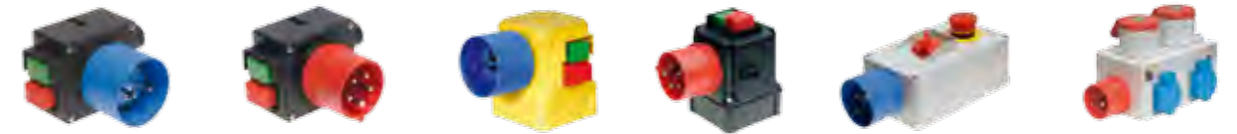


# Switching Systems

Modular Solutions for  
Customized Applications.

# Klinger & Born Solutions

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Innovation meets tradition.  
The result is perfection.

Cost-effective and made-to-measure control  
and drive engineering solutions.

### The company

We have always been committed to providing quality solutions even for the tiniest of details. It is exactly this quality-driven philosophy that sets us apart from the competition when it comes to developing our products and systems with meticulous attention to detail – as the huge diversity of applications for which we design our switches and switch systems requires high levels of durability and material quality combined with a competitive price.

We can proudly claim that we have achieved to endow our products with this very combination, and our customer satisfaction levels duly reflect our commitment.

Our success story began back in 1982. Since then we have been delivering electrotechnical components to industrial partners all over the globe. Our comprehensive range of products includes starters and control units, motor protection switches, contactors, cam switches, electronic brakes and emergency stop switches. Our specialization, however, is in components to start and brake asynchronous motors.

### You have certain expectations? So do we.

It is not only manufacturing that stands for highest quality. Experienced engineers in our own R&D department develop tailor-made solutions for our clients. Let us know what challenges your organisation faces in terms of machine or plant control. Our team of experts will then find and implement bespoke solutions for your applications that fully meet your requirements. Even if you do not exactly know what such a solution may look like, we will take your initial ideas and translate them into realisable products. Another strength of our company is customisation – because a starter is not always just a starter. Depending on the extent of customisation, starters may be used for several purposes and may come with various functionalities. This is the very difference that you will be able to feel in our products.

At Klinger & Born we take a deep dive into whatever we do.

#### Better details and functionalities.

You wonder how we manage to combine the good quality we are renowned for and low prices? The answer is a lean corporate structure, an in-house production and control system, partially automated production processes and inspections with PLC controllers, a high vertical range of production and – for the manufacturing of our components – a partner in the Far East.

#### Technology required by the markets.

Efficiency, economy, safety and compliance with standards – starters have to meet much higher demands nowadays than only a few years ago. Not only do they start technologically advanced drive systems, they also monitor, control and sometimes even slow them safely down. Every single day we strive to combine ever more complex functionalities into state-of-the-art products for any application.

#### Switch to the future.

We always aim at being leaders in innovation thus giving fresh impetus to the markets. Holding more than ten patents, we have set many an important milestone in our industry, e.g. with our new electronic brake, which introduces trend-setting technology to the market. As a small yet dynamic company we are also well positioned to co-operate with partners acting as global players in their markets. Our track record of comprehensive solutions for international groups provides demonstrable evidence.

Klinger & Born provide assistance each step of the way – expert advice and support from square one through to the successful implementation and handover. Either on your behalf or together with you as a development partner, our engineers will design innovative products which go well beyond market requirements. Punctual and dependable delivery services are a matter of course.

“High quality, expert advice and support, low prices and adherence to delivery dates – challenge us and we will exceed your expectations.”

# One-stop shopping at Klinger & Born.

flexible · step by step · personal advice

Whatever you require – we have the answer. We will work hand-in-glove with you to develop exactly the product you are looking for. Each and every step of the process will remain transparent to you. At the end of the day you will receive a product ready for series production that will have passed several test cycles.



1

Request for quote, expert advice and project planning



2

Development of electronic components, circuit diagram design (CAD)



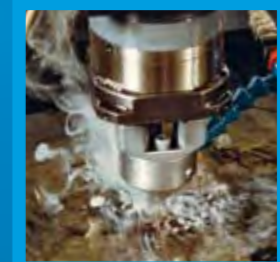
3

Selection of components, bill of material creation



4

Tooling



5

Pre-production series test



6

Prototype building



10

Routine test



9

Series production – wire subassembly, plastics processing and final assembly



8

Certification



7

Manufacturing of inspection equipment





“All our switches are made to measure. Thanks to the many possible combinations of the individual components, we are always able to realise a solution that meets your requirements.”

## Simply Start.

connect · plug in · get started

You should be able to do as you please using modularly adaptable and flexibly designed starters of an outstanding quality. And you may rest assured that you will always get good value for your money. Find out for yourself! At short notice, we will supply you with a range of products completely ready for connection.

