

A large industrial machine, likely a KEB automated system, featuring a prominent blue rotating component. The machine is surrounded by a complex network of white metal frames and structural elements. The background shows a factory setting with windows and other industrial equipment.

KEB

PLASTIC MACHINERY AUTOMATION

**HELPING
BUILD
BETTER
MACHINES**



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COMPLETE SOLUTIONS FOR PLASTIC MACHINERY

CLOUD

REMOTE ACCESS

VISUALIZATION

CONTROLS

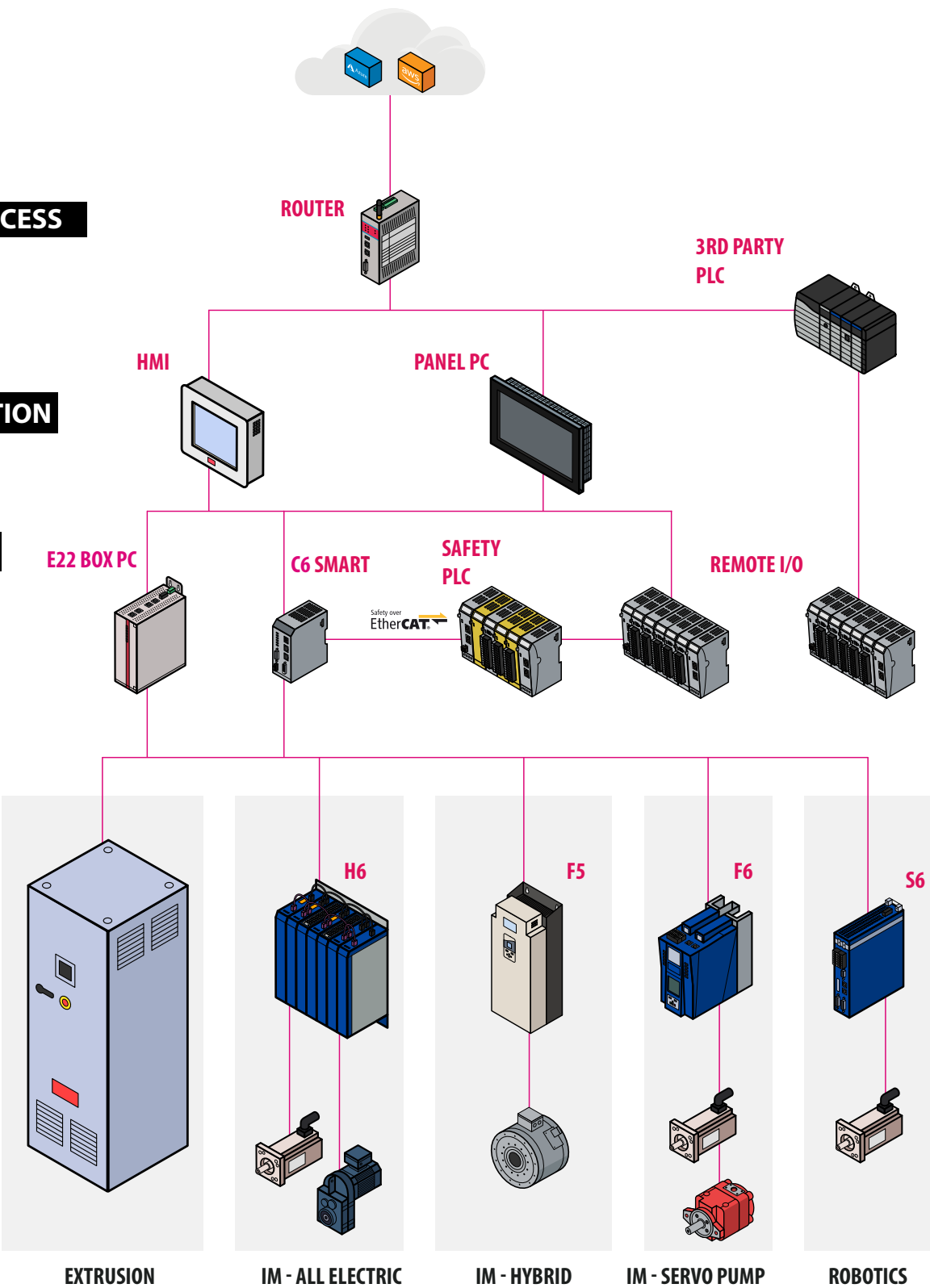
I/O

PANELS

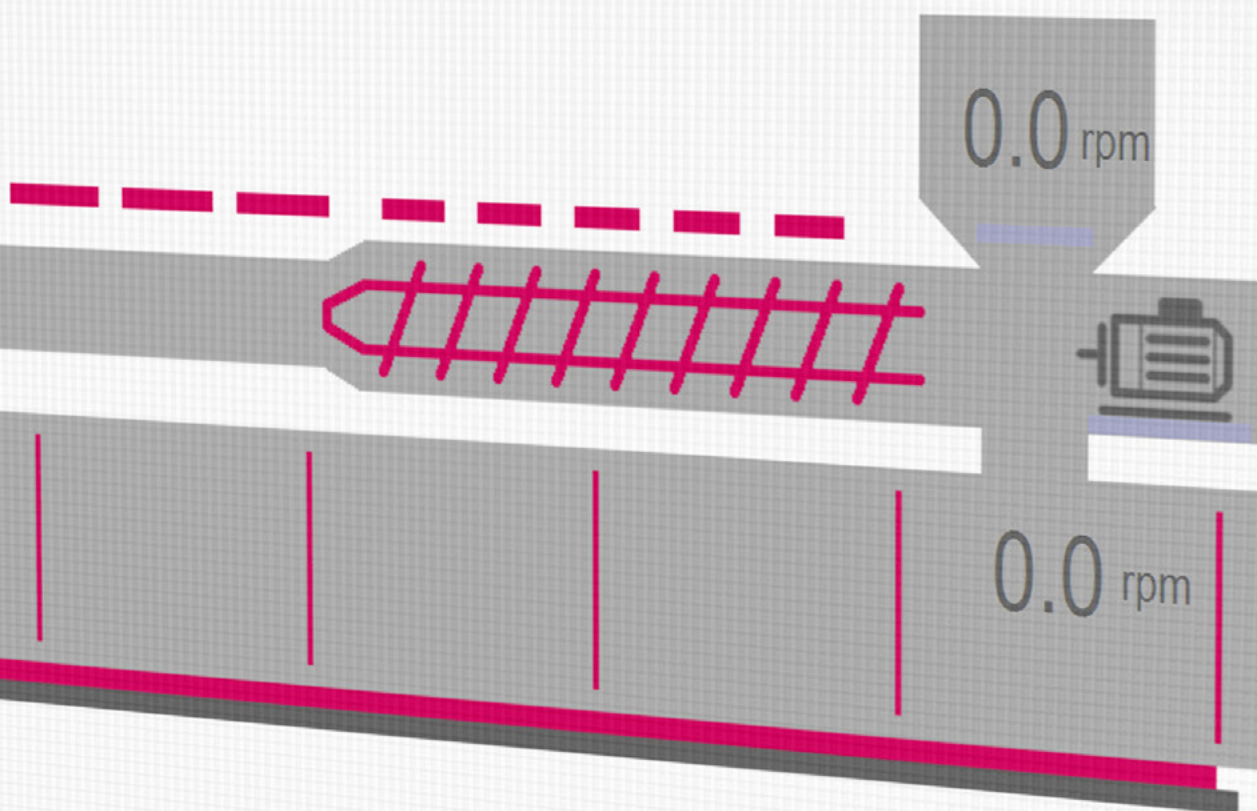
DRIVES

MOTORS

GEARS



CONTROLS



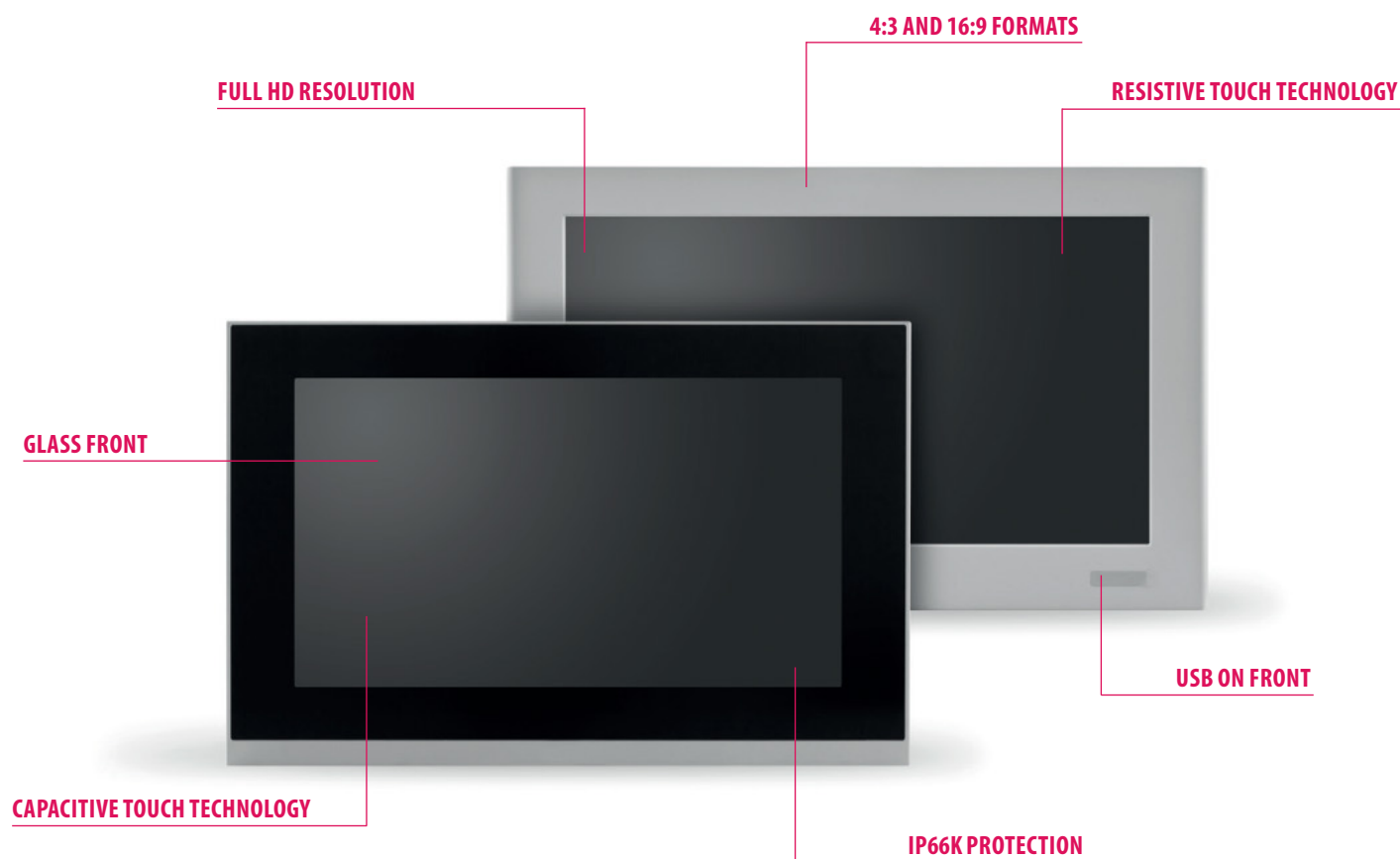
Working time
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CONTROL INDUSTRIAL PCS

KEB offers scalable control technology suitable for all Plastic machinery - anything from mixers to injection molding machine control to handling robotics. Embedded and Intel-based Industrial PCs are EtherCAT masters and provide real-time motion control.

KEB controls are designed for industrial applications (no fans, micro-UPS, SSD options). They are available in DIN, Box, and Panel configurations. Panel PCs are offered up to 24" in either resistive or capacitive touch.



HIGHLIGHTS

- Fanless panel or IPC box up to 50° C operating temperature
- Intel® Bay Trail Platform with 64-bit architecture
- LED backlit TFT LCD display with 16 million colors in range of formats
- Slim version available for installations with limited space
- Smart memory concept for maximum flexibility in application

Engineering plastic machines that are reliable, efficient, and scalable require powerful software tools. COMBIVIS Studio 6 guides the machine designer through the engineering process. From initial concept to maintenance, COMBIVIS studio 6 offers to increase engineering productivity and shorten the development time. The following tools can be used during specific design phases:

INITIAL CONCEPT

KEB's unique project configurator brings the concept to life with guided product selection and easy BOM output with technical specs and manuals provided in the document database. From the configurator a project configuration can be created including drives, PLC, remote I/O and HMI project setup. The configurator and built-in document database reduces time finding technical specs and configuring initial system design.

