Main Catalog 2020
Volume 1 | IPC, Motion, Automation
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New Automation Technology

Beckhoff implements open automation systems based on PC Control technology. The product range covers Industrial PCs, I/O and Fieldbus Components, Drive Technology and automation software. Products that can be used as separate components or integrated into a complete and seamless control system are available for all industries. The Beckhoff New Automation Technology philosophy represents universal and open control and automation solutions that are used worldwide in a wide variety of different applications, ranging from CNC-controlled machine tools to intelligent building automation.

The central divisions of Beckhoff, such as development, production, administration, distribution, marketing, support and service are located at the Beckhoff Automation GmbH & Co. KG headquarters in Verl, Germany. Rapidly growing presence in the international market is taking place through subsidiaries and branch offices. Through worldwide co-operation with partners, Beckhoff is represented in more than 75 countries.
Since the foundation of the company in 1980, continuous development of innovative products and solutions using PC-based control technology has been the basis for the continued success of Beckhoff. Many automation technology standards that are taken for granted today were conceptualised by Beckhoff at an early stage and successfully introduced to the market.

The Beckhoff PC Control philosophy and the invention of the Lightbus system, the Bus Terminals and TwinCAT automation software represent milestones in automation technology and have become accepted as high-performance alternatives to traditional control technology. EtherCAT, the real-time Ethernet solution, makes forward-looking, high-performance technology available for a new generation of leading edge control concepts.
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Milestones

1982  P1000 – single-board motion controller
1986  PC Control – first PC-based machine controller
1988  S1000 – software PLC/NC on PC (DOS)
1989  Lightbus – high-speed fieldbus utilising optical fibre
1990  All-in-one PC motherboard
1995  Bus Terminal – fieldbus technology in terminal block format
1996  TwinCAT – real-time software package under Windows with PLC and motion control functions
1998  Control Panel – remote IPC Control Panels
1999  Fieldbus Box – the I/O system in IP 67
2002  CX1000 – modular Embedded PCs for DIN rail mounting
2003  EtherCAT – real-time Ethernet fieldbus system
2005  TwinSAFE – the compact safety solution
2005  AX5000 – EtherCAT Servo Drives
2007  Industrial Motherboards – made in Germany
2008  XFC – x-treme Fast Control Technology
2009  HD Bus Terminals – 16-channel terminals in 12 mm
2010  TwinCAT 3 – eXtended Automation Technology
2011  AM8000 – Synchronous Servomotors with One Cable Technology
2012  2nd generation of Control Panels – Panel PCs and Control Panels with multi-touch technology
2012  XTS – eXtended Transport System
2014  AX8000 – multi-axis servo system
2014  EtherCAT Plug-in Modules – Bus Terminals for circuit boards
2015  EtherCAT P – One Cable Automation
2015  TwinCAT HMI – for platform-independent user interfaces
2015  TwinCAT IoT – for simple cloud communication
2015  TwinCAT Analytics – recording and analysis of process data
2016  EtherCAT measurement modules – system-integrated high-end measurement technology
2017  Process technology – system-integrated solutions for explosion protection requirement
2017  C60xx – the generation of ultra-compact IPCs
2017  AMP8000 – Distributed Servo Drive system
2017  TwinCAT Vision – machine vision integrated into automation technology
2018  Embedded PCs with ARM Cortex™-M7 processor
2018  EtherCAT G – Ultimate I/O Performance
2018  XPlanar – Flying Motion
2019  C70xx – multi-core Industrial PCs in IP 65/67
2019  TwinCAT Machine Learning – scalable, open and in real time
2019  TwinCAT Cloud Engineering – smart engineering directly in the cloud
Four components, one system

The IPC Company

Beckhoff supplies the right Industrial PC for every application. High-quality components based on open standards and the rugged construction of the device housings mean that the Industrial PCs are ideally equipped for all control requirements. Embedded PCs make modular IPC technology available in miniature format for DIN rail mounting. In addition to their application in automation, Beckhoff Industrial PCs are also ideally suited to other kinds of tasks – wherever reliable and robust PC technology is required.

