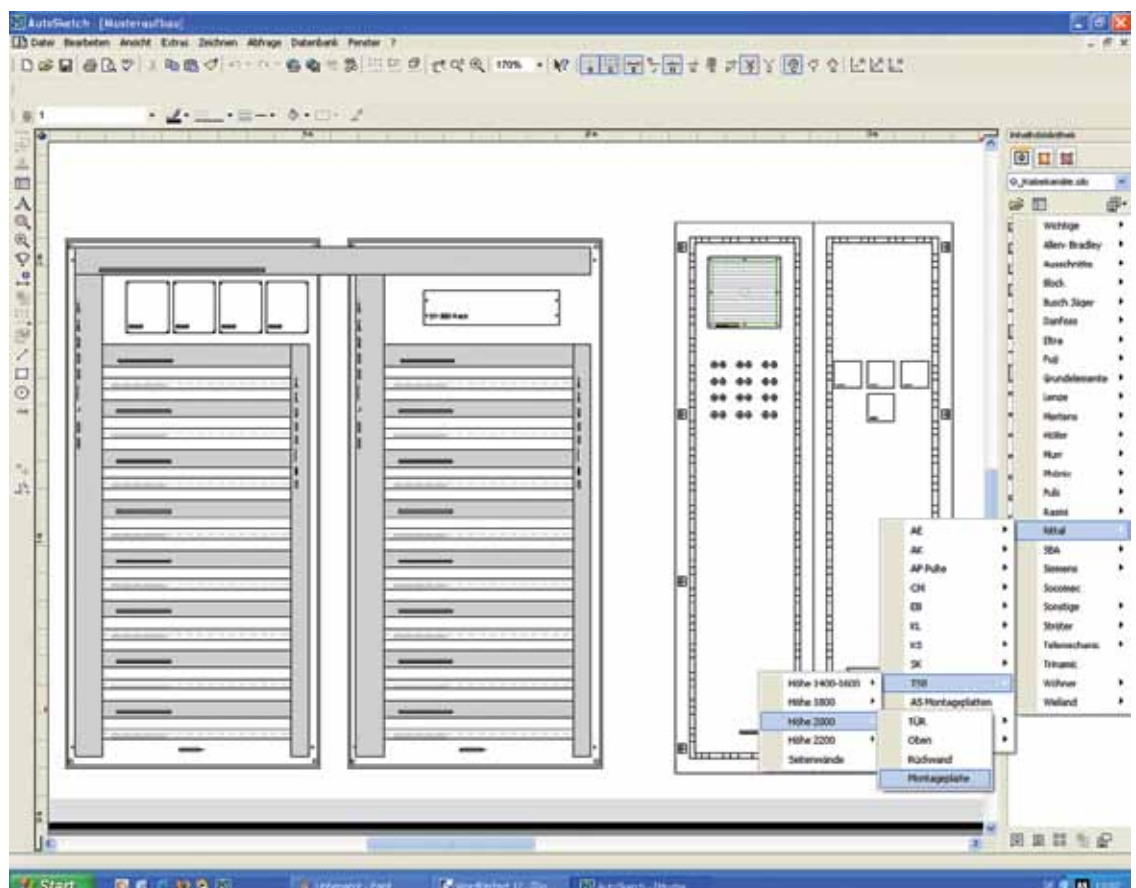
After transfer of the generated machine program to the CNC control of the machine the workpiece will be machined automatically.

As a second possibility the construction plan can be drawn up using the eCAB CE - Customizing Expert. This software is devised to allow adding construction devices easily and for numeric input of coordinates. The customers are provided with this software by the control cabinet industry and toll manufacturers. This enables them to plan the construction according to the drawing without needing additional information on the construction devices.

What makes this software remarkable is its close connection with AutoSketch.

Within a construction drawing you can shift from the fully graphic version AutoSketch to the Customizing Expert anytime you wish without loss of data.

The graphical parts libraries are included in the supply of the machine. They are structured hierarchically in a descriptive tree menu and contain some thousands of predefined parts from various vendors of control cabinet industry. They libraries are easy expandable by the users.



The standard for panel builders

The eCAB WorkCenter machining center was designed for one-off production of electric enclosures. Today, due to many unique features, it forms the de facto standard in this industry.

Flexibility obtains top priority

The eCAB WorkCenter allows automatic machining of flat or folded workpieces up to 2,400 x 1,550 mm on the frontside part fixture. After facile unclosing of a door in the center of the machine an opening for fixture of non-dismountable enclosures up to a size of 1,600 x 1,450 mm shows up. They can be machined in highest precision on all sides. Due to the high scalability of the machine it can perfectly be adapted to your special needs.

