CronaTech

KEB

APPLICATION **WOODWORKING**
AND HIGH-SPEED SPINDLES

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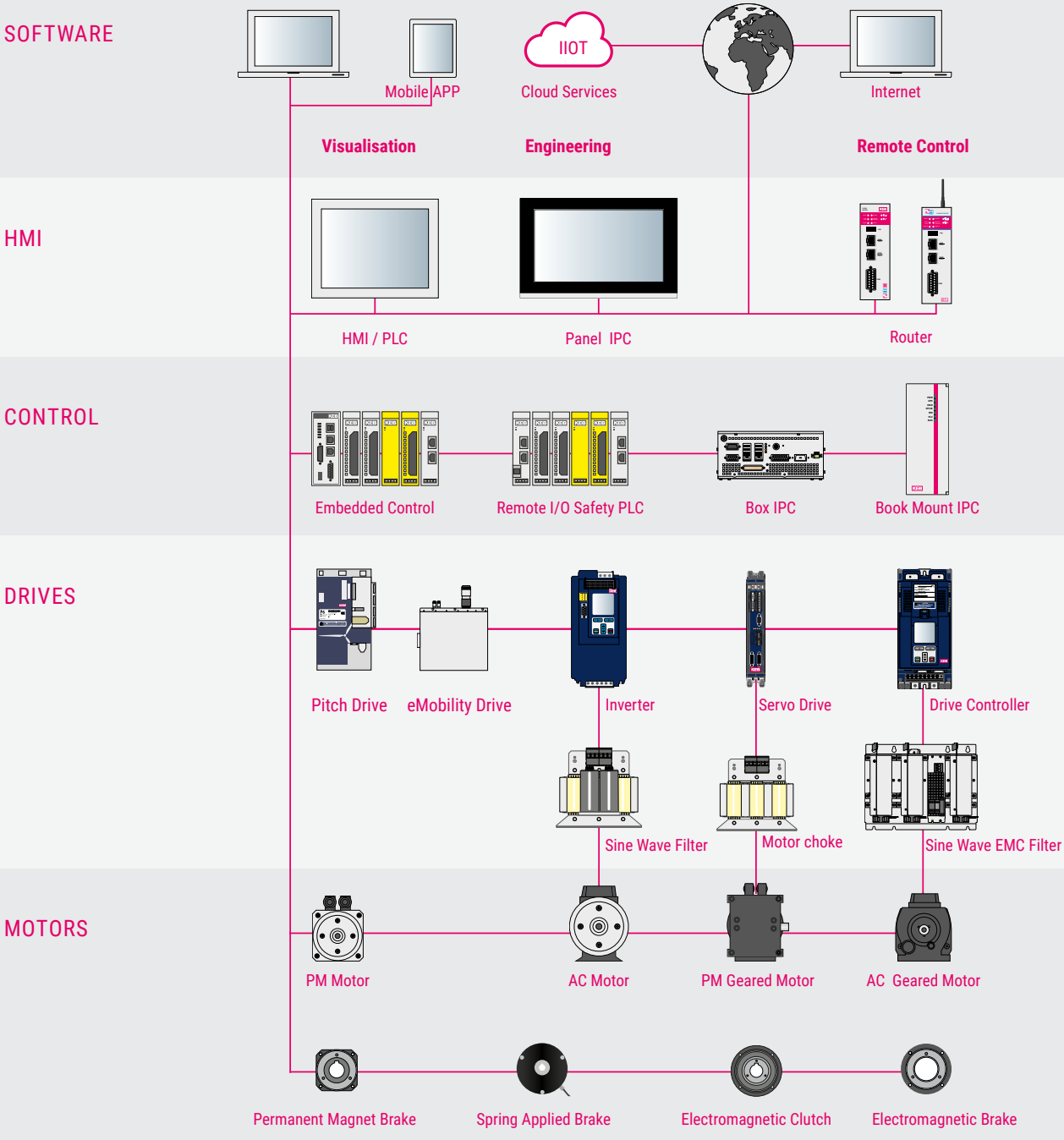
KEB

SYSTEM SOLUTIONS FOR WOODWORKING MACHINERY

From HMIs and controls to frequency inverters, motors and brakes, KEB Automation provides drive solutions from a single source. The individual components are optimally matched to each other and lead to the highest efficiency of woodworking machines and high-speed spindles.

