

BECKHOFF New Automation Technology

News

05'2017



Many-core Embedded PCs



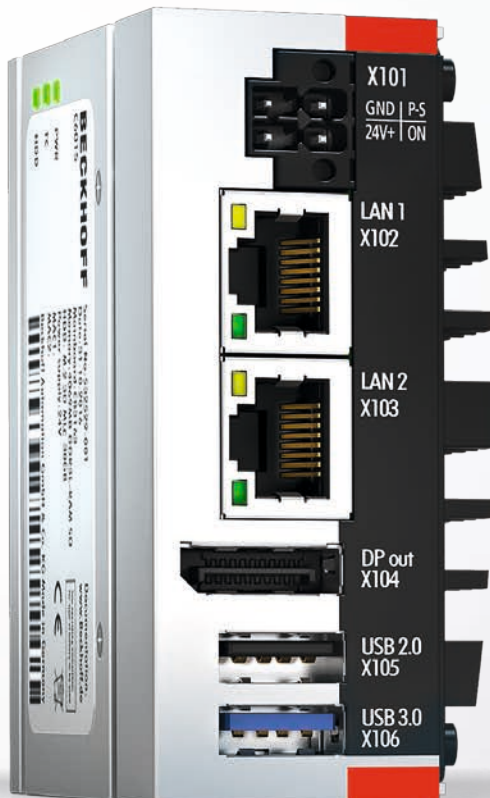
High-end measurement modules



Process industry I/Os



XTS in Hygienic Design



Ultra compact IPC C6015:
extreme space-savings and flexibility

Ultra compact IPC C6015: extreme space-savings and flexibility

i With the C6015 ultra compact IPC Beckhoff is extending its existing range of entry-level products by the currently most compact Industrial PC. Besides an excellent price-performance ratio, the IPC offers all common industry standard features such as a high temperature range, EtherCAT compatibility and high resistance to vibration and shocks. Equipped with an integrated Intel® Atom™ CPU with up to four cores, it provides high performance reserves. Only processors from the Embedded line with long-term availability are used in the C6015 series, ensuring a future-proof investment for the user. Both the new module motherboard and the combined die-cast zinc and aluminium housing have been newly developed to ensure the high quality Beckhoff is well-known for, such as industrial compatibility, reliability and products made in Germany. With universal multi-core support, the C6015 can be used simultaneously for high-performance automation, visualisation and communication applications. Its flexible installation options with virtually free orientation of the PC allow various installation scenarios, even in the tightest of spaces. Despite passive cooling, the C6015 is suitable for a temperature range up to +55 °C. Moreover, with a mounting space of just 82 x 82 x 40 mm, it is only one third the size of the previously smallest C6905 IPC series.

► www.beckhoff.com/C6015

News | Industrial PC

i **C5240 | 19-inch slide-in Industrial PC**
The C5240 Industrial PC expands the C52xx Industrial PC series by a variant with four height units and a large number of PCI and PCIe plug-in card slots in 24 V DC or 100 to 240 V AC versions. It is designed for installation in a 19-inch rack and is equipped with components of the highest performance class according to the ATX standard. A Beckhoff Industrial Motherboard is used with Intel® Celeron®, Pentium®, Core™ i3, i5 or i7 processors of the fourth, sixth and seventh generation.

► www.beckhoff.com/C5240

CP6906-0001-0000 | "Economy" built-in Control Panel

The CP6906 "Economy" Control Panel expands the IPC entry-level class by a built-in Control Panel with DVI/USB extended interface. The panel is designed for installation in the front of a control cabinet and has a 7-inch touch screen display. Ideally combined with the compact Embedded PCs from the CX series or the C6xxx Industrial PCs, this results in an inexpensive PC/panel system. The CP6906 is supplied with 24 V power supply. The integrated DVI/USB Extended technology enables remote panel operation at a distance of up to 50 m from the PC.

