

BECKHOFF New Automation Technology

Enabling your Creativity:
PC-based Control from Beckhoff
for Stage and Show Technology



Discover the fascinating world of PC-based control technology from Beckhoff.

Industrial Automation

Concert Halls

Theatres/Operas

Cinemas

Congress and Media Centres

TV Studios

Building Automation



Beckhoff implements open automation systems based on PC control technology.

One control system for diverse automation tasks

With PC-based control, Beckhoff provides a universal automation platform that has been used globally in the most varied industries for more than 35 years. The modular automation system of Beckhoff consists of a broad range of powerful Industrial PCs, I/O components for a large variety of signals, the high-speed EtherCAT bus system, universal TwinCAT automation software as well as highly dynamic drive technology components. It allows the implementation of the most diverse control solutions – from industrial or machine



automation to wind farm networking through to intelligent building automation and technology applications for stage performances.

A host of references worldwide in the areas of mobile and stationary stage and show technology, unique applications as well as entertainment technology are ample proof that PC-based control technology is ideal for implementing technically demanding stage shows and media stagings. When it comes to fast set changes, complex video projections, spectacular light shows and water features, kinetic installations, animated figures as well as interaction between the audience and media, creativity is essential on the part of the

artists and designers, but also of the control technology, which quite literally brings the ideas to stage. As a "creativity to technology translator", the system integrator becomes the interface, so to speak, between art and technology, transforming creative ideas into solutions – with control components from Beckhoff.

Your benefits with PC-based control:

- Economic efficiency – from investment, to implementation, to use
- Future-proof – with technologies available today for the demands of tomorrow
- Simple networking – all information is available in one universal system
- Flexibility – to respond and adapt to individual user needs
- High availability – through broad compliance with accepted communications standards

A universal automation platform for stage, show and building technology.

Upper stage machinery



Stage lighting



Lower stage machinery



The universal and open control platform for the most diverse applications



Hall lighting



Audio

Video installations/
projections



Operating and
monitoring



Heating, ventilation,
air conditioning

PC-based control integrates all applications in one system

The robust PC platform offers finely scalable performance and is ideal for centralised or decentralised control of all applications involved in stage and show technology as well as building automation. Beckhoff I/O systems can be used to integrate the whole range of sensors and actuators. Due to the modularity of the system, a new I/O signal can be integrated by simply adding an I/O component into the terminal system to extend the functionality. Moreover, because it supports all the usual protocols and interfaces of stage, media and building

technology, the Beckhoff automation platform is able to address all devices and systems typical in this industry – from movable objects through AV, media technology and lighting technology to building automation. Beckhoff supplies a broad range of scalable drive components – optionally equipped with integrated safety technology – for motion control applications such as for scenery or point hoists, show elements or kinetic installations, for example. All different applications and their functionalities can be programmed and configured using the universal TwinCAT software. In addition, PC-based control offers outstanding connectivity.

Your benefits for stage and show technology with PC-based control:

- Continuity – one control platform for all trades
- Openness – interfaces for all popular communication standards in the area of stage, media and building technology
- Scalability – in terms of performance, design and price
- Modularity of components – for flexible control system design
- Extensive connectivity – from horizontal communication to cloud integration

Stage Industry

For stationary performances

- Theatres
- Operas
- Concert halls
- Musical theatres
- Cruise liners
- Convention and media centers

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Show Industry

For mobile performances

- Concerts/Tours
- Music festivals/Dance events
- Shows
- Awards/Contest shows
- Sporting events

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Unique Applications

For installations with water, light and kinetics

- Art installations
- Media installations
- Corporate trade shows
- Corporate presentations
- Product stagings
- Shop concepts

Page 20



Entertainment Industry

For attractions

- Entertainment parks
- Theme parks
- Entertainment districts
- Motion picture studios
- TV studios

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Systems



Movable Objects

Beckhoff control components for:

- Upper and lower stage machinery
- Chain hoists and winches
- Kinetic objects
- Animatronics
- Acoustic elements

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Lighting Technology

Beckhoff control components for:

- Stage lighting
- Lighting effects
- Hall lighting
- Building lighting

Page 30

AV and Media Technology

Beckhoff control components for:

- Audio installations
- Video installations/projections
- Stage managers desks
- Interactive systems
- Water effects

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Building Automation

Beckhoff control components for:

- Operating and monitoring
- Lighting
- Heating, ventilation, air conditioning
- Facade
- Energy management

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Movable Objects

Beckhoff control components for:

- Upper and lower stage machinery
- Chain hoists and winches
- Kinetic objects
- Animatronics
- Acoustic elements

Lighting Technology

Beckhoff control components for:

- Stage lighting
- Lighting effects
- Hall lighting
- Building lighting

AV and Media Technology

Beckhoff control components for:

- Audio installations
- Video installations/projections
- Stage managers desks
- Interactive systems
- Water effects

Building Automation

Beckhoff control components for:

- Operating and monitoring
- Lighting
- Heating, ventilation, air conditioning
- Facade
- Energy data acquisition

System integration across all disciplines: for the most diverse applications.

TwinCAT ADS

EtherCAT Automation Protocol (EAP)

PosiStageNet

DMX

sACN

Art-Net™

SMPTE Timecode

Audio

AES70 (OCA)

PJLink

DALI

EIB

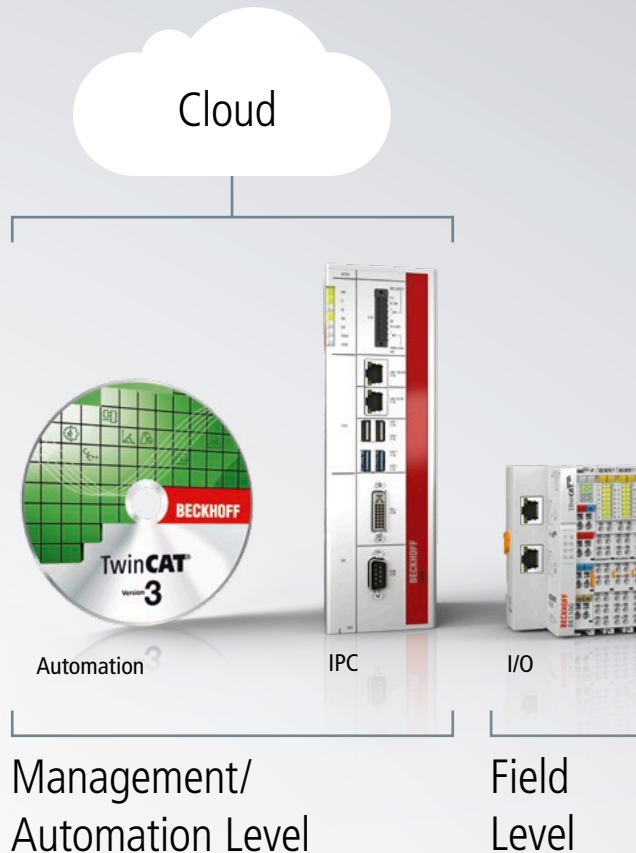
LON

BACnet

SMI

M-Bus

MP-Bus



Comprehensive connectivity: Beckhoff supports all industry standards

With its open software and hardware interfaces, PC-based control is ideal for centralised or decentralised control of all systems involved in the stage, show and concert industry, such as movable objects, lighting technology, AV and media technology and building automation. Besides integrating all common building technology standards such as DALI, LON, EIB/KNX, BACnet, SMI, MP-Bus, M-Bus, EnOcean, RS232/RS485, Modbus and TCP/IP, system integrators have all typical interfaces at their disposal for connecting lighting technology as well as AV and multimedia systems. With support for DMX, sACN™, SMPTE Timecode, Art-Net and PosiStageNet, PJLink and AES70 (OCA), Beckhoff speaks the unique "languages" of these industries, ensuring that the most varied devices and applications in stage and show technology can be controlled on the basis of standard control components.



