6ª SESIÓN

BECKHOFF
New Automation Technology

JUEVES 6, 12:50-14:00

XTS, eXtended Transport System

el software sustituye al sistema mecánico con mayor funcionalidad y flexibilidad

Ponente:

- **D. Lluís Moreno (Responsable de Producto BECKHOFF)**

Agenda

Breve Introducción empresa

História de las revoluciones tecnológicas

Sistemas XTS, concepto, modularidad, funcionalidad, así como aplicaciones/cinemáticas tipo

Capacidad de control del XTS

Intercomunicación del XTS / TwinCAT3 a IT

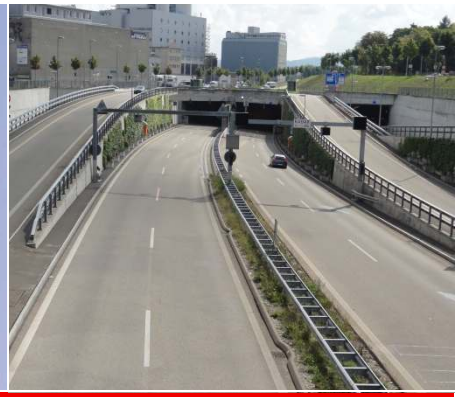
Aplicación real en máquina dosificadora

Reliable experience: 30 years in Industrial Automation

With Beckhoff, you choose a partner with vast experience:

For more than 30 years, Beckhoff provides solutions and components in Machine-, Factory-, Process-, Energy-, Infrastructure- and Building Automation



Reliable experience

A small garage and a big idea: the beginning

Reliable management: founder Hans Beckhoff…

Dipl.-Phys. Hans Beckhoff

Managing Director

since 1980:

- Managing Director, shareholder and founder of Beckhoff Automation GmbH
- Finished his studies with a Diploma in Nuclear Physics in Berlin and Munster, Germany

Reliable business development

Headquarters Verl: enough capacities to trust in

Beckhoff Corporate Headquarters and R&D Centre

12,000 m²

Boards
(4,500 m²)

I/O
(4,700 m²)

IPC
(6,500 m²)

Drives
(10,600 m²)

Engineer-ing
(5,000 m²)

Service
(1,850 m²)

Warehouse
(4,000 m²)

37,150 m²

Total:
49,150 m²

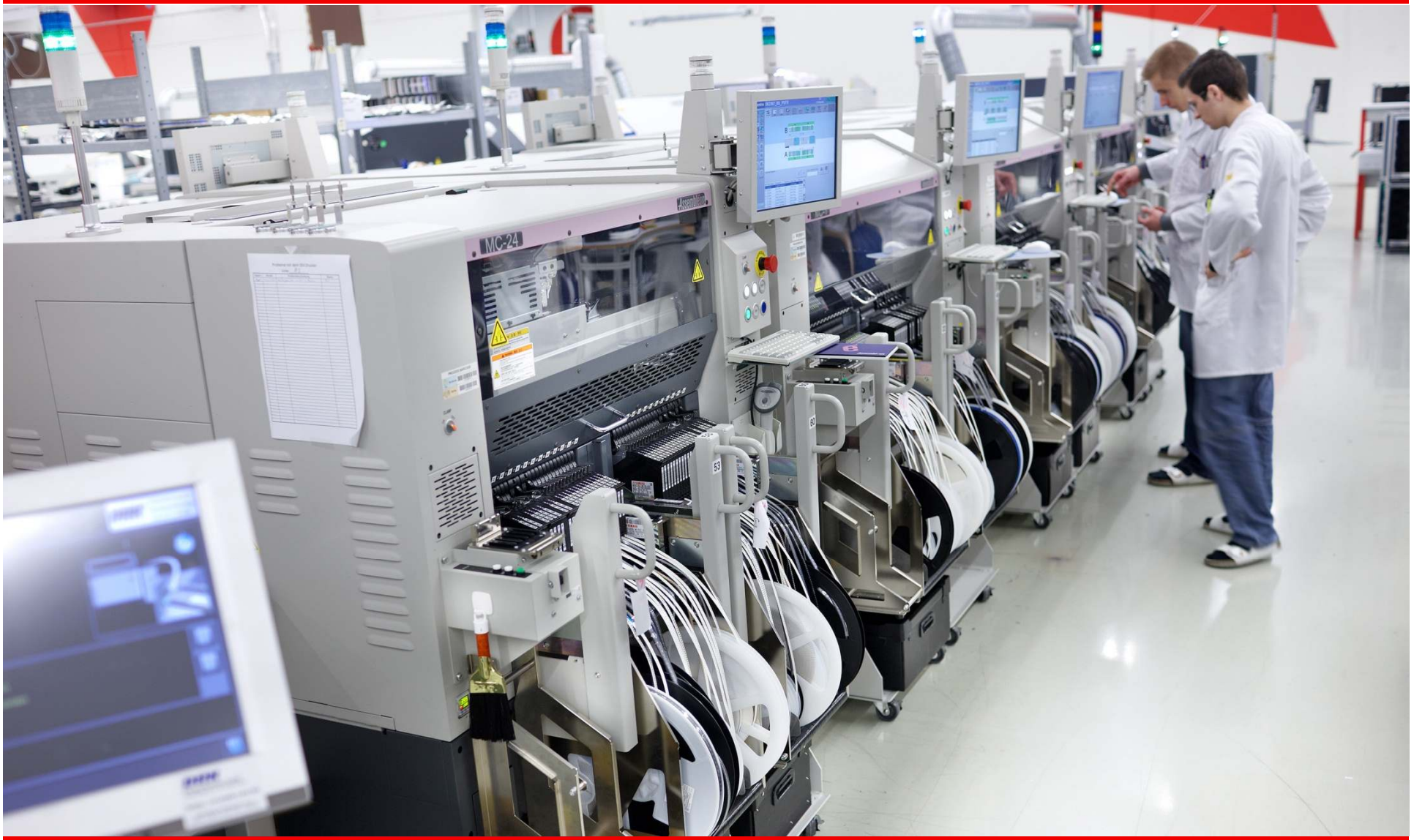
Decisive success factor: “Made in Germany”

As a technology leader, Beckhoff does not compromise on quality.
All our products are developed and produced by Beckhoff in Germany.

All products are CE-compliant and comply to other internationally applicable norms (e.g. UL, CSA)