Tools for all purposes

Up to 18 drills, taps, milling cutters or tools for special purposes, like circular thread cutters or engraving tools, can be placed into the ATC magazine for programmed tool change. With the exception of the tool-diameter dependend

chucks all tool holders are identical, so that tools can be exchanged quickly. No length-compensatory tapping tool holders are needed because threads are cut or pressed by positioning of the Z-axis with thread pitch (metric as well as non-metric). All tools are DIN standardized, available from stock at your tool outfitter.

Pure Power

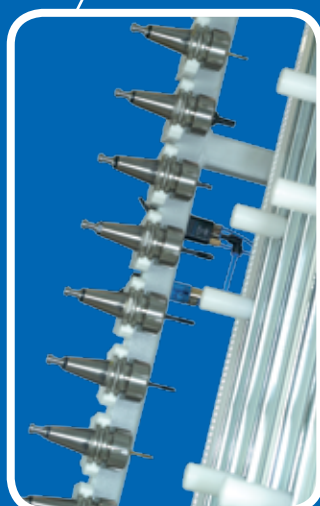
Under the hood of the Y-axis a real power pack waits for action. A modern 5.5 kW / 18,000 min⁻¹ (optional 7,5 kW) high frequency CNC spindle motor services the up to 18 tools. Over a wide speed range a constant torque of 7.4 Nm ensures machining of all relevant material, like steel, stainless steel, copper, aluminum or any machinable plastics, including GRP. The freely programmable minimum quantity lubrication system ensures long tool life.

Embedded ergonomics

A low loading height, good accessibility from all sides, a powered depth control stop for easy enclosure positioning and sophisticated



The eCAB WorkCenter with closed door for frontal machining of flat workpieces.



The tool magazine with up to 18 positions



Pneumatic frontside part fixture 7 pneumatic muscles at the base of the machine's frame hold flat workpieces in place at the push of a button. The muscles can be switched off individually to avoid blocking areas in the clamping range. The coating under the fixing points remains undamaged.



Chip-resistant positioning techniques with ball screws and linear guides on all axes

workpiece fixtures reduce set-up time to a minimum. An open machine frame construction with insulated hollow spaces and hoods reduces resonance and structure-borne noise for the benefit of quiet machine operation. The precise concentric rotation of the tool spindle reduces vibrations so that there is no need for barrier-forming workpiece downholders.

High level investment protection

Except for the machine frame, which is an abrasion-free warp resistant steel construction, all machine components are DIN standard parts of the leasing European manufacturers. A minimum of moving parts reduces the contingency risk. Chip resistant ball screws and linear guides of highest precision are used for axis positioning.

All drives are fully digital and brushless, designed for continuous daily use. The modern 4-axes control from BECKHOFF is based on realtime Ethernet. All control components and drives are remote maintainable to ensure a high system availability at low operational costs.

Fast amortization

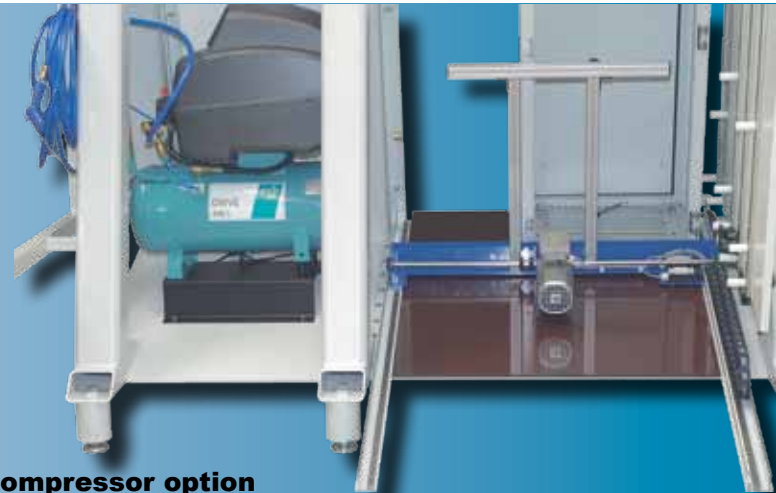
For refinancing of the machine no high quantities are needed. Operating efficiency is guaranteed from 12 typical one-off enclosures per month.

Low operational costs

The machine needs no cyclic maintenance through the manufacturer. Maintenance requirements reduce to daily refilling of the lubricant, cleaning and greasing of easily accessible greasing points in a 3-monthly service interval.