Motion

Stage Industry



Show Industry



Unique Applications



Entertainment Industry





From 1 to
36 cores



AES70 (OCA)
DMX
Art-Net™/sACN
SMPTE Timecode
PosiStageNet
PJLink
BACnet
Modbus

Secure your
technological lead
with Beckhoff.

Maximum scalability

Control solutions from Beckhoff are up to the task at hand: all product lines in the areas of Industrial PCs, I/Os, drive technology and automation software are exactly scalable to suit the application. The range of Industrial PCs thus extends from the C6015 ultra-compact IPC with dimensions of 82 x 82 x 40 mm to the many-core Industrial Server with up to 36 cores.

Comprehensive connectivity

PC-based control speaks all networking languages: all customary communication standards and fieldbus systems – and all protocols typically used in media and building automation – are supported, permitting the easy integration of all systems and devices.



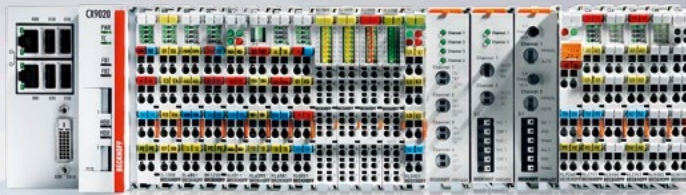
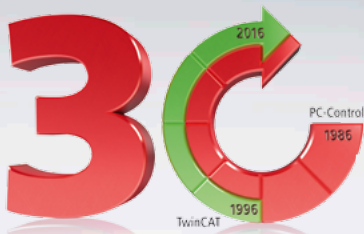
Your benefits
in stage and show
technology with
Beckhoff.

Take the fast way to your individual user interface: with TwinCAT HMI

Integrated in Visual Studio®, TwinCAT HMI software offers a WYSIWYG editor for HTML5 as well as straightforward configuration using drag and drop for all resolutions, operating systems and devices, including mobile.

Modular and easy to integrate: the Beckhoff safety solution

Beckhoff provides a scalable safety solution in terms of both software and hardware in order to ensure the safety of operators and actors, which is certified according to SIL 3. The safety I/Os act as interfaces to the safety-related sensors and actuators and integrate seamlessly into the Beckhoff control system.



Long-term availability

When you choose Beckhoff, you choose industry-proven, reliable and long-term available control technology "Made in Germany".

Modular and flexible

The Beckhoff I/O portfolio includes over 400 signal types and 36 fieldbus systems, and is ideal for controlling the full range of sensors and actuators. Together with the modular TwinCAT automation software, users have optimum flexibility when configuring their application-specific controls and for extending functionality over time.

Further benefits of the Beckhoff control solution:

- Use of standard components, programming and networks
- Recording of all data points in one system
- Consistent software for all trades
- Shorter engineering times and lower costs
- Complete system provider with deep industry expertise
- Simple installation of third-party software



Compact drive technology: EL72xx series

The EL72xx series servo terminals of the Beckhoff EtherCAT I/O system integrate a full servo amplifier for motors up to 200 W in a standard HD terminal housing and are therefore ideal for applications with small available installation space.

Scalable drive technology – highly dynamic and highly precise: AX5000 series

The AX5000 EtherCAT Servo Drives are designed to provide the best possible functionality and economy. The integrated, fast control technology with a current control cycle of down to 62.5 µs supports fast and highly dynamic positioning tasks. As a high-performance communication system, EtherCAT is ideal for integration with PC-based control technology.

Additional highlights for stage and show technology:

- Ultra-compact Industrial PCs
- EtherCAT: real-time fieldbus system
- EtherCAT P: One Cable Automation for field level devices
- Cycle times down to 50 µs
- Support for multi-core CPU functionality
- Sound options for PCs
- Network ports as standard on all controllers
- Multi-touch displays from 7 to 24 inches
- DMX communication







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The universal and open control platform for the most diverse applications



Movable Objects

Beckhoff control components for:

-  Upper machinery
-  Acoustic elements
-  Hall floor adjustment
-  Turntables/revolving stages
-  Lower machinery
-  Condition monitoring




Lighting Technology

Beckhoff control components for:

-  Stage lighting
-  Hall lighting
-  Building lighting



AV and Media Technology

Beckhoff control components for:

-  Audio installations
-  Video installations/projections
-  Stage managers desks

Building Automation

Beckhoff control components for:

-  Facade/shading
-  Lighting
-  Operating and monitoring
-  HVAC
-  Water supply
-  Energy data acquisition and data logging

Stage Industry References



"Hamilton", Musical of Lin-Manuel Miranda, Broadway, NY, USA
Hudson Scenic Studio, Yonkers, NY, USA



Bregenz Festival, Austria

© Bregenzer Festspiele/Karl Forster



References for Stage Industry, selection

Movable objects

- ACR/Elettrica Ducale srl, Italy:
 - Scala di Milano, Milan, Italy
- Drivecontrol, s.r.o., Újezd u Brna, Czech Republic:
 - Janaček Theatre, Brunn, Czech Republic
 - Fomenko Theatre, Moscow, Russia
- Flying by Foy, Las Vegas, NV, USA:
 - American Idiot, Broadway NY, USA
 - Billy Elliot, Broadway NY, USA
 - Mary Poppins, Broadway NY, USA
 - Spamalot, Broadway NY, USA
- Fülling & Partner Ingenieurgesellschaft mbH, Germany
 - "Das Wunder von Bern", Theater an der Elbe, Germany
 - German Pavillon, World Expo 2015
 - Kazakhstan Pavillon, World Expo 2015
 - Messe Frankfurt, lifting platform, Germany
 - Rocky, Stage Palladium Theatre, Germany
- Helsinki Music Center, Finland
- HOAC Schweisstechnik GmbH, Germany:
 - Royal Theatre Copenhagen, Denmark
- Hudson Scenic Studio, Yonkers, NY, USA
 - Various musicals
- Sibelius Hall, Lahti, Finland
- Stakebrand Technische Toneelinstallaties, NL:
 - Carré Theatre Amsterdam, Netherlands
- STB Steuerungstechnik Beck GmbH, Austria
 - Control of floating stage for "Turandot" opera performance at Bregenz Festival
- Theatertechnische Systeme GmbH, Germany:
 - Schauspielhaus Nürnberg, Germany
 - Staatstheater Wiesbaden, Germany
 - Schauspielhaus Düsseldorf, Germany
 - Deutsche Oper am Rhein, Düsseldorf, Germany
 - Music Theatre, Malmö, Sweden

Lighting/multimedia

- Ferry Porsche Congress Center, Zell am See, Austria
- Helsinki City Theatre, Finland
- Imatra Theatre, Finland
- Microsoft Deutschland GmbH, Cologne, Germany
- People's Grand Theatre, Jilin City, China
- Rovaniemi Theatre, Finland
- Stage Entertainment GmbH, Germany:
 - "Das Wunder von Bern"
- Tampere Hall, Finland

