

**BECKHOFF** New Automation Technology

# News

01'2019



Ultra-compact Industrial PCs



Embedded PC CX7000

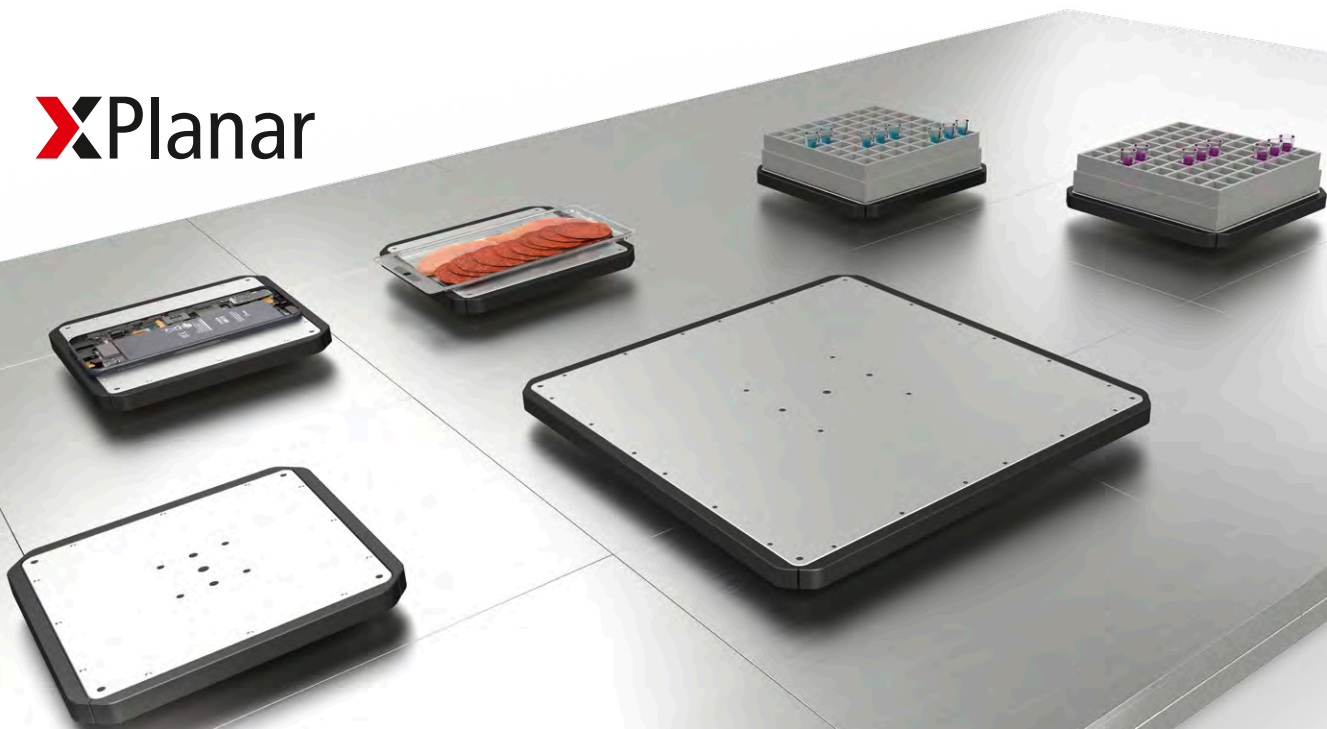


TwinCAT Speech



TwinSAFE Logic I/Os

**XPlanar**



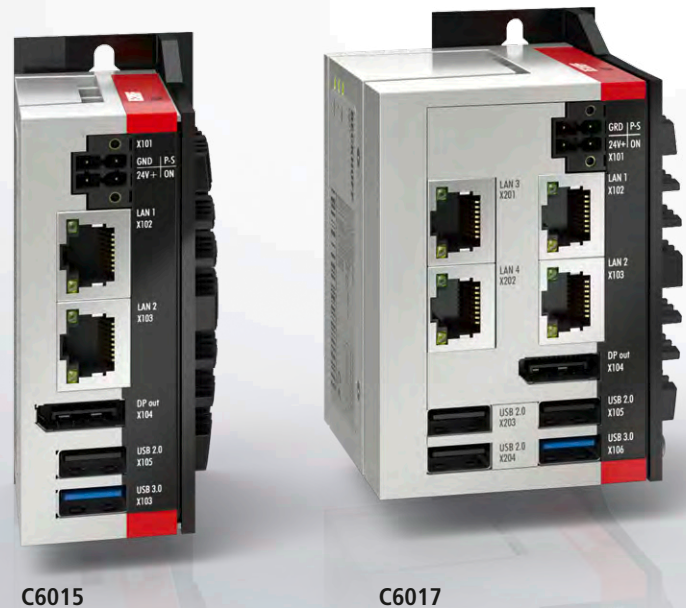
Completely free motion:  
XPlanar

# The ultra-compact IPC generation

**i** The series of ultra-compact Industrial PCs that was launched with the C6015 has been highly successfully positioned in the market because of its flexible application possibilities. The C6017 multi-core device offers further optional interfaces (up to 2 x RJ45, 2 x USB 2.0), an optional 1-second UPS, or a combination of additional interfaces and UPS, all in a housing that still measures only 82 mm x 82 mm x 66 mm.