► www.beckhoff.com/CP6906





6th and 7th-Generation Intel® Core™ i3, i5 and i7 fast processors

The latest Intel® Celeron®, Pentium® and Core™ i3, i5, i7 processors of the 6th and 7th generation are available for Industrial PCs with a 3½-inch motherboard and also for all ATX Industrial PCs. An Intel® Celeron® processor is used in the basic PC configuration, while Intel® Pentium®, Core™ i3, i5 and i7 processors are available as options.

The seventh generation requires a Windows 10 64-bit operating system. With the sixth generation, the use of Windows 7 32-bit or 64-bit operating systems is possible besides Windows 10. Beckhoff exclusively uses processors from the Embedded line providing long-term availability and is introducing them in all Industrial PC series.

► www.beckhoff.com/IPC



Performance leap for Embedded PCs – 12 cores on the DIN rail



News | Embedded PC



Interface option PROFINET IRT device available with TwinCAT 3

In conjunction with TwinCAT 3, the PROFINET IRT interface (CXxxxx-B931) for the CX5100 and CX2000 series enables connection to a PROFINET IRT network. Embedded PCs with a B931 interface can be used as IRT/RT devices, and they are operated in IRT networks with up to 250 μ s and in RT networks with up to 1 ms.

► www.beckhoff.com/embedded-pc



i Providing many-core performance on the DIN rail, the new Embedded PCs from the CX2000 series make very powerful industrial control systems possible. The CX2042 has an Intel® Xeon® CPU with a clock rate of 1.3 GHz (four cores), the CX2062 an Intel® Xeon® CPU with a clock rate of 1.6 GHz (eight cores) and the CX2072 an Intel® Xeon® CPU with a clock rate of 1.5 GHz (12 cores). A fan with ball bearings and speed monitoring is integrated into all basic CPU modules. In addition to the CPU, the basic modules also contain the main memory with a size of 8 GB RAM, optionally available with up to 32 GB. The controller boots from a CFast flash memory card where both the operating system as well as user programs and data are stored.

The CPU has an internal 128 kB NOVRAM, which acts as a persistent data memory if no UPS is used. Microsoft Windows 10 IoT Enterprise LTSC 64 bit is used as operating system. The use of TwinCAT 3 allows automation tasks to be distributed across the various cores of the Intel® Xeon® CPU. All system modules from the CX2000 series for left- or right-sided functional extensions can also be connected to the new Embedded PCs. Internally the modules are connected via PCI Express and can be plugged to the CPU in the field. The power supply for the CPU module comes from a CX2100-0014 or CX2100-0914 power supply module. Up to two mass storage modules (either CX2550-0010 CFast modules or CX2550-0020 2½-inch SSD modules) can be plugged in between the power supply unit and the CPU, allowing the use of up to three mass storage devices in total.

► www.beckhoff.com/CX2000

Automation and process technology in one system

i Exceptionally compact with intrinsically safe I/O: EtherCAT Terminals for explosion protection.

With the ELX terminals, Beckhoff combines highly compact remote I/O modules with safety barriers for the direct connection of intrinsically safe field devices such as sensors and actuators. The high resolution and accuracy of the ELX terminals guarantee the same measurement accuracy already familiar through the EtherCAT components for non-hazardous areas from Beckhoff. The compact design of the I/O terminals provides a further advantage: there are up to four intrinsically safe inputs available in a 12 mm wide housing and up to eight in the 24 mm housing type. Eliminating the need for external barriers leads to significant space reductions inside control cabinets, and helps achieve significant cost savings at the same time. With ATEX and IECEx certification, the ELX terminals

comply with all industry-specific guidelines for explosion protection and can be used in nearly all markets worldwide, which reduces the user's dependence on different suppliers for different regions. The wide range of uses is also supported by the enormous variety of signals handled by the spectrum of Beckhoff I/O solutions: a suitable I/O module is available for every application. Using the ELX terminals, process technology users can implement extremely compact, cost-effective control system architectures and leverage the outstanding diagnostics functionality found in EtherCAT to help minimise system downtime.