Stage managers desk

- HFE professionelle Studiotechnik GmbH, Germany

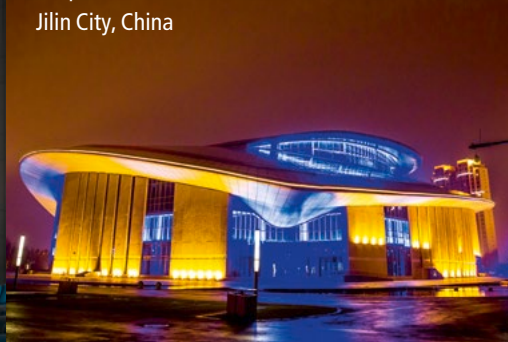
University collaborations with Beckhoff

- Anton Bruckner Privatuniversität, Linz, Austria
- Hochschule für Musik und Tanz Köln, Germany
- UCLL, Leuven/Limburg, Belgium
- University of Wisconsin, USA
- University of Shanghai, China:
 - Robots for Beijing Opera
- Yale School of Drama/Yale Repertory Theatre, New Haven, USA

Janaček Theatre, Brunn, Czech Republic



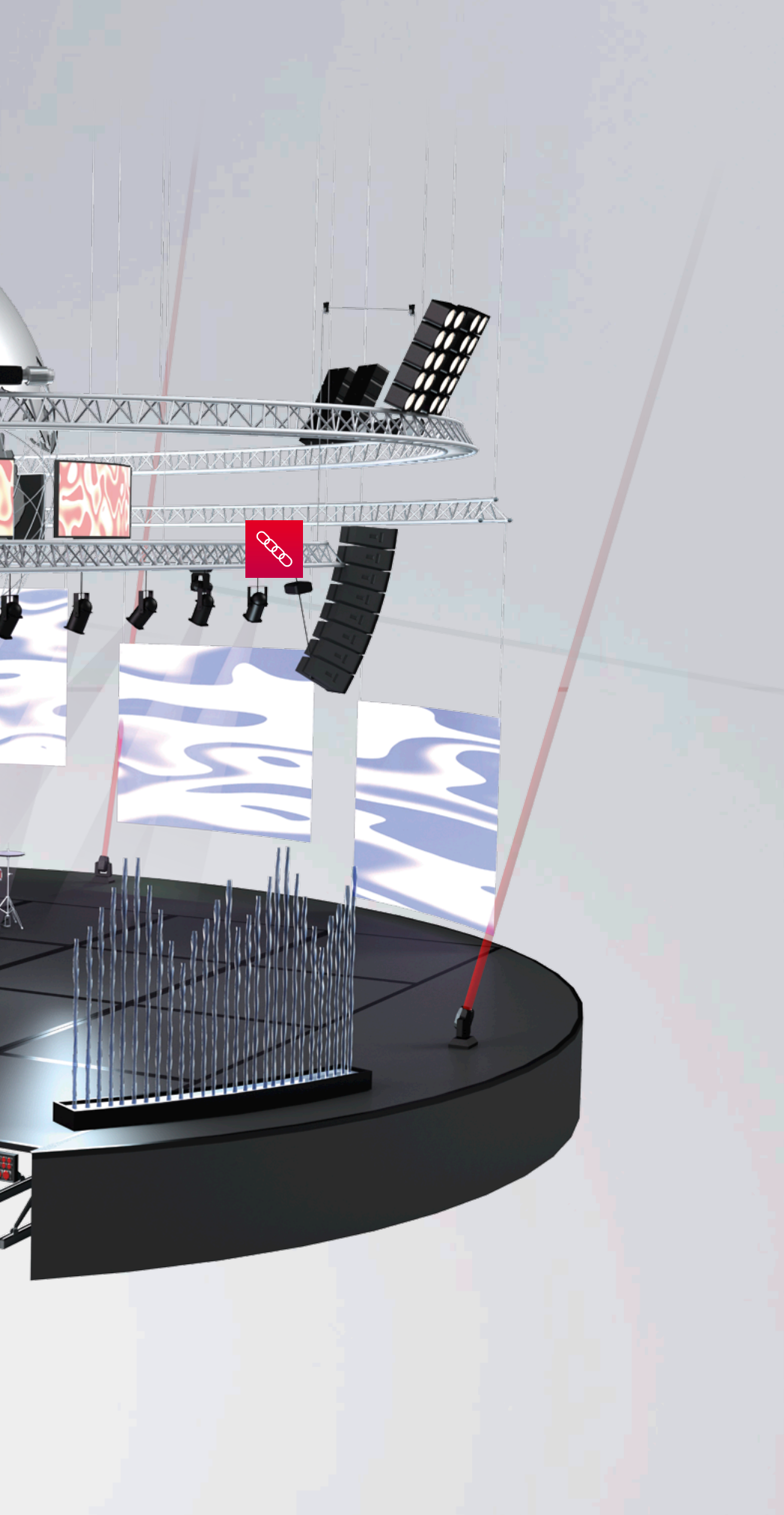
People's Grand Theatre,
Jilin City, China



Show Industry: For mobile performances.



The universal and open control platform for the most diverse applications





Movable Objects

Beckhoff control components for:

-  Hoists
-  Winches
-  Stage machinery
-  Platforms




Lighting Technology

Beckhoff control components for:

-  Stage lighting
-  Lighting effects

AV and Media Technology

Beckhoff control components for:

-  Audio installations
-  Video installations/projections
-  Water effects/features

Building Automation

Beckhoff control components for:

-  Optional integration into existing building automation

Show Industry References



EVENTIONS PRODUCTS BV

"Sensation White", dance event
Statecore Innovative Entertainment Technology BV,
De Meern, Netherlands

Aquagraphic® Aquatique Show,
Straßburg, France

AQUATIQUE
SHOW



References for Show Industry, selection

Concerts/tours

- SGPS/Show Rig, Las Vegas, NV, USA:
 - Sir Paul McCartney
 - Justin Bieber
 - Miley Cyrus
 - Beyoncé
 - Aerosmith
 - Justin Timberlake
 - Guns N' Roses
 - Rihanna
- Sigma Services Inc., Florida, USA
- TAIT/Fisher Technical Services, Las Vegas, NV, USA:
 - U2
 - Lady Gaga
 - Bon Jovi
 - Black Eyed Peas
 - Shakira

Music festivals/dance events

- The Factory CVBA – VSO, Belgium:
 - "Pukkelpop" Festival, Hasselt, Belgium
- SGPS/Show Rig, Las Vegas, NV, USA:
 - Coachella Music Festival
 - EDC – Electric Daisy Carnival
- Statecore Innovative Entertainment Technology BV, De Meern, NL
 - "Sensation White", Amsterdam, Netherlands

Shows

- Ehrlich Entertainment, Germany:
 - various magic shows with water effects, Germany
- Flying by Foy, Las Vegas, NV USA:
 - "A New Day", Caesar's Palace, Las Vegas, NV
- SGPS/Show Rig, Las Vegas, NV, USA:
 - Cirque Arenaline, Hongkong, China
 - J-Lo, Las Vegas, NV, USA
 - Mariah Carey, Las Vegas, NV, USA
- Skjonberg Controls for Entertainment Industry, USA:
 - various shows

Awards/contest shows

- SGPS/Show Rig, Las Vegas, NV, USA:
 - Academy Awards/Oscars
 - Grammy Awards/Emmy Awards
 - Miss Universe

Sporting events

- Böckstiegel Automation/GTG GmbH, Germany
 - MetLife Stadium New York, Super Bowl
- SGPS/Show Rig, Las Vegas, NV, USA:
 - NBA All-Star
- Sigma Services, Florida, USA
 - Cleveland Cavaliers
- spidercam GmbH, Feistritz, Austria:
 - mobile camera system SpiderCam®
- TAIT/Fisher Technical Services, Las Vegas, NV, USA:
 - various sporting events



SpiderCam®, Austria



U2 360° Tour

© Photo: Ralph@Larmann.com

Unique Applications: for installations with water, light and kinetics.