With the addition of the C6030 ultra-compact Industrial PC, the many benefits of the series such as low space requirements, universal applicability for almost any automation and visualisation task as well as flexible installation are also available for complex applications with the highest performance requirements. The new C6032 adds a further circuit board level to the C6030 single-board Industrial PC for accommodation of modular interface and function extensions. With the use of compact PCIe modules the C6032 can be adapted perfectly to the requirement profile of the application.

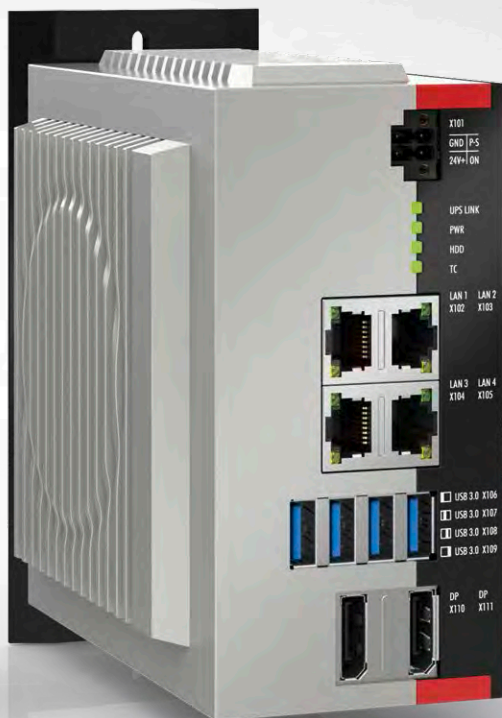
- [www.beckhoff.com/C6015](http://www.beckhoff.com/C6015)
- [www.beckhoff.com/C6017](http://www.beckhoff.com/C6017)
- [www.beckhoff.com/C6030](http://www.beckhoff.com/C6030)
- [www.beckhoff.com/C6032](http://www.beckhoff.com/C6032)



## News | Industrial PC







C6030



C6032

# Stainless steel multi-touch panels

The Control Panels from the CP39xx-14xx series in a stainless steel finish are control and operating devices that meet strict hygiene requirements – above all important in the pharmaceutical, food and packaging industries. Two 16:9 display versions are offered with diagonal sizes of 15.6- and 18.5-inch and a resolution of 768 x 1366 pixels. In addition to the capacitive multi-touch screen there are also versions available with additional emergency stop and three short-stroke keys with LED ring lighting for comfortable operation. Thus, central control tasks such as start and stop are integrated directly in the Control Panel.

A stainless steel front can be ordered ex factory for the built-in multi-touch Panel PCs from the CP22xx, CP26xx and CP27xx series as well as for the CP29xx built-in multi-touch Control Panels in place of the standard aluminium front.

- [www.beckhoff.com/stainless-steel](http://www.beckhoff.com/stainless-steel)
- [www.beckhoff.com/CP39xx-14xx](http://www.beckhoff.com/CP39xx-14xx)
- [www.beckhoff.com/C9900-F94x](http://www.beckhoff.com/C9900-F94x)

# Embedded PCs with Intel® Atom™ processor



The DIN-rail-mountable, fanless Embedded PCs from the CX5200 series are equipped with Intel® processors of the Atom™ X series. The series encompasses two devices that differ from each other by processor type and RAM size:

- CX5230: Intel® Atom™ CPU, 1.3 GHz, 2 cores
- CX5240: Intel® Atom™ CPU, 1.6 GHz, 4 cores

The CX5200 PCs supplement the existing devices of the CX5000 series. In direct comparison the new processors are considerably more efficient.

In contrast to the CX5000 the CX5200 series has a modular construction. The multi-pin terminal on the left-hand side enables the connection of a system or fieldbus module of the CX2000 family.

► [www.beckhoff.com/CX5200](http://www.beckhoff.com/CX5200)



## Intel® Atom™ x5-E3930 and x7-E3950 for Industrial and Embedded PCs


The Intel® processors of the Atom™ X series become available for control cabinet Industrial PCs and Panel PCs. An Intel® Atom™ x5-E3930 processor with two cores is used in the basic PC configuration, while the Intel® Atom™ x7-E3950 processor with four cores is offered as an option. The RAM is also extended from 4 GB to 8 GB DDR4 RAM with the same option. The new Atom™ processor generation requires Windows 10 64-bit as the operating system.

Beckhoff fully uses processors of the Embedded line with guaranteed long-term availability and is introducing them in all Industrial PC series.

The DIN-rail-mountable, fanless Embedded PCs from the CX5200 series are also equipped with Intel® processors of the Atom™ X series.

► [www.beckhoff.com/IPC](http://www.beckhoff.com/IPC)



A Beckhoff CX7000 Embedded PC is shown in the center. It is a white, vertical industrial computer with a black front panel. The front panel features a microSD card slot labeled 'SD', an Ethernet port labeled 'X002', and a D-sub connector labeled 'X001'. The top of the unit is labeled 'CX7000'. To the left of the unit is a large red arrow pointing right, and to the right is a large red arrow pointing left. The text 'ARM, 400 MHz' is inside the left arrow, and '12 Multi I/O' is inside the right arrow. The Beckhoff logo is visible on the front panel.