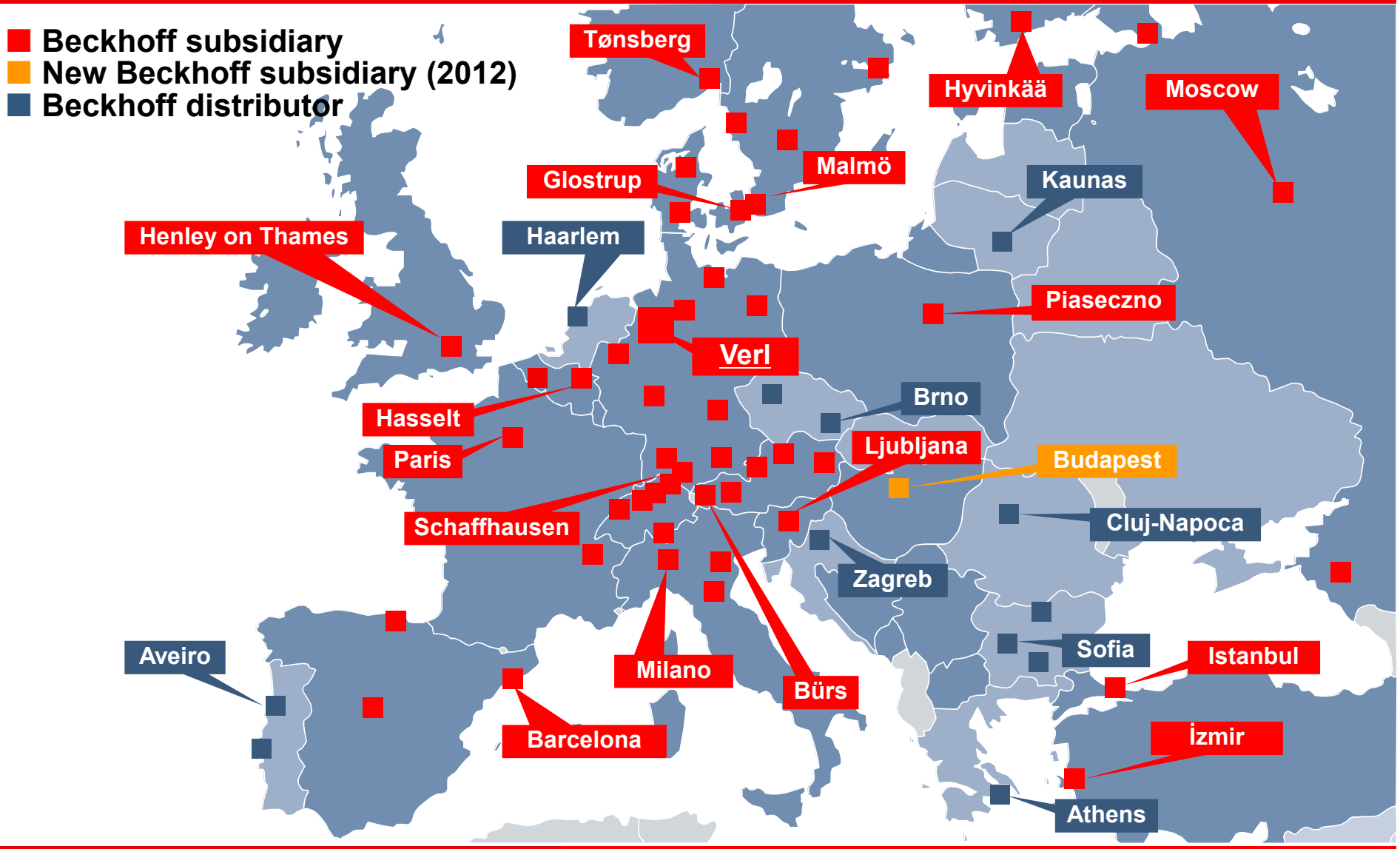
Reliable business development

Our in-house electronic board manufacturing…



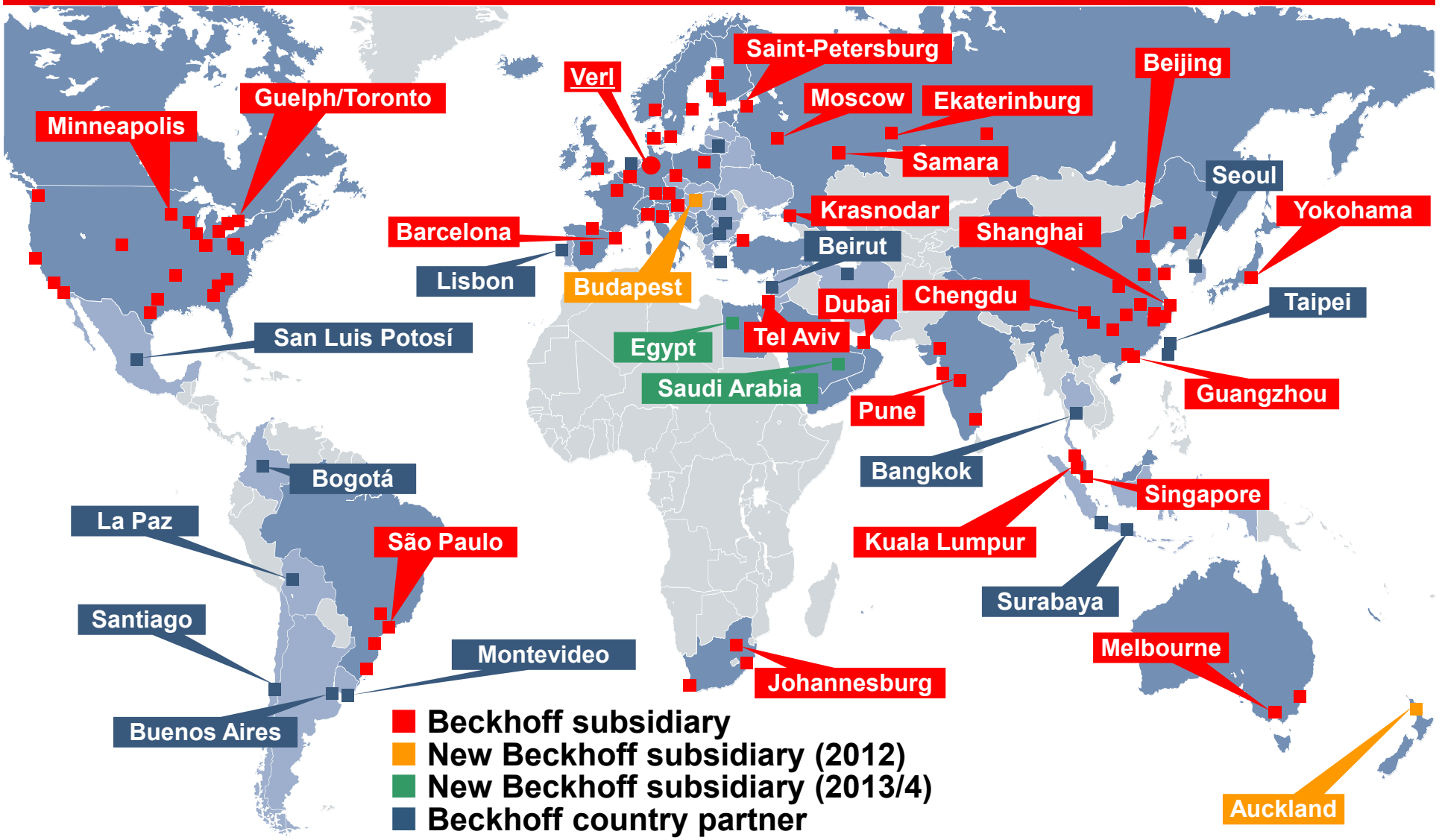
Reliable business development

Our European Sales Network



Reliable business development

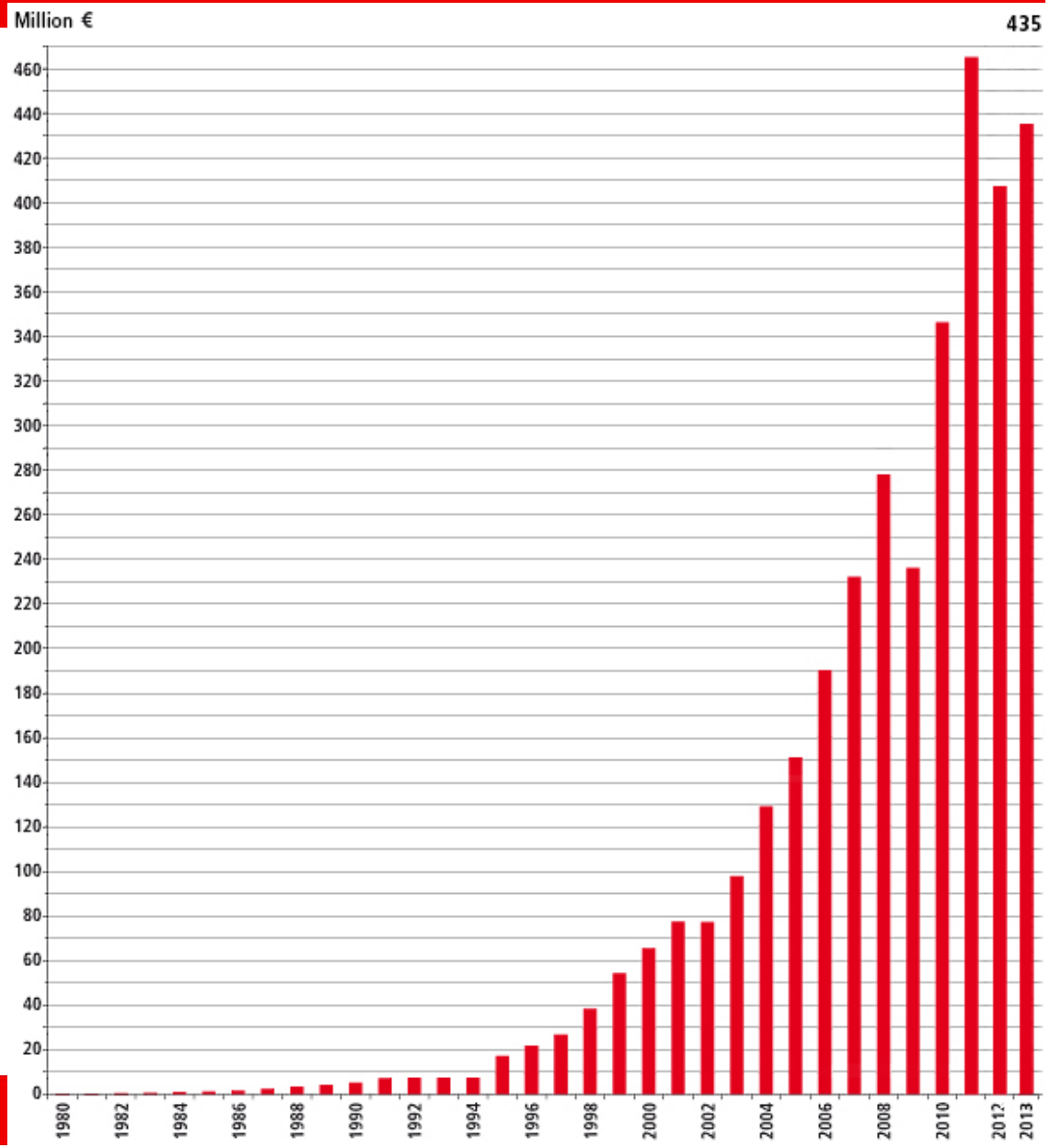