- Partner in woodworking since 1983
- more than 750,000 systems in the field
- around 45,000 sold drives per year
- experienced application team with field service, application group, customer centre, simulation team, product management and commissioning team



HIGH-SPEED SPINDLES AND SPECIAL DRIVES

KEB is well established in drive technology for special motors. With the drive controller generation COMBIVERT S6 and F6 KEB brings the expertise in this area to a new performance level.

Optimally utilised hardware resources and high performance make it possible to combine all operating modes and motor variants in one single software.

With the precise motor data, the behaviour of drive controller and motor at critical operating points can be calculated and verified by means of real-time simulation in the HIL system (Hardware In The Loop).

- encoderless positioning and speed stiffness up to 120,000 rpm
- safe field-weakening operation and utilisation of the reluctance torque in synchronous machines with asymmetrical reactance (e.g. IPM motors)
- Multi-encoder interface and all operating modes in the standard modular system

ONE INVERTER FOR ALL APPLICATIONS

The COMBIVERT F6 drive controllers from KEB Automation combine frequency inverter and servo drive in only one device. In the power range from 2.2 kW to 450 kW they control a wide variety of motor technologies, increase the efficiency and reliably ensure safety in woodworking machines.

The COMBIVERT S6 Servo Drive is available for space-saving installation in the control cabinet. It is a modern, compact and at the same time flexible servo drive for a rated current of 2.6 A to 16.5 A in two housing sizes. Its high overload reserves enable the best dynamics.

With the frequency inverter COMBIVERT G6 KEB offers furthermore a device for controlled applications in the power range from 0.75 kW to 30 kW, which controls motors completely without feedback.

- Asynchronous and synchronous motors, high-torque motors, synchronous reluctance motors, high-speed spindle motors, rotary or linear motors
- Multi-encoder interface: with and without encoder, analogue and digital encoder types
- Multi fieldbus interface, switchable