ARM, 400 MHz

12 Multi I/O

# TwinCAT®3

## News | Industrial PC

# Embedded PCs with ARM Cortex™-M7 processor

**i** The Embedded PCs of the CX7000 series have an ARM Cortex™ M7 single-core processor with 400 MHz. In the basic configuration, they have a slot for a microSD card and an Ethernet interface. As a special feature, the CX7000 series has eight integrated multi-functional inputs as well as four integrated multi-functional outputs.

The CX7000 does not have a fieldbus interface. The CX7080 offers two serial interfaces, one with RS232 and one with RS485 physics. Both serial interfaces are on the D-sub socket.

E-bus or K-bus terminals can be attached as required; the CX70xx automatically recognises the type of I/O system connected during the start-up phase. The control system is programmed with TwinCAT 3 via the Ethernet interface.

► [www.beckhoff.com/CX7000](http://www.beckhoff.com/CX7000)



# Economy line of the EtherCAT measurement modules

## Basic line

24 bit  
10 kps per channel  
simultaneous  
100 ppm @ 23 °C



## Economy line

24 bit  
1 kps per channel  
multiplexed  
100 ppm @ 10...40 °C



## News | I/O



### Distances of up to 300 m in the EtherCAT network

In combination with an EK1101-0010 EtherCAT Extended Distance Coupler, the single-port EK1121-0010 EtherCAT Extended Distance junction enables the bridging of distances up to 300 m. The EK1101-0010 coupler connects EtherCAT with the EtherCAT Terminals (ELxxxx). A station consists of an EK1101-0010 coupler, any number of EtherCAT Terminals and a bus end cap. The coupler converts the passing telegrams from Ethernet 100BASE-TX to E-bus signal representation.

- [www.beckhoff.com/EK1101-0010](http://www.beckhoff.com/EK1101-0010)
- [www.beckhoff.com/EK1121-0010](http://www.beckhoff.com/EK1121-0010)





The ELM314x Economy line of the high-precision EtherCAT measurement modules supplements the established ELM3x0x basic line with the 1 ksp/s sample class in 2-, 4-, 6- and 8-channel variants. The modules allow high-precision measurements with 100 ppm accuracy over a wide temperature range at low channel costs. They can be set channel-by-channel to current or voltage measurements and offer sampling rates of up to 1 ksp/s per channel. The extensive diagnostics features known from the basic line for unattended long-term use have also been implemented. Analog signals in the ranges from  $\pm 1.25$  to  $\pm 10$  V, 0 to 10 V,  $\pm 20$  mA or 0/4 to 20 mA can be processed.

#### Reliable measurement technology meets industrial requirements:

- up to 50,000 samples per second
- measurement accuracy of 100 ppm at 23 °C
- metal housings for optimum heat dissipation
- extremely robust – ideal for harsh environments
- high-quality data acquisition
- pretreated in the factory for high-quality measurement results
- integrated connection and functional diagnostics
- optional factory calibration certificate

► [www.beckhoff.com/ELM314x](http://www.beckhoff.com/ELM314x)



#### 1-channel LED strobe control terminals

The LED driver terminals from the EL2596 series contain a flexible power supply unit that supplies the LED with the required voltage and current. The terminals support applications from constant lighting to short light pulses in the kHz range. The EL2596-xxxx terminals also feature a trigger output for camera triggering as well as high-end fast voltage and current control, e.g. for providing line scan cameras with constant illumination. The input voltage of the EL2596 is 24 V DC. The input voltage of the EL2596-0010 is 48 V DC.

► [www.beckhoff.com/EL2596](http://www.beckhoff.com/EL2596)



# EtherCAT G: Telegram processing on the fly at 1 Gbit/s

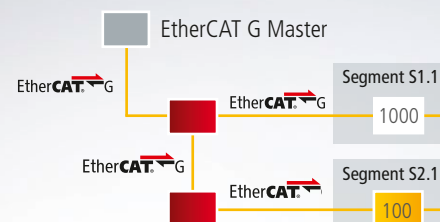
- 100BASE-TX
- Vast choice of components

- Real-time Ethernet down to the I/O level
- Flexible topology
- Outstanding diagnostic capabilities
- Synchronisation accuracy better than 100 ns

100 Mbit/s

EtherCAT®

## Branch Controller



## News | I/O

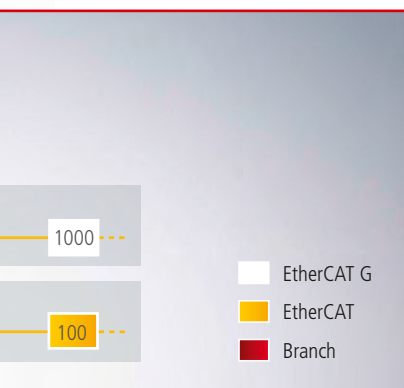
**i** EtherCAT G builds on the principles of the successful EtherCAT technology but moves the available data rates up to 1 Gbit/s. The EtherCAT protocol itself remains unchanged. As before, all of the devices on a network receive the telegrams sent by the EtherCAT master. Each EtherCAT slave still reads the data addressed to it "on the fly" and inserts its own data into the frame as the frame moves downstream; now, though, it does this at 1 Gbit/s. Hardware propagation times are

the only factor slowing down telegram processing. The last device in a segment (or branch) identifies an open port and uses the full duplex feature of Ethernet network physics to send the telegram back to the master. EtherCAT G also retains all other capabilities of EtherCAT. Devices with three or four ports (junctions) enable users to flexibly configure network topologies that suit the exact requirements of their machine architecture.