IEC 61131-3 LANGUAGES

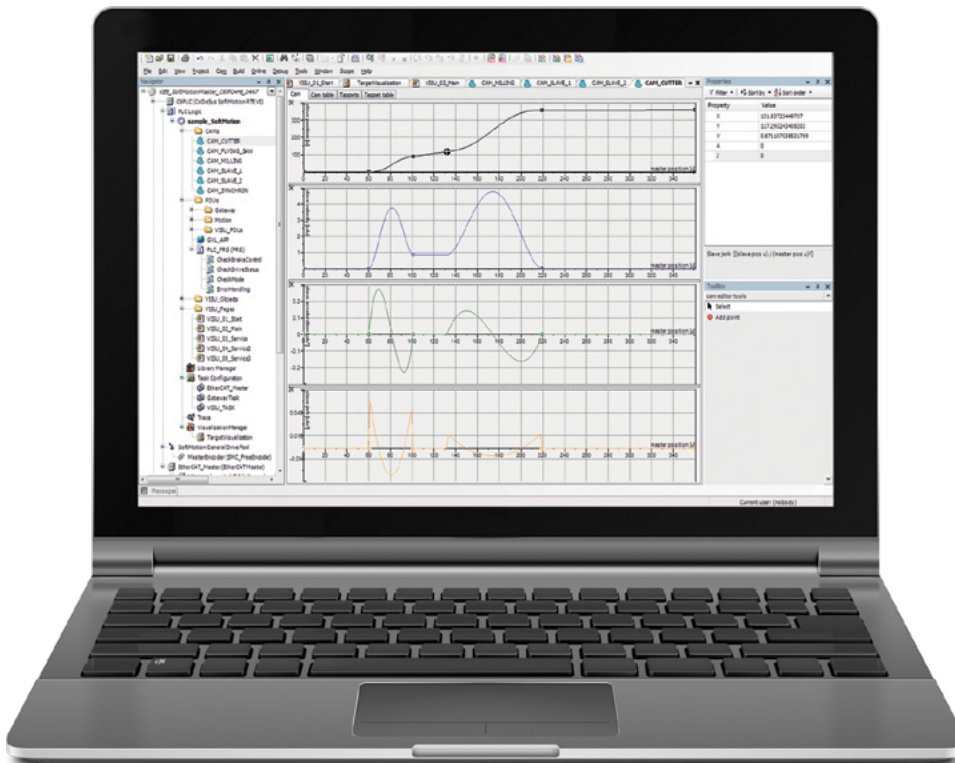
Programs are developed with IEC 61131-3 languages allowing open, reusable, and powerful object oriented programming in Structured Text (ST). For further ease of use and reduced application development time an extensive library of drag-and-drop KEB and PLCopen function blocks can be used for specific motion control tasks.

STARTUP WIZARDS

Powerful start-up wizards reduce commissioning times. The Wizards guide a user through processes like setting up the EtherCAT process data, performing a motor tune, and tuning servo motor performance.

REMOTE MAINTENANCE

Once the machine is in the field, remote maintenance is possible with the integrated COMBIVIS Connect software. This feature saves time and money by resolving problems fast without the need of service trips.



HIGHLIGHTS

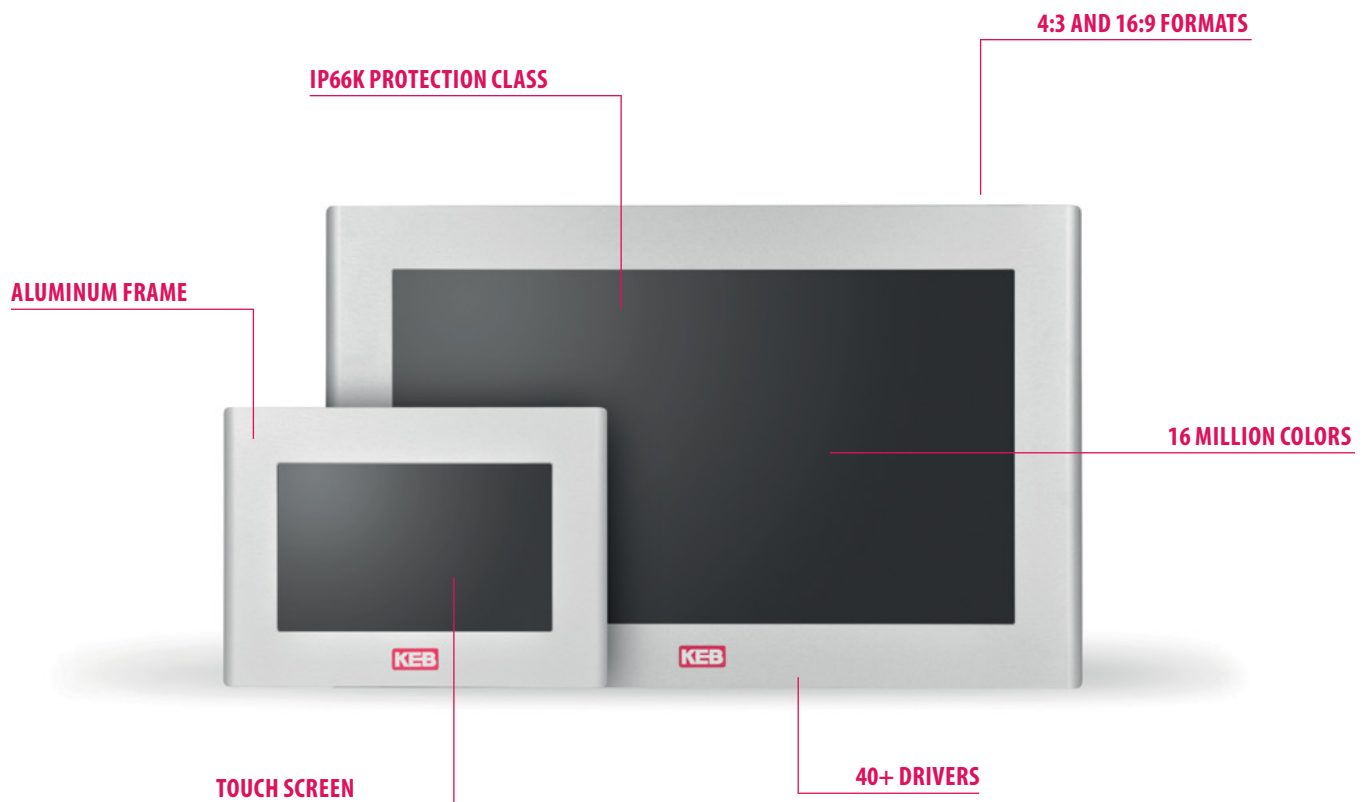
- IEC 61131-3 application development
- Device and library database
- Product configuration
- Start-up and diagnosis assistant
- COMBIVIS studio HMI integration
- Document database