► www.beckhoff.com/ex

EtherCAT®

Zone 2

News | Process industries



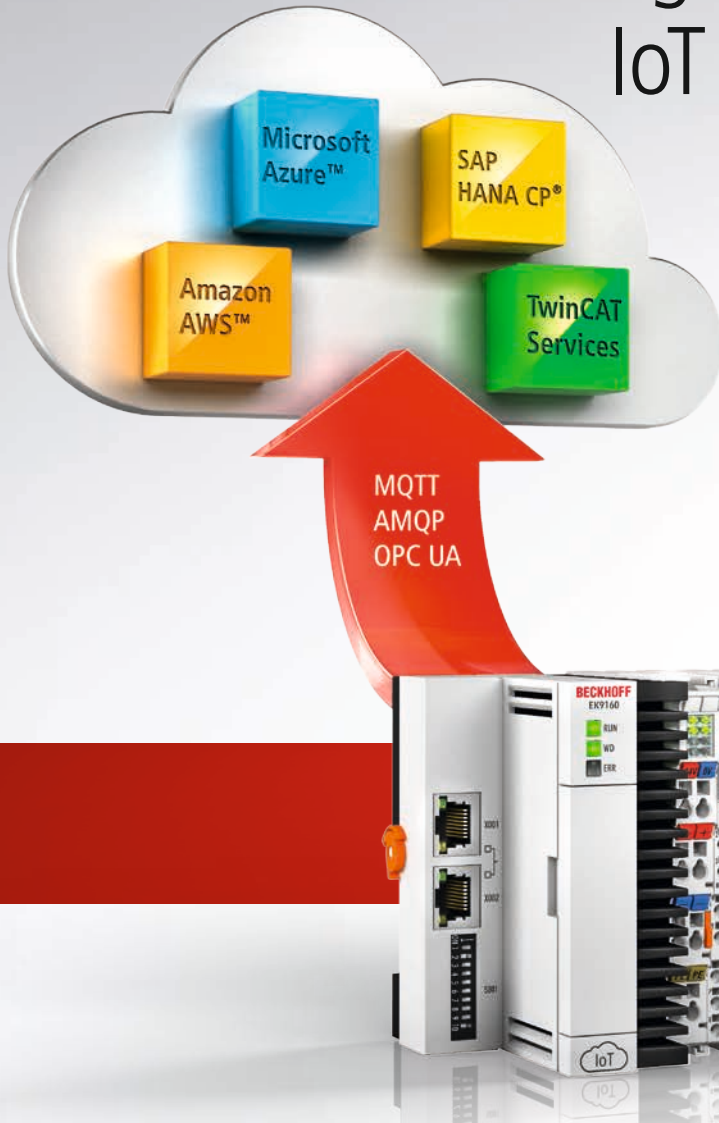
i Explosion-proof panel solution: the elegant CPX series with aluminium enclosures.



With the CPX Panel series models, the proven multi-touch technology of Beckhoff Control Panels and Panel PCs is available in even more robust versions, complying with the requirements for use in hazardous areas classified Zone 2/22. The high level of functionality and excellent build quality ensure the durability of CPX panels even under harsh environmental conditions. The capacitive touch technology provides the typical convenient operation found on all Beckhoff multi-touch panels. The aesthetically pleasing appearance of the Beckhoff panels, and the look and feel of the aluminium housing are maintained, making them visual highlights in explosion-proof environments. The comprehensive CPX panel range includes a large selection of display formats, sizes, installation options and features. Depending on the area of application, both the panels for control cabinet installation and stand-alone panels for flexible installation nearly anywhere in a room are available in the CPX29xx and CPX39xx series. Moreover, the fanless Panel PCs from the CPX27xx and CPX37xx series can be used for highly reliable system control.