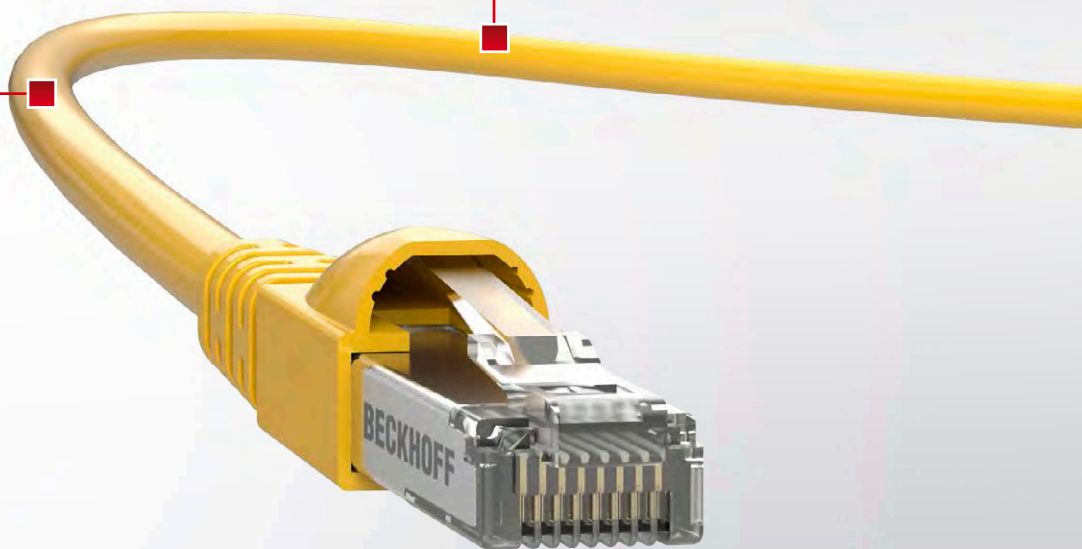


- Exceptionally simple parameterisation and configuration
- Low system costs
- Maximum performance
- Ability to integrate functional safety
- IEEE-802.3 compliant

- 1000BASE-T
- Supports data-intensive applications
- Very high bandwidth



- Branch controller system
  - optimises propagation delay
  - integrates standard Ethernet segments



1 Gbit/s  
Ether**CAT**<sup>®</sup> G

Optional machine modules can still be plugged and unplugged via the Hot Connect feature. Network-wide diagnostics are available to help minimise machine downtime and increase availability. The built-in system of distributed clocks also continues to ensure that devices are synchronised precisely in better than 100 ns.

#### The gigabit fieldbus

- on-the-fly processing scalable to 100 Mbit/s and 1 Gbit/s
- branch controllers for integrating EtherCAT and EtherCAT G
- easy to configure
- end-to-end diagnostics

► [www.beckhoff.com/EtherCATG](http://www.beckhoff.com/EtherCATG)

## New generation of energy and power measurement terminals

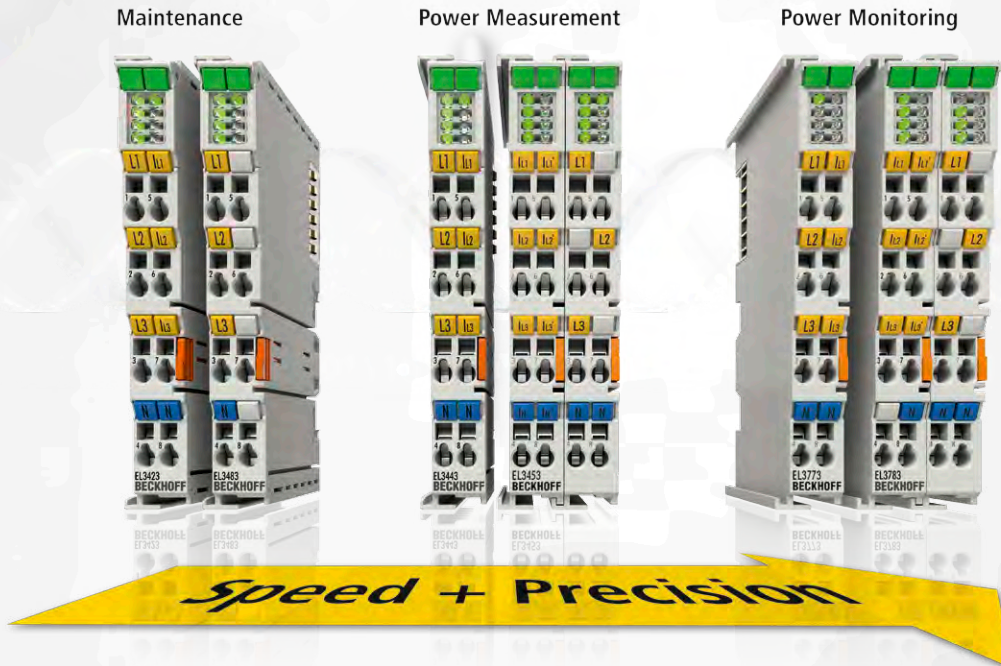
The four new EtherCAT Terminals for monitoring the supply network offer:

