

BECKHOFF New Automation Technology

Enabling your Creativity:
PC-based Control from Beckhoff.



IPC

I/O

Motion

Automation

Control components bring your creativity on-stage ...

PC-based control technology from the specialists at Beckhoff offers you a comprehensive range of modular components, comprising high-performance Industrial PCs, TwinCAT automation software, modular I/O equipment as well as scalable Drive Technology components. Together with the EtherCAT real-time communication system and a variety of hardware and software interfaces, PC-based control is ideal for automating all functions in stage and show technology: from movable objects, to lighting and AV media technology, to building automation. A host of high profile references worldwide in the areas of mobile and stationary stage and show technology, unique applications, as well as theme parks are proof of this.



Automation

Central or local control of all systems.



IPC

Scalable Industrial PCs as control platform.
Multi-touch Panels for operating and display devices.



I/O

I/O systems for integrating sensors and actuators.



Motion

Servo Drives and motors for stage components or show elements.



... and ignite your imagination off-stage.

The creative and live entertainment industry is booming globally, and audience demands for spectacular stagings and special effects are growing at the same time. The right kind of automation will add an excitement boost whether the event is a theatre production, a pop concert, a theme park or even a trade fair presence. When it comes to engaging audiences with magical lighting or water effects, kinetic installations, fast set changes, animatronics or interactions in the 5D cinema, unrestricted creativity and previously unseen ideas are quite literally brought on stage for the artists and designers. As a "creativity to technology translator", the system integrator becomes the interface, so to speak, between art and technology. This transforms the most ambitious creative ideas into technically-sound solutions – all with control and automation components from Beckhoff.

► www.beckhoff.com/stage

Stage Industry

For all stationary performances.

Page 8–11

Theatres

Operas

Concert halls

Musical theatres

Cruise liners

Convention and media centers



© Caiaimage/Martin Barraud

Unique Applications

For installations with water, light and kinetics.

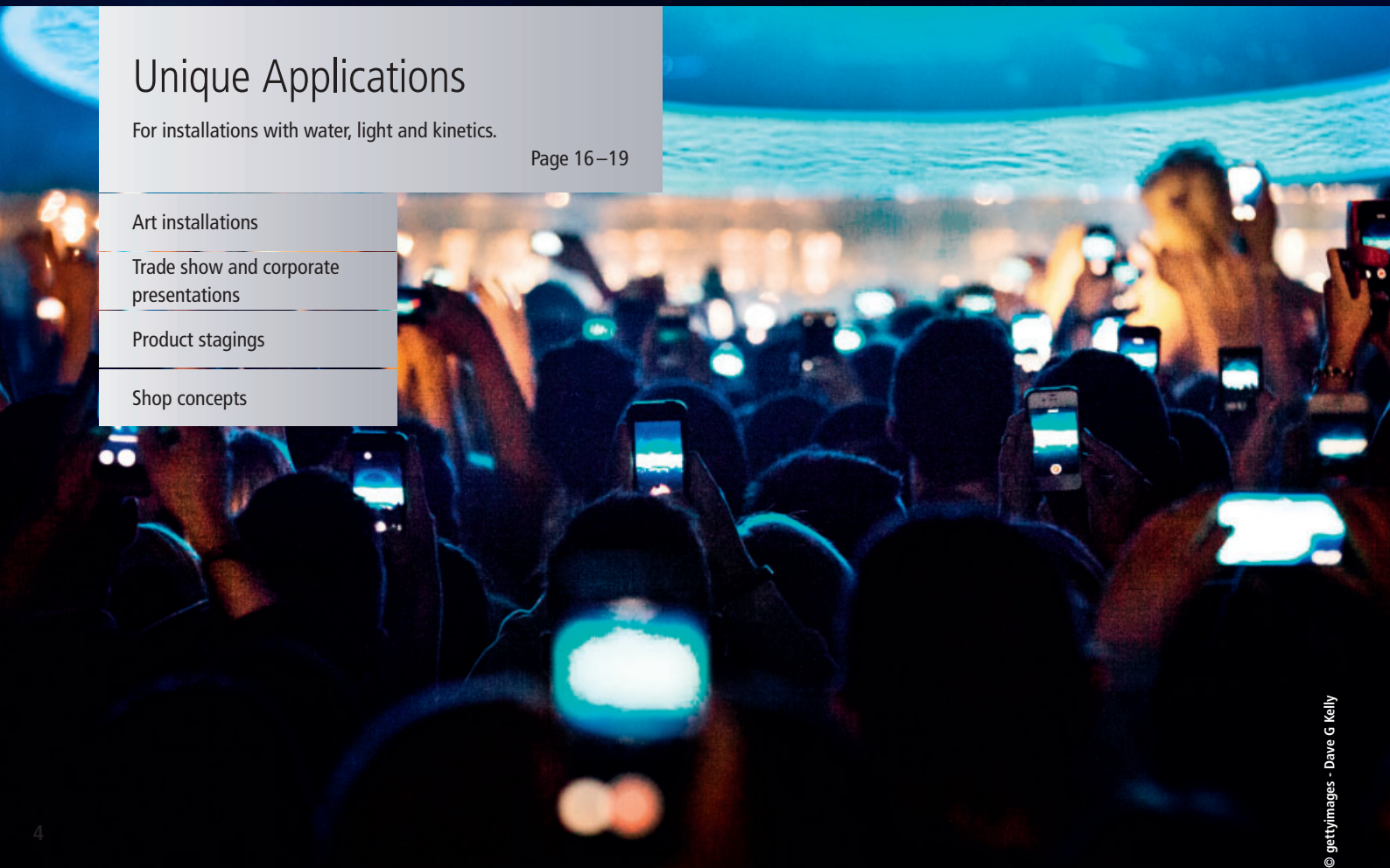
Page 16–19

Art installations

Trade show and corporate presentations

Product stagings

Shop concepts



© gettyimages - Dave G Kelly

Show Industry

For all mobile performances.

Page 12–15

Concerts

Tours

Events

© DWP - Fotolia

Entertainment Industry

For attractions.

Page 20–22

Entertainment parks

Theme parks

Entertainment districts

TV studios

© gettyimages - PhotoAlto/Ocillon Dimier

Movable Objects

Beckhoff control components for:

Details page 26

Stage machinery

Hoists

Winches

Kinetic objects

Animatronics

AV and Media Technology

Beckhoff control components for:

Details page 28

Audio installations

Video installations/projections

Stage managers desk

Interactions

Water effects

Lighting Technology

Beckhoff control components for:

Details page 27

Stage lighting

Lighting effects

Hall lighting

Building lighting

© Gino Santa Maria - Fotolia

Building Automation

Beckhoff control components for:

Details page 29

Operating and monitoring

Lighting

HVAC

Facade

Energy management

Stage Industry

For all stationary performances.