The universal and open control platform for the most diverse applications



Movable Objects

Control components for:



Kinetic objects

Lighting Technology

Beckhoff control components for:



Lighting



Lighting effects

AV and Media Technology

Beckhoff control components for:



Audio installations



Video installations/projections



Water effects/features



Interaction via Kinect sensor



Interaction via smartphone



Interaction via Wearables

Building Automation

Beckhoff control components for:



Optional integration into
existing building automation

Unique Applications References



"Kinetic Rain", Changi Airport, Singapore
MKT AG/ART+COM AG, Germany

"Time-dynamic Model of Saxony",
SMAC, Chemnitz, Germany



© Changi Airport Group Singapore



© James Fox, Abida, Norway



Super Bowl, MetLife Stadium N.Y., USA

References for Unique Applications, selection

Art installations

- MKT AG/ATELIER BRÜCKNER GmbH/TAMSCHIK MEDIA + SPACE GmbH, Germany:
 - "Time-dynamic Model of Saxony", State Museum of Archaeology in Chemnitz, Germany
- MKT AG/Art+Com AG, Germany
 - "Kinetic Rain", Changi Airport, Singapore
- MKT AG/HB Laserkomponenten GmbH, Germany
 - 3D KineMatrix
- LightHive, London, U.K.

Media installations

- AquaDom, saltwater aquarium, Berlin, Germany
- Aquatique Show, France:
 - Aquagraphic®
- as systems GmbH, Markt Einersheim, Germany:
 - Waterdoor, Flimser Wasserwelten, Switzerland
- Ferry Porsche Congress Center, Austria
- GTG GmbH/Böckstiegel Automation, Germany
 - Digital Tower, Changi Airport Singapore
 - Super Bowl, MetLife Stadium N.Y., USA
- Microsoft Deutschland GmbH, Cologne, Germany
- MKT AG/HB Laserkomponenten GmbH, Germany
 - 3D KineMatrix

Movable objects

- Frenckel Clock Tower, Tampere, Finland
- Milla & Partner GmbH, Germany:
 - Energy center, German Pavilion, EXPO 2010
- MKT – Fine Exhibition Engineering, Germany:
 - State Museum of Archaeology Chemnitz, Germany
 - "Kinetic Rain", Changi Airport, Singapore
 - 3D KineMatrix
- Scandinavian Design Group, Norway:
 - "Breaking the Surface", Lundin Norway, Norway
- spidercam GmbH, Feistritz, Austria:
 - mobile camera system Spidercam®
- TAIT/Fisher Technical, NV, USA:
 - Lincoln Center, New York, NY, USA
 - Shanghai World Expo Sphere Array
- Utinam, horloge monumentale, Besancon, France

Corporate trade shows/corporate presentations

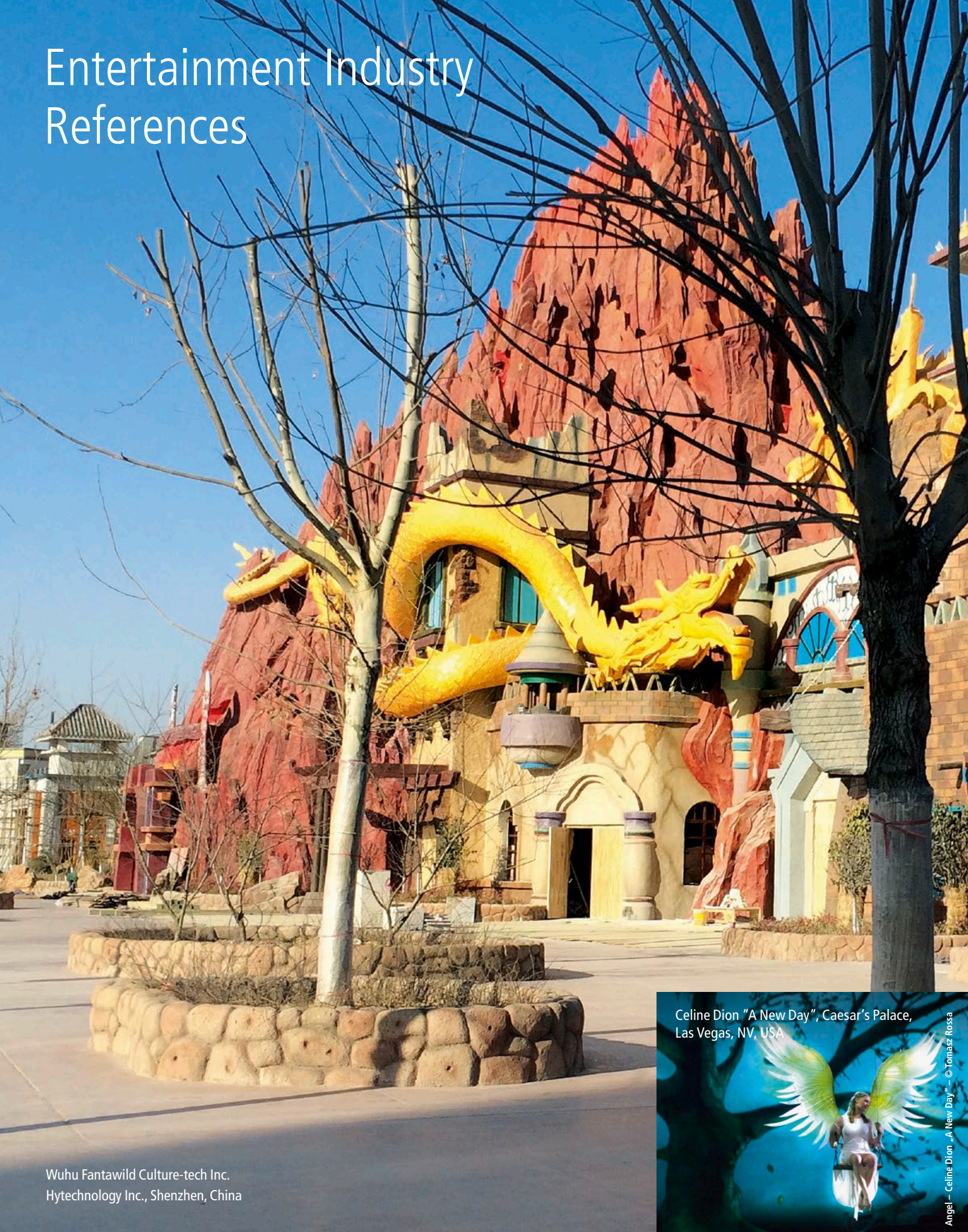
- Ehrlich Entertainment, Germany:
 - "Jules Verne & Porsche", Germany
 - "175 years railroad in Germany", Germany
- Scandinavian Design Group, Norway:
 - "Breaking the Surface", Lundin Norway, Norway
- SGPS/Show Rig, Las Vegas, NV, USA:
 - CES
 - IBM
 - Walmart
 - Samsung
 - Ford
 - General Motors
 - Volvo
 - Toyota

Entertainment Industry: For attractions.