- Voltage measurement through direct connection of the three phases and N
- Simple pre-evaluation of the measured data
- Internally calculated factor for simple power quality analysis

► [www.beckhoff.com/EL34x3](http://www.beckhoff.com/EL34x3)

The new generation of EL34x3 sets different priorities:

- High-feature version EL3443 | three-phase power measurement terminal with comprehensive evaluations
- Economy version EL3423 | basic energy measurement, also in DC networks for IoT and energy management projects, for example
- Mains monitoring version EL3483 | threshold value monitoring for voltage, frequency and phase with output of warning and status bits
- EL3453, successor to EL3413 | 3-phase power measurement up to 690 V AC with extended functionality



## News | I/O

### Signal diversity for IP 67 applications

The 8-channel EP4378-1022 analog combi box makes it easy to connect diverse components directly in the IP 67 world. The combi box module features broad signal diversity by combining an analog input with an analog output and a digital universal input/output (DIO) in each M12 connector. In this way, field devices with different signals, such as frequency converters or 24 V DC motors can be cost-effectively connected using a single cable. Four additional DIOs for devices such as limit switches similar complete the signal range.

► [www.beckhoff.com/EP4378-1022](http://www.beckhoff.com/EP4378-1022)





### Stainless steel linear actuator with integrated power electronics

The linear actuator in stainless steel extends the linear actuator product family by a version in hygienic design. The stainless steel housing and the corner/edge-free design make the AA1821 ideal for use in the food, pharmaceutical and chemical industries. With a protection rating of IP 69K the linear actuator is ideally equipped to withstand adverse and aggressive environmental conditions.

► [www.beckhoff.com/AA1821](http://www.beckhoff.com/AA1821)



## News | Compact Drive Technology



### Stepper motor I/Os extend compact Drive Technology

The new stepper motor I/Os are intended for stepper motors in the medium performance range:

- EL7047-9014 EtherCAT Terminal
- EP7047-9034 EtherCAT Box
- EJ7041-0052 EtherCAT plug-in module

The PWM output stages cover a wide range of voltages and currents. Together with two inputs for limit switches, they are integrated in the I/Os. The I/Os can be adjusted to the individual motor and application by changing just a few parameters.

The EL7047-9014 and EP7047-9034 enable the implementation of an STO (Safe Torque Off) safety function corresponding to a Cat. 3 PL d safety level according to DIN EN ISO 13849-1:2015.

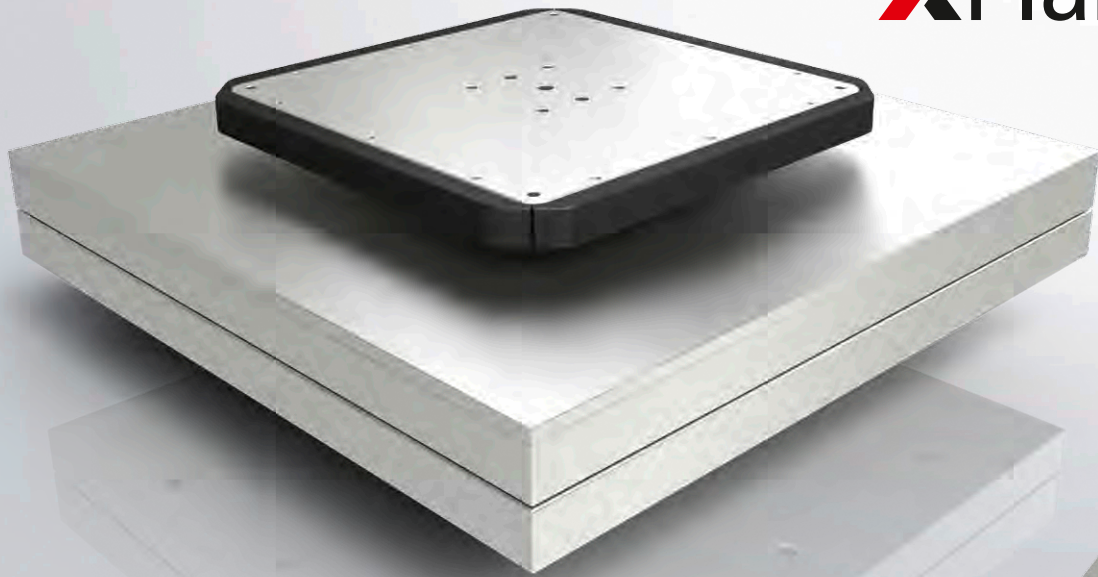
- [www.beckhoff.com/EL7047-9014](http://www.beckhoff.com/EL7047-9014)
- [www.beckhoff.com/EP7047-9034](http://www.beckhoff.com/EP7047-9034)
- [www.beckhoff.com/EJ7041-0052](http://www.beckhoff.com/EJ7041-0052)





# Less components, more functions: XPlanar

**XPlanar**



## News | Motion

**i** As an automation and motion specialist, Beckhoff is setting new benchmarks in drive technology with the eXtended planar motor system. Free-floating planar movers move jerk-free and contact-free at up to 4 m/s over planar modules that can be arranged in any desired layout. The movers are kept at a defined distance by electromagnetic forces. Travelling magnetic fields generated in the planar modules provide for a precise and highly dynamic positioning of the movers. The result: maximum possible flexibility in layout and architecture, maximum positioning flexibility and optimal simplification of machines and plants.