CONTROL HMI

Manufacturing environments are constantly changing, and for that reason plastic machines must be usable by different operators. High quality HMIs with high functionality and durability is necessary to maximize productivity.

The C6 HMI boasts a stunning 16 million colors housed in a IP66K front bezel. It features a durable resistive touchscreen for use in harsh environments. With over 40 communication drivers, the C6 HMI can be used with KEB control products or all major PLC/control platforms. This flexibility gives machine builders the ability to standardize development on one visualization platform.

All HMI products include a CONNECT runtime license. This means the product is capable of secure remote access which can be used for program updates, troubleshooting, and diagnostics.



HIGHLIGHTS

- High-quality visualization system
- Flexible, open communication with multiple interfaces and drivers
- Integrated remote maintenance - Industry 4.0
- Intelligent memory management with large internal memory
- IP66K front suitable for harsh environments
- 4.3" up to 15.6" (Both 4:3 and 16:9 formats supported)

Combivis studio HMI is used for designing HMI screens. KEB has the philosophy that the HMI interface should be designed for flexibility, scalability, and connectivity.

Studio HMI has a number of features that will benefit machine builders looking to export machinery across the globe. Screens layouts easily scale to different dimensions. Studio HMI supports multi-lingual text displays and can be equipped with powerful datalogging and alarm functionality.

PROJECT NAVIGATOR

TOOLBOX

GRAPHICS EDITOR

SCRIPT EDITOR



HIGHLIGHTS

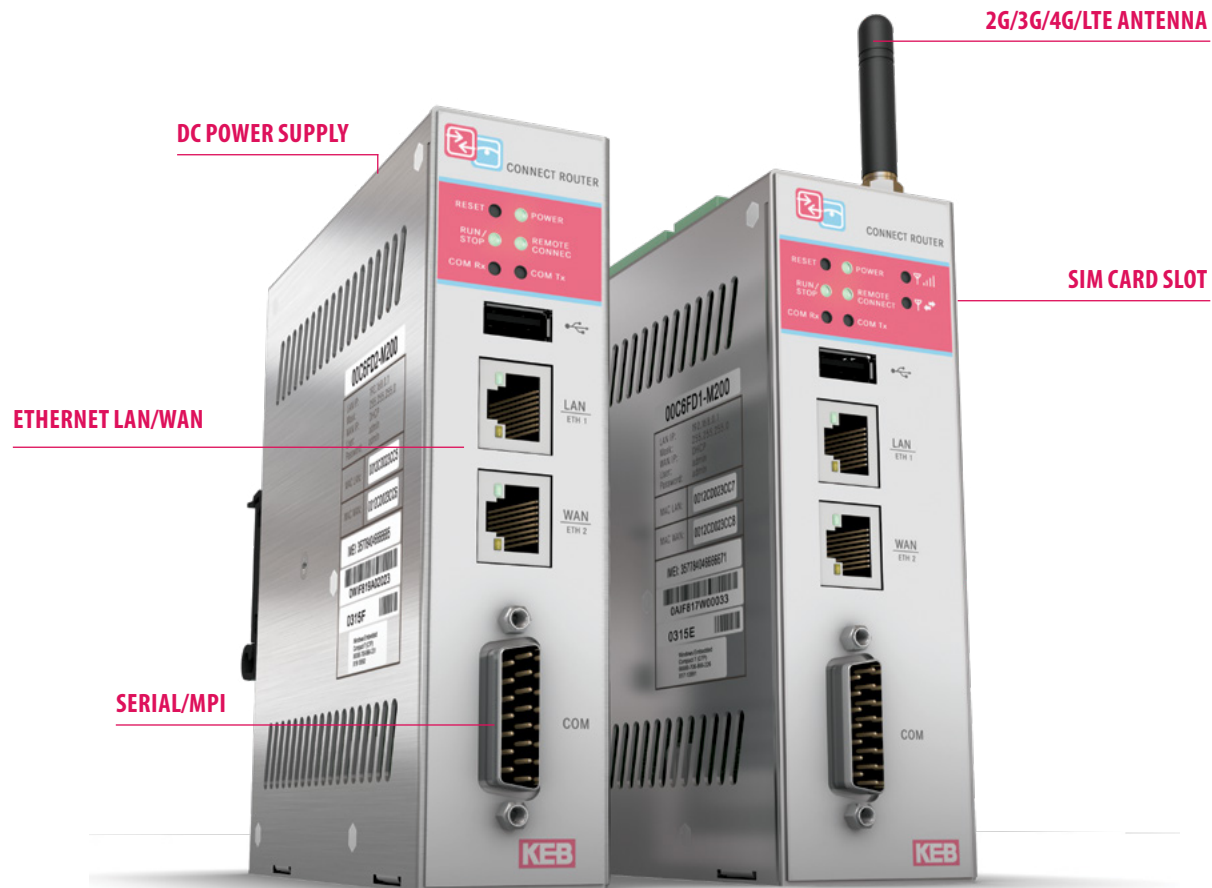
- 40+ drivers interfaces with major PLC platforms
- Automated variable exchange
- Parallel development of HMI and controller projects
- Extensive template library
- High-level archiving possibilities
- Easily supports multi-language displays for global customers

CONTROL VPN ROUTER

Reduce field visits and travel costs with KEB's VPN Router. The C6 Router provides secure Remote Access for any brand of PLC in the field. An optional HMI runtime allows for data logging, trending, and remote alarm management.

The C6 Router comes in four versions to best suit your installation. With or without HMI functionality, with or without the ability to connect via a GSM cellular modem.