Our Worldwide Sales Network



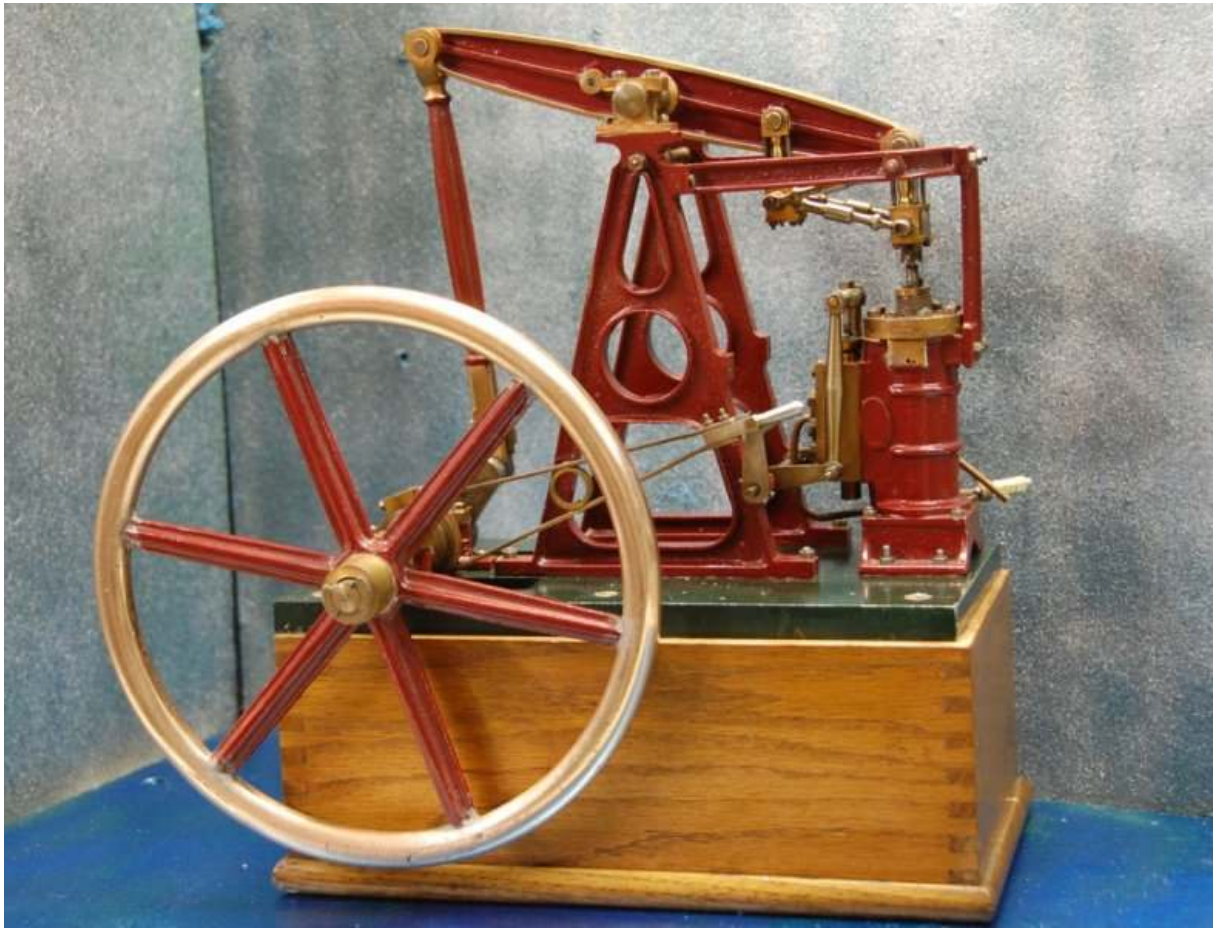
Reliable business development

Continuous growth in worldwide sales…

- Harmonic and organic growth
- Consistent technology development
- Stable customer base
- Stable employee base
- Financial stability
- Factor 93 since 1990
- (8 since 2000)