The I/O Company

Beckhoff has the right technology for every signal and every fieldbus. Beckhoff supplies a complete range of Fieldbus Components for all common I/Os and fieldbus systems. With the Bus Terminals in protection class IP 20, and the Fieldbus Box modules in IP 67, a complete range is available for all important signal types and fieldbus systems. In addition to conventional bus systems, Beckhoff offers a complete EtherCAT I/O range for the high-speed Ethernet fieldbus based on EtherCAT Terminals, the EtherCAT Box and EtherCAT Plug-in Modules.
The Motion Company

In combination with the Motion Control solutions offered by the TwinCAT automation software, Beckhoff Drive Technology represents an advanced and complete drive system. PC-based control technology from Beckhoff is ideally suited for single and multiple axis positioning tasks with highly dynamic requirements. The AX5000 and AX8000 Servo Drive series with high-performance EtherCAT communication offer maximum performance and dynamics. Servomotors with One Cable Technology, which combines power and feedback system in a standard motor cable, reduce material and commissioning costs. The drive systems XTS (eXtended Transport System) and XPlanar replace classic mechanical systems by innovative mechatronics. They enable individual product transport applications with a continuous flow of material.

The Automation Company

Beckhoff offers comprehensive system solutions in different performance classes for all areas of automation. Beckhoff control technology is scalable – from high-performance Industrial PCs to mini PLCs – and can be adapted precisely to the respective application. TwinCAT automation software integrates real-time control with PLC, NC and CNC functions in a single package. All Beckhoff controllers are programmed using TwinCAT in accordance with the globally-recognised IEC 61131-3 programming standard. With TwinCAT 3, C/C++ and MATLAB®/Simulink® are available as programming languages in addition to IEC 61131-3.
The IPC Company

The Industrial PC (IPC) is the hardware centrepiece of PC-based control technology. Beckhoff supplies Industrial PCs suitable for any application, which are based on open standards, enabling individual configuration to meet a wide range of control requirements.

Whether in the form of an Embedded PC with a compact form-factor for DIN rail mounting, a control cabinet PC, or as a Panel PC, in-house motherboard development enables Beckhoff to respond quickly to IT trends and customer-specific requirements.

► www.beckhoff.com/IPC

**Multi-touch Panel PCs**
- large model variety
- high computing power
- display sizes from 7-inch to 24-inch
- easy installation in control cabinets or on mounting arms
- special versions for explosion protection
- customer-specific implementations

► www.beckhoff.com/multi-touch

**Multi-touch Control Panels**
- large model variety
- display sizes from 7-inch to 24-inch
- landscape and portrait orientation
- easy installation in control cabinets or on mounting arms
- special versions for explosion protection
- customer-specific implementations

► www.beckhoff.com/multi-touch

**Single-touch Panels**
- Control Panels or Panel PCs
- display sizes from 5.7-inch to 19-inch
- easy installation in control cabinets or on mounting arms
- customer-specific implementations

► www.beckhoff.com/single-touch
Control cabinet Industrial PCs  
- high computing power  
- industrial-strength housing designs  
- easy installation  
- high flexibility in terms of display connections

Embedded PCs  
- scalable performance range  
- up to 12 cores  
- compact design  
- direct I/O interface  
- modular extension options  
- DIN rail mounting

- large model variety of Industrial PCs and Embedded PCs  
- high-performance PCs, featuring a wide range of processors, from Intel® Celeron® to top of the line Core™ i7 processors  
- long-term availability of all Industrial PCs and Embedded PCs  
- As the inventor of PC-based control technology, Beckhoff closely cooperates with global technology partners Intel and Microsoft.

www.beckhoff.com/Control-cabinet-PC  
www.beckhoff.com/Embedded-PC
The I/O Company

EtherCAT Box
- IP 67 EtherCAT I/O system
- high performance for harsh environments
- compact and robust
- can be mounted directly on machines, outside of control cabinets and terminal boxes
- integrated sensor/actuator supply directly via EtherCAT P
  - www.beckhoff.com/EtherCAT-Box
  - www.beckhoff.com/EtherCAT-P-Box

EtherCAT Plug-in Modules
- very compact EtherCAT I/O system in IP 20 for plug-in into a circuit board (signal distribution board)
- optimised for high-volume production
- application-specific connector interface
- Use of cable harnesses avoids wiring errors.
  - www.beckhoff.com/EtherCAT-Plug-in-Modules

Bus Terminals
- open, fieldbus-neutral IP 20 I/O system
- more than 400 different Bus Terminals
- support for more than 20 fieldbus systems
- gateways for subordinate bus systems
- system-integrated safety I/O terminals available
  - www.beckhoff.com/BusTerminal
Beckhoff supplies a complete range of fieldbus components for all common I/O and bus systems. With Bus Terminals offering IP 20 protection and Fieldbus Box modules in IP 67, a comprehensive range of devices is available for a wide variety of signal types and fieldbus systems. In addition to components for conventional bus systems, Beckhoff offers an integrated product range optimised for EtherCAT. Invented by Beckhoff, this real-time Ethernet solution for industrial automation has global acceptance and is characterised by outstanding performance and simple handling. The result is high-precision machine and plant control and significantly increased production efficiency.