The universal and open control platform for the most diverse applications

Entertainment Industry References



Wuhu Fantawild Culture-tech Inc.
Hytechnology Inc., Shenzhen, China

Celine Dion "A New Day", Caesar's Palace,
Las Vegas, NV, USA



Angel - Celine Dion „A New Day“ – © Tomasz Rossa



References for Entertainment Industry, selection

Entertainment parks

- Walt Disney Imagineering (WDI), Burbank, USA
- Hytechnology Inc., Shenzhen, China:
 - Songs of birds, Wuhu Fantawild Culture-tech Inc.
 - Nuwa patches up the sky, Jinan Fantawild Culture-tech Inc.
- K. D. Decoratives Ltd., Huddersfield, U.K.:
 - "The Night before Christmas" (Sundown Adventure Land)
- Sigma Services Inc., Florida, USA:
 - Paramount Wonderland, Canada
- Alterface Projects S.A., Wavre, Belgium:
 - Interactive cinema with 4/5-D special effects for entertainment parks
- Steel Construction and Robotic Machinery (S.Co.R.E), Amchit, Lebanon:
 - Race simulator "Real Motion"
- Xesa Systems, Cremona, Italy
 - Full-motion simulator for driving simulation

Entertainment districts

- TAIT/Fisher Technical Services, Las Vegas, NV, USA
- City of Dreams Casino, Macau, China

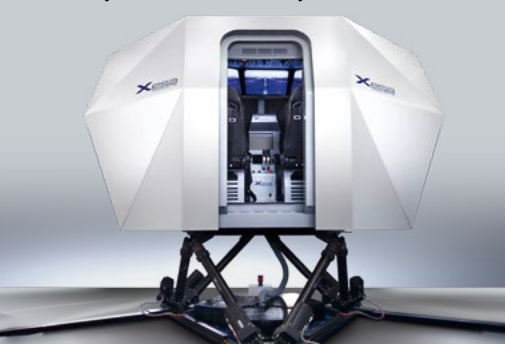
Motion picture studios/TV studios

- SGPS/Show Rig, Las Vegas, NV, USA:
 - Fast & Furious 7
 - Ironman 3
 - The Muppets
 - Transformers: Age of Extinction

TV shows

- SGPS/Show Rig, Las Vegas, NV, USA:
 - Big Brother
 - Biggest Loser
 - The Voice

Xesa Systems, Cremona, Italy



Alterface Projects S.A., Wavre, Belgium



Movable Objects

Management Level



TwinCAT system software



Industrial PC C6920



Multi-touch Panel

Scalable screen sizes

Ethernet TCP/IP

Field/Control Level

Drive Technology

Simple Drive Technology



Embedded PC, EtherCAT Terminals Directional control of motors Position detector Controlled speed Power terminal KL8001

EtherCAT

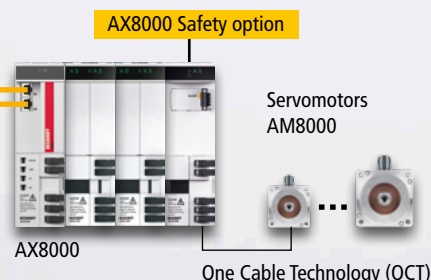
Compact Drive Technology



DC motor Stepper motor Servomotor Display and manual operation

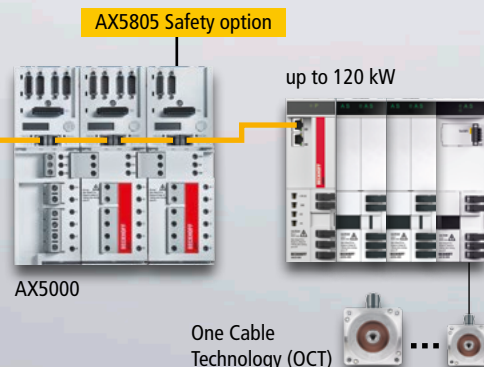
Servo Drives

Multi-axis servo system



EtherCAT

1-axis and 2-axis Servo Drives



The EL7201 EtherCAT Terminal with STO safety function can be used for controlling AM8100 series servomotors.

Maximally scalable and flexible: the Beckhoff control platform for movable objects

Beckhoff offers precisely scalable drive technology components for a wide range of drive engineering tasks, from very simple motion control such as directional control or position detection to complex servo sequences such as those that are required for highly synchronous motion control of upper and lower stage machinery or for animated figures. The performance spectrum ranges from the so-called compact drive technology with space-saving EtherCAT Terminals and servo terminals, which integrate a complete servo drive in the housing of a rail-mounted I/O

OPC UA
AMQP
MQTT



TwinCAT^{ADS}
EtherNet/IP[™]
PROFINET[®]
Art-Net[™]/sACN
PosiStageNet
EAP
Ethernet TCP/IP
Modbus



19" slide-in Industrial PC
C5240

Communication

Hydraulic control

Maintenance and monitoring



Embedded PC,
EtherCAT Terminals

Hydraulic
valve



Condition
Monitoring

Energy
management

EtherCAT

Fieldbus

Robotics



PROFIBUS
CANopen Modbus
RS232



TF5120
KUKA

TF5130
Stäubli

Safety

Safety Digital



Embedded PC

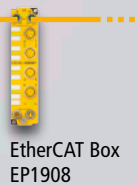
TwinSAFE
Logic Bus
Terminal
EL6900



Safe
inputs



Safe
outputs



EtherCAT Box
EP1908

EtherCAT

Safety Analog



TwinSAFE
Logic Bus
Terminal
EL6910



TwinSAFE SC

terminal, to the highly dynamic servo amplifiers with up to 120 kW. This means that a suitable solution is available for every application in terms of design, performance and price. Sequential control for up to 255 axes can be executed on a Beckhoff Industrial PC with TwinCAT as the automation software. By combining several controllers, it is also possible to move 1,216 axes in highly precise synchronisation, as was realised for the "Kinetic Rain" installation at the airport in Singapore. With the end-to-end, scalable safety solution – from safety I/O modules to drives – an integrated safety solution up to SIL 3 requirements is available for almost all applications in the area of movable objects. In addition, a wide

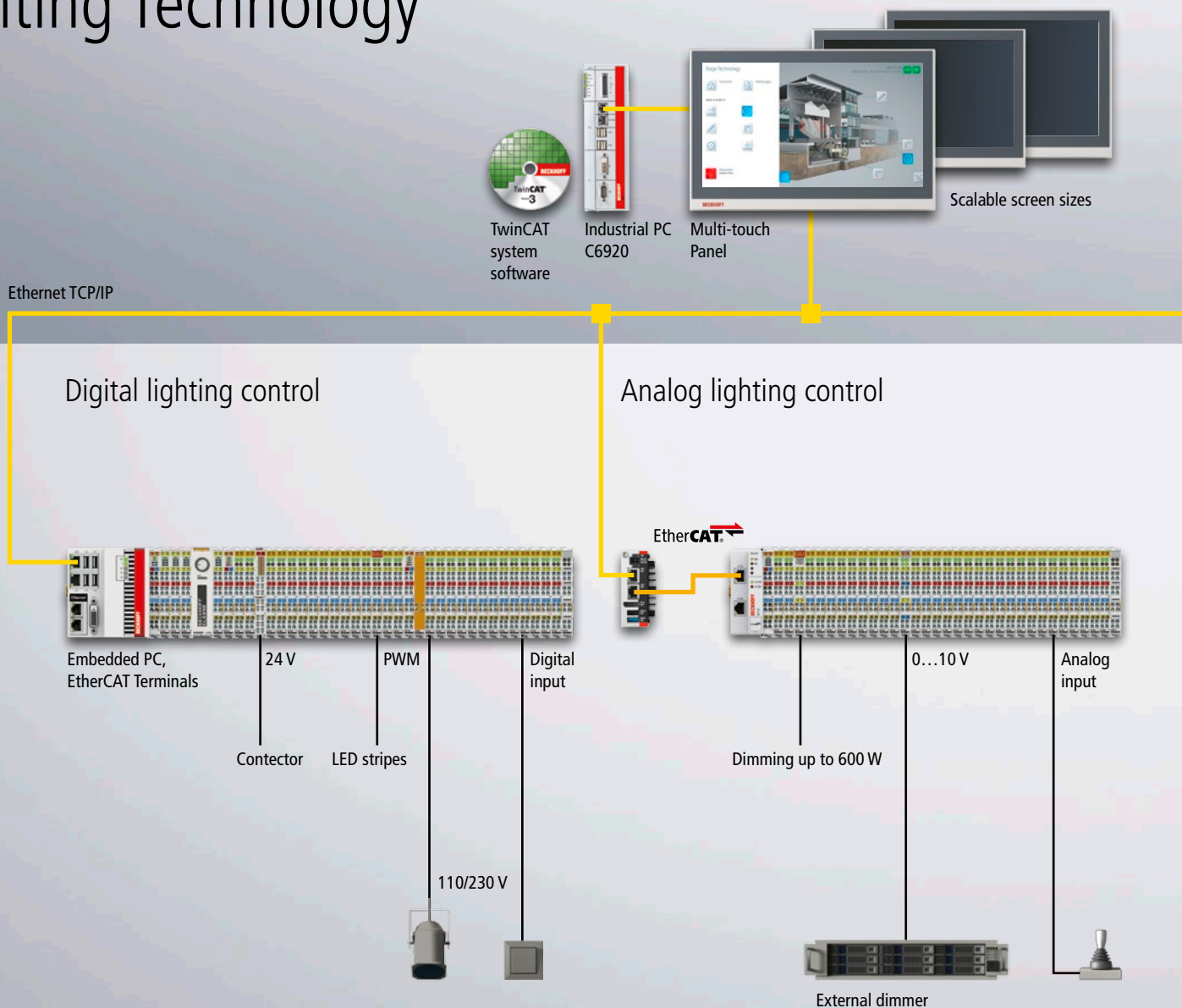
range of communication interfaces and the support of all common fieldbus systems ensure the openness that a control system needs for the connection of all external third-party devices. The large portfolio of PC platforms in all performance categories and designs, multi-touch panels and TwinCAT, the modular automation software, provide all the components required for the implementation of the most diverse control desk concepts. The control system is complemented by the inclusion of various data connection options and cloud connectivity.