Revoluciones tecnológicas



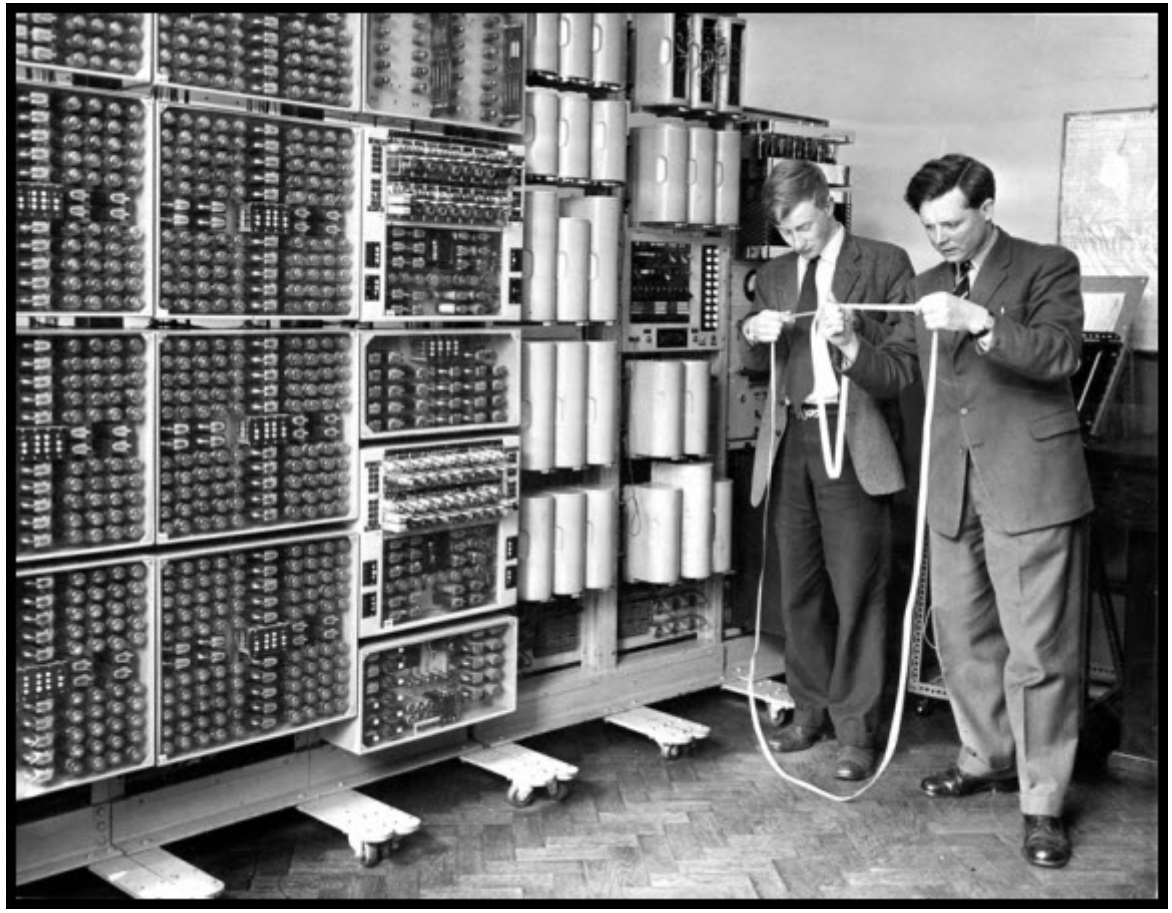
Motor/Máquina de vapor 1600-1700

Revoluciones tecnológicas

Primer teléfono

1876

Revoluciones tecnológicas



Habitaciones computacionales

1940s – 1960s

Revoluciones tecnológicas

Primer PLC

1968

Revoluciones tecnológicas

Primer XTS,
nuevo concepto mecatrónico

eXtended Transport System
2012

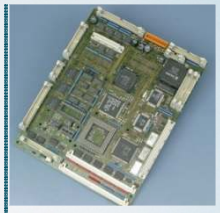
Combinación de motor Lineal
y servomotor rotativo

30 years ahead with PC Control

- The Company with One-Step-Ahead Technology







µC-based Control | PC-based Control | PC-based Control

1989 1981 1982 1983 1984 1985 1987 1991 1992 1994 1997

1986 **First PC-based machine controller was delivered by Beckhoff**

1988 S1000: Software PLC/NC on PC (DOS)

1989 Lightbus: Fibre-optic fieldbus for fast I/O coupling

1990 C2000: All-in-one Motherboard

1993 S2000: Software PLC/NC/CNC on PC (DOS)

1995 **Bus Terminals: Fine granular I/Os**

1996 TwinCAT: Standard real-time automation software running on Windows

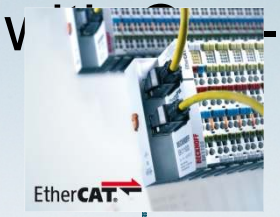
1998 CP-Link: Remote Control Panels up to 100 m from IPC