Small footprint

Through dual-use and vertical operation the required space is lower than the space required for manual production.



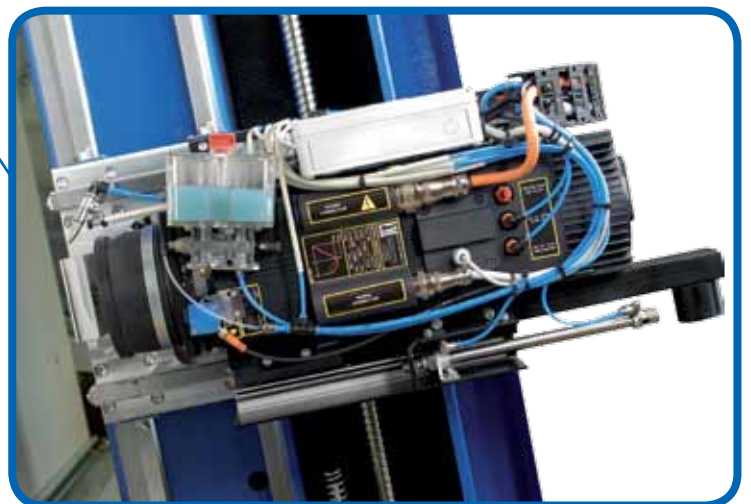
The **compressor option** for operational sites without central compressed air supply works supersilent and needs no additional space.

The **powered depth control stop** eases mounting of heavy enclosures. The motor stops automatically at the machining position.

eCAB WorkCenter with enclosure in the enclosure bay.



The machine's **fully automatic door** is opened, closed and locked by pressing a button.



The power pack

The high frequency spindle motor with pneumatic guided chip catcher, automatic lubrication system and outlet for the optional chip extraction.

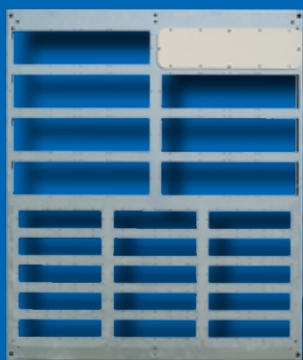
Wide range of accessories



Circular thread cutter



Multi terminal box holder, single row



Multi flange plate holder



Magnetic hand brush



Engraving option



Bus bar holder



Load handling device

Already the standard scope of supply of the eCAB WorkCenter leaves few to be desired. Through a comprehensive range of accessories and options the functionality of the machine can be expanded. Most accessories can be retrofitted on demand. If software is needed for an option it can be installed through remote maintenance.

The **circular thread cutter** option is used for the making of large threads (M20-M63 as well as non-metric NPT threads) with only one additional tool.

With the **multi terminal box holder** multiple small boxes can be fixated for batch processing by flipping a pneumatic switch. The multi terminal box holder itself is fastened by pneumatic clamps in the enclosure opening of the machine. Available in different versions.

For batch processing of flange plates the **multi flange plate holder** can accommodate up to 30 flange plates of equal or different size.

The optional **bus bar holder** is used for fixation of copper bus bars (with a typical thickness of 10 mm). Up to 3 bars of up to 2,400 mm can be mounted for further machining.

With the **engraving option** the eCAB WorkCenter can be used for holohedral engraving and marking. The patented engraving tool-holder compensates differences in height of workpiece automatically. It always uses constant contact pressure.

The machine's **fully automatic door** is opened, closed and locked by pressing a button.

Putting work pieces into the machine becomes very easy and comfortable with the **load handling device**. Even large work pieces can be placed on the machine with little effort

The **tool change aid** (within the scope of supply) eases the change of dies. Attached to the machine frame it is always at hand. It prevents damage to the tool chucks and provides an adjustment gauge for the correct tool length.

With the **magnetic hand brush** and the **magnetic broom** ferromagnetic chips and dust from grinding can be collected in no time at all.

Industrial terminal Option, swivel arm at machine frame, with TFT/DVI display, instead standard outfit.

Chip Extraction Option for automatic removal of millingswarfs, approx. 90% swarf catch, incl. low-noise industrial vacuum

Printer Option: projects can be labelled continually with the printer option.