Movable Objects

Lighting Technology

Management Level

Field/Control Level



Technical functional drawing



The EL6601 Ethernet switch port terminal supports the connection of devices, which communicate via the protocols DMX, DALI, EIB/KNX, LON, Art-Net™, sACN or PosiStageNet.

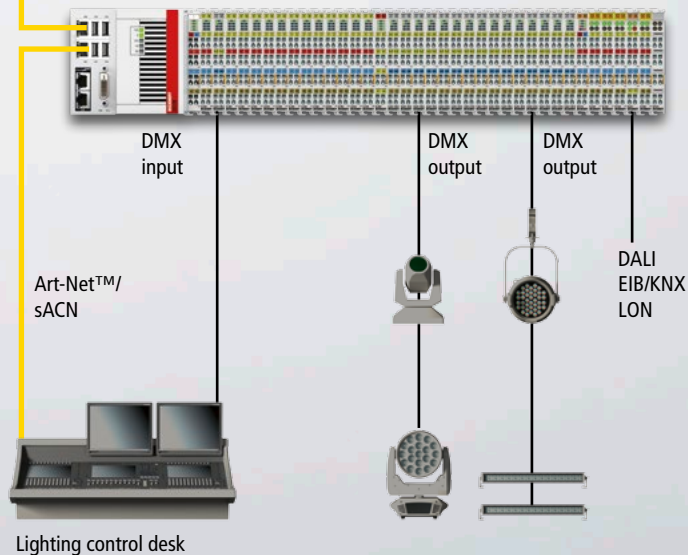
Beckhoff I/O Terminals seamlessly integrate lighting technology into the control platform

Beckhoff offers a scalable, modular component portfolio for the implementation of all lighting concepts in stage and show technology, in unique applications and in the entertainment sector: from stage lighting and special lighting effects to hall and building lighting. The Beckhoff I/O terminals support and seamlessly integrate the entire performance spectrum – from digital lighting control for simple switching operations to analog dimmer functions and protocols for lighting control – into the control platform. In addition to DALI, DMX,

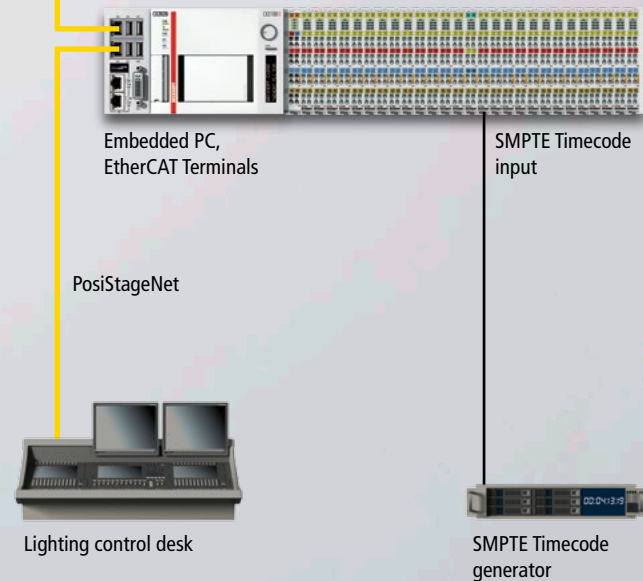


19" slide-in Industrial PC
C5240

Protocols for lighting technology



Protocols for communication



sACN and Art-Net[™], the SMPTE Timecode and PosiStageNet communication protocols are also available: SMPTE Timecode is used for the exact synchronisation and repeatable sequence control of different technical systems in complex stage shows. PosiStageNet can be used, for example, to send position data of moving objects to the lighting control system in order to automatically track these objects or to select lighting scenarios depending on their position.

With a large selection of PC platforms in all performance categories and designs, multi-touch panels and TwinCAT, the modular automation software, all the components required are available