Theatres

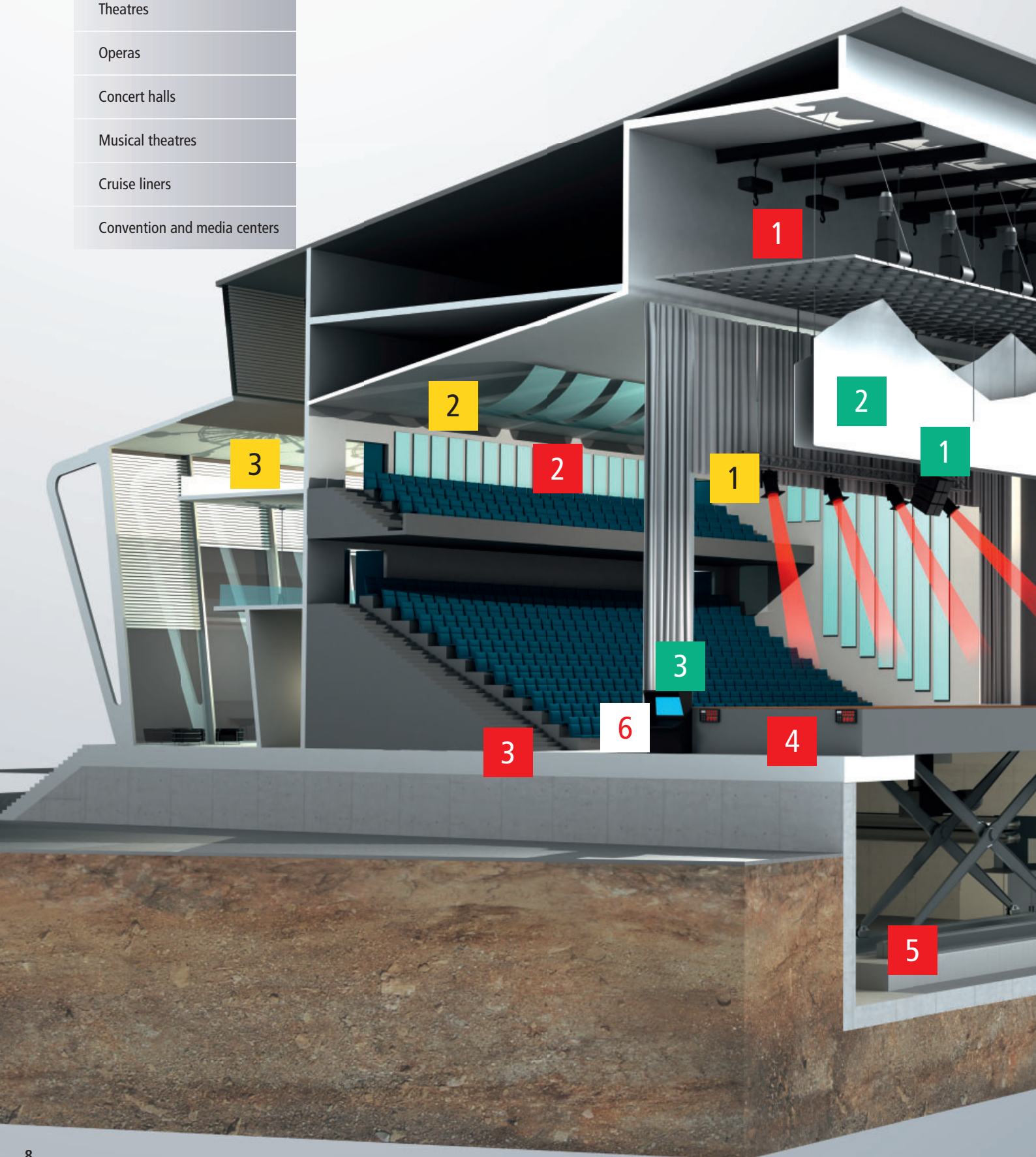
Operas

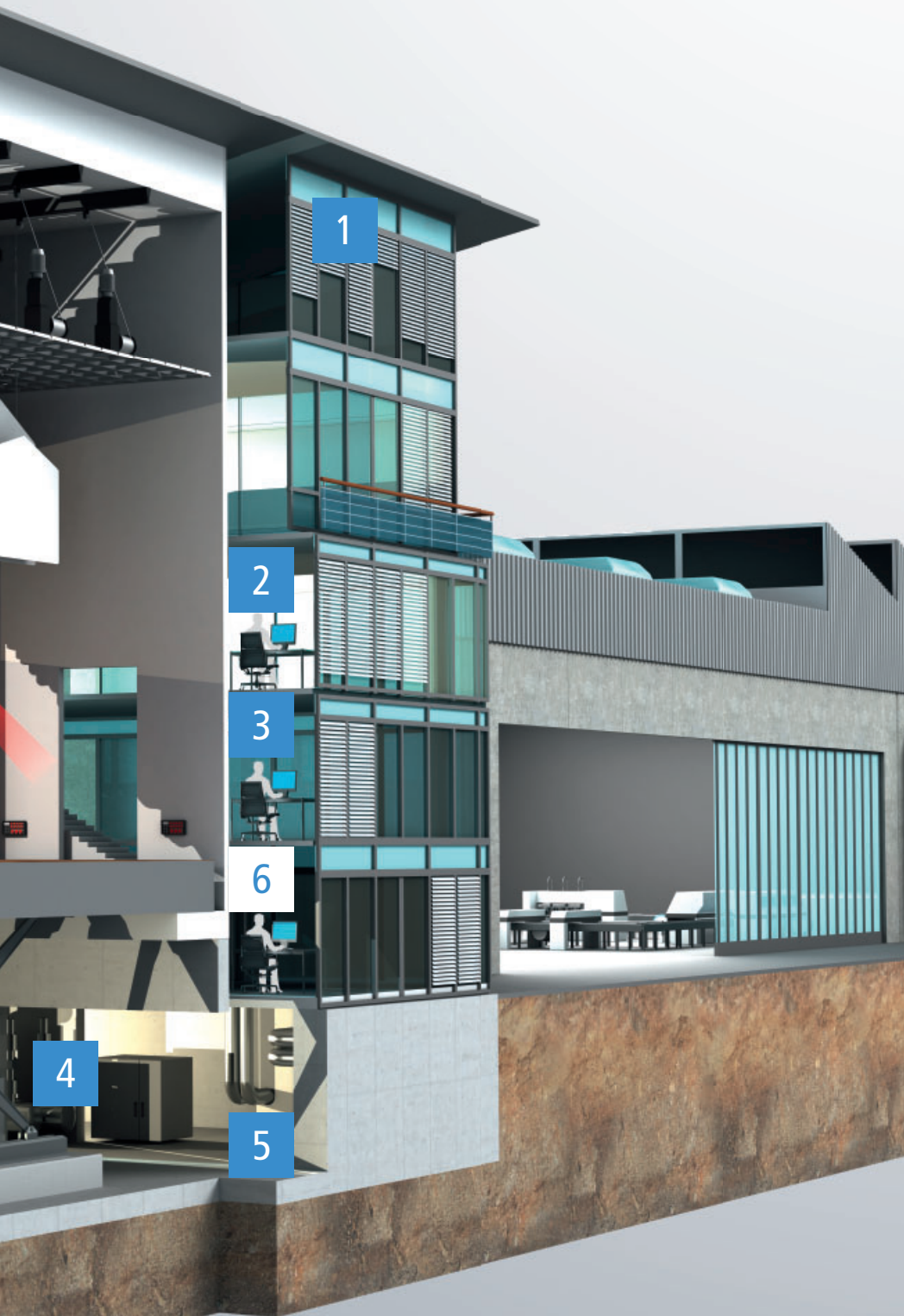
Concert halls

Musical theatres

Cruise liners

Convention and media centers





Beckhoff control components for:

Movable Objects

- 1 Upper machinery
- 2 Acoustical elements
- 3 Floor layout changes
- 4 Turntables/revolving stages
- 5 Lower machinery
- 6 Predictive maintenance

Lighting Technology

- 1 Stage lighting
- 2 Hall lighting
- 3 Building lighting

Audio/Video and Media Technology

- 1 Audio installations
- 2 Video installations/projections
- 3 Stage managers desk

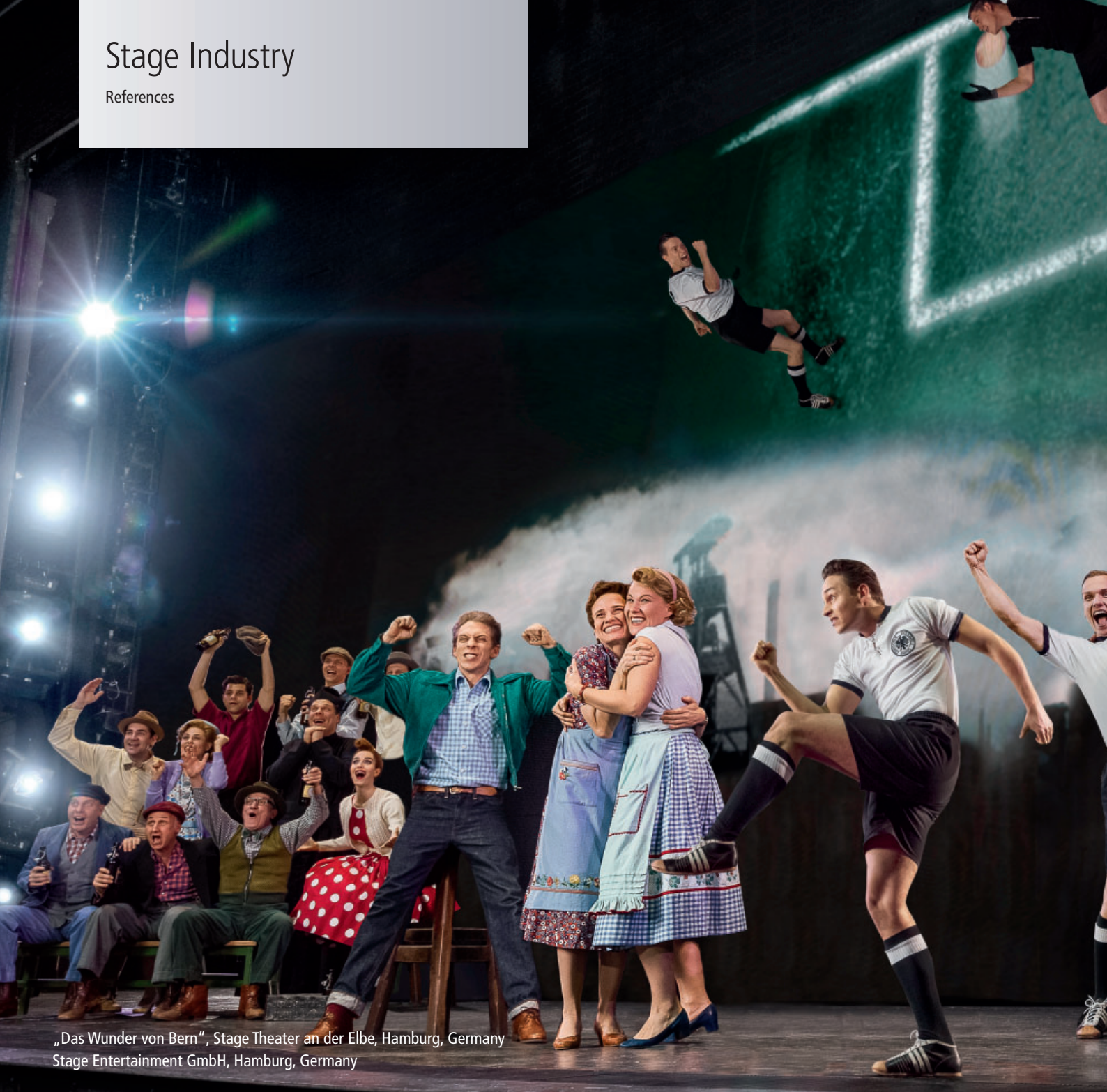
Building Automation

- 1 Facade/shading
- 2 Lighting
- 3 Operating and monitoring
- 4 HVAC
- 5 Watering
- 6 Energy data acquisition and data logging

Remote maintenance

Stage Industry

References



„Das Wunder von Bern“, Stage Theater an der Elbe, Hamburg, Germany
Stage Entertainment GmbH, Hamburg, Germany



Carré Theatre Amsterdam, the Netherlands
Stakebrand Technische Toneelinstallaties, Heeze, the Netherlands



Janáček Theatre, Brno, Czech Republic
Drivecontrol, s.r.o., Ujezd u Brno, Czech Republic

© Miroslav Krčma



Scala di Milano, Milan, Italy
ACR/Elettrica Ducale srl, Manzano, Italy



We reserve the right to make technical changes.