Offering far more than 2,000 variants, we can supply you with solutions for numerous requirements. If your application cannot be catered for, we will use our CAD system to combine and match already existing partial solutions with your specifications. This helps us keep response times low and your order will be on its way in no time.

**Klinger & Born starters are also available with various add-ons:**

- Undervoltage trigger
- Overload protector
- Electronic brake
- Limit switch connection
- Emergency stop switch
- All commercially available connector systems
- And much more



Ready-for-Connection Electrical Components

Automatic closing unit

## Bespoke Control Systems.

a huge variety of applications · high operating safety  
optimal component selection

Especially when it comes to interdisciplinary applications, machinery safety requirements are getting ever more stringent. And control tasks are getting ever more complex. We provide expert advice and suggest efficient solutions. From designing circuit diagrams

fit to be submitted to authorised testing centres, all the way to ready-for-connection components. Beyond that, we provide technical support for the installation of control units.



Manually operated star-delta starters



Automatic star-delta starters



Customised control systems



Control panels with touch screen



Switch boxes, incl. PLC, for automation purposes



Machine control systems



Soft start device S-2-400-5,5



Frequency converter FU-H-3-400-3



Frequency converter FU-P-3-400-5,5

## Gentle Start – Strong Effect.

mains protection · wear resistant · cost effective

You know the problem - high starting currents overload the mains supply, affect other consumers, cause mechanical problems due to their sudden occurrence and lead to high wear levels throughout the entire drive system.

Klinger & Born's soft start devices reduce starting currents while slowly and continuously increasing them during the start-up phase until they reach full mains voltage. They come with an almost unlimited number of start/stop-operation options. Our soft start devices minimize mechanical loads as well as pressure surges in pipes when the system is switched off. The drive system operates smoothly and shock-free. Compared to star-delta starters, start-up times are shorter. Integrated bypass contacts reduce dissipation and thus heat

generation. Additionally, they help reduce the EMI effects on the mains supply. For stiff drive systems, we recommend the use of a frequency converter (see next page).

### Technical data

- Adjustable start-up time: 0 – 12 sec.
- Switch-off time: 0 – 12 sec.
- Bypass contacts
- Breakaway function
- LED status display
- May be mounted on a DIN rail
- Requires less space than a star-delta starter
- Output classes 0.75 – 30 kW

## Continuously Variable Speeds.

powerful · energy-saving · flexible

Energy-efficient motor operation while starting and braking is just one of the many advantages of our frequency converters. The main job, converting direct voltage into alternating voltage with variable amplitude and frequency, is done with effortless ease. They thus supply the motor with an adjustable variable-voltage and variable-frequency output, which allows for a continuously variable motor speed. Even at a low frequency, high torque is available. Our frequency converters come with a mains failure detection and motor overload protection system. They may also be programmed to meet the requirements of your system.

### Technical data

- Output frequency 0 – 400 Hz
- Easy programming
- V/F control
- One-phase and three phase power output
- Operation via a control panel or connecting terminal
- Integrated brake chopper
- Adjustable start/stop ramp profile from 0 to 3,600 sec
- Integrated electronic overload protection system
- 150 % overload capability for 60 sec
- 10 or 15 kHz PWM frequency (depends on type)
- Undervoltage and overvoltage disconnection system
- Set point control signal 0 – 10 V or 0(4) – 20 mA
- Programmable potential-free relay output
- Braking resistor connection facility
- RS-485 interface
- Output classes 0.75 – 30 kW

# We Brake for You.

powerful · high quality · particularly reliable

## 1.5 million units in use

In the past few years a variety of electric brake systems made by Klinger & Born has been put into operation all over the globe. And they are still working today. The figure underlines our expertise and innovation in this field. Not only do the products we develop reflect our technical know-how, but they also distinguish themselves through their long service life, as has been demonstrated by their long years of service in a wide range of different machines. Electronic switching devices by Klinger & Born are available for all connection types.

## The fully automated cost brake

The products we develop save time and effort, and thus considerably reduce the cost for our customers – our new star delta brake unit makes the time-consuming adjustments for one and three phase motors a thing of the past. Three new patented processes and the simplified connection method we have developed allow you to put machines into operation extremely quickly. A dual core monitoring and control system independently calculates the best working and switching points. Faults – like fluctuating voltages or currents – are automatically compensated for and the system always delivers the correct braking current. A neat trick is the system's automatic load detection. It allows, for instance, to use different sizes of saw blades on freely running out systems such as circular saws – without readjusting the machine. This is advantageous when a machine has several drives but is operated with only one control unit. An LED display keeps you informed about the current operational status of the unit.