► www.beckhoff.com/ex

"Plug-and-Cloud" with the IoT Bus Coupler EK9160



The EK9160 Coupler provides direct connectivity for EtherCAT I/Os to the Internet of Things (IoT) without the need for a control program. It converts the E-bus signal representation to different IoT communication protocols and enables in this way the simple and standardised integration of I/O data into cloud-based communication and data services. Neither a controller nor prior programming is necessary. The I/O data transmission can be parameterised in a user-friendly configuration dialog of the integrated web server providing access via any browser. The required cloud services and security functions (authentication, encryption, etc.) can also be conveniently configured using a browser. Following parameterisation, the coupler autonomously transmits the digital or analog I/O values to the cloud service, including timestamp. To safeguard against data loss in the event of network failures, a local buffer is available for the transmitted I/O data.

► www.beckhoff.com/EK9160



i EL5042 | 2-channel BiSS-C interface

The 2-channel BiSS-C interface for direct connection of BiSS-C encoders is suitable for exact and fast positioning applications – with distributed clocks ensuring high synchronicity with other processes. Via unidirectional BiSS-C communication, the EL5042 sends as a master the clock signal for position detection to the BiSS-C slave (encoder), which returns the position data with up to 64-bit resolution. The EL5042 can be optimally adapted to different encoder types by selecting appropriate operation modes, transmission frequencies and frame widths.

► www.beckhoff.com/EL5042



i EJ6224 | IO-Link master

The EJ6224 IO-Link master, provided in the highly compact format of an EtherCAT plug-in module for an optimised machine footprint, enables the connection of up to four IO-Link devices. The point-to-point connection between master and devices can be parameterised via the EtherCAT master. The convenient IO-Link commissioning tool offers useful features such as automatic scanning of IO-Link devices, comfortable editing of sensor parameters and an integrated online search for sensor description files (IODD).

► www.beckhoff.com/EJ6224



EL3783 | Power monitoring oversampling terminal 690 V AC

The EtherCAT Terminal is used for state monitoring of a 3-phase AC voltage system. For each phase, voltage up to 400/690 V_{rms} and current up to 1/5 A_{rms} are sampled as instantaneous values with a resolution of 16 bits. The six channels are measured simultaneously based on the EtherCAT oversampling principle with a temporal resolution of up to 50 µs and then passed on to the control system. The control system has sufficient computing power for true RMS or performance calculations and complex custom algorithms based on the measured voltages and currents. Through the feature "ExtendedRange", the user has the full technical measuring range available at up to 130 % of the specified nominal measuring range.

► www.beckhoff.com/EL3783



i TF3650 | TC3 Power Monitoring

The new PLC library evaluates raw current and voltage data, which are usually supplied by EL3773 and EL3783 EtherCAT Terminals. Function blocks are available for the calculation of RMS values for current, voltage and power. These can be output as momentary or average values. Maximum and minimum values are also available on the function block. Frequency and frequency spectra can be determined, such as e.g. harmonics in the network and their load in the form of the Total Harmonic Distortion (THD).

► www.beckhoff.com/TF3650



News | I/O

i EPP6228-0022 | IO-Link master

The EPP6228 IO-Link master module enables connection of up to eight IO-Link devices, e.g. IO-Link box modules, actuators, sensors or combinations thereof. The EtherCAT P Box is parameterised via the EtherCAT master. Integration with EtherCAT P provides the benefit that in addition to communication, the box module also supplies connected devices with power via a single cable. IO-Link is designed as an intelligent link between the fieldbus level and the sensor, wherein parameterisation information can be exchanged bidirectionally via the IO-Link connection.