Stage Industry References, selection:

Movable Objects

- ACR/Elettrica Ducale srl, Manzano Italy:
 - Scala di Milano, Milan, Italy
- Drivecontrol, s.r.o., Újezd u Brno, Czech Republic:
 - Janáček Theatre, Brno, Czech Republic
 - Fomenko Theatre, Moscow, Russia
- Fisher Technical Services, Las Vegas, NV, USA:
 - Spiderman: Turn Off The Dark on Broadway, New York, USA
- Flying By Foy, Las Vegas, NV, USA:
 - American Idiot, Broadway NY, USA
 - Billy Elliot, Broadway NY, USA
 - Mary Poppins, Broadway NY, USA
 - Angels in America, Broadway NY, USA
 - Chitty Chitty Bang Bang, Broadway NY, USA
 - Spamalot, Broadway NY, USA
 - The Who's Tommy, Broadway NY, USA
- Helsinki Music Center, Helsinki, Finland
- HOAC Schweisstechnik GmbH, Moers, Germany:
 - Royal Theatre Copenhagen, Denmark
- Sibelius Hall, Lahti, Finland
- Stakebrand Technische Toneelinstallaties, Heeze, the Netherlands:
 - Carré Theatre Amsterdam, the Netherlands
- Theatertechnische Systeme GmbH, Syke, Germany:
 - Schauspielhaus Nürnberg, Germany
 - Staatstheater Wiesbaden, Germany
 - Schauspielhaus Düsseldorf, Kleines Haus, Düsseldorf, Germany
 - Deutsche Oper am Rhein, Düsseldorf, Germany
 - City Theatre, Hildesheim, Germany
 - City Theatre, Koblenz, Germany
 - City Theatre, Heilbronn, Germany
 - Stralsund Theatre, Germany
 - Music Theatre Malmö, Sweden

Lighting/Multimedia

- Ferry Porsche Congress Center, Zell am See, Austria
- Stage Entertainment GmbH, Hamburg, Germany:
 - „Das Wunder von Bern“, Stage Theater an der Elbe, Hamburg
- City Theatre, Kuopio, Finland
- Microsoft Technology Center, Cologne, Germany
- Miele administrative building, Gütersloh, Germany

Stage Managers Desk

- HFE professionelle Studiotechnik GmbH, Leipzig, Germany

Universities, working with Beckhoff

- Yale School of Drama/Yale Repertory Theatre, New Haven, USA
- University of Wisconsin, Madison, Wisconsin, USA
- Musikhochschule Köln, Cologne, Germany
- University of Shanghai, Shanghai, China:
 - Robots for Beijing Opera, China

Show Industry

For all mobile performances.

Concerts

Tours

Events

1

2

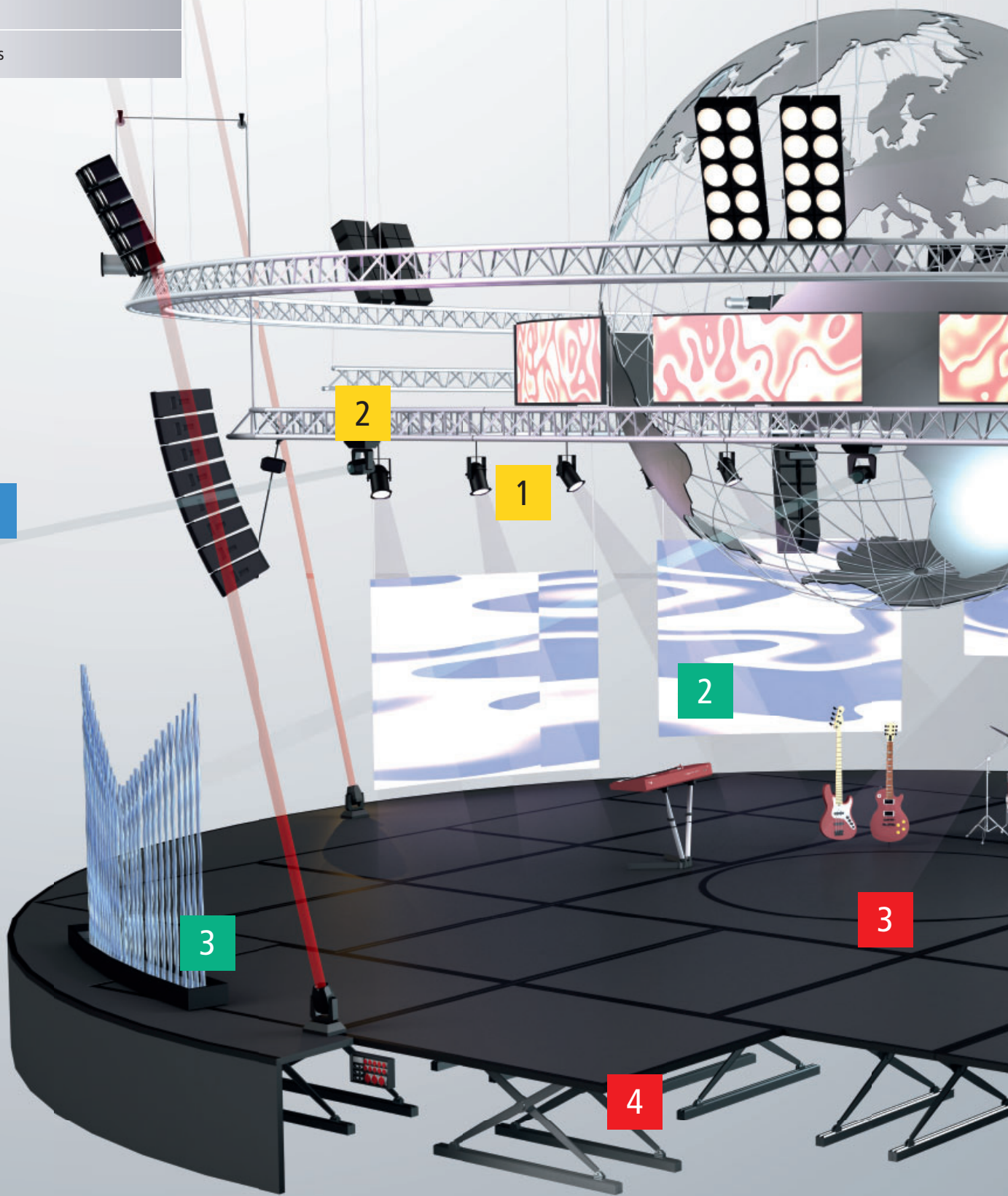
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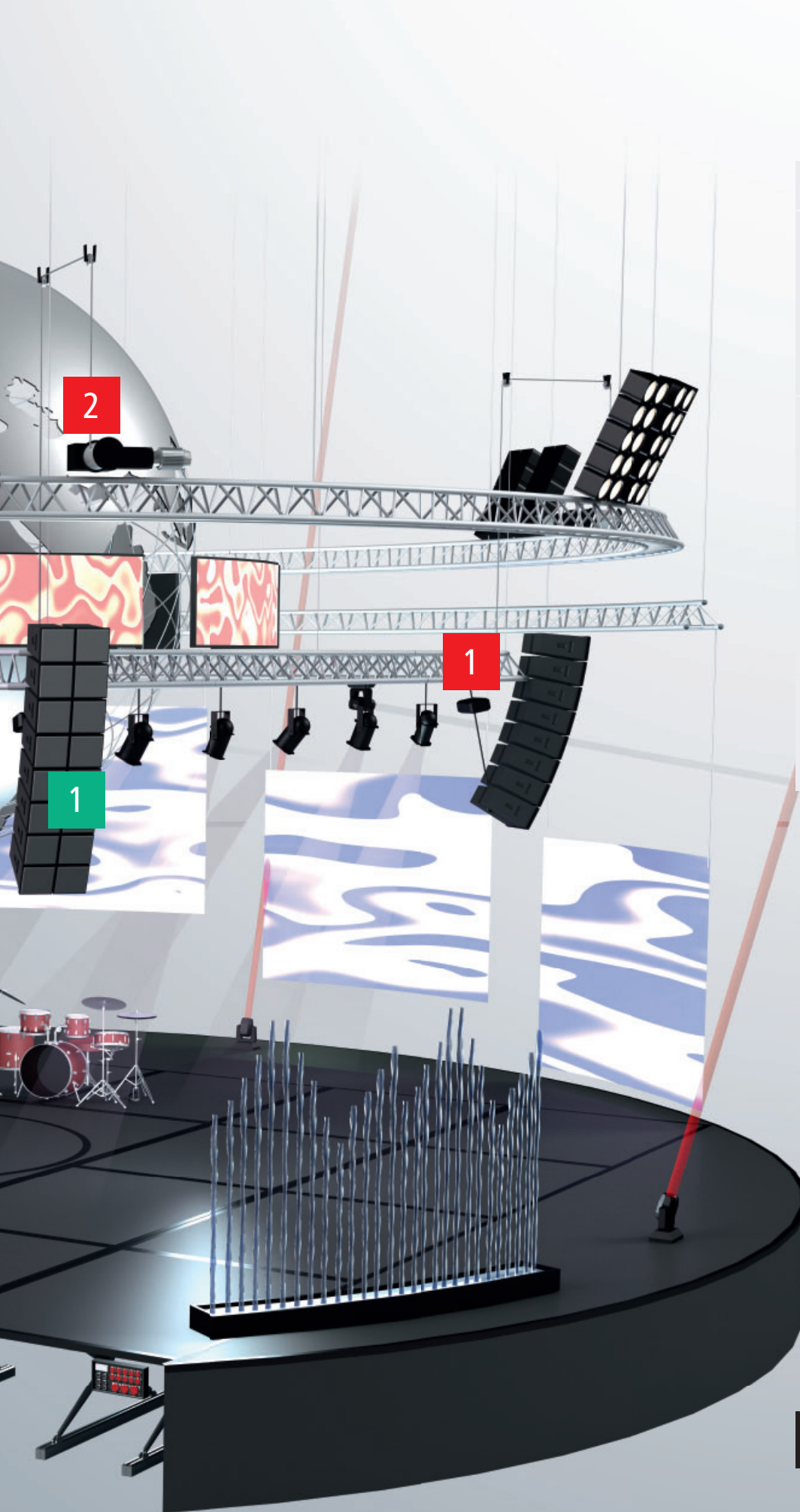
2