THE KEB SPEED CONTROL METHODS: ASCL / ASICL / SCL

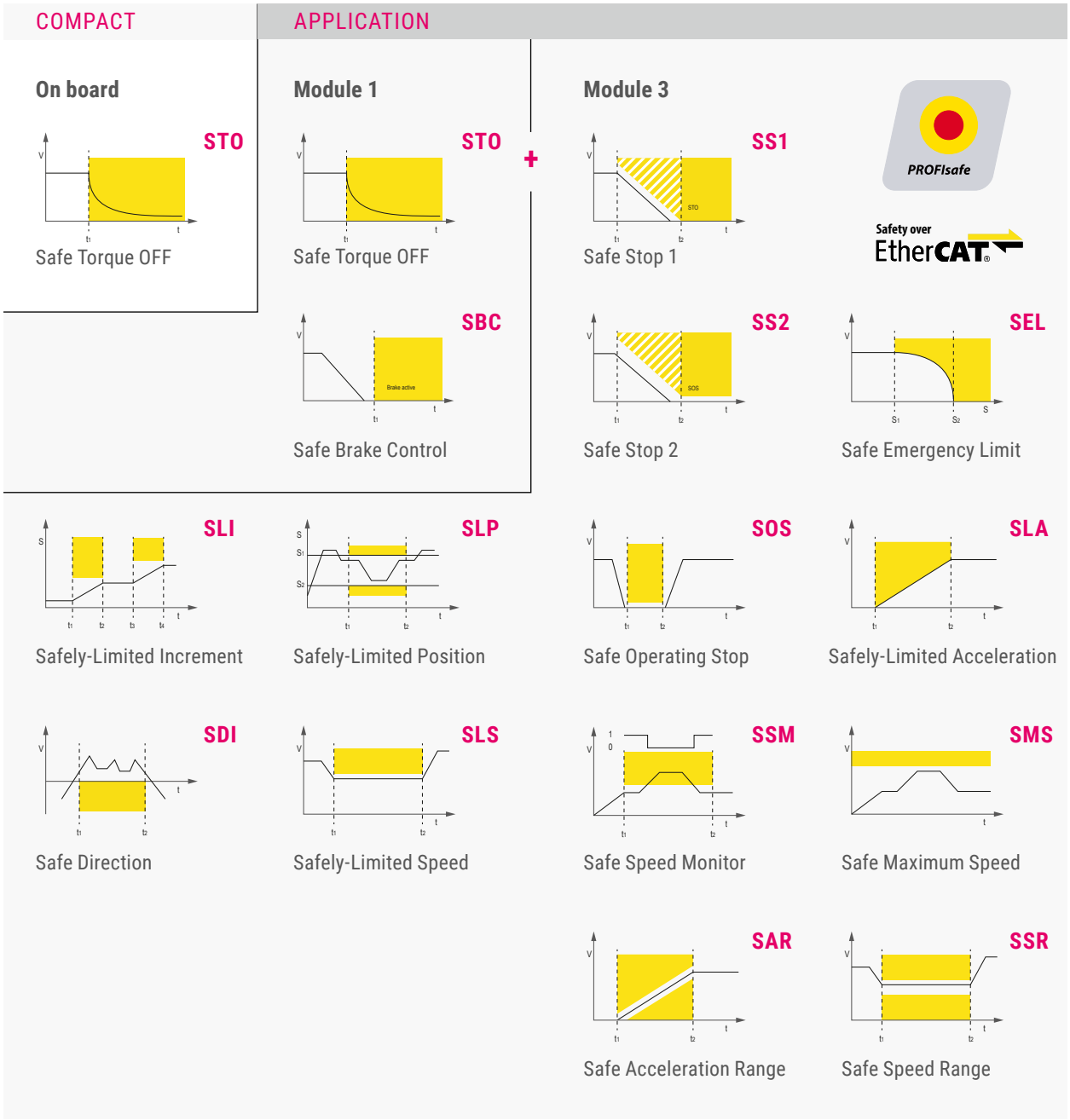
When it comes to the encoderless controlled drive of asynchronous motors, ASCL (Asynchronous Closed Loop) is the method of choice. This is supplemented by the ASiCL (Asynchronous Single Current Closed Loop) method, which ensures stable, encoderless driving at very low speeds and, in the case of asynchronous machines, also allows the regulation of the slip speed for asynchronous machines.

The SCL method (Sensorless Closed Loop) also offers a possibility for precise, sensorless speed and torque control of synchronous or IPM high-speed motors.

Illustration: F6, S6, G6

Keeping the risks posed by technical equipment to people and the environment as low as possible – that is the goal of functional safety. Machining or machine tools can endanger operators or technicians, for example, by tools which rotate at high speed. Drive technology that provides the required safety functions with or without encoders offer the user various advantages.

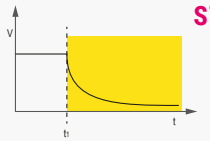
To avoid dangerous operating conditions, safety functions monitor the speeds, directions of rotation or axis positions. The objective of the drive controllers with integrated safety functions and the safety controller in the KEB portfolio is to realise this particularly economically.