1st Revolution

2nd Revolution

30 years ahead with PC Control

- The Company with One-Step-Ahead Technology



PC-based Control

PC-based Control

2000 2001 2004 2007 2009 2011

1999
Fieldbus Box:
The compact
IP 67 modules

2002
CX1000:
Embedded
PC –
Modular
DIN rail
Industrial PCs

2003
EtherCAT:
Real-time
Ethernet
for automation

2005
TwinSAFE:
The compact
safety solution

AX5000:
EtherCAT
Servo Drive

2006
Scientific
Automation:
Measurement
technology and
Engineering science
as a control
component

2008
XFC:
eXtreme Fast
Control for
efficient machines
and plants

2010
TwinCAT 3:
Engineering tool
for object-oriented
and modular
automation

2012
XTS:
eXtended
Transport System

3rd Revolution

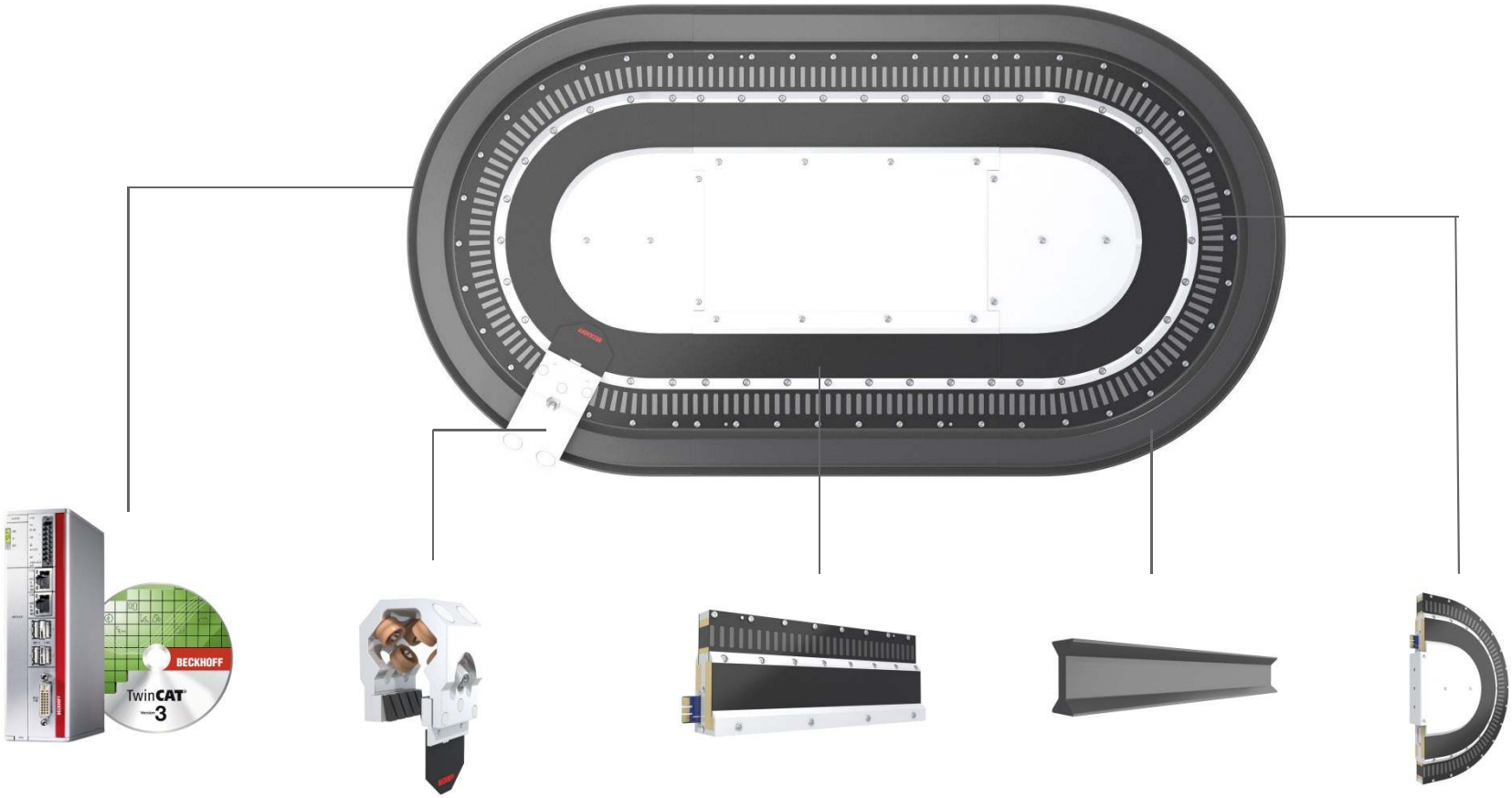
Evolution 4th Revolution

XTS | technical Details

Tecnologia – nuevo concepto Mecatrónico

XTS | New degrees of freedom for mechanical engineering

The modular assembly system XTS



Industrial-PC
TwinCAT NC PTP
TwinCAT XTS

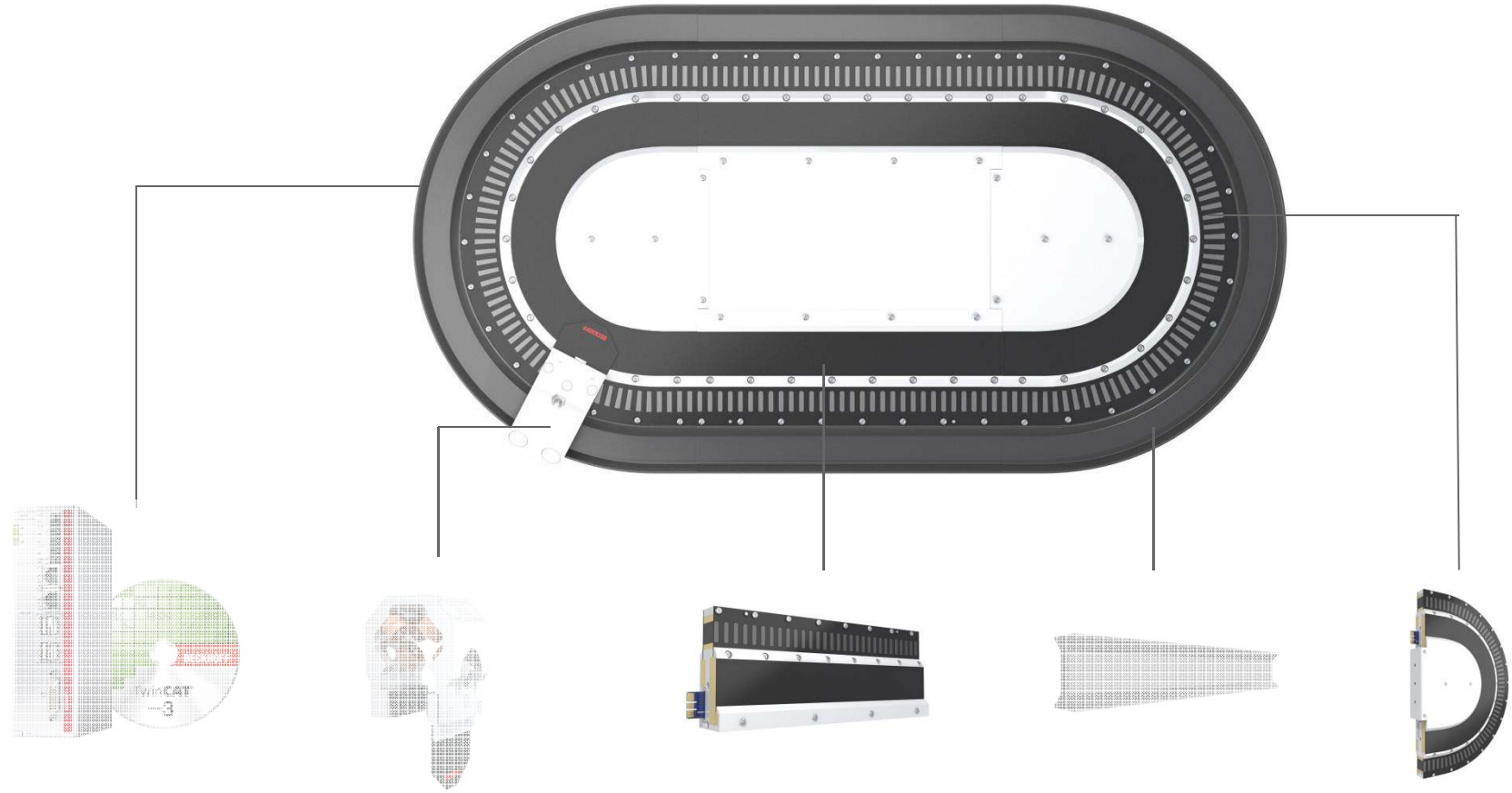
Mover