3

3

4





Beckhoff control components for:

Movable Objects

- 1 Hoists
- 2 Winches
- 3 Stage machinery
- 4 Platforms

Lighting Technology

- 1 Stage lighting
- 2 Lighting effects

Audio/Video and Media Technology

- 1 Audio installations
- 2 Video installations/projections
- 3 Water effects

Building Automation

- 1 optional integration into existing building automation

Remote maintenance

Show Industry

References



EVENTIONS PRODUCTS BV

Aquagraphic®
Aquatique Show, Straßbourg, France

AQUATIQUE
SHOW
INTERNATIONAL



SpiderCam®, Austria



BECKHOFF New Automation Technology

We reserve the right to make technical changes.



„Sensation White“, dance event
 Statecore Innovative Entertainment Technology BV,
 De Meern, the Netherlands



U2 360° Tour

© Photo, Ralph@Larmann.com

Show Industry References, selection:

- Ehrlich Entertainment, Germany:
 - Jules Verne & Porsche, Germany
 - 175 years railroad in Germany, Germany
 - various magic shows with water effects, Germany
- Fisher Technical Services, Las Vegas, NV, USA:
 - U2 Tour, USA
 - Lady Gaga Tour, USA
 - Bon Jovi Tour, USA
 - Black Eyed Peas Tour, USA
 - Shakira Tour, USA
- Show Systems, Orlando, FL, USA, SGPS/Show Rig, Las Vegas, NV, USA:
 - Aerosmith Tour, USA
 - Guns N' Roses Tour, USA
 - Alicia Keys Tour, USA
 - Beyoncé Tour, USA
 - Christina Aguilera Tour, USA
 - Justin Timberlake Tour, USA
 - Jay-Z Tour, USA
 - Gwen Stefani Tour, USA
- Sigma Services Inc., Special Effects, Florida, USA
- Skjonberg Controls for Entertainment Industry, USA:
 - various shows
- Statecore Innovative Entertainment Technology BV, De Meern, the Netherlands:
 - „Sensation White“, dance event

Unique Applications

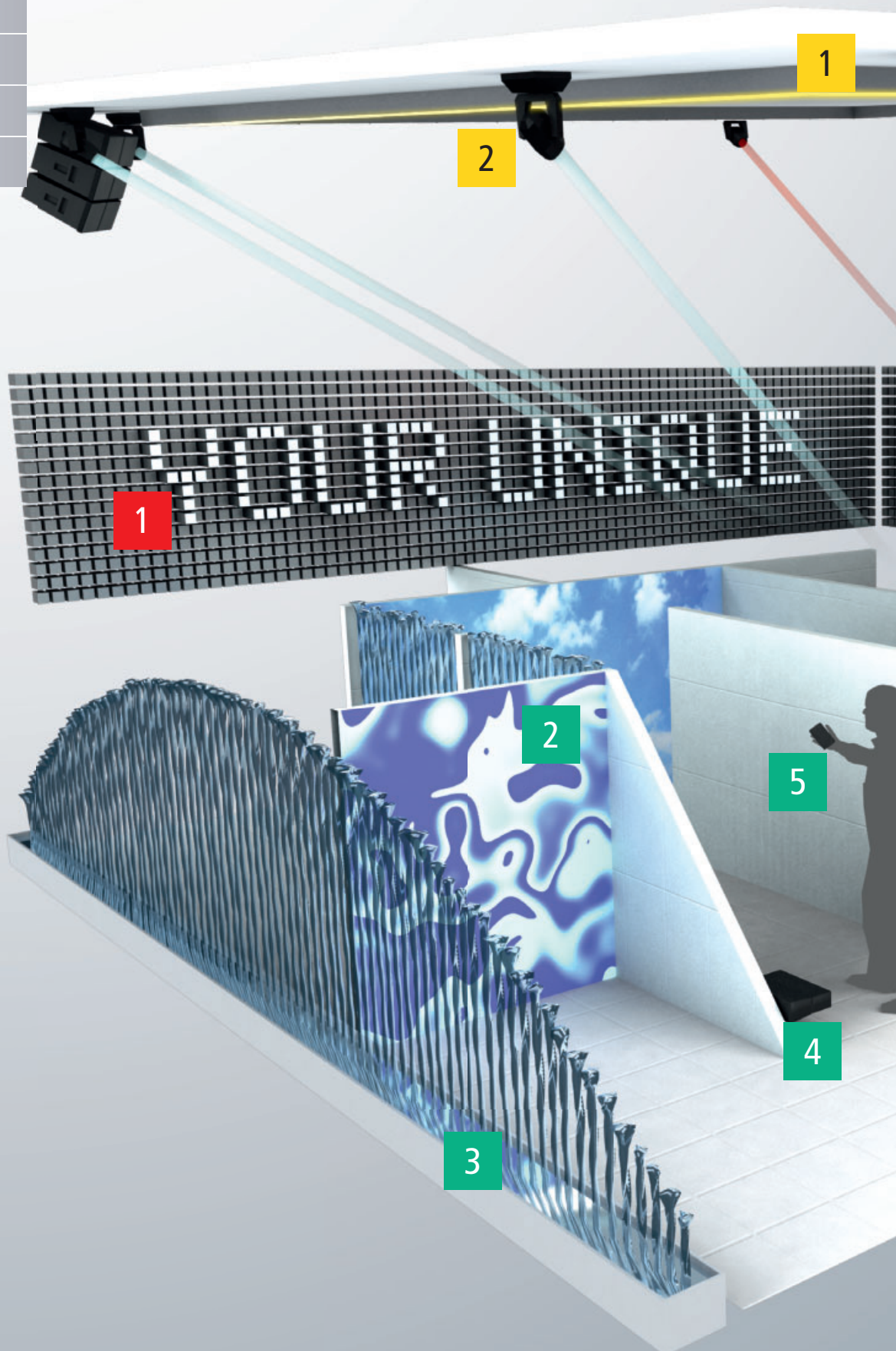
For installations with water, light and kinetics.

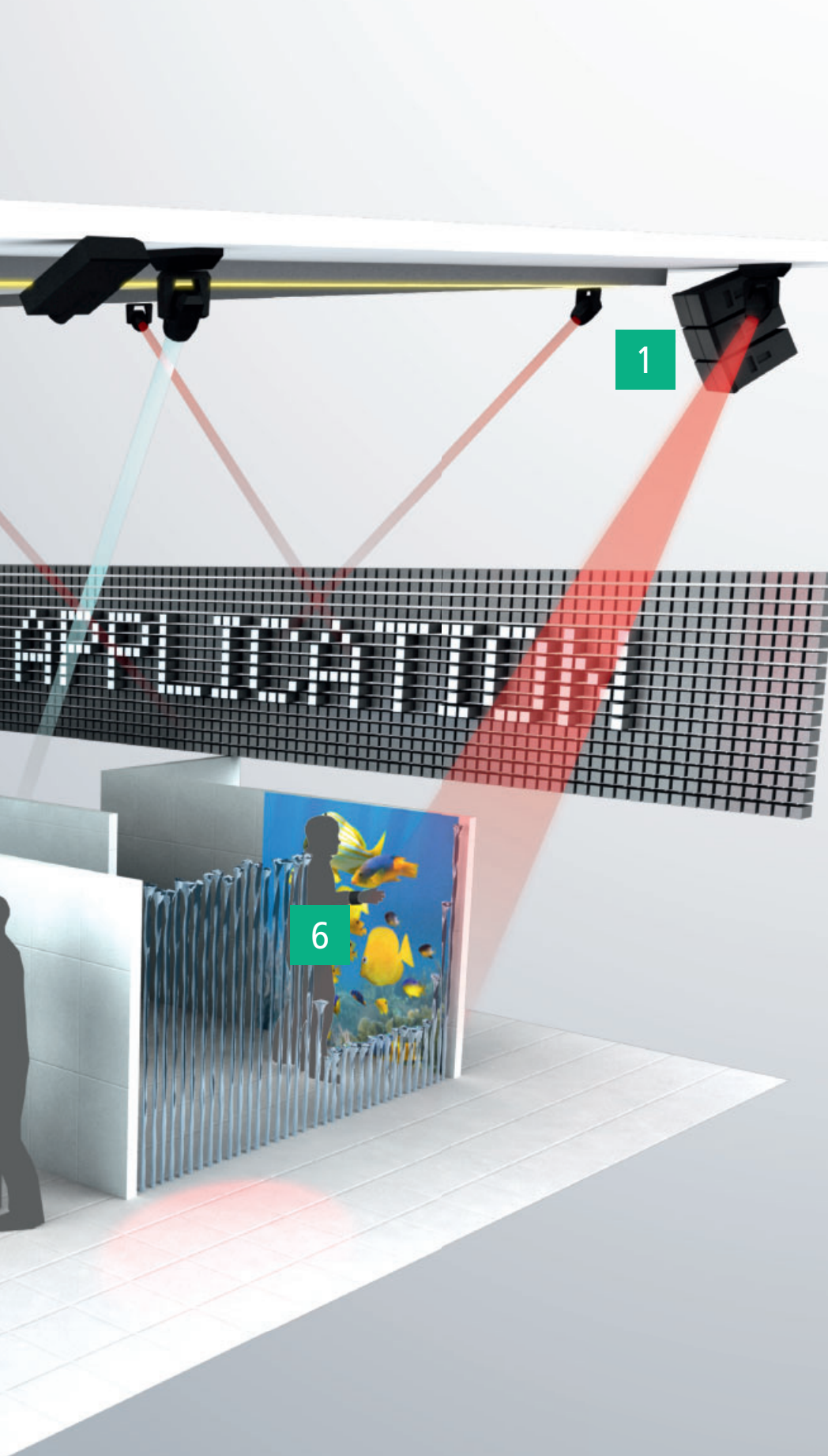
Art installations

Trade show and corporate presentations

Product stagings

Shop concepts





Beckhoff control components for:

Movable Objects

- 1 Kinetic objects

Lighting Technology

- 1 Lighting
- 2 Lighting effects

Audio/Video and Media Technology

- 1 Audio installations
- 2 Video installations/projections
- 3 Water effects
- 4 Interaction via Kinect sensor
- 5 Interaction via smartphone
- 6 Interaction via Wearables

Building Automation

- 1 optional integration into existing building automation

Remote maintenance

Unique Applications

References



„Kinetic Rain“, Changi Airport Singapore, Singapore
MKT AG/ART+COM AG, Munich, Germany



„Time-dynamic Model of Saxony“, Staatliches Museum
für Archäologie Chemnitz, Germany
MKT AG/ATELIER BRÜCKNER GmbH/
TAMSCHIK MEDIA + SPACE GmbH, Germany



„Breaking the Surface“, Lunden Norway
Scandinavian Design Group, Oslo, Norway

© James Fox, Abida, Norway



© Changi Airport Group Singapore



Energy center in the German pavilion at EXPO 2010 in Shanghai, China
Milla & Partner GmbH, Stuttgart, Germany

Unique Applications References, selection:

- AquaDom, Sea Life, Berlin, Germany
- Aquatique Show, Strasbourg, France:
 - Aquagraphic®
- As systems, Effect Engineering, Markt Einersheim, Germany:
 - Waterdoor, Flimser Wasserwelten, Flims, Switzerland
- Fisher Technical Services, Las Vegas, NV, USA:
 - Shanghai World Expo Sphere Array, Shanghai, China
 - Lincoln Center, New York, NY, USA
- LightHive (temporal installation from Alex Haw), London, U.K.
- Milla & Partner GmbH, Stuttgart, Germany:
 - Energy center in the German pavilion at EXPO 2010 in Shanghai, China
- MKT AG, Fine Exhibition Engineering, Munich, Germany:
 - „Time-dynamic Model of Saxony“, Staatliches Museum für Archäologie Chemnitz, Germany
 - „Kinetic Rain“, Changi Airport Singapore, Singapore
- Scandinavian Design Group, Oslo, Norway:
 - “Breaking the Surface“, Lundin Norway, Norway
- spidercam GmbH, Feistritz, Austria:
 - mobile camera system SpiderCam®

Entertainment Industry

For attractions.

Entertainment parks

Theme parks

Entertainment districts

TV studios





Beckhoff control components for:

Movable Objects

- 1 Stage machinery
- 2 Movable water features
- 3 Animatronics
- 4 4/5-D cinema effects
- 5 Predictive maintenance

Lighting Technology

- 1 Stage lighting
- 2 Lighting
- 3 Infrastructure lighting
- 4 Lighting effects

Audio/Video and Media Technology

- 1 Audio installations
- 2 Video installations/projections
- 3 Interactions
- 4 Water effects
- 5 Air effects

Building Automation

- 1 Facade/shading
- 2 Lighting
- 3 Operating and monitoring
- 4 HVAC
- 5 Infrastructure
- 6 Visitor management
- 7 Energy data acquisition and data logging

Remote maintenance

Entertainment Industry

References



Interactive cinema with 4-5-D special effects
Alterface S.A., Wavre, Belgium



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



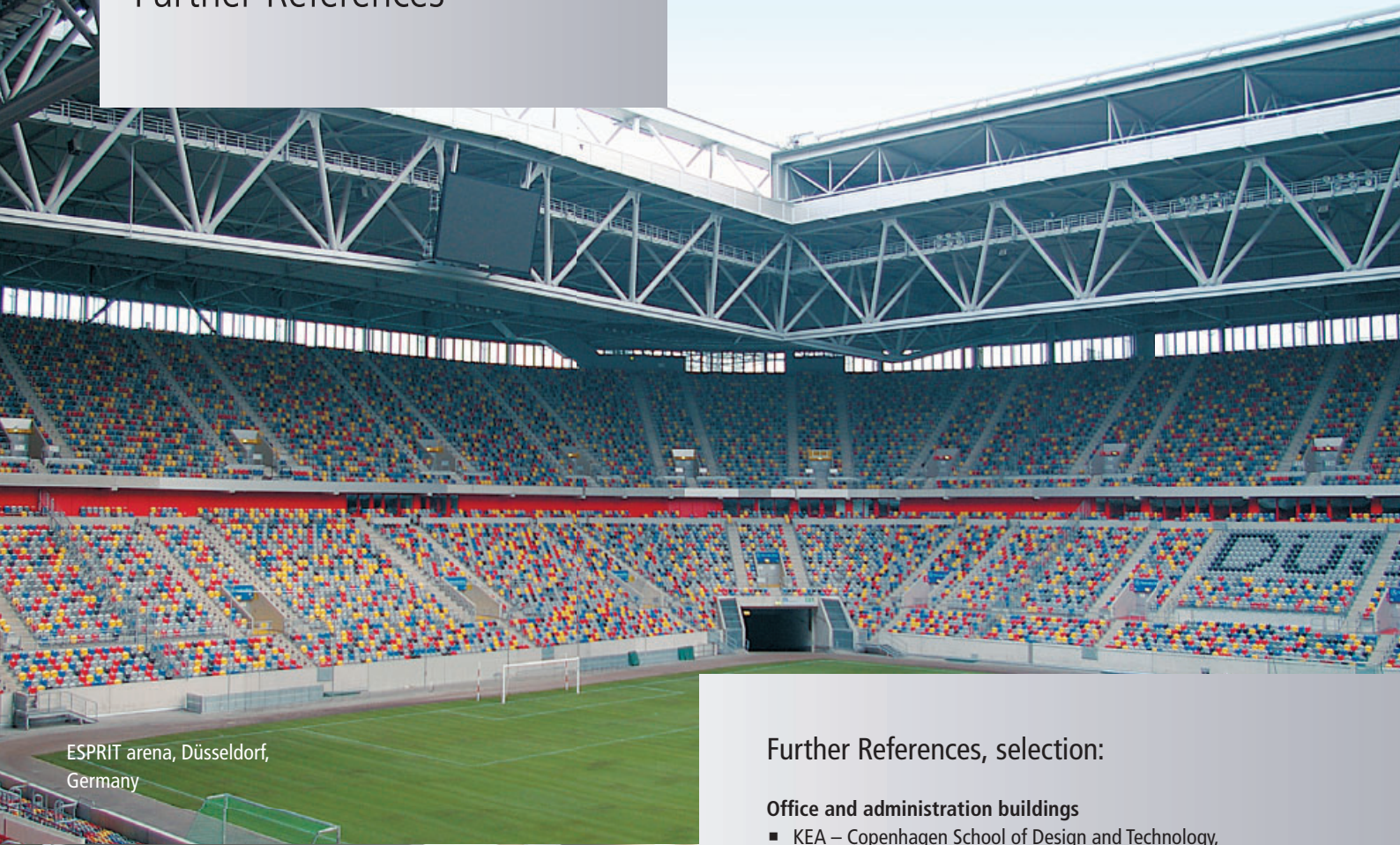
Celine Dion „A New Day“, Caesar’s Palace, Las Vegas, NV, USA
Flying By Foy, Las Vegas, USA

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

Entertainment Industry References, selection:

- Alterface Projects S.A., Wavre, Belgium:
 - Interactive cinema with 4-5-D special effects for entertainment parks
- City of Dreams Casino, Macau, China
- Flying By Foy, Las Vegas, NV, USA:
 - „A New Day“, Caesar’s Palace, Las Vegas, NV, USA
- Hytechnology Inc., Shenzhen, China:
 - Songs of birds, Wuhu Fantawild Culture-tech Inc., China
 - Nuwa patches up the sky, Jinan Fantawild Culture-tech Inc., China
- K. D. Decoratives Ltd., Huddersfield, U.K.:
 - „The Night before Christmas“ (Sundown Adventure Land)
- Sigma Services Inc., Special Effects, Florida, USA
- Steel Construction and Robotic Machinery (S.Co.R.E), Amchit, Libanon:
 - Race simulator „Real-Motion“

Further References



ESPRIT arena, Düsseldorf,
Germany



Center for Virtual Engineering at the Fraunhofer IAO Institute,
Stuttgart, Germany

© Christian Richters



Deutsches Museum, Munich, Germany

Further References, selection:

Office and administration buildings

- KEA – Copenhagen School of Design and Technology, Copenhagen, Denmark
- KölnTriangle, Cologne, Germany
- Microsoft Deutschland GmbH, Cologne, Germany
- Schüco Technology Center, Bielefeld, Germany
- Tower 185, Frankfurt a. M., Germany
- Zayed University, Abu Dabhi, UAE
- Center for Virtual Engineering at the Fraunhofer IAO Institute, Stuttgart, Germany

Hotels

- Holiday Inn, Samara, Russia
- Park Hotel Vitznau, Vitznau, Switzerland
- The Dolder Grand, Zurich, Switzerland

Museums

- Deutsches Museum, Munich, Germany
- Charlottenburg Palace (new wing), Berlin, Germany
- Sisi Museum in the Vienna Hofburg, Vienna, Austria
- Stadtmuseum Dresden, Germany

Stadiums

- Allianz Arena, Munich, Germany:
Building automation
 - VA Tech Elin EBG, Austria
- ESPRIT arena, Düsseldorf, Germany:
VIP box
 - GTE Gebäude- und Elektrotechnik GmbH, Germany
- Veltins-Arena auf Schalke, Gelsenkirchen, Germany:
Movable football pitch
 - Industriële Automatisering Kremer BV, the Netherlands

The hard and software platform

From I/O to motion.