For other accessories and options please visit:

www.steinbauer.de

The switch cabinet machining center eCAB WorkCenter - **Technical data**

Prinziple / CNC Control-system	4 axes (X-, Y-, Z- and C-axis)
Remote maintenance / Remote user guidance	yes / yes (requires internet connection)
Machining of flat and folded work pieces from / up to (HxW)	100 x 100 mm ⁽¹⁾ / 1,550 x 2,400 mm
Max. folding of flat work pieces	70 mm
Machining of enclosures from / up to (HxW)	100 x 100 mm ⁽¹⁾ / 1,600 x 1,000 mm, all sides 1,600 x 1,450 mm with XL option
Fixation of flat work pieces	mech. quick action clamps / fluidic muscles
Fixation of enclosures	fully pneumatic with powered depth control stop
Machinable material	steel, stainless steel, copper, aluminum, PVC, GRP
Machinable material thickness	1-10 mm
Loading height front / rear	approx. 470 mm / 180 mm
Velocity (maximum / typical) X-,Y-,Z-axis	60 m/min / 45 m/min
Repeat accuracy (all axes)	0.04 mm
High frequency CNC spindle motor	5.5 kW / 18,000 min ⁻¹ (optional 7.5 kW) 0-7.000 min ⁻¹ constant torque 7,4 Nm at 12,000 min ⁻¹ : 4.3 Nm
Tool lubrication	Automatic oil-spray lubrication, programmable by user
Number of tools (standard / maximum)	12 / 18
Tool chucks	Industrial standard steep angle SK30 (DIN 2080) with ER full metal chucks (DIN 6499 Form B) suitable for all kinds of tools (drills, thread-rollers/cutters, milling cutters and tools for special purposes).
Tool diameter	1.0 - 20 mm
Drills	D1.0 - D20 mm
Taps	thread-cutters M2-M16 forming taps M2-M12 large threads M20-M63 (with circular thread milling option) as well as non-metric threads
Engraving tools	0.1-3 mm, solid-carbide (for metal), automatic height compensation for bent workpieces
Milling tools	3-8 mm (standard: 6 mm) Various types, multi cutter operation
Milling performance (max.)	3 mm sheet steel: 2,000 mm/min 2 mm stainless steel: 200 mm/min 10 mm copper bus bar: 400 mm/min

⁽¹⁾ *Special design available*

Weights and measures, noise emission

Machine dimensions over all, incl. safety fence (H x W x D)	2,600 x 3,520 x 3,000 mm
Transport dimensions (H x W x D)	2,600 x 3,200 x 2,350 mm ⁽³⁾
Recommended maintenance clearance	rear: 500 mm, left <u>or</u> right: 500 mm
Mass	approx. 2,700 kg
Foundation static load / concrete grade	10 kN/m ² / 25 N/mm ²
Max. noise emission(DIN)	82 dB(A), curve A (0.5-10 KHz) ⁽²⁾

⁽²⁾ *Measured with digital sound level meter C269-E, 1m distance from center of machine, 1m above ground*

⁽³⁾ *Reduced shipping dimensions available at surcharge*

Connections

Electrical	3x 400 V / 50/60 Hz (3L/N/PE), 32A CEE connector
Compressed air	6-8 bar, suction capacity 300 l/min, 6 mm connector
LAN Standard / connector	Ethernet 10BaseT/100BaseTX, RJ45 connector

All specifications are without obligation. Subject to change without notice.

eCAB WorkCenter - integration made easy

All major E-CAD applications have documented interfaces. In addition to our own design software eCAB Sketch and eCAB CE (supplied with the machine) we support the following 3rd Party applications. If your standard application is not listed, please contact us.

HDS EL SCHRANK®

Engineering Base

CAD CABEL
CabinetLayout

Autodesk
DXF / DWG
ePLAN®
cabinet



MOELLER
ProPlan

CIM-TEAM E3
A ZUKEN COMPANY series

ELCAD

WSCAD
electronic GmbH
WSCAD5

Metzner
Triathlon

ELPROMATIC
ElproCAD

RACOS

QUCOS
ELEKTROCAD



Curious?

Talk with us about other automation technology for panel builders, like...

eCAB **ModCenter** - the all-rounder

eCAB **DrillMate** - our smart boring machine for the small workshop

eCAB **PWA** - our personal cable manufacturing equipment

eCAB **NC-Cut** - our trimming machine for cut-to-measure parts

eCAB **Jumbo** - the innovative assembling aid for heavy mounting plates

STEINHAUER Elektromaschinen AG
Sankt-Jobser-Str. 47a
D-52146 Würselen / Germany

Tel.: +49-(0)2405/4695-36
Fax: +49-(0)2405/4695-43
Email: mail@steinhauer.de
www.steinhauer.de

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