Straight
Motor module

Guide
rail system

Curved
motor module

The modular assembly system XTS



Industrial-PC
TwinCAT NC PTP
TwinCAT XTS

Mover

Straight
motor module

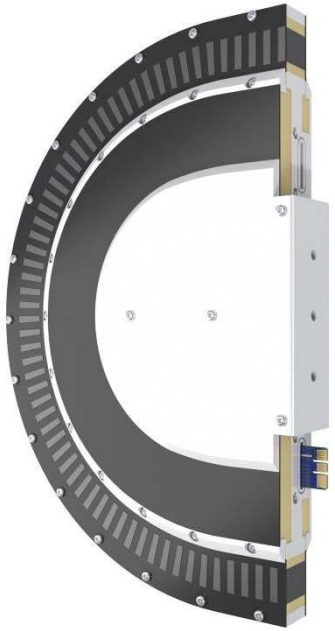
Guide
rail system

Curved
motor module

The modular assembly system XTS: motor module

Curved
motor module

Straight
motor module



Installation area
guide rail

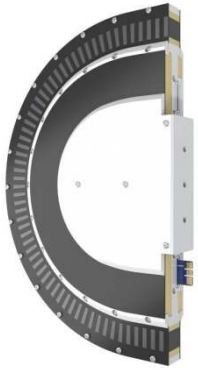
Motor,
coil package

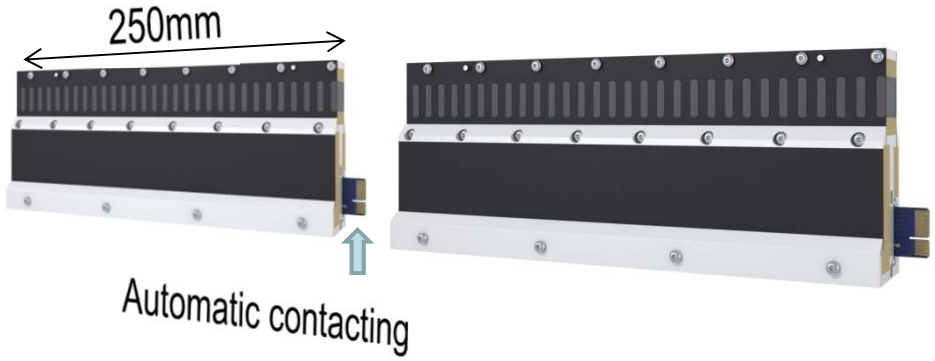
Power,
EtherCAT
through-
connected

Position
measurement

Installation area
machine base

The modular assembly system XTS: motor module





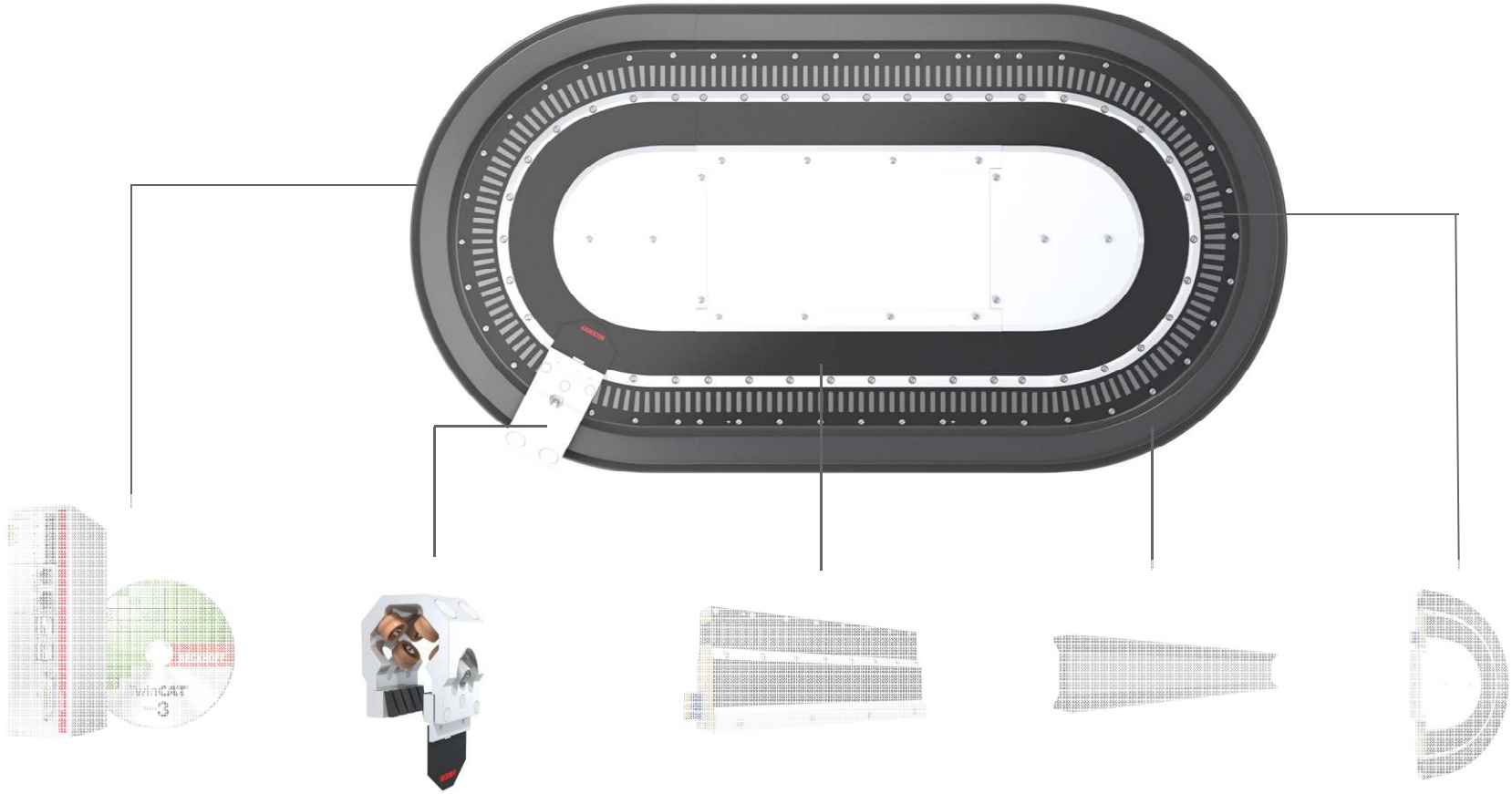
The length of the straight path can build in 250 mm elements with a simple assembling of the components.

with the help of curve sections the path can be made endless.

The electrical connection between the modules will automatically be created at the assembling of the motor modules.

A supply cable to one motor module is required only every 3 meters.