Embedded PC: IPC with integrated I/O level



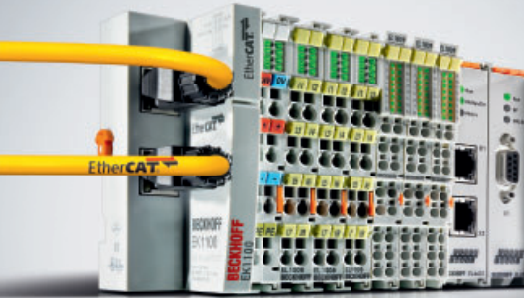
Industrial PC: Control cabinet and Panel PC



Control Panel: Multitouch display and Control Panel

The Beckhoff co-stars behind the scenes.

At the heart of the control system are robust, scalable Industrial PCs (IPCs) with TwinCAT as the integrated automation software. Together with EtherCAT, the Ethernet-based, real-time capable fieldbus, these IPCs offer a high-performance automation platform for integrating PLC, visualisation, Motion Control, safety technology and measurement technology. With more than 400 signal types, the Beckhoff I/O system covers the entire range of actors and sensors, from digital and analog standard signals to the integration of lighting equipment, Motion Control, SIL 3-compliant safety functions through to Condition Monitoring. All requirements for precision control of moving objects are fulfilled by the broad range of scalable drive technology components, ranging from servo and stepper terminals for small motor control to high-performance Servo Drives.



EtherCAT I/Os: Broad I/O spectrum in IP 20 and IP 67



AX5000: Digital Compact Servo Drive



AM8000: Synchronous Servomotor



Servo terminals: Compact Drive Technology

TwinCAT: Software for engineering and runtime



TwinSAFE: Integrated safety solution

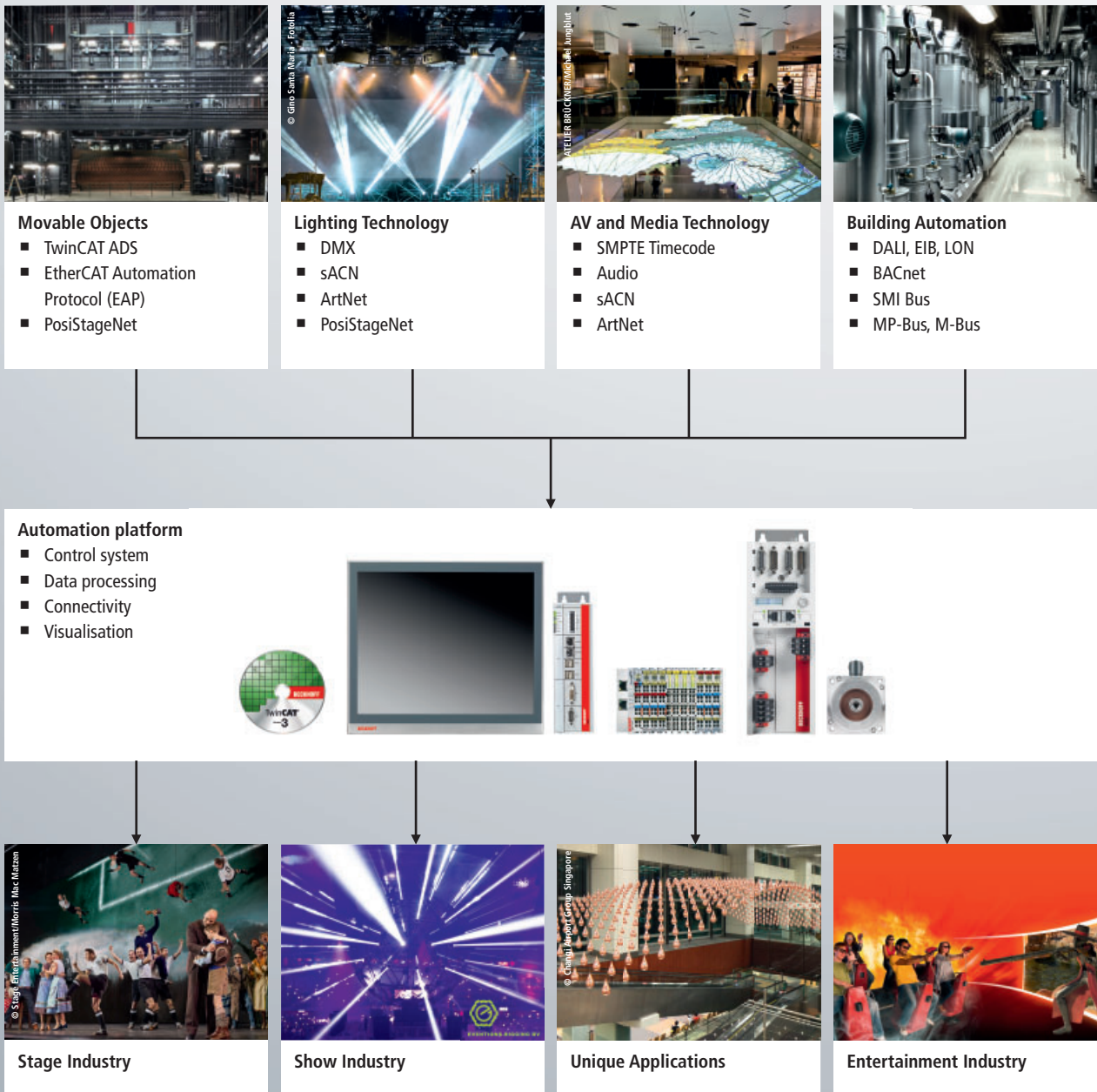


EtherCAT: Integrated real-time fieldbus for ultra-fast process communication



From single components to integrated systems.

Through open software and hardware interfaces, PC-based control is ideal for centralised or decentralised control of all functions involved in stage, show, and concert technology: such as moving objects, lighting technology, AV and media technology as well as building automation. In addition to integration of DALI, LON, EIB/KNX, dimmers and LED, the most commonly used interfaces are available to system integrators for connecting AV multimedia systems. With DMX, sACN, SMPTE Timecode, ArtNet and PosiStageNet, Beckhoff "speaks" the languages of the industry, ensuring the most varied areas of stage and show technology can be controlled on a foundation of standard control components. System integrators can choose the solution that best suits their applications in terms of performance and cost from the comprehensive portfolio of modular automation components.

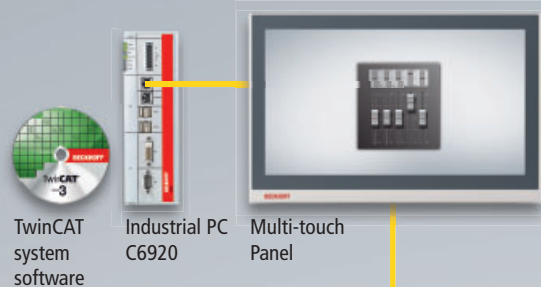


Movable Objects

Beckhoff control components for:

Stage machinery
Hoists
Winches
Kinetic objects
Animatronics

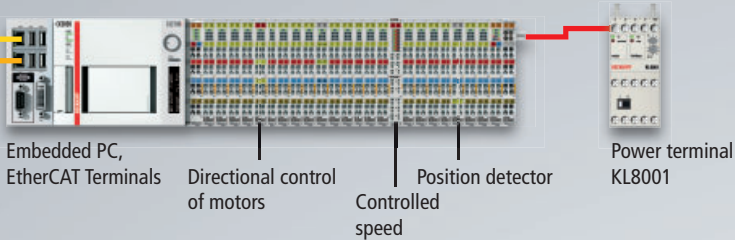
Control level



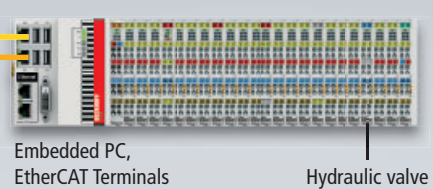
- TwinCAT ADS
- OPC UA
- Modbus
- PosiStageNet
- EAP
- Ethernet TCP/IP
- EtherNet/IP