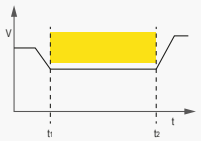
PRO

Module 5

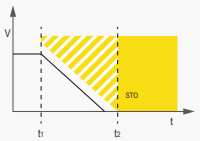
Safety over EtherCAT



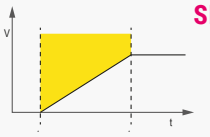
Safe Torque OFF



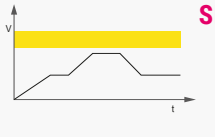
Safely-Limited Speed



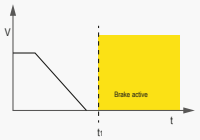
Safe Stop 1



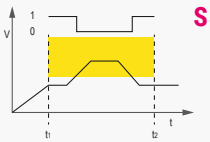
Safely-Limited Acceleration



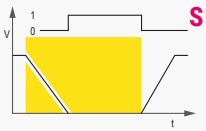
Safe Maximum Speed



Safe Brake Control



Safe Speed Monitor



Safe Door-Lock Control

- safe communication: As a widely used and established solution with Safety over EtherCat (FSoE) or via PROFIsafe.
- SLS (Safely-Limited Speed): In this way, the drive monitors the speed safely. If the set speed limit is exceeded, an error reaction takes place that was defined during project planning. The SLS function protects tools from overspeeding.
- safe standstill (SSM f=0Hz, SDLC, SSM) PLc or PLd, encoderless and with safe encoder: Safety functions integrated in the inverter.
- ideal for retrofit solutions: Saves an additional standstill monitor
- SDLC (Safe Door-Lock Control): The SDLC function can be used as a cover lock for the machine, which only opens the cover when the motor has come to a safe standstill (for example, for tool changing).
- and many other speed- and position-dependent safety functions

The KEB range offers comprehensive hardware solutions in combination with excellent software functionalities from display to motion profile. The wide-ranging product portfolio starts with compact controllers and extends to the powerful C6 P34, which is available as a Box, Panel or Book Mount IPC.

KEB also offers the C6 Safety PLC and Safety I/Os, a certified safety controller with safe inputs and outputs that comply with the IEC 61508 SIL 3 and DIN EN ISO 13849-1 PLe standards.

USER-FRIENDLY HMIS WITHOUT PROGRAMMING EFFORT

With HELIO, you can quickly and easily create intuitive HMIs that are truly responsive and independent of platforms and end devices thanks to web technology.

- user-friendly HMIs without programming effort
- responsive and independent of platforms and devices
- Templates include professional interface design already out-of-the-box
- Development costs are significantly reduced

HARDWARE IN THE LOOP (HIL)

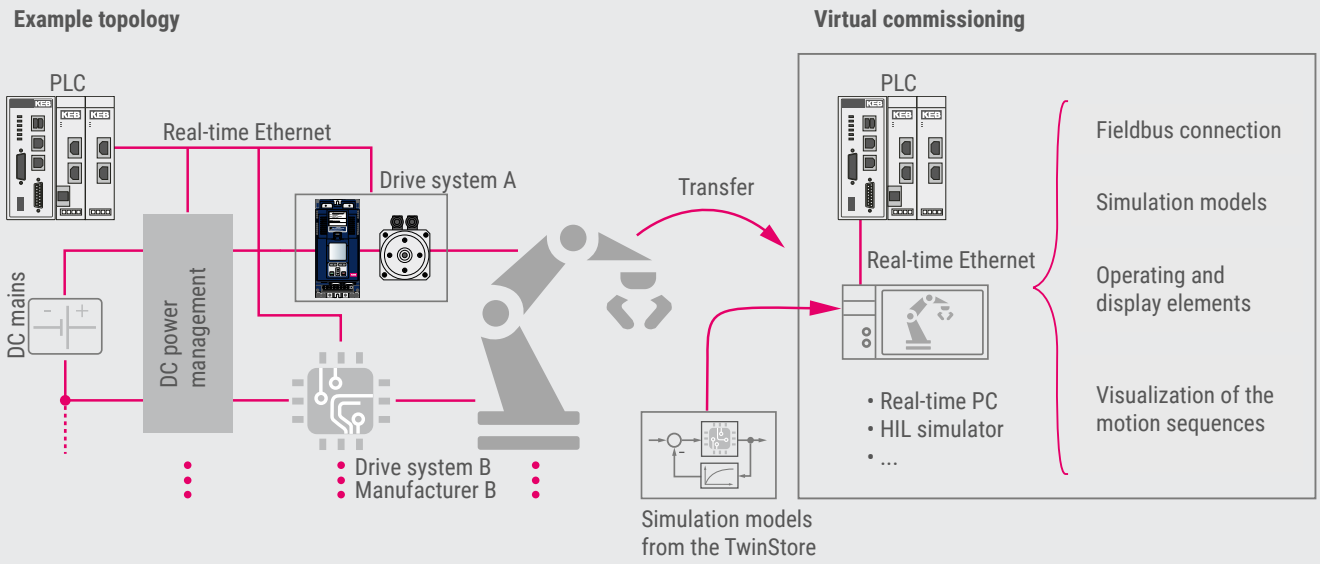
On request, KEB offers with „Hardware in the Loop“ (HIL) a prior simulation of the interaction of drive and motor. In this way, speed, torque and currents can be calculated and checked before the actual commissioning and, for example, parameterisation errors can be avoided on site that could later lead to unstable operation of the motor.