The modular assembly system XTS



Industrial-PC
TwinCAT NC PTP
TwinCAT XTS

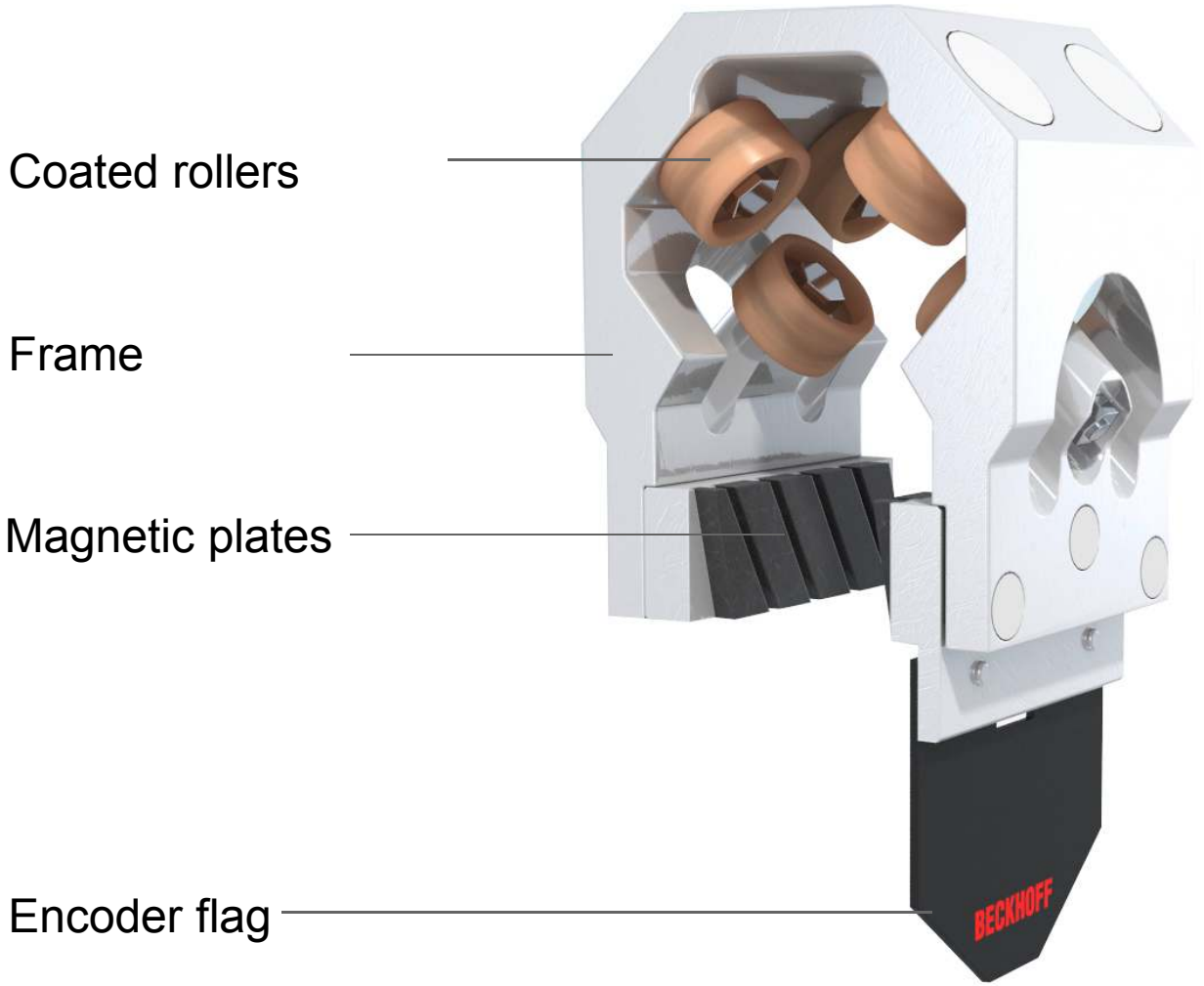
Mover

Straight
motor module

Guide
rail system

Curved motor
module

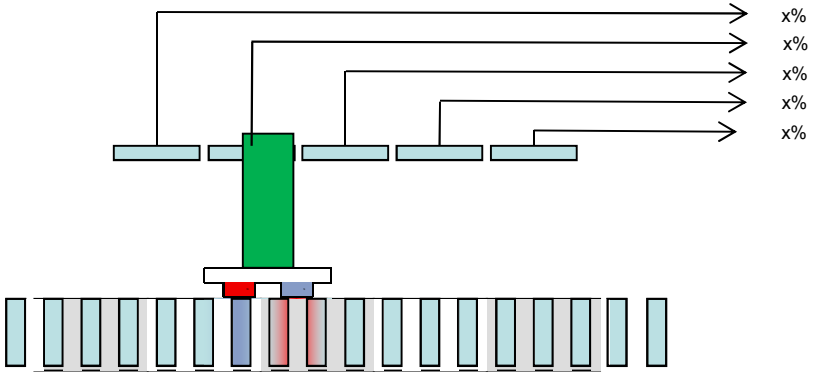
The modular assembly system XTS: mover



The modular assembly system XTS: position measurement

The position measurement system is integrated in the motor module. The motor module detects the position of the encoder flag:

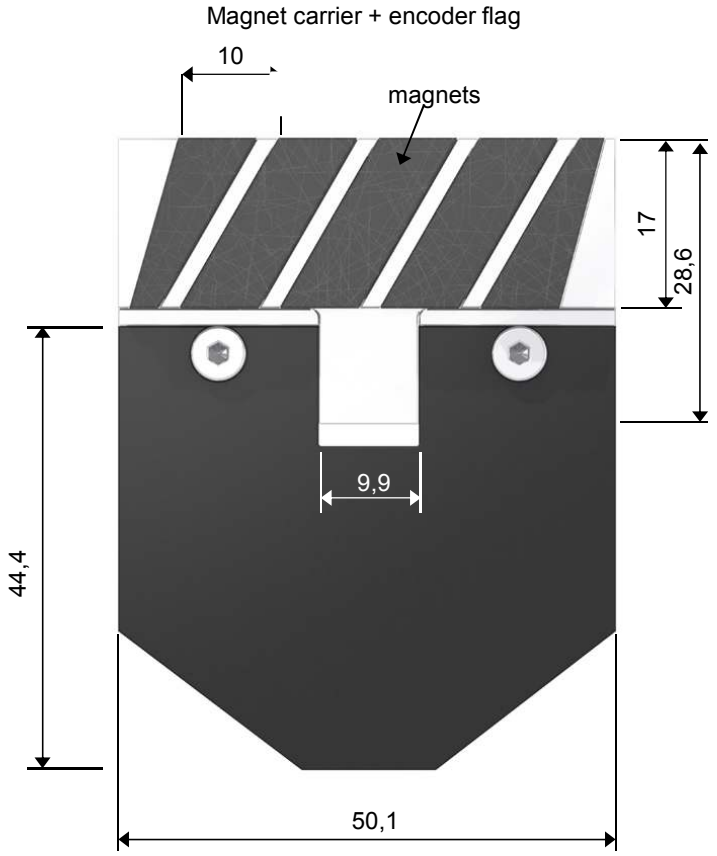
- **Absolute** working system, no homing necessary
- position measurement of **multiple** movers available
- continuous position signal also across the motor module boundary
- High accuracy
  - Standstill repeatability <10 µm
  - Absolute accuracy <250 µm
- High sampling rate 10 µs



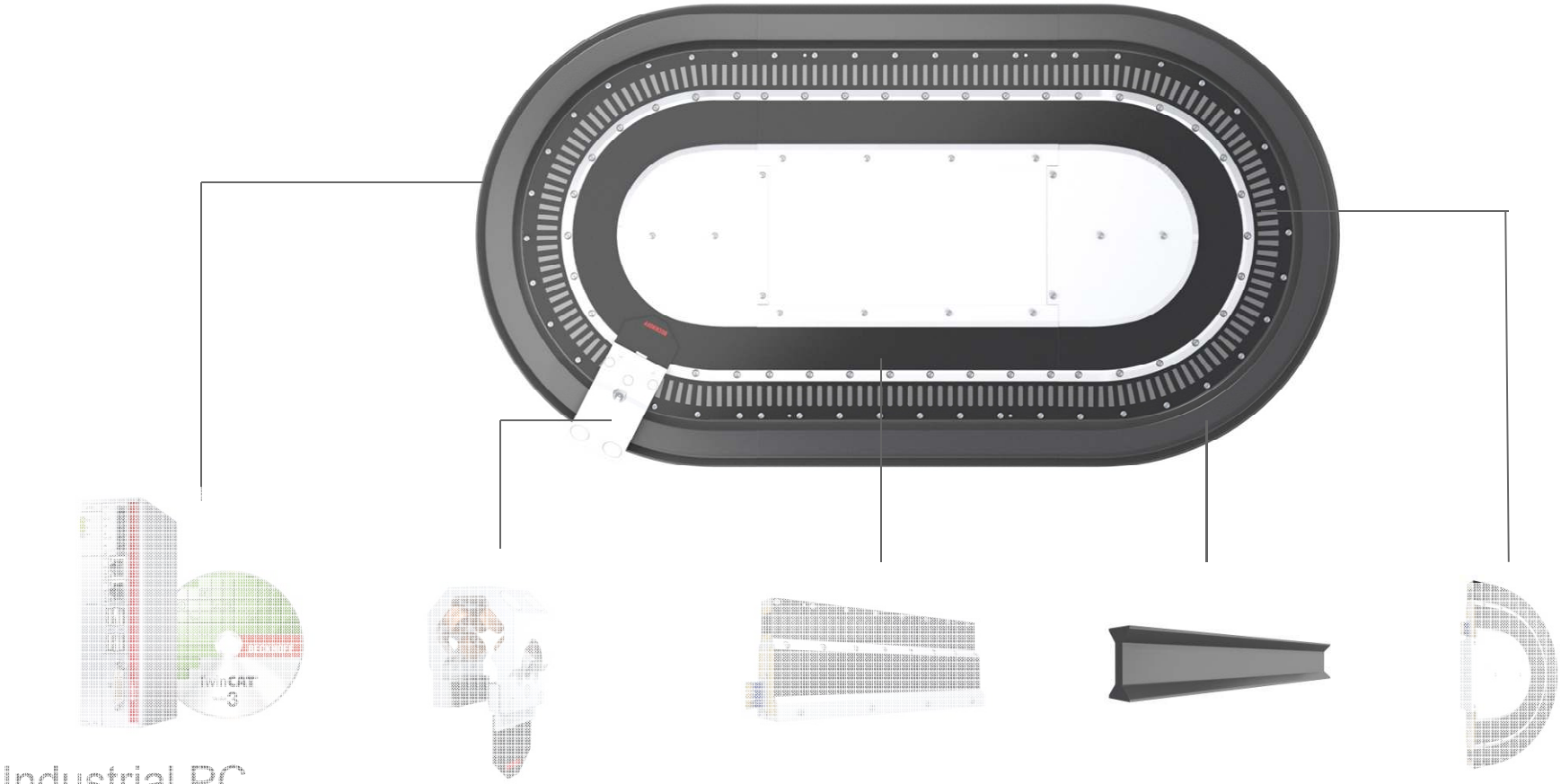
The modular assembly system XTS: displacement measurement