Ethernet TCP/IP

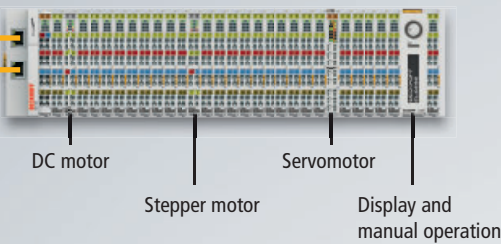
Simple Drive Technology



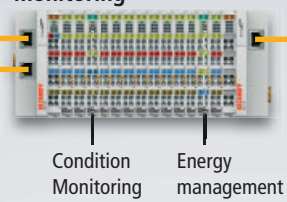
Hydraulic control



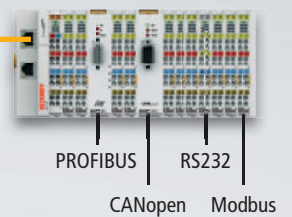
Compact Drive Technology



Maintenance and monitoring



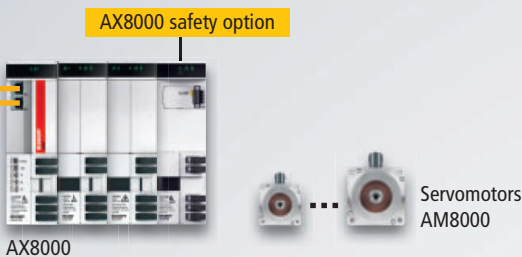
Communication



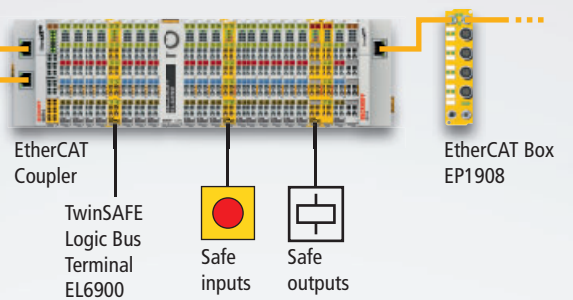
EtherCAT

EtherCAT

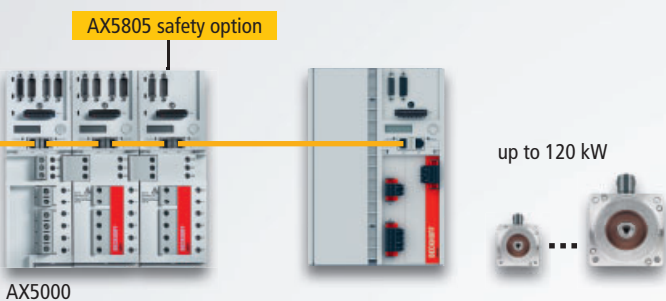
Multi-axis servo system



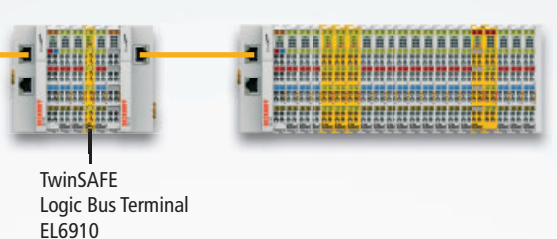
Safety



1-axis and 2-axis Servo Drives



Safety

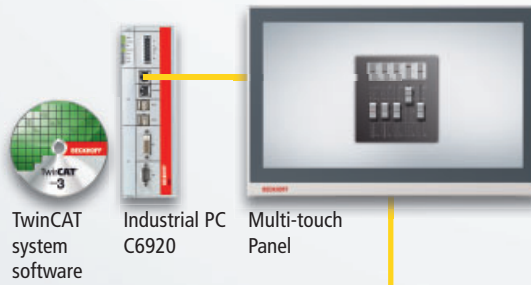


Lighting Technology

Beckhoff control components for:

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

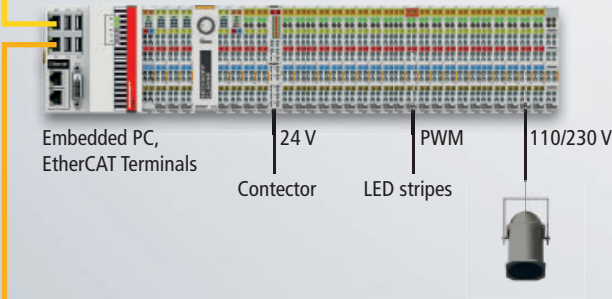
Control level



- TwinCAT/ADS
- OPC UA
- BACnet
- sACN
- PosiStageNet
- ArtNet
- Ethernet TCP/IP

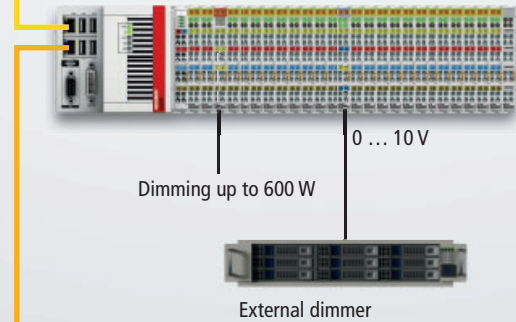
Ethernet TCP/IP

Digital lighting control



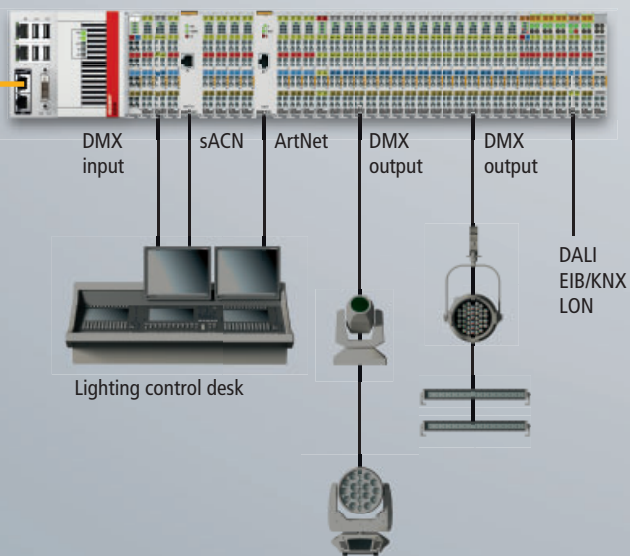
EtherCAT

Analog lighting control

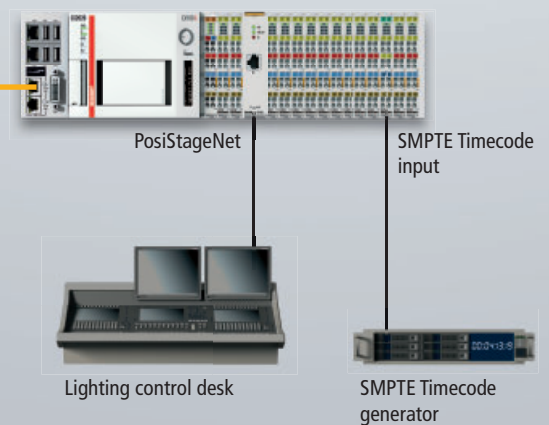


EtherCAT

Protocols for lighting technology



Protocols for communication

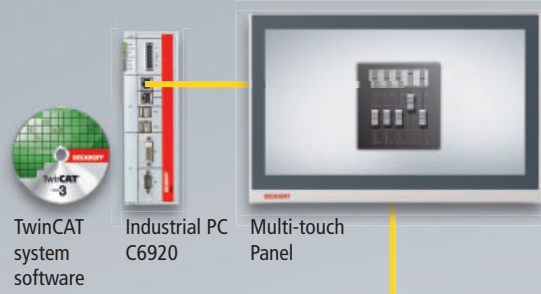


AV and Media Technology

Beckhoff control components for:

- Audio installations
- Video installations/projections
- Stage managers desk
- Interactions
- Water effects

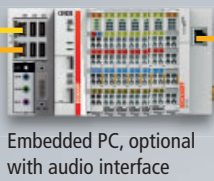
Control level



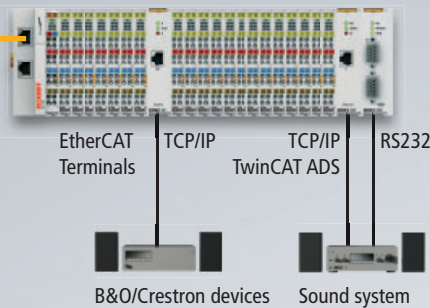
- TwinCAT ADS
- OPC UA
- BACnet
- sACN
- PosiStageNet
- ArtNet
- Ethernet TCP/IP