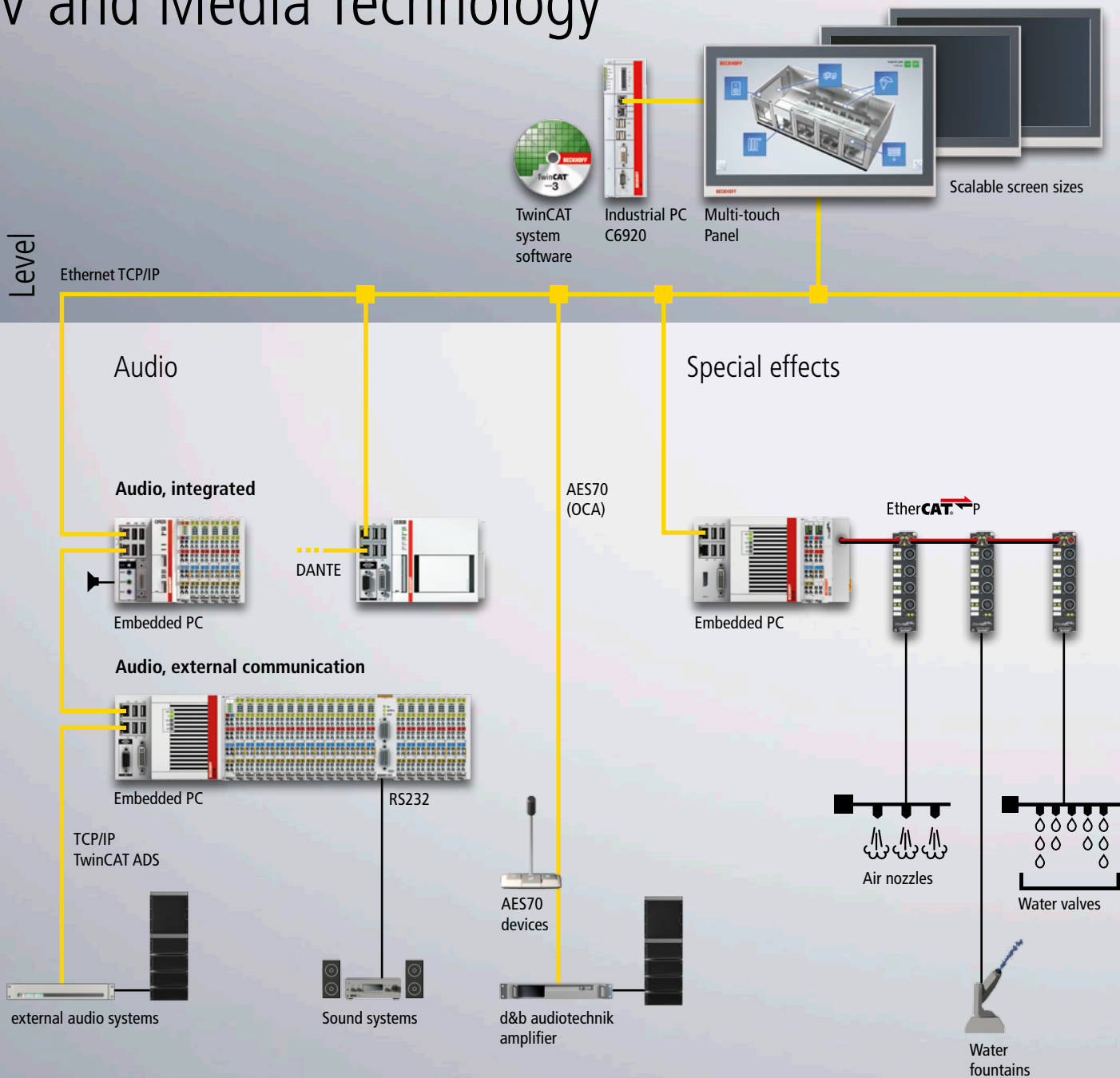
for the implementation of a wide range of control desk concepts. The control system is complemented by various data connection options and cloud connectivity.

Lighting Technology

AV and Media Technology

Management Level

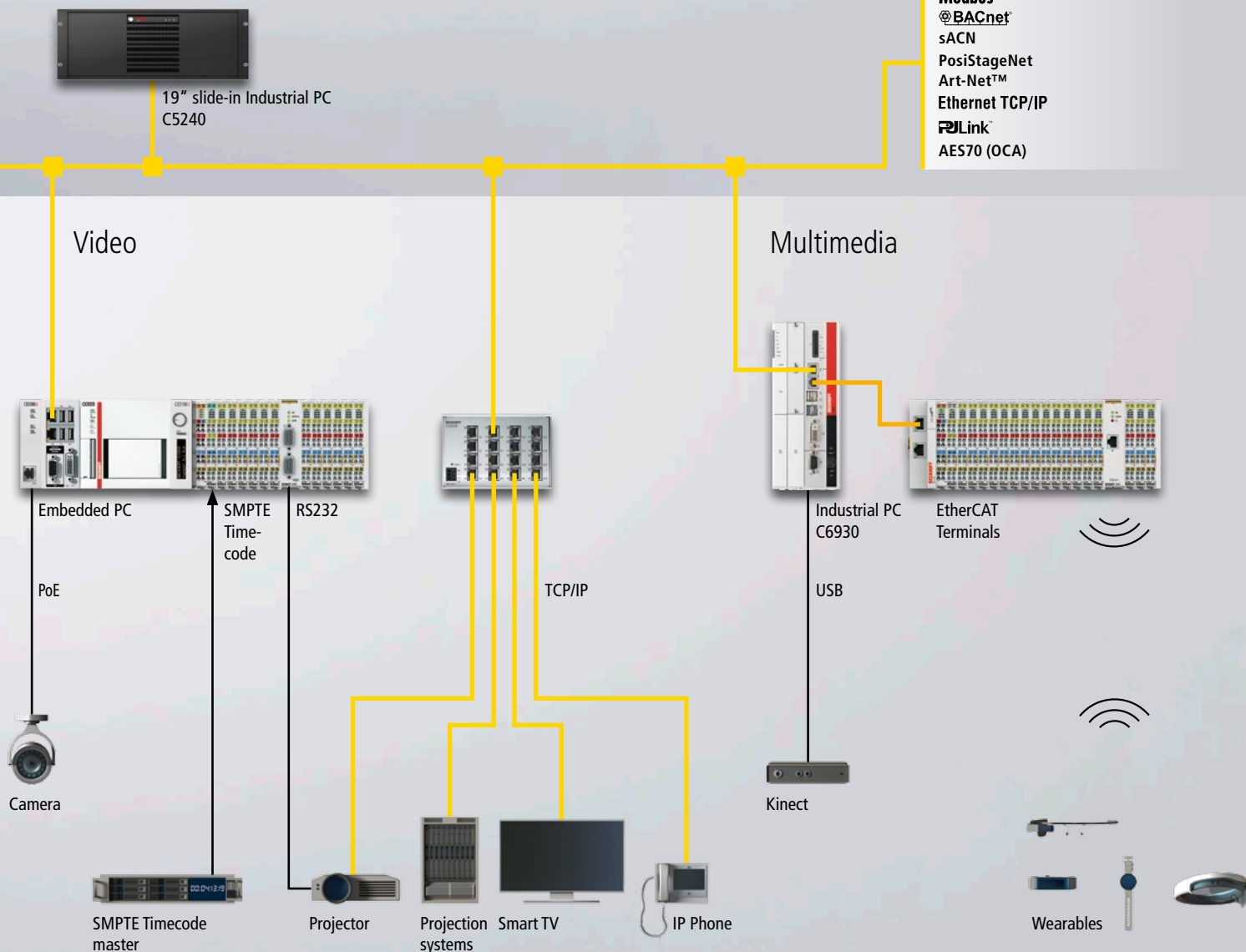
Field/Control Level



The CX5130, CX5140 and CX20x0 Embedded PCs are available with DisplayPort option.

One universal platform for all audio/video equipment, water effects, interactive systems, and stage managers desks

In addition to Ethernet TCP/IP, serial protocols and OPC UA, the Beckhoff control platform supports all relevant protocols in the area of media technology. This includes Open Control Architecture (AES70 standard), PJLink, SMPTE Timecode, Crestron, Bang & Olufsen, Art-Net™ and Streaming ACN (sACN), among others. Vendor-independent control of the widest range of media technology equipment enables the seamless operation of audio and video systems, display devices, multimedia



servers and streaming services – in one network and on the same platform. The advantage for users is clear: they are not restricted in their choice of media technology equipment and are free from manufacturer-specific protocol considerations. The Beckhoff platform serves as a “multi-language gateway”, ensuring flexible communication among devices, as well as optimum usability.

Through the scalability and modularity of the software and hardware components from Beckhoff, users can tailor their control system precisely to the scope of the control tasks at hand. Users can achieve significant performance improvements and cost reductions, but also optimise

available installation space. The CX2000 Embedded PC, for example, represents an extremely powerful and modular control solution based on multi-core processors from Intel®, helping to combine audio, PoE, DisplayPort and DVI on one universal platform.

AV and Media Technology

Building Automation

Management Level

Field/Control Level

EtherCAT

Ethernet TCP/IP

Operating and Monitoring

HVAC



Embedded PC,
EtherCAT Terminals

Bus Terminals



Remote control



Control panel



Weather forecast



Manual operating



Embedded PC,
Bus Terminals



Ventilation



Cooling



Heating



Air quality



Temperature

Energy saving
(EN50001 ready)

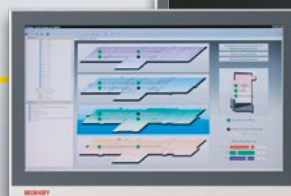
Scalable screen sizes



TwinCAT
system
software



Industrial PC
C6920



Multi-touch
Panel



The eXtensible Room Box from Beckhoff reduces the engineering requirements.