The virtual variant of commissioning can often be realised within one day. This saves time and costs during on-site commissioning.

DIGITAL TWIN

With ISG-virtuos from ISG Steuerungstechnik, a simulation technology is available that enables virtual commissioning with the help of a digital twin. Based on this, the so-called TwinStore is an online store in which KEB Automation offers digital twins of frequency inverters of the S6 and F6 series for virtual commissioning.

This eliminates high modelling times for the user. The prefabricated models of individual components can be easily integrated by the customer into ISG-virtuos and then pulled into the individual model. In this way, a virtual image of an application consisting of KEB components can be created in a short time.



KNOW-HOW IN WOODWORKING

From the control system with numerous software features, to the processing of all machine process data and the inverters, to the motor with gear unit and brake, keb is the high-performance partner for woodworking.

CNC STATIONARY TECHNOLOGY

Within woodworking, the individual production of highly complex pieces of wood is the top class. For this, CNC solutions are needed that feature a consistent concept of coordinated hardware and software components. This begins with IPC-based control technology and the appropriate visualisation, and extends to drive controllers with integrated safety, right through to the motors and gears.

The high-performance CNC control from KEB guides the highly dynamic, interpolated axes with flying colours and convinces with the best finish of the workpiece

- scalable CNC control with ready-made modules for easy commissioning and visualisation
- integrated ISG CNC kernel
- Extension of machine functions via IEC 61131 without restricting CNC functionality
- highly dynamic servo drives
- coordinated communication in the smallest fieldbus cycle grid

EDGE PROCESSING

Benefit from our expertise in edge processing machines. We support you in the implementation of your safe and future-oriented machine. Rely on integrated functional safety – from the PLC to the drive technology.

Dynamic edge processing units require intelligent programming structures. Seamlessly integrate ready-made modules into your project and, for example, implement a „flying saw“ and phasing via drag & drop using CAM and positioning modules in your C6 IPC from KEB. Visualise at the highest level with a C6 HMI.

SOLUTIONS FOR EDGE PROCESSING

- IPCs and HMIs with ready-made software modules
- highly dynamic drive controllers
- various interpolation methods, e.g. B-Spline

SURFACE TECHNOLOGY

Sawing, drilling or milling, grinding, polishing and lacquering: Absolute perfection is required for surface finishing. Even the smallest error can lead to the loss of the workpiece.

KEB's speed-stiff drive solutions ensure that this does not happen at all. Optimum results despite ever varying wood structures are ensured by reliable speed control.

SOLUTIONS FOR SURFACE TECHNOLOGY

- perfectly matched inverter/motor combinations
- sanding technology with ASCL/SCL (sensorless speed control)
- economical solution, strong performance: HMI LC / embedded controls

SOLID WOOD

Whether rough or very fine: solid wood offers a wide variety of structures and that is precisely what makes the material so attractive. However, it is always important to find the right system solution for the respective application.

After all, a rough sawmill application poses different challenges for the drive than the millimetre-precise division of wooden panels. At KEB you will find everything for the perfectly coordinated processing of solid wood

SOLUTIONS FOR SOLID WOOD PROCESSING

- robust drive controllers
- (geared) motors with up to 1.3 MW – high power, designed for harsh environments
- encoderless safety technology

TRANSPORT, HANDLING AND ASSEMBLY

No matter if it is about feeding and unloading, further transport between individual processing stations, intermediate storage or entire assembly systems from the furniture carcass to the house wall: transport tasks are becoming more and more complex and increasingly have to provide support for the further processing of goods.