### PCB versions

- Electronic brake up to 10 A
- Electronic brake up to 16 A
- Add-on electronic brake up to 16 Aeff
- Compact add-on electronic brake
- KLIBO-Power-Brake
- KLIBO-Power-Brake-Plus
- Midi/Maxi-Brake
- Electronic brake with starter

### Versions with cases

- KLIBO-Phase-Brake
- KLIBO-Start-Brake
- KLIBO-Star-Delta-Brake-Timer
- KLIBO-Diode-Brake



# Electronics for a Perfect Start.

compact · safe operation · reliable



Rotational direction monitoring with phase drop-out detection



Delayed starting, automatic closing unit



KLIBO-Star-Delta-Timer

## Rotational direction monitoring – for a process that is safe from the start

With some machines, starting them in the wrong rotational direction can be a hazard for operators and product conveyors alike. In these machines – e.g. compressors, pumps, conveyor belts, or gearboxes – a start-up with the wrong rotational direction must be prevented. One way to do that is to monitor the rotational field: When the line voltage is applied, a PCB detects the right rotational direction and checks whether all phases are present. Optical and acoustic indicators for the switch are available on request.

## Automatic closing units – automated processes

Our automated closing units not only make working with machines easier, but the delayed starting also protects the fuse of the mains connection. This is how it works. When the main device is started, the automatic closing unit will automatically start the secondary device. The control unit detects the current input of the starting machine and – after a certain delay – starts the secondary device. When the main drive is shut down, the secondary device will also be switched off after a certain delay.

## Start-up current limiter – go easy on the machine

Are you familiar with this scenario? Your customer plugs a machine with a high power input – e.g. an angular grinder, a chipper, a pressure washer, or a welder – into a socket, switches it on – and nothing happens. This is because the high power input during start-up has triggered the circuit breaker. Nowadays, for many applications high start-up currents are no longer admissible and a smooth, jolt-free start is desired. The all-electronic start-up current limiters by Klinger & Born limit the start-up current to a set value and facilitate a gentler start-up that protects the machine.

## Star-Delta-Timer – protecting the motor

The KLIBO-Star-Delta-Timer has been specifically designed for the star delta starting of cage motors. Starting times can be individually adjusted to meet specific application requirements. All subsequent operating sequences have an optimised timing and are controlled and monitored by a controller that comes with a watch-dog feature. In the field, manual switches in conjunction with a certain lack of expertise and time constraints often lead to premature switching, thus excessively loading the motor and the power supply.



Little Helpers for Big Machines.  
reasonable price · long service life · available at short notice

As Individual as it Gets.  
individual · robust · always available at short notice



KLIBO7,5  
4.0 kW 230 V~/AC-3 and 7.5 kW 400 V~/AC-3



KB-04  
3.0 kW 230 V~ and 4.0 kW 400 V~/AC-3



Thermal overload relay for  
KLIBO7,5 contactor



Cam switches with a power range of up to 25 A and 32 A, featuring up to 12 interrupter chambers / 24 switching contacts

### Why make our own contactors ...

... if there are so many available in the market? Simply because there are no power contactors that meet our requirements – in particular for the use with electronic brakes. And there is a second reason, the price.

By using PLC automation for the production and testing of our KB-04 and KLIBO7,5 contactor series, we get them at low cost for use in our starters.

### Controlling and switching

The function and design of the cam switches follows your controlling and switching requirements – with customised terminal designations, 2 or 4 mounting holes, and connecting bridges with cover. Our cam switches distinguish themselves through their high switching performance, a sturdy centre axle for a long service life, and pleasing switching behaviour. They can be used as on-off switches, main switches, selector switches, control switches, step switches, reversing switches, pole changing switches etc.

### The following types and features are available:

- Frontplate size 48 x 48, 64 x 64 and 72 x 72 mm
- Main switch type with lockable frontplate
- Lock-out feature to prevent unintentional switching
- Emergency stop main switch with red mushroom type pushbutton on yellow frontplate
- 25 A or 32 A
- Switching voltage up to 660 V

# Environments Affect Quality.

Do you know the required minimum number of switching cycles for an emergency stop switch? It is 6,050 if you want to comply with the pertinent standard. Our emergency stop switches easily do 150,000 switching cycles. Small wonder then that we were able to obtain a patent on this "PLUS".

Our switches are as diverse as the tasks they are made for. But there is one thing that all our switches – emergency stop switches, flush-type switches, foot switches, or limit switches – have in common: They feature outstanding robustness, reliability, and high quality.