The planar mover fully deserves the title “allrounder” and opens up new degrees of flexibility:

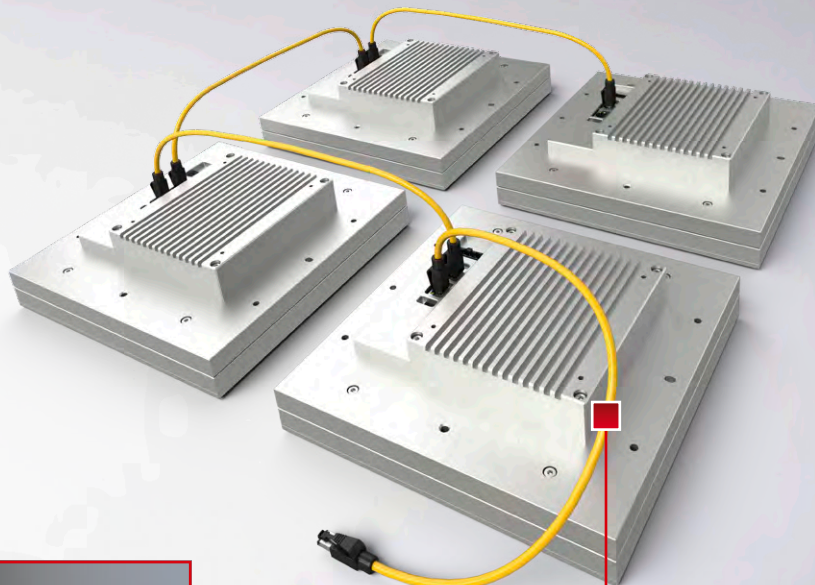
- carries loads of up to 6 kg – even more in a group
- tilting by 5° for transporting and handling liquids
- special planar modules for rotating movers by 360° – increased flexibility
- lifting, lowering, weighing: variable in height by up to 5 mm
- wall and ceiling travel: vertical and upside down

► [www.beckhoff.com/xplanar](http://www.beckhoff.com/xplanar)



**The planar principle:**

A planar mover incorporating permanent magnets levitates above planar modules that generate a magnetic field and detect the mover position.



**The fieldbus EtherCAT:**  
high performance





# Track Management – functional extension of the TC3 XTS Extension

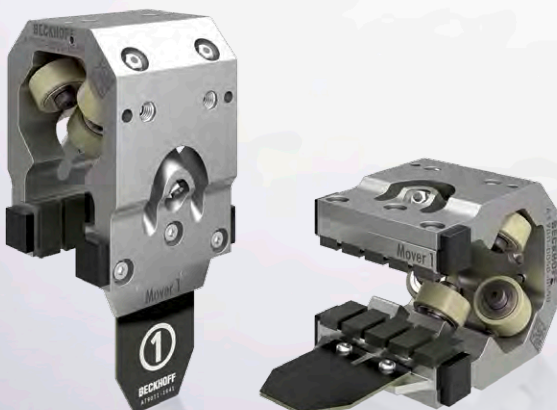


The Track Management extended software function of the TC3 XTS Extension enables the combination of a virtually unlimited number of XTS tracks of different lengths. Motor modules can be moved between XTS tracks via customer-specific mechanical constructions. In addition, movers can switch between XTS tracks during operation.

► [www.beckhoff.com/TF5850](http://www.beckhoff.com/TF5850)



## News | Motion



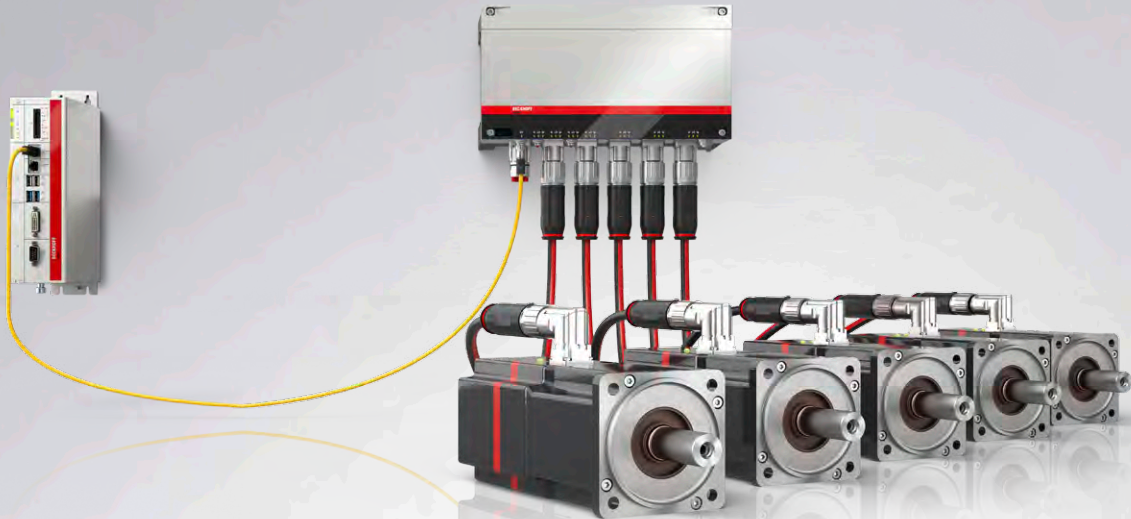
### Mover 1 – fixed assignment of mover to servo axis