► www.beckhoff.com/EPP6228



i EP922x-00x7 | B17-ENP power distribution modules for longer distances and increased power

The two infrastructure box modules EP9221-0057 (1-channel) and EP9224-0037 (4-channel) can be used to distribute EtherCAT communication in combination with two times 24-V voltage supply including protective conductor to the connected devices via B17-ENP connectors. These modules can be used to bridge longer distances and to provide increased power output respectively. The new power distribution modules demonstrate the systematic development of the One Cable Automation (OCA) philosophy in line with the growing variety of devices and components based on EtherCAT P, ECP and ENP, which extend the application possibilities of OCA.

► www.beckhoff.com/EP9221-0057

► www.beckhoff.com/EP9224-0037



EtherCAT measurement modules – extremely accurate, fast and robust.

i With the new device series for high-end measurement technology, ultra precise, fast and robust measurement modules will become an even more integrated part of PC-based control solutions. The new EtherCAT measurement modules can be directly integrated into the modular EtherCAT communication system and combined with the extensive portfolio of more than 500 other EtherCAT Terminals. New metal housings optimise shielding and cooling in measurement technology applications. At the same time, the durable housings provide enhanced flexibility at the interface level, such as for LEMO or BNC plug connectors or for push-in as a quickly customisable standard solution. Measurement accuracy of 100 ppm at 23 °C, precise synchronisation of < 1 µs, and the high sampling rate of up to 50,000 samples per second guarantee high-quality data acquisition.

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
- flexible connector front-end: LEMO, BNC, push-in
- pretreated in the factory for high-quality measurement results
- integrated connection and functional diagnostics
- optional factory calibration certificate

► www.beckhoff.com/measurement-modules



News | High-end measurement technology

EtherCAT measurement modules



- ELM3704, ELM3702
Multi-functional input
- ELM3004, ELM3002
Voltage measurement
- ELM3104, ELM3102
Current measurement
- ELM3504, ELM3502
Measuring bridge analysis
- ELM3604, ELM3602
IEPE analysis

Fast:

Basic models feature up to 50,000 samples/s with 24-bit resolution

Precise timing:

Exact synchronisation in $< 1 \mu\text{s}$ with EtherCAT distributed clocks (both internally and externally with superordinate clocks)

Precise values:

Measurement accuracy of 100 ppm and better with high temperature stability (depending on measurement range)

Proactive:

Integrated connectivity and functional diagnostics ensure long-term operating reliability



EL3751 | 1-channel multi-functional input for measurement technology, 24 bit, 10 ksp/s

The EL3751 analog input terminal is part of the new generation of analog EtherCAT measurement terminals. The nominal measuring range of the input channel can be comprehensively parameterised, both electrically and on the software side. Input circuitry see:

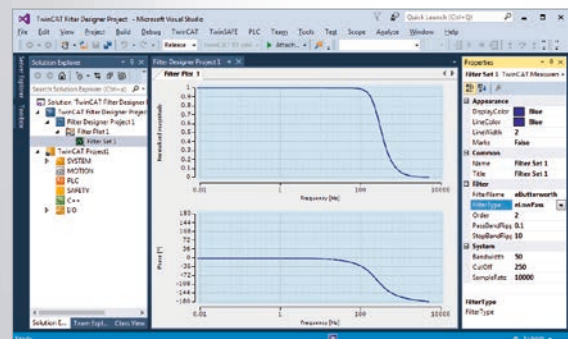
► www.beckhoff.com/EL3751



TE1310 | TC3 Filter Designer

The TC3 Filter Designer is a graphic engineering tool for determining coefficient digital filters. In Microsoft Visual Studio® it integrates seamlessly with the existing TwinCAT engineering environment. Selectable filter designs are Butterworth, Chebyshev und Inverse-Chebyshev, while the possible filter types are lowpass, highpass, bandpass and bandstop. The filter coefficients can be modified graphically or by means of a tabular specification.