KB-01 flush-type switch with undervoltage trigger



Emergency stop



Emergency stop switching device



Limit switch



Foot switch with protective hood



Main switch up to 7.5 kW  
Main switch up to 11.0 kW  
Main switch KB-H

# A New Level of Individuality.

individual · variable · customised



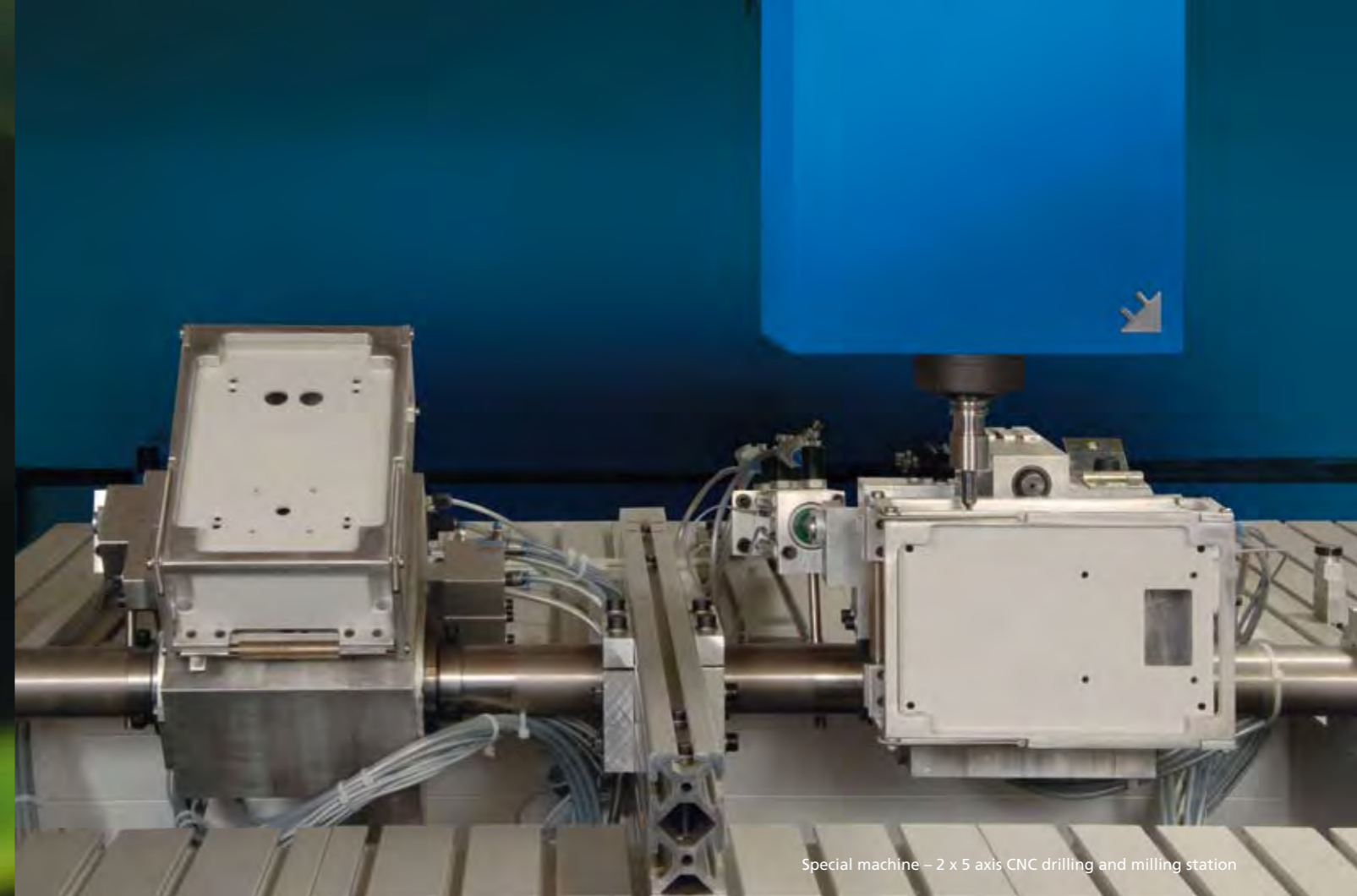
Top-hat rail case



Case K3000



Case K3500



Special machine – 2 x 5 axis CNC drilling and milling station

## Making cases – it's your choice

Tell us what your case should look like, where to drill the holes and what shapes to mill out. Our 2 x 5 axis CNC drilling and milling station was specifically designed to take the customisation of cases to a new level. To do that we use e.g. a Solid Works 3D drawing or a file. Our computer programme will then automatically calculate all milling and drilling coordinates. This enables us to drill and mill even small batches of cases efficiently and at a low cost. We will be happy to design custom-made solutions for you if our standard product line does fail to meet your requirements. You tell us what you want, and we will provide you with a reasonably priced offer.

## How can we do that?

Our tools production in the Far East allows us to respond to your requirements with a high degree of flexibility and at low prices. Should you wish so, we will also print or assemble the cases for you.

Just ask us. We will be pleased to help you.



Case K4000



Special case



Connector 400 V / 16 A



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Concept and layout: Becker Späth, Darmstadt / Pictures: istockphoto, Photocase / 1.000 / 01.2009