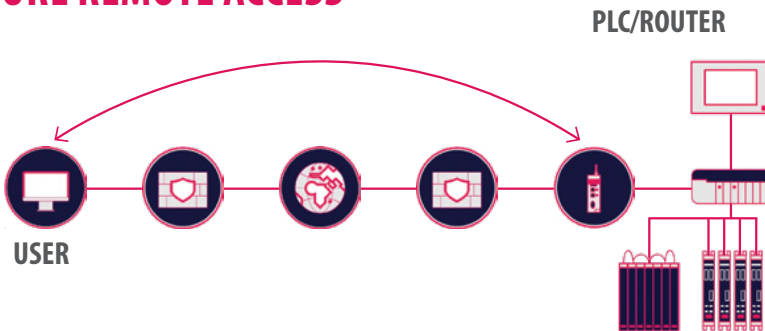
The C6 Router is the ultimate service and support tool for your plastics machine.



HIGHLIGHTS

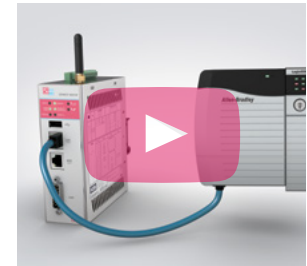
- Remote monitoring using Ethernet or Cellular connection
- Industrial Grade - 24VDC power supply, Extended Temperature versions, rugged metal housing
- 2G/3G/4G/LTE GSM Cellular available - Antenna options up to IP67
- Access to remote devices via Ethernet or serial interface
- Optional HMI functionality for data logging, diagnostics, and alarm notifications

SECURE REMOTE ACCESS



- Direct encrypted VPN connection
- Connection Validated with KEB's redundant server network
- Combivis CONNECT™ allows extensive firewall and user configuration
- 3rd-Party audited to meet the IEC 62443-3 standard

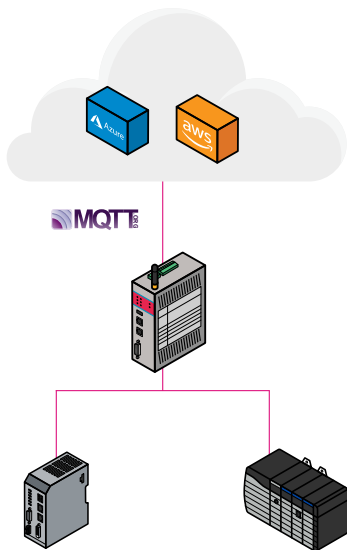
Integrate with your PLC



goo.gl/ZxbQHC



DATA LOGGING WITH MQTT



HIGHLIGHTS

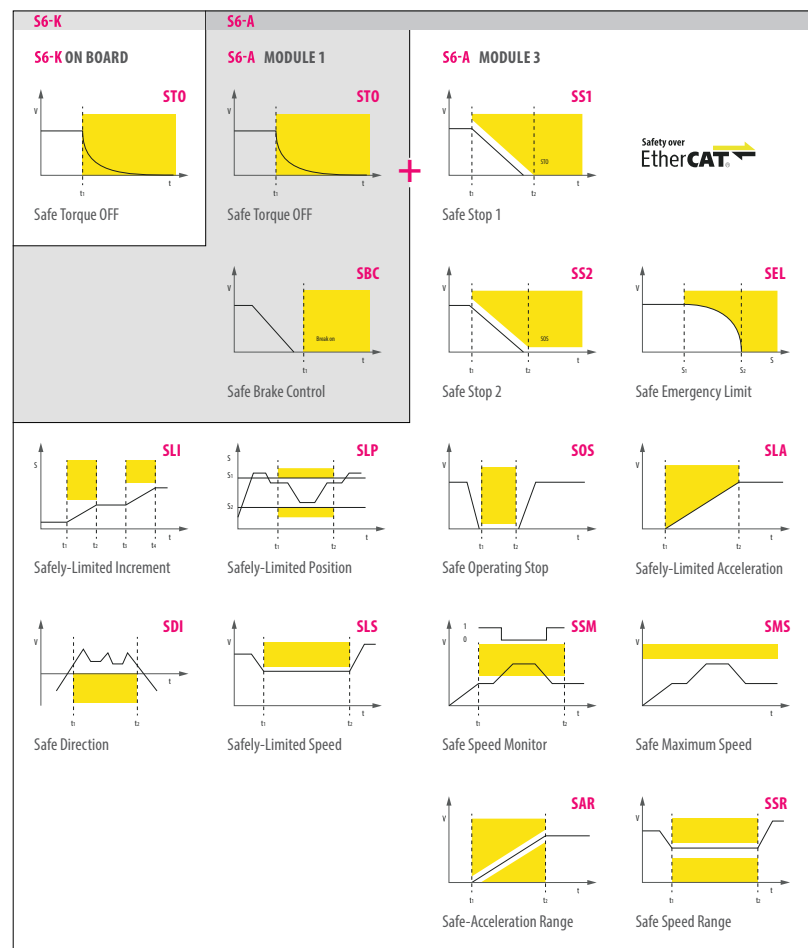
- Create your own Cloud-based analytics platform
- C6 Router uses lightweight MQTT push Agent
- Flexible with Cloud-based platforms like Amazon Web Services and Microsoft Azure
- 40+ drivers can be used with all major PLC platforms

DRIVES



WHY USE DRIVE-BASED SAFE MOTION?

- Less wiring - remove contactors and other traditional safety components
- Fast response - offload safety handling from safety PLC to individual drives
- Faster power cycles - Safe modes possible without removing high power to drive
- Increased productivity - access machine in safe modes without shutting down completely
- Replace electromechanical wear components like contactors and relays
- Cost savings compared to traditional safety solution

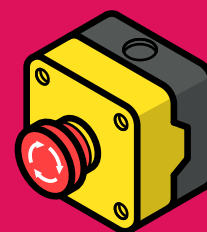


Safety over
EtherCAT



HIGHLIGHTS

- STO comes standard on all new drive series
- Advanced Safe Motion possible in Drives
- TÜV Certified Safety PLC and Safe I/O - to SIL3 / PLe level
- Control Safety products function on FSoE (Fail Safe over EtherCAT) bus



DRIVES TECHNOLOGY

KEB brings over 30 years of Plastic Drives application experience

FLEXIBLE OPTIONS - LESS DRIVE VARIANTS

As much as machine builders try to standardize, different markets and customers have different requirements and needs. Often times, customers across the globe specify different control vendors and communication protocols.