► www.beckhoff.com/TE1310



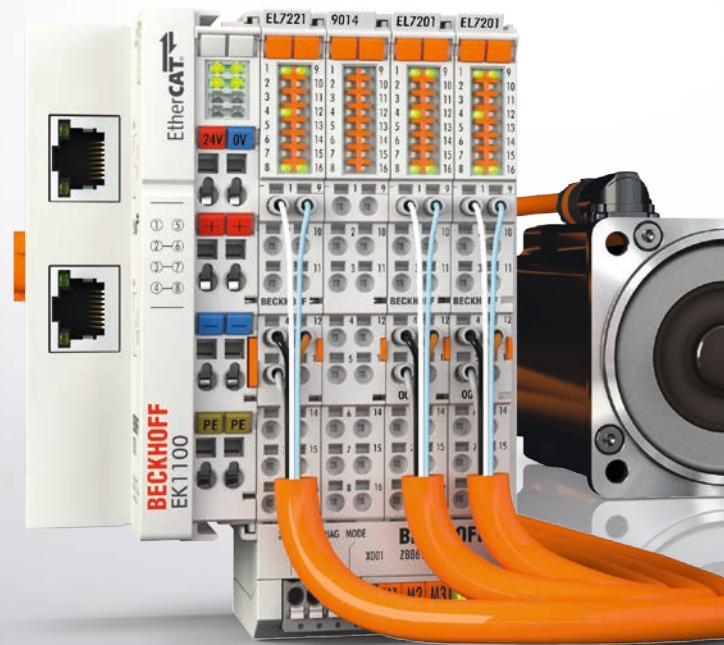
Servo terminal with OCT and STO for moto

i The EL7221-9014 servomotor EtherCAT Terminal with integrated One Cable Technology (OCT) offers powerful servo performance in a very compact design for motors from the AM8100 series up to 8 A (I_{rms}). The integrated electronic type plate of the AM81xx motors can be read in by the servo terminal to configure the motor parameters automatically. Thus, commissioning of the motors as well as cabling are minimised. The specified output power is attained in operation with the ZB8610 fan cartridge. The EL7221-9014 enables the user to implement the safety function STO (Safe Torque Off) that corresponds to a Cat 3, PL d safety level according to DIN EN ISO 13849-1:2015.

► www.beckhoff.com/EL7221-9014

i Exactly suited to the EL7221-9014, the powerful AM8131, AM8132 and AM8141 servomotors achieve an output of 400 W with the usual high dynamics. The AM8100 servomotor series with increased performance are pushing the field of use of 50 V DC motors closer to the range of applications of high-voltage servo technology, further enhancing the scalability of compact servo drive technology from Beckhoff.

► www.beckhoff.com/AM8100



News | Motion

AM8074 | New motor length for more performance

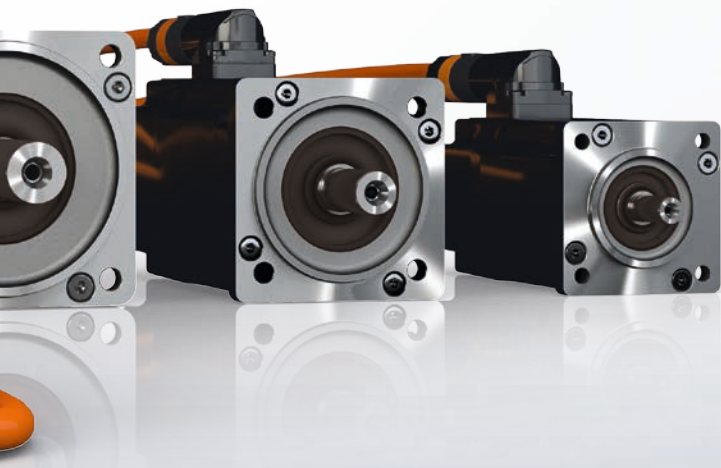
The highly dynamic AM8000 servomotors are characterised by high energy efficiency and low costs. The motor series offers overlapping torque ranges across all flange codes, allowing the best suited combination of servo drive and motor to be selected for every application. The flange code F7 (AM807x) is supplemented by a further motor length: The new types with standstill torques of 92 Nm and 129 Nm (variant with external ventilation) cover the rated torque range from 19.1 to 93 Nm and complete the AM807x size for optimally coordinated, powerful drive solutions. As usual, there is a choice of a low-speed or high-speed winding in addition to the standard windings. Based on the drive axis requirements, the AX5000 servo drive can be selected according to the standstill current, which, for example with the low-speed winding, enables considerable cost savings. The high-speed winding can be used in applications with fast acceleration and/or high rated speed requirements. If necessary, the power density of the motors can be further increased with external axial ventilation.