KEB offers you the right solutions for these tasks.

SOLUTIONS FOR TRANSPORT AND HANDLING

- encoderless positioning of synchronous motors, relevant for panel storage, among other things
- long motor cable lengths with appropriately designed filters
- Software functionalities in the inverters
- innovative solutions for energy-efficient systems with multiple axes via DC link system

DIGITAL SHOWROOM GET TO KNOW OUR OFFER VIRTUALLY

Want to get an idea of our components? Then our digital showroom is the right place for you. Get to know the portfolio of KEB Automation by means of a CNC machining centre in 3D - from the control to the frequency inverter to the motor.

During your tour through the virtual machine halls, you will receive useful information and learn what drive solutions „from a single source“ mean in practice.

FIRE PROTECTION WITH FILTER TECHNOLOGY

Leakage currents as low as 300 mA can trigger a fire, which is why 300 mA residual current circuit breakers are absolutely essential, especially in woodworking machines. KEB has developed the new COMBILINE E6 filter series, which has been implemented throughout the current G6, S6 and F6 inverter series.

These filters are available both as separate units in the form of auxiliary or sub-mounted filters, but also as a variant integrated into the unit, depending on the unit series and size. The leakage currents in the inverter-cable-motor connection, which are unavoidable due to the system, are fed back into the own system by the filter and thus kept away from the ‚wrong way' via the RCD. This allows technically flawless operation on the prescribed universal current-sensitive residual-current devices without any problems and without triggering them.

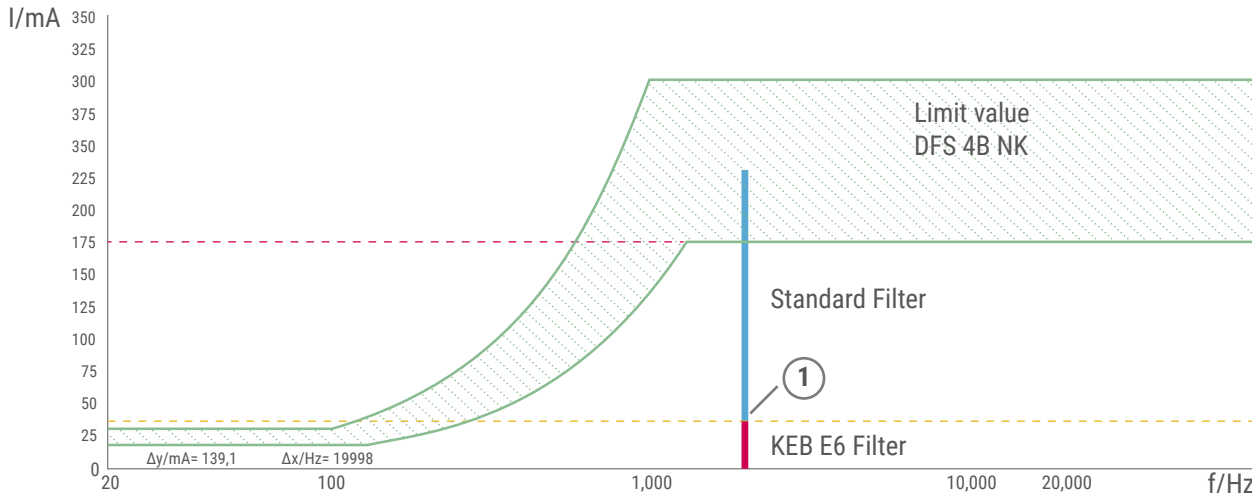


Illustration: Leakage current measurement 22E6T60-1050

Measuring point	Current I / mA	Frequency f / Hz
①	36,6	4,000

- all-current sensitive residual current device of type B/B+
- leakage currents are drastically reduced
- COMBILINE E6 filters available separately in all power classes
- Filters are integrated as standard in COMBIVERT G6 or S6 Drives
- also available as sub- or side-mounted filters, or collective filters

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