www.beckhoff.com/IO
www.beckhoff.com/EtherCAT

**EtherCAT Terminals**
- IP 20 EtherCAT I/O system
- real-time Ethernet performance retained into each terminal
- integration of highly precise measurement technology, condition monitoring, drive technology and process technology
- electronic overcurrent protection
- gateways for subordinate fieldbus systems
- TwinSAFE PLC and safety I/Os

www.beckhoff.com/EtherCAT-Terminal

**Fieldbus Box**
- open, fieldbus-neutral IP 67 I/O system
- 12 fieldbus systems, 24 signal types
- compact and robust
- can be mounted directly on machines, outside of control cabinets and terminal boxes while reducing machine footprint
- IO-Link box modules for inexpensive point-to-point connections

www.beckhoff.com/FieldbusBox

**Infrastructure Components**
- PC cards for all common fieldbus systems
- Industrial Ethernet switches
- EtherCAT junctions and media converters in IP 20 and IP 67 ratings

www.beckhoff.com/Infrastructure-components

- comprehensive, modular I/O system for all signal types and fieldbus systems
- universal product range optimised for EtherCAT
- high investment security: mature I/O technology based on more than 20 years of success in the field
- Beckhoff is the I/O pioneer, developing the Bus Terminal concept and EtherCAT.
In combination with the motion control solutions offered by the company’s TwinCAT automation software, Beckhoff Drive Technology provides an advanced, all-inclusive drive system. PC-based control technology from Beckhoff is ideally suited for single- and multi-axis positioning tasks with high dynamic requirements.

The AX5000 and AX8000 Servo Drive series with high-performance EtherCAT communication offer the best-possible performance and dynamics. Servomotors with One Cable Technology (OCT), combining power and feedback systems into one standard motor cable, reduce material and commissioning costs.

www.beckhoff.com/DriveTechnology

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**Servo Drives**
- available as multi-axis system or stand-alone version (1-/2-channel)
- high-speed EtherCAT communication
- wide range of nominal current types, up to 170 A
- flexible motor type selection
- optimised for multi-axis applications

www.beckhoff.com/Servo-Drives

**Distributed Servo Drive system**
- servo drives directly integrated into the motor
- STO/SS1 safety function as standard; optionally Safe Motion
- Advanced power electronics ensure minimal derating.
- no changes in machine design required

www.beckhoff.com/AMP8000

**Synchronous Servomotors**
- for demanding positioning tasks
- highly dynamic behaviour
- brushless three-phase motors
- permanent magnet in the rotor

www.beckhoff.com/Servomotors
Compact Drive Technology
- solutions for up to 8 A in the space-saving I/O system
- simple connection of stepper, servo, DC or AC motors
- IP 20 or IP 67 connection options
- matching motors and gearboxes

www.beckhoff.com/compact-drive-technology

eXtended Transport System XTS
- linear motor on an endless path
- replaces traditional mechanics with advanced mechatronic solutions
- software-based functional changes
- individual product transport with continuous material flow

www.beckhoff.com/XTS

eXtended planar motor system XPlanar
- free-floating movers for non-contact movement
- 6 degrees of freedom
- integrated position feedback
- highly flexible floor and track layout
- ideal for the food and pharma industry

www.beckhoff.com/XPlanar

- scalable product range of servo drive technology
- integrated safety technology in compliance with safety performance level PL e, integrated into compact Drive Technology up to safety performance level PL d
- As the pioneer of One Cable Technology and the eXtended Transport System, Beckhoff specialises in manufacturing efficient, space-saving motion solutions.
Beckhoff offers comprehensive system solutions in numerous performance classes for all areas of automation. The control technology is exceptionally scalable – from high-performance Industrial PCs to mini-PLCs – and can be adapted precisely to application-specific requirements. TwinCAT automation software integrates real-time control with PLC, NC and CNC functions in a single feature-filled package.

www.beckhoff.com/Automation

**Efficient engineering**
- integration into Microsoft Visual Studio®
- wide selection of programming languages: IEC 61131-3, C/C++, MATLAB®/Simulink®, Safety C/FBD
- modular software development
- automatic code generation interface
- link to source code control systems