Wouldn't it be nice if a common drive technology was scalable with different communication products. The same motor shaft performance would be reliable and guaranteed across different control offerings.

KEB's x6-A control board supports multiple ethernet-based protocols which are software selectable. This allows machine builders to support less product variants and provide better serviceability of machines.



EtherNet/IP™

EtherCAT®

PROFI
NET®

ETHERNET
POWERLINK



KEB Drives like the S6 feature a dual-channel universal encoder input. This allows 1 drive to interface with many different feedback types. Feed back types supported:

- Incremental (TTL/HTL)
- Resolver
- Hiperface
- BiSS
- SSI
- EnDAT 2.1
- EnDAT 2.2

HEATSINK OPTIONS

As standard, KEB drives are offered with air-cooled heatsinks. Optionally, larger powered drives can be equipped with Liquid-Cooled heatsinks. Liquid-Cooled drives offer more power density and allow for smaller electrical panels.



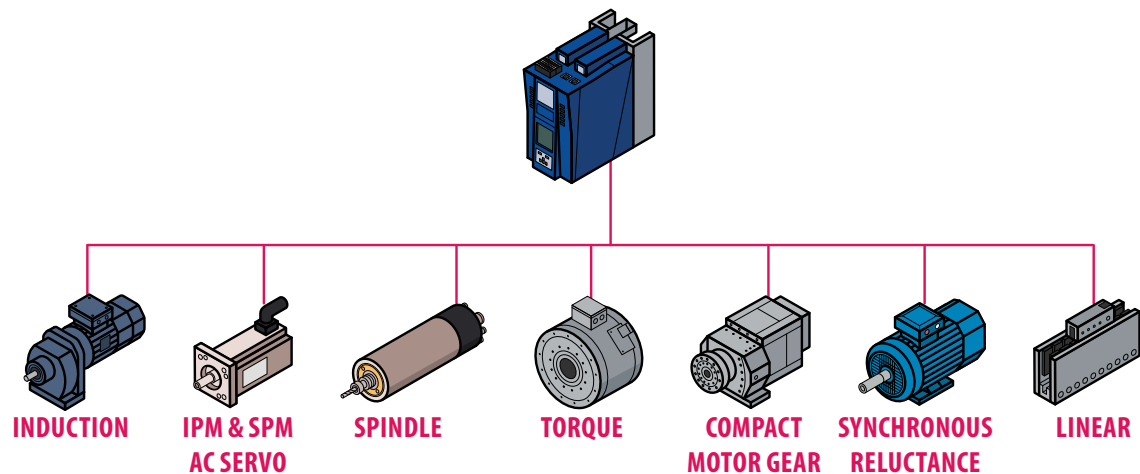
With over 200,00 installed Plastics drives, our experience speaks for itself.



ONE DRIVE FOR ALL MOTOR TYPES

Modern machine builders use the best available motor technology for the job. But they do not want to add complexity to their design by requiring different drive series for each motor type.

KEB drives run a wide variety of motor types. The motor models are changed with a simple parameter change. KEB drives control the following motor types:



MOTOR TEMPERATURE SENSING

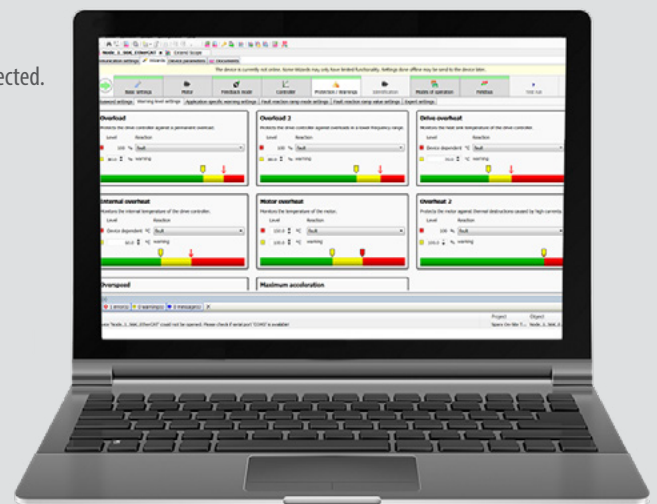
Motors represent a significant investment in the machine design and they must be protected.

KEB drives feature motor temperature inputs that support:

- KTY 84/100
- PTC
- PT1000

KEB's powerful Combivis Software includes wizards that help an engineer program alarm functionality related to the motor temperature input.

Easily define acceptable temperature ranges, warning levels, and actions to be taken.



EXTRUSION

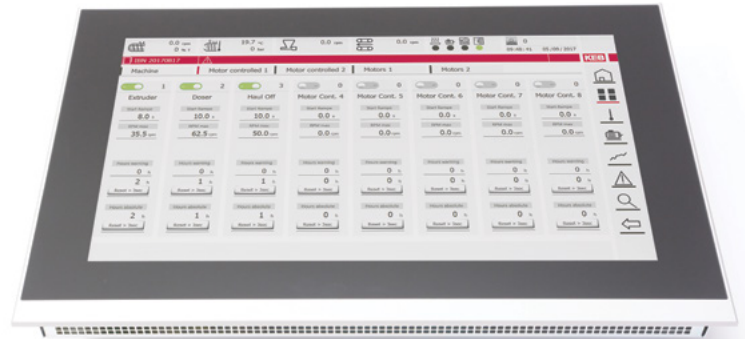


CONTROLS

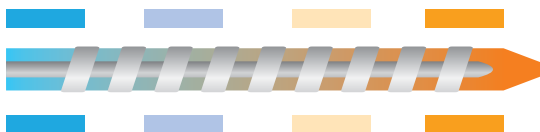
KEB's industrial PC platform is ideal for the complete extruder machine control. Programmers benefit from KEB's Combivis Studio 6 IDE which supports IEC 61131-3 programming languages.

Developers can leverage powerful KEB libraries. Advanced functionality for barrel heater control, drive communication, and load sharing are possible.

Additionally, KEB offers many different expandable I/O modules. Modules can be flexibly added and even remotely mounted on the machine control. Digital, Analog, Temperature, and Relay output modules are offered.