A fixed assignment of the mover to the software axis is possible with a new mover type and the latest TC3 XTS Extension. This mover, called mover 1, is always recognised as servo axis 1 and used as the first servo axis after start-up. All following movers (standard movers) are counted upwards. This results in a fixed assignment between axis numbers and movers, which is even retained after the system has been switched off. No other functions of the XTS are changed or impaired.

► [www.beckhoff.com/AT9011](http://www.beckhoff.com/AT9011)







# Supply module for AMP8000 enables Drive Technology without control cabinets

**i** The AMP8620 module is directly connected to the mains supply, which minimises the footprint and the cabling effort for the entire machine. It contains all required circuitry components, such as mains filters, rectifiers and charging circuits for the integrated DC-Link capacitors. Further distribution modules or decentralised AMP8000 Servo Drives can optionally be connected to the supply module. It has two EtherCAT P outputs, through which either EtherCAT P modules can be supplied or else additional supply modules can be connected that may be required for system expansion. The safe 24 V power supply unit integrated in the power supply module ensures that the logic

power supply does not exceed the permissible level. The DC-Link capacitors integrated in the supply module store the regenerative energy of the entire system and then make it available again for acceleration processes. This ensures the best-possible utilisation of the energy supplied.

► [www.beckhoff.com/AMP8620](http://www.beckhoff.com/AMP8620)



# TwinCAT Vision: Machine vision integrated into automation technology.



## Vision Integrated

Detection Monitoring  
Measurement Identification  
Inspection

### Cloud connectivity

Because TwinCAT Vision is integrated into the TwinCAT control platform, it can connect directly to TwinCAT IoT and TwinCAT Analytics.



### Openness

TwinCAT Vision follows the Beckhoff philosophy of open control technology. It is hardware-neutral: TwinCAT Vision works both with line-scan and area-scan cameras with GigE Vision interface.

**GigE**  
VISION

Power  
Hardware  
Trigger



**EtherCAT**





### Integrated: an end-to-end vision solution for automation

With TwinCAT Vision, Beckhoff is incorporating comprehensive image processing capabilities into its control platform. TwinCAT now unites a full range of machine functionality – PLC, motion control, robotics, high-end measurement technology, IoT, HMI and machine vision – in an end-to-end engineering and control platform, eliminating the need for separate, often third-party, machine vision solutions. It also opens up vast innovation potential in mechanical engineering – for instance, through consistent real-time synchronisation with other automation tasks or support for track-and-trace solutions.

► [www.beckhoff.com/TwinCAT-Vision](http://www.beckhoff.com/TwinCAT-Vision)



### TwinCAT Analytics Workbench and Service Tool

With the two TwinCAT 3 Analytics Engineering products, TE3500 TwinCAT 3 Analytics Workbench and TE3520 TwinCAT 3 Analytics Service Tool, Beckhoff provides a basis for developing new data-based business models. Furthermore, this database helps with machine optimisation and simplifies machine service and support. Both tools are seamlessly integrated into Microsoft Visual Studio® in order to facilitate user familiarisation.

► [www.beckhoff.com/TE3500](http://www.beckhoff.com/TE3500)

► [www.beckhoff.com/TE3520](http://www.beckhoff.com/TE3520)



## News | TwinCAT



### In real time

Integrating the PLC, motion control, robotics, high-end measurement technology and machine vision capabilities on a single platform enables superior real-time application performance and significant gains in machine efficiency.