Ethernet TCP/IP

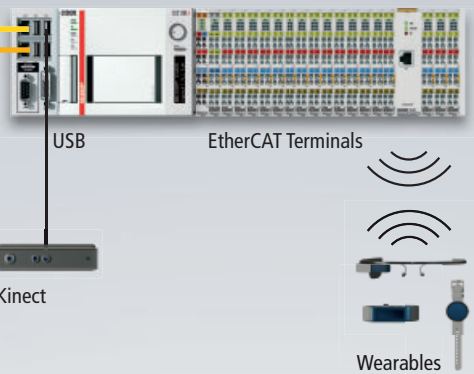
Audio, integrated



Audio, external



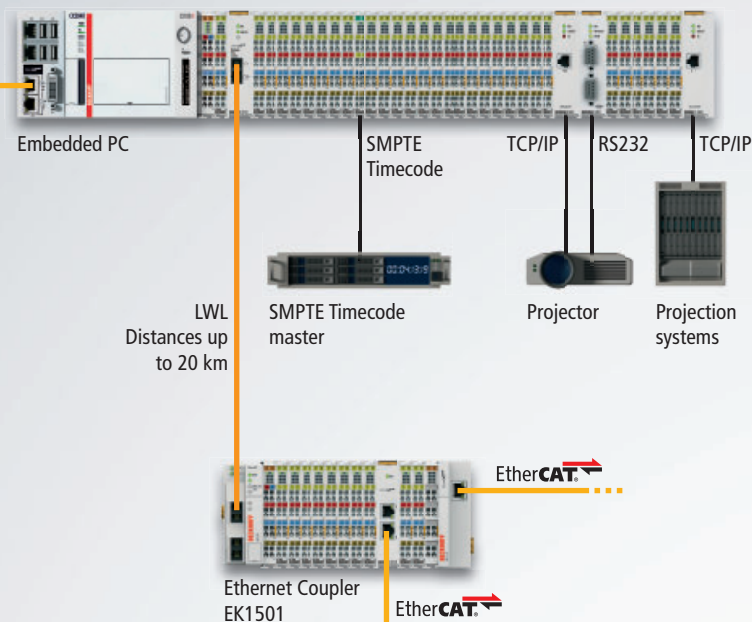
Multimedia



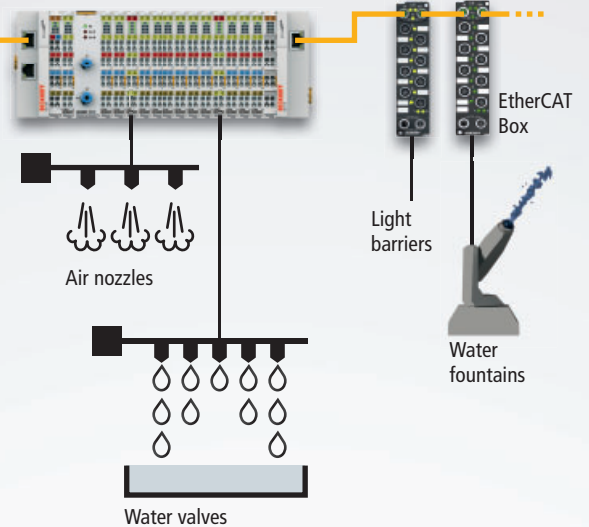
EtherCAT

EtherCAT
Distances up to 100 m

Video



Special effects

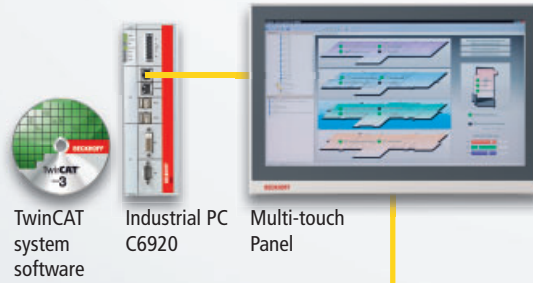


Building Automation

Beckhoff control components for:

Operating and monitoring
Lighting
HVAC
Facade
Energy management

Control level



TwinCAT/ADS
OPC UA
BACnet

Ethernet TCP/IP

Operating and monitoring



Embedded PC, EtherCAT Terminals

Bus Terminals



Remote control



Timer



Control panel



Manual operating module

Lighting



Embedded PC, Bus Terminals

DALI



Lighting

LON



Lighting



Control panel

EIB/KNX



Occupancy sensor



Switchable power outlets

HVAC



Embedded PC, Bus Terminals



Ventilation



Heating circuit



Temperature



Cooling/
dehumidifying



Air quality control

Facade



Bus Terminal Controller, Bus Terminals

SMI



Shading



Access control

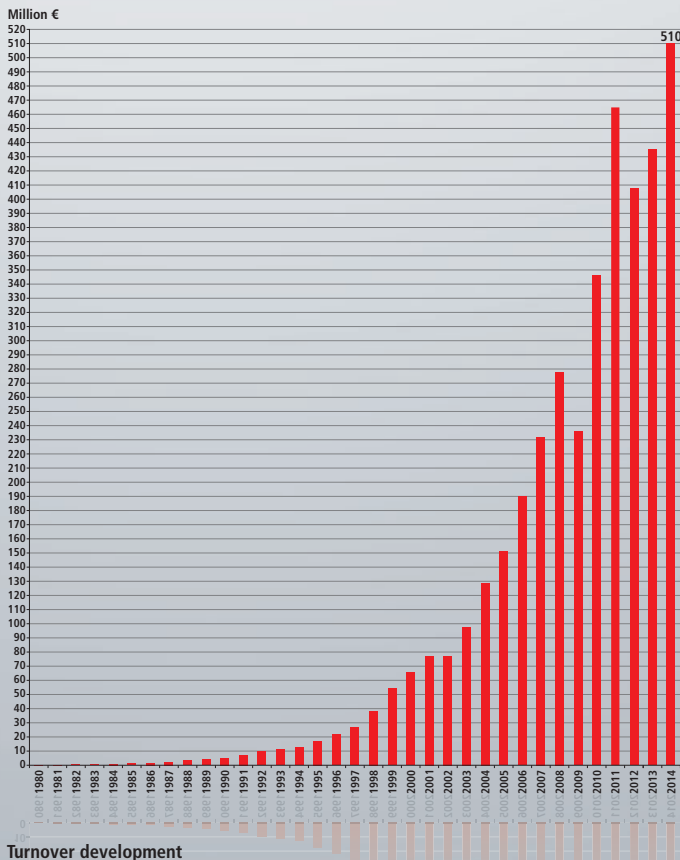
Beckhoff – New Automation Technology

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 seamlessly matched control system are available for all industries. The Beckhoff "New Automation Technology" philosophy represents universal and open control and automation solutions used in a wide variety of applications worldwide, ranging from CNC-controlled machine tools to intelligent building automation.

► www.beckhoff.com

Beckhoff at a glance

- Headquarters Verl, Germany
- Turnover 2014: 510 million € (+17 %)
- Staff worldwide: 2.800
- Branch Offices Germany: 11
- Subsidiaries/Branch Offices worldwide: 34
- Distributors worldwide: in more than 70 countries (as of 04/2015)



Worldwide presence on all continents

The worldwide presence of Beckhoff in more than 70 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.

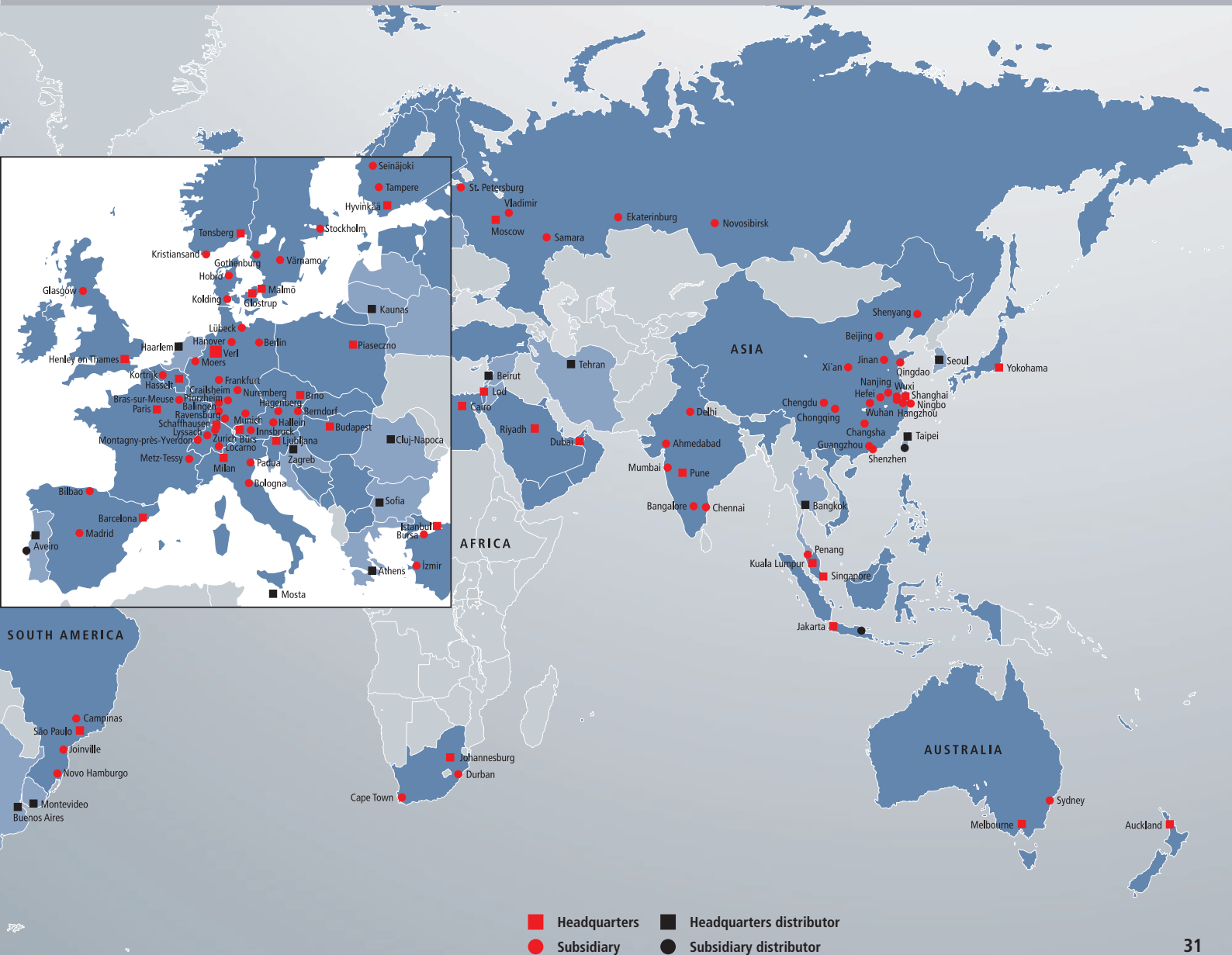
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- Further information and industry solutions ► www.beckhoff.com/stage
- Beckhoff catalogues and flyers as download ► www.beckhoff.com/media

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