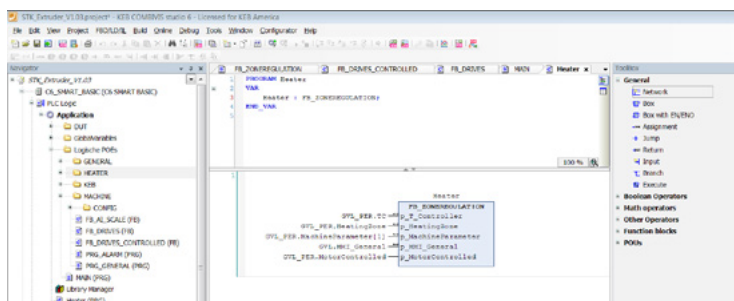
HEATER FUNCTION BLOCKS



Heater management is a critical function for all extrusion. Customers can develop their own controls or use KEB's pre-made Heater/Cooling Function Blocks.

KEB function blocks reduce development time while providing outstanding performance and flexibility. The temperature control has an auto-tuning function that optimizes control performance while reducing set-up times.

KEB's Heater functions blocks allow multi-zone heater control that is extremely responsive and stable. It is well suited for applications requiring high accuracy.



UNIVERSAL TEMPERATURE INPUT

APPLICATIONS EXTRUDERS

LARGE POWER

KEB drives utilize the latest IGBT technology which allows for extremely compact drive sizes. KEB offers drives in both 230V and 480V voltage classes - up to 1,000Hp.

Control Card and Functional Safety is standardized and can be easily scaled across the entire drive lineup. This means that the drive development time can be shortened when designing a full machine line-up

- Up to 1,000 Hp
- Compact Design - Latest IGBT technology
- Scalable with all communication options
- Scalable with all control functionality
- Air and Liquid-Cooled availability



COMPLETE PANELS

KEB offers complete Extruder drive panels. The panels are UL508A listed and include necessary breakers, EMI filters, etc.

Optionally, a KEB HMI, C6 Router, or special filtering solutions can be offered if the application requires it.

The SCCR rating depends on the drive size and components used but higher SCCR ratings are available upon request.

- Turnkey Drive Panel - Ready to wire
- Small Size - Compact Extruder Drives
- Different Cooling options available
- Optional HMI Drive Operator
- Optional C6 Router - Secure Remote Access
- Air and Liquid Cooled options available



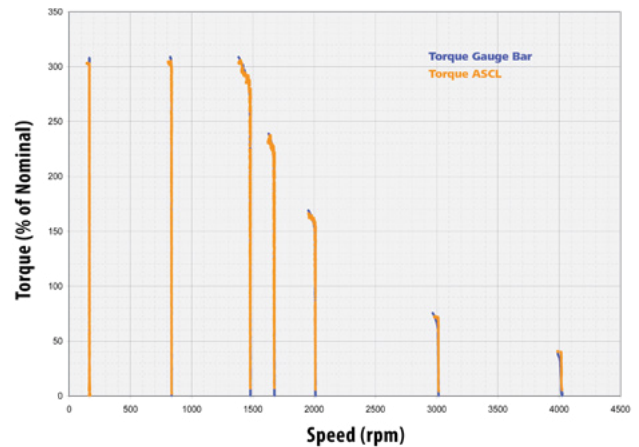
SCL™ MOTOR CONTROL

Superior Torque and Speed regulation allow for a better extruded final product. KEB's revolutionary Sensorless Closed Loop™ (SCL) was introduced over 10 years ago and continues to outperform today.

Sensorless Closed Loop does not require traditional motor feedback and cabling. Instead, KEB's proprietary SCL algorithm uses internal drive measurements and an extremely accurate motor model to provide precise torque and speed control - even at low speeds.

SCL can be used with AC Servo Motors. Additionally, ASCL can be used with induction (asynchronous) motors.

- Superior Torque and Speed Control
- Proven - 10+ years of commercial success
- Accurate Torque Limits
- Reduce system costs - Remove encoder, cabling, etc.
- Easy to set up - with Static Motor Tune
- SCL (PM Servo Motors) & ASCL (Induction Motors)



(A)SCL provides excellent torque control, even at low speeds

TORQUE LIMITS

The ability to protect the extruder screw, gearbox, and mechanical parts is absolutely critical. KEB extruder drives feature accurate and reliable torque limits that can be configured to help protect the machine.

Absolute torque limits can be defined as well as limits in both the motor and generator mode.



The background of the image is a dense, overlapping pile of blue plastic bottle caps. The caps are of various sizes and orientations, creating a textured, repetitive pattern of blue. Two semi-transparent red rectangular boxes are overlaid on the image, one above the other, containing white text.