**High performance**
- cycle times from 50 µs
- multi-core support
- support of 32-bit and 64-bit operating systems
- pre-emptive multitasking

**Connectivity**
- useable with all fieldbus systems
- open and expandable for IT trends – today and tomorrow
- adheres to industry-specific and standard protocols
- ideal for IoT and cloud computing applications

www.beckhoff.com/TwinCAT3
TwinCAT 3
- one software platform for engineering and runtime
- integrated real-time support
- software modules for PLC, NC, CNC, robotics, HMI, measurement technology, analytics, safety, machine vision, machine learning

TwinCAT 2
- open, compatible PC hardware
- embedded IEC 61131-3
- software PLC, software NC and software CNC
- connection to all common fieldbuses

TwinSAFE
- integrated safety system from I/Os to drives
- compact safety PLC
- certified for solutions up to IEC 61508 SIL 3 and DIN EN ISO 13849-1:2008 PL e
- safety engineering integrated into TwinCAT 3

- efficient, universal engineering
- programming in different languages
- Open, hardware-independent control system gives freedom of choice in terms of automation and control components.
- scalable control platform from single- to multi-core CPUs
- all control functions on a single, centralised platform: PLC, motion control, robotics, measurement technology, a.o.
System overview

**Automation**
- TwinCAT
  - TwinCAT Base
  - TwinCAT I/O
  - TwinCAT PLC
  - TwinCAT C/C++
  - TwinCAT Safety
  - TwinCAT HMI
  - TwinCAT Measurement
  - TwinCAT Control

**IPC**
- Industrial PC
  - Panel PC CP22xx
  - Panel PC CP26xx
  - Panel PC CP27xx
  - Panel PC CP32xx
  - Panel PC CP37xx
  - Panel PC CP62xx
  - Panel PC CP65xx
  - Panel PC CP66xx

**Embedded PC**
- Embedded PC CX70xx
- Embedded PC CX80xx
- Embedded PC CX81xx
- Embedded PC CX9020
- Embedded PC CX5120
- Embedded PC CX5130
- Embedded PC CX5140

**I/O**
- Infrastructure Components
  - PCIe Ethernet FC902x

- Bus Terminals
  - Bus Coupler BK1120 (K-bus interface), Bus Terminals KL/KSxxxx

- EtherCAT Terminals
  - Coupler EK1xxx, EtherCAT Terminals EU/EUxxxx/ELxxxx/ELMxxxx

- EtherCAT Plug-in Modules
  - EtherCAT Plug-in Modules EJxxxx

- EtherCAT Box
  - EtherCAT Box EPxxxx, EQxxxx, ERxxxx

- Fieldbus Box
  - EtherCAT P Box EPPxxxx

**Motion**
- Drive Technology
  - Multi-axis servo system AXIIxxxx
  - Servo Drives AXIxxxx
  - Distributed Servo Drive system AMPBxxxx
  - Synchronous Servomotors AMBxxxx

Detailed system and fieldbus information from page 230

BECKHOFF New Automation Technology
"C6640 muss 7% breiter und 15% höher dargestellt werden"

Achtung (Button NICHT löschen)

Embedded PC CX5230, CX5240

Embedded PC CX2020, CX2030, CX2040

Embedded PC CX2042, CX2062, CX2072

Compact Drive Technology

XTS | eXtended Transport System

XPlanar | eXtended planar motor system

Stainless steel servomotors AMB8xx

Linear Servomotors AXXSxx, AAxxSxx

Compact Drive Technology

XTS | eXtended Transport System

XPPlanar | eXtended planar motor system

BECKHOFF New Automation Technology
ACHTUNG ((Button NICHT löschen))
die Europakarte ist vom 13.11.2019 >>> wie die aus der Picture Library, nur GB ;-) und Zeichenwege
die Weltkarte ist vom 13.11.2019 >>> wie die aus der Picture Library, allerdings Wort "Südamerika" etwas nach unten verrückt UND Wort "San Diego" versetzen, da das sonst möglicherweise durch den Registerschnitt angeschnitten wird, Wort "Santiago de Chile" versetzen (da zu nah an der Adresse), Wort "Port Elizabeth" verschieben, da sonst im Bund und GB und Zeichenwege >>> kurz vor Rausgabe nochmal checken, ob noch aktuell!!!!

ACHTUNG ((Button NICHT löschen)) bei der Europakarte drauf achten, ob sich Orte außerhalb des Rahmens befinden

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