Due to the high currents, not all coil types are available with One Cable Technology (OCT) via M40 speedtec® plug. For connection a terminal box is used if the current exceeds 40 A. The known options feather key or sealing ring are available for selection. Ready-made connecting cables and specially tailored planetary gears round off the range.

► www.beckhoff.com/AM8074



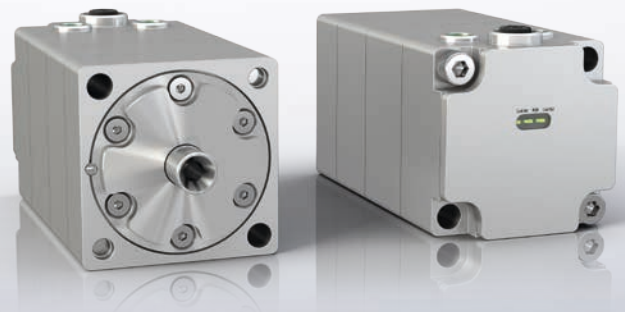
rs up to 8 A



i AA1121 | Linear actuator with integrated power electronics

The linear actuator sets new standards for the electronic control of valves and linear adjusting units. With a lifting height of 10 mm and a peak force of 800 N, new standards are achieved with regard to the power density of linear actuators. The complete adjusting axis is defined with a size of only 49 x 49 x 92 mm (flange square x overall length). The linear actuator is equipped with integrated power electronics that is controlled simply and extremely fast via EtherCAT. A continuous force of 150 N can be generated with the actuator. Accelerations of 7 m/s² and linear speeds of 100 mm/s allow exceptionally short control cycles.

► www.beckhoff.com/AA1121



i Servomotor EtherCAT Box with OCT and STO for motors up to 4.5 A

With integrated One Cable Technology (OCT), the EP7211-9033 servomotor EtherCAT Box provides high servo performance in a compact form factor directly in the field. Designed for AM8100 series motors with up to 4.5 A (*I_{rms}*), the EtherCAT Box is ideal to implement fast and highly dynamic positioning tasks in IP 67 environments, and in addition it ensures reliable operation with numerous monitoring functions. With digital inputs for end position monitoring and Safe Torque Off (STO), the EP7211-9033 enables the user to implement STO safety functions corresponding to a Cat 3, PL d safety level according to EN ISO 13849-1:2015. When used in combination with the enhanced-performance types of the AM8100 servomotor series, the servomotor EtherCAT Box optimises the low voltage portfolio of the Compact Drive Technology.

► www.beckhoff.com/EP7211-9033



XTS Hygienic: highly flexible and optimised cleaning

i XTS Hygienic, the stainless steel version of the eXtended Transport System from Beckhoff, opens up a wide spectrum of new applications, first and foremost in the primary food and pharmaceutical industries and for processing and filling liquids in general. With the high protection rating of IP 69K, very good chemical resistance and without any hidden corners, edges or undercuts, the version in hygienic design offers a lot of potential for innovation in these

industries: the advantages of the standard system as a highly flexible motion solution are combined with ease of cleaning, thus enabling process optimisations and maximum production line availability even when the demands made on hygiene are high. Few mechanical adjustments and full software compatibility make it possible to use the XTS to the optimum, depending on the type of application, and to switch between the XTS standard version and the XTS Hygienic.