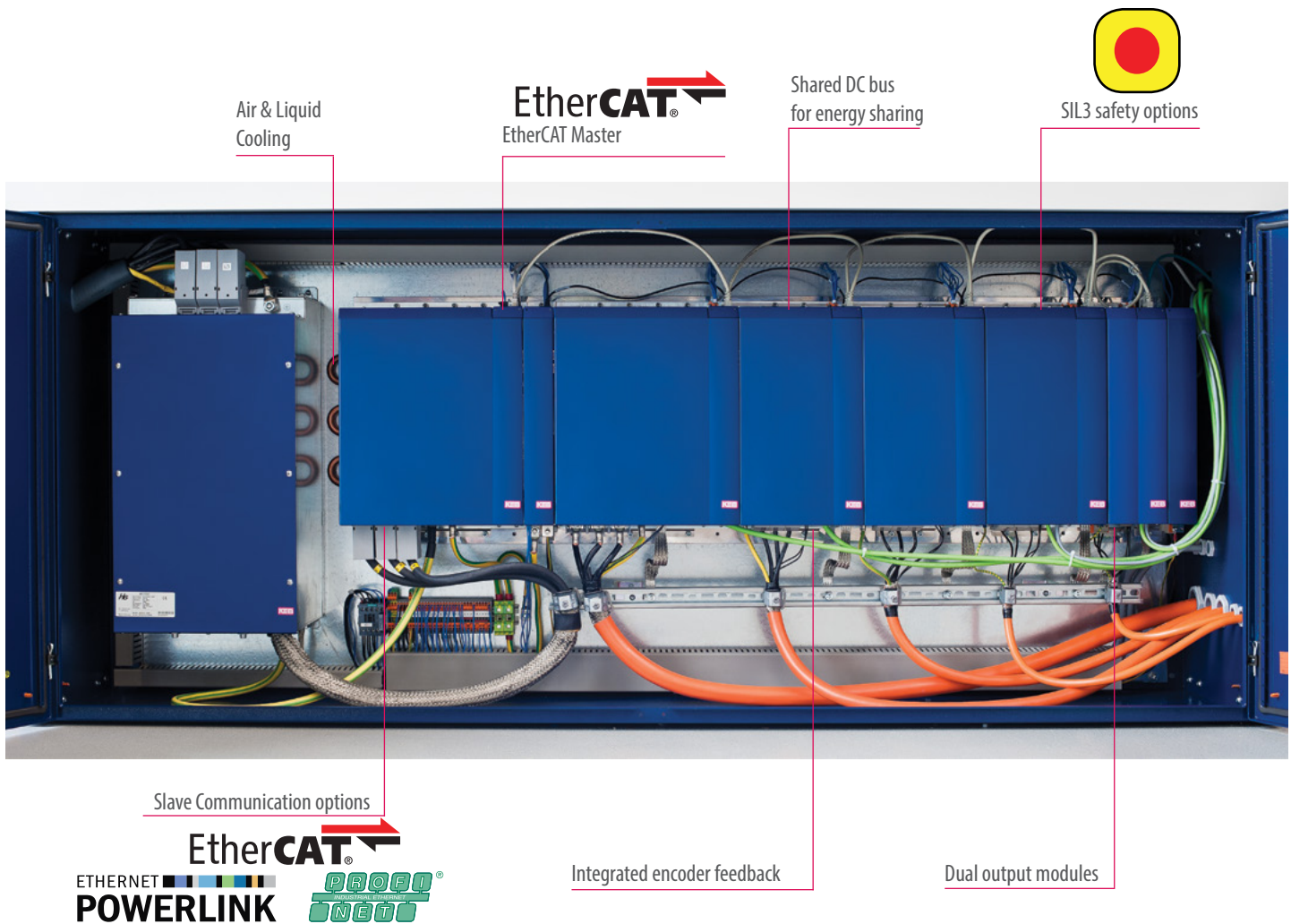
INJECTION

MOLDING

ALL ELECTRIC SOLUTION - H6 DRIVE

KEB's H6 multi-axis drive provides the ultimate performance for all-electric injection molding machines. A wide range of module sizes, cooling options, and safety modules allow the customer to build a drive system that works best for their installation.

The drive can be configured as an EtherCAT master with pluggable fieldbus cards that support Profibus, CAN, Interbus, and Profinet. Drive modules are available in double or single-axis outputs up to 110kW. AFE/Rectifier, 24VDC Supply and PLC control modules can also be selected to best suit the application's requirements.



HIGHLIGHTS

- Multi-axis drive platform (shared DC bus)
- Operates induction and servo motors
- High performance – EtherCAT connected
- Dual output modules possible
- AFE modules with regeneration and Voltage Regulation for poor quality mains
- Integrated SIL3 safety functionality and encoder feedback

APPLICATIONS INJECTION MOLDING

MOTION CONTROL

KEB drives, servo motors, and planetary gearheads help machine builders reduce cycle times by offering dynamic motion control capabilities with low settling times.

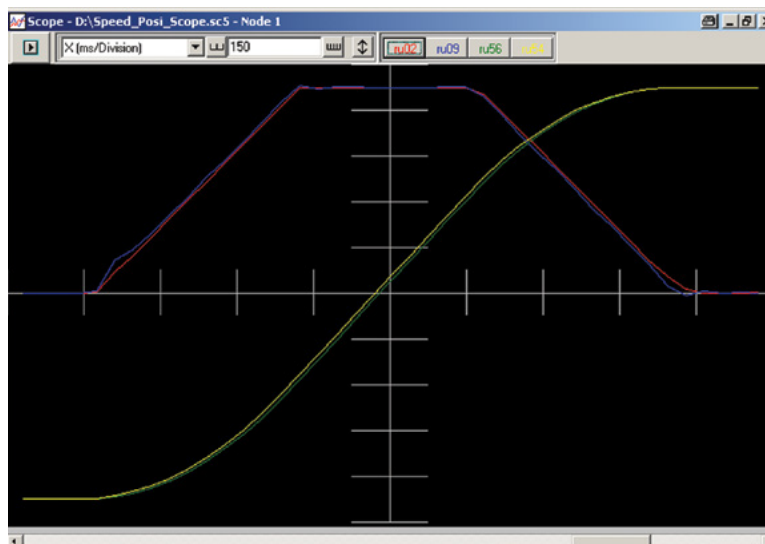
KEB drives feature a current control loop that is updated at 62 μ S. Additionally, KEB controls and drives feature Real-time bus protocols like EtherCAT.

KEB Motion Control products help reduce cycle times by providing dynamic response with minimal settling times.

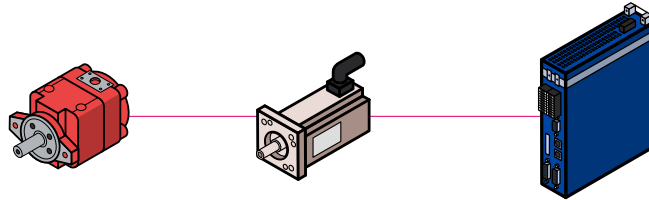
INTERNAL POSITIONING MODULE

KEB closed loop drives contain an internal 32-bit positioning module. This allows the PLC to write a target position to the drive and the drive calculates the optimal positioning profile on-the-fly. KEB drives then confirm the target position has been reached back to the PLC in order to sequence the next motion profile.

Alternatively, if a fixed position profile is used - KEB drives can store a position table inside the drive and sequence through the target positions.



SERVO PUMP CONTROL



FEATURE

ASCL/SCL

Precise speed control without feedback

Less heating in the system

Internal PID controller

Less audible noise

Potential for field weakening operation

Standard KEB hardware/software

BENEFIT

- Improved system efficiency
- Lower operating costs
- Lower upfront costs (no feedback/cable)
- Solutions for induction and servo pumps
- Smaller cooling system required
- Longer operating lifetime of components
- Less frequent coolant changes
- Used in place of pump controller or PLC program
- Improved worker comfort
- Reduced cycle times
- Improved throughput
- Off-the-shelf product





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