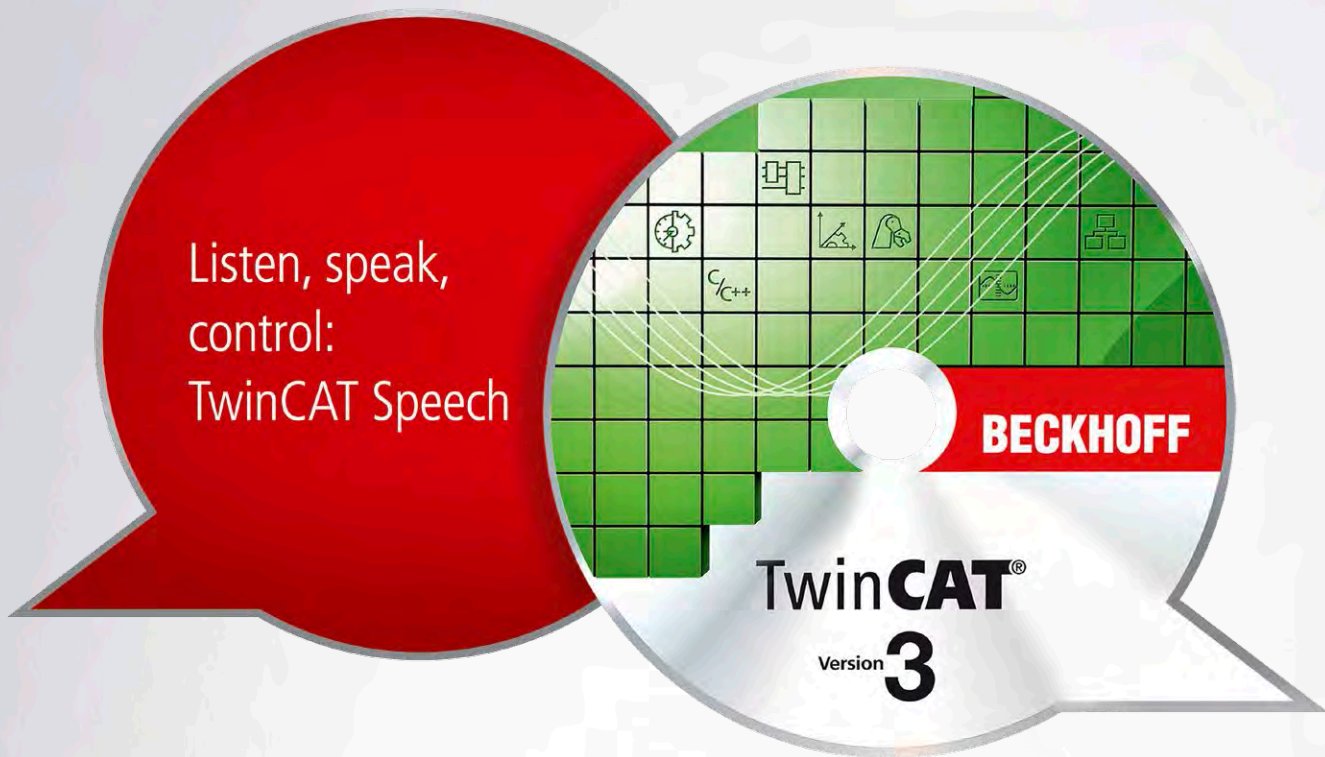
### TwinCAT 3 Target for MATLAB®

The TwinCAT MATLAB® Target offers System Target Files for the use of the MATLAB® coder. It enables the generation of TwinCAT 3 runtime modules, which can be instantiated and parameterised in the TwinCAT 3 engineering environment.

► [www.beckhoff.com/TE1401](http://www.beckhoff.com/TE1401)







## News | TwinCAT

# Speech-based input and output for control systems

**i** With TwinCAT, the automation system operates as smoothly and efficiently as the human body. The Industrial PC with TwinCAT Runtime provides the intellectual capacity, TwinCAT Motion Control ensures precise and dynamic movements, the most varied interfaces for sensors and bus systems supply information, and TwinCAT Vision added vision capabilities as a fully integrated component. With the new TwinCAT Speech software module, listening and speaking functions now complete the analogy with the capabilities of humans. The convenient speech-based input and output supports operation and maintenance personnel eliminating the need to access conventional control terminals.

- communication via the standard audio output of the PC-based control system (sound card with speakers, headset, etc.)
- ability to speak and understand a wide range of national languages (26 languages supported)
- different male and female voices selectable
- available online and offline (online: optionally with Amazon Polly; offline: Windows)
- optional caching of online-generated audio files

► [www.beckhoff.com/TwinCAT-Speech](http://www.beckhoff.com/TwinCAT-Speech)

# Modularity and scalability on all levels

**i** With the new generation of safety controllers based on the EL6910, Beckhoff ushers in a new era in safety technology by further expanding the concept of modularity within the TwinSAFE system. Apart from adding functionalities for the highly granular and flexible modularisation of each safety project in order to optimally meet the respective safety requirements, Beckhoff enables all new safe I/O modules to directly execute customer-specific safety projects, including communication with multiple devices. Since the intelligence of the entire safety application can be distributed over the involved safety-relevant devices, the user can adapt the TwinSAFE system even more specifically to the needs of each machine concept.

- EP1918-0002: EtherCAT Box, 8-channel digital input, TwinSAFE Logic, 24 V DC
- EL2912: EtherCAT Terminal, 2-channel digital output, TwinSAFE Logic, 24 V DC, 2,3 A
- EL1957: EtherCAT Terminal, 8-channel digital input, 4-channel digital output, TwinSAFE Logic, 24 V DC, 0,5 A

► [www.beckhoff.com/EL1957](http://www.beckhoff.com/EL1957)

► [www.beckhoff.com/EL2912](http://www.beckhoff.com/EL2912)

► [www.beckhoff.com/EL1918-0002](http://www.beckhoff.com/EL1918-0002)

## News | TwinSAFE



All Information:

► [www.beckhoff.com](http://www.beckhoff.com)

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