Motion



Developed in close co-operation with the EHEDG

The XTS Hygienic was developed in close co-operation with the European Hygienic Engineering & Design Group (EHEDG). As a result, it meets all the requirements for system certification according to EL Class I AUX. The most important properties of this stainless-steel version include the high IP 69K protection class, which guarantees the highest-possible degree of protection against ingress of dust and water. In addition, it exhibits very good chemical stability so that the surfaces are able to stand up to surfactants, acidic and alkaline cleaning agents, different alcohols and disinfectants and even hydrogen peroxide.

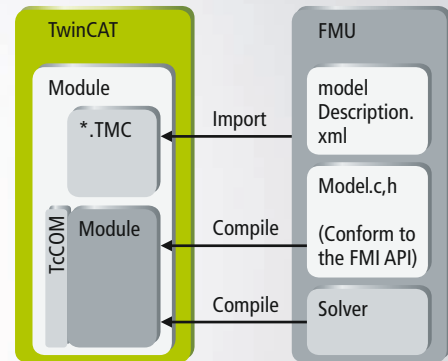
► www.beckhoff.com/ATH2000

New TwinCAT 3 Engineering tools

i TE1420 | TC3 Target for FMI

The TC3 Target for FMI provides an interface for simulation tools that support the Functional Mockup Interface (FMI). The interface enables the generation of TwinCAT 3 runtime modules, which can be instantiated and parameterised in the TwinCAT 3 engineering environment. Models exported with FMI 2.0 – both Model Exchange and Co-Simulation – are supported. There are already a number of solvers available in TwinCAT 3 for the calculation of models exported as Model Exchange.

► www.beckhoff.com/TE1420

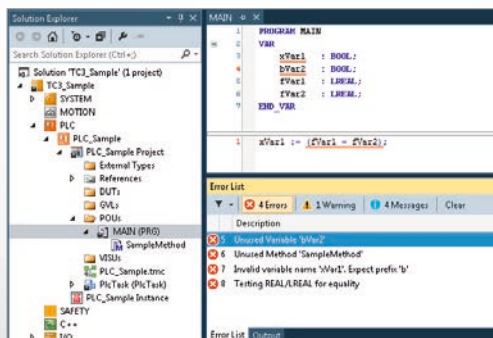


News | TwinCAT

i TE1200 | TC3 PLC Static Code Analysis

With the integration of the static code analysis, a further tool is available in TwinCAT 3.1 that supports the PLC software development process. The static code analysis is an analysis tool that tests PLC software on the basis of coding rules and identifies potential weak points of an implementation even during the development stage. The analysis extends from checking compliance with naming conventions through to examining the use of objects and operators. Easier readability and an improved program structure are achieved through the analysis. Furthermore, the user's attention is drawn to possibly unintentional and faulty implementations, so that these program points can be optimised at an early stage.

► www.beckhoff.com/TE1200



i TE1210 | TC3 PLC Profiler

Through dynamic measurement of the time response, it is possible with the help of the TC3 PLC Profiler to analyse the runtime behaviour of a PLC application and to identify time-consuming call-ups and program sections. Runtime difficulties can be revealed and software optimisation potentials identified on the basis of these results.

► www.beckhoff.com/TE1210

i TE35xx | TC3 Analytics Workbench

With the Analytics Workbench a system for online and offline analyses for one or more machines can be set up. The basic Analytics Workbench consists of the TwinCAT PLC runtime environment, the Analytics PLC library, the IoT communication environment for data streaming, the Analytics Configurator in Microsoft Visual Studio®, and a professional license for TwinCAT Scope Views.

► www.beckhoff.com/TE35xx

All information:

► **www.beckhoff.com**

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The certification procedure for the ELX and CPX series products was not completed at the time this flyer went to print.