Increased comfort and reduced energy consumption: system-spanning building automation

By supporting all communication standards for building automation, all building functions and systems – from operating and monitoring, lighting, HVAC and facade control through to energy data collection – can be integrated into the automation platform from Beckhoff. The universal, coordinated control system increases comfort levels for building users. In addition, the

Technical functional drawing



19" slide-in Industrial PC
C5240

OPC UA
AMQP
MQTT



TwinCAT/ADS
Modbus
BACnet
Ethernet TCP/IP

Lighting



Embedded PC,
Bus Terminals

LON
DALI
DMX

DALI



Lighting



Emer-
gency
lighting



Switchable
power
outlets

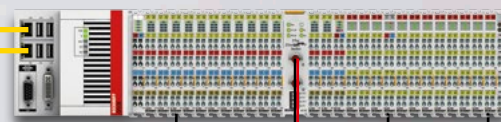


Occupancy
sensor



Room Controller

Facade



Embedded PC,
EtherCAT Terminals

Bus
Terminals



Access
control



Shading



Sun position
calculation

eXtendable Room Box



EtherCAT[®] P

system-integrated nature of the platform delivers energy savings and reductions in investment and operating costs.

TwinCAT function blocks for building automation enable the automation of shading, lighting and ventilation, in addition to heating and cooling according to the time of day and presence of occupants. This enables energy-saving room automation and enhanced comfort at the same time. In this way, lighting correlates directly with facade control, and an effective interconnection of the two disciplines is the optimal way to reduce the

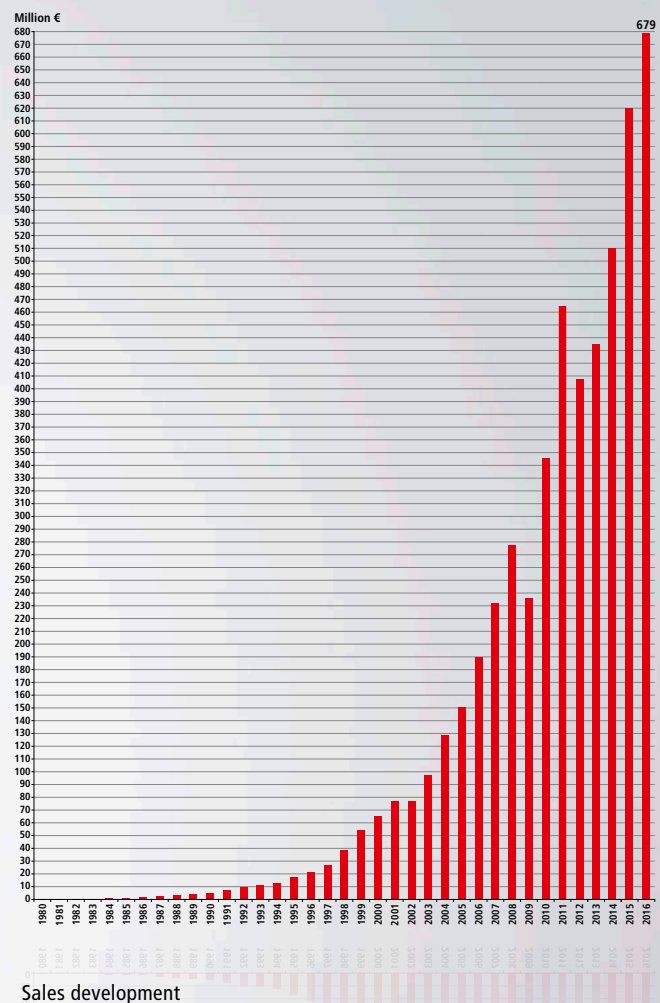
energy consumption of lighting system. The end goal is to use as much natural daylight as possible without glare, while still providing constant light intensity.

A building can be regulated on a time-dependent basis via integrated room automation in a variety of different operating modes. This especially reduces heating and cooling energy consumption during longer periods of absence. Nevertheless, the system must reach a comfortable temperature quickly during core occupancy hours and ensure good air quality at the same time.

Building Automation

Globally available:
the Beckhoff automation expertise.





The Beckhoff "New Automation Technology" philosophy represents innovative control and automation solutions that are used worldwide in a wide variety of different applications and industries, ranging from CNC-controlled machine tools and wind turbines to intelligent building automation.

Worldwide presence on all continents

The worldwide presence of Beckhoff in more than 75 countries ensures fast service and support for globally operating customers in their local language. Moreover, geographical proximity helps us develop an in-depth understanding of the technical challenges our customers are faced with around the world.

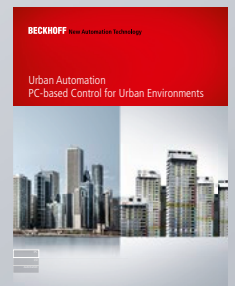
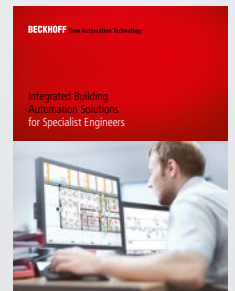
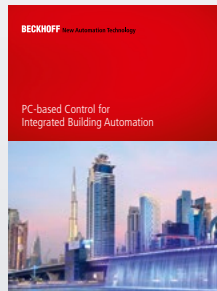
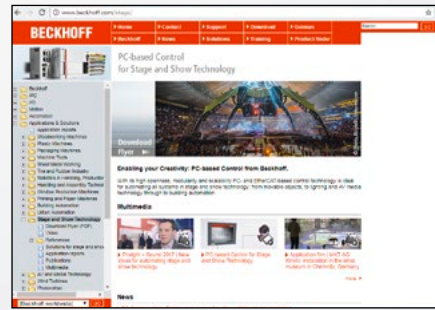
Beckhoff at a glance

- Headquarters Verl, Germany
- Sales 2016: 679 Mio. € (+9,5 %)
- Staff worldwide: over 3,850
- Sales/Technical Offices Germany: 20
- Subsidiaries/Branch Offices worldwide: 34
- Distributors worldwide: in more than 75 countries

(as of 11/2017)

► www.beckhoff.com

All in-depth information at a glance.



Print media online

All Beckhoff catalogs and flyers are available for download from our website at:

► www.beckhoff.com/media

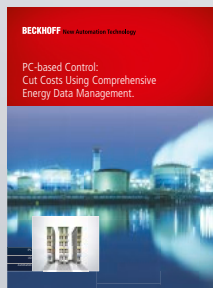
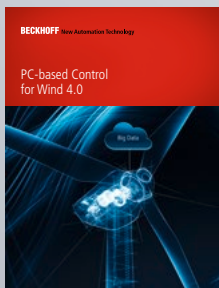
General information

- Website
- Main Catalog: Volume 1 and 2
- Product Overview
- News Catalog



Specific information

- Media and control technology on a single platform
- PC based Control for Integrated Building Automation
- Integrated Building Automation for Technicians
- Building Automation for
 - System Integrators
 - Specialist Engineers
 - Architects
 - Operators
 - Investors



Additional information

- PC-based Control for
 - Urban Environments
 - Wind 4.0
 - Water Management
 - Photovoltaic Production
 - Shipbuilding
 - Energy Data Management



Company magazine

- PC Control Magazine
- Stage Technology Compendium
- Building Automation Compendium

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