Mover component encoder flag:

- High position accuracy, encoder flag and magnet carrier build one unit
- Low construction volume
- Lightweight and sturdy glass-fibre material
- **Different encoder** flags allow the identification of **individual movers**



The modular assembly system XTS



Industrial PC
TwinCAT NC PTP
TwinCAT XTS

Mover

Straight
motor module

Guide
rail system

Curved motor
module

The modular assembly system XTS: Guide rail system

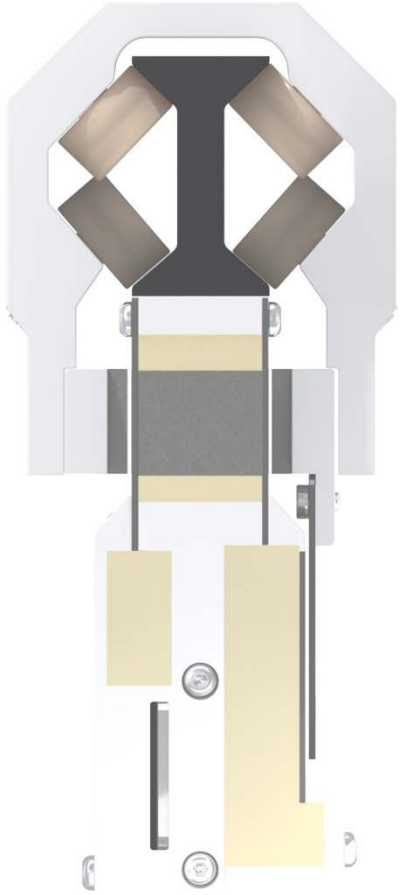
The special guide rail system is optimized for the use with the motor module:

- Straight and curved parts available
- The straight length is free of joints (minimum of 4 in a system), lengths up to 6 m available
- Easy mounting by adjustment pins
- Hard coating (abrasion-resistant hard anodized aluminum surface), low wear

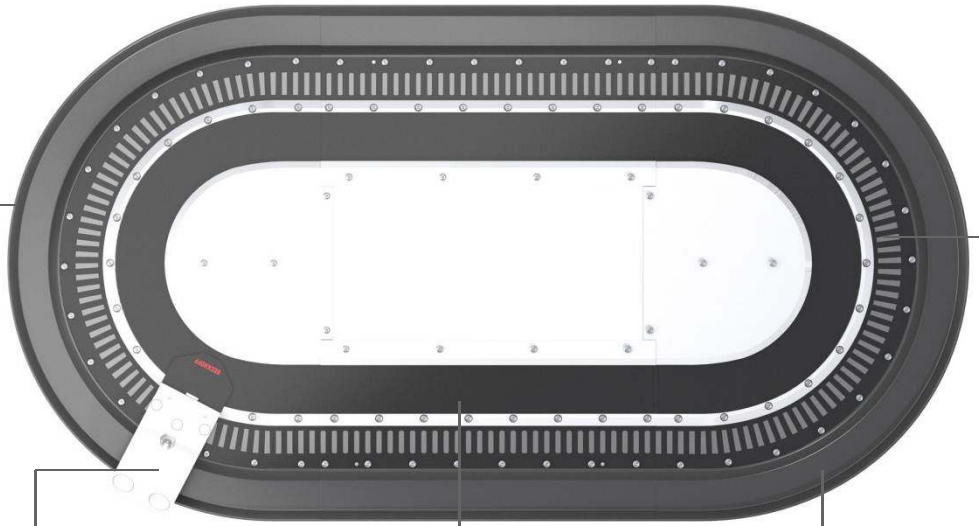
The modular assembly system XTS: Guide rail system

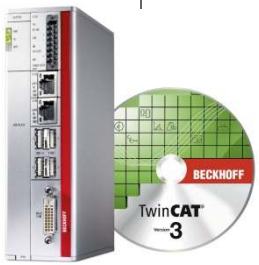
Guide rail and mover are tuned to each other:

- Rail- and rollers surface matched for low-wear
- Backlash-free as result of pre-stressed rollers
- No lubrication required, no oil
- Low noise emission



The modular assembly system XTS

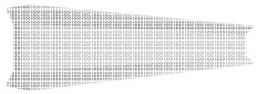




Industrial PC
TwinCAT NC PTP
TwinCAT XTS

Mover

Straight
motor module



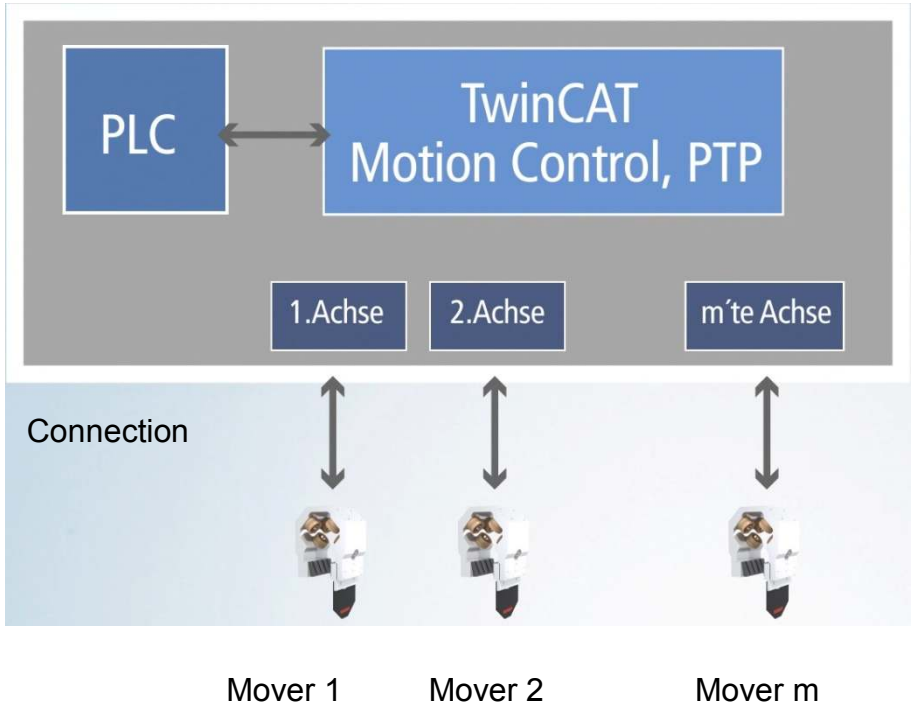
Guide
rail system

Curved
motor module

The modular assembly system XTS: Software and Programming PC

XTS is integrated in the TwinCAT-tool chain. Through **the XTS extension**, the programmer controls **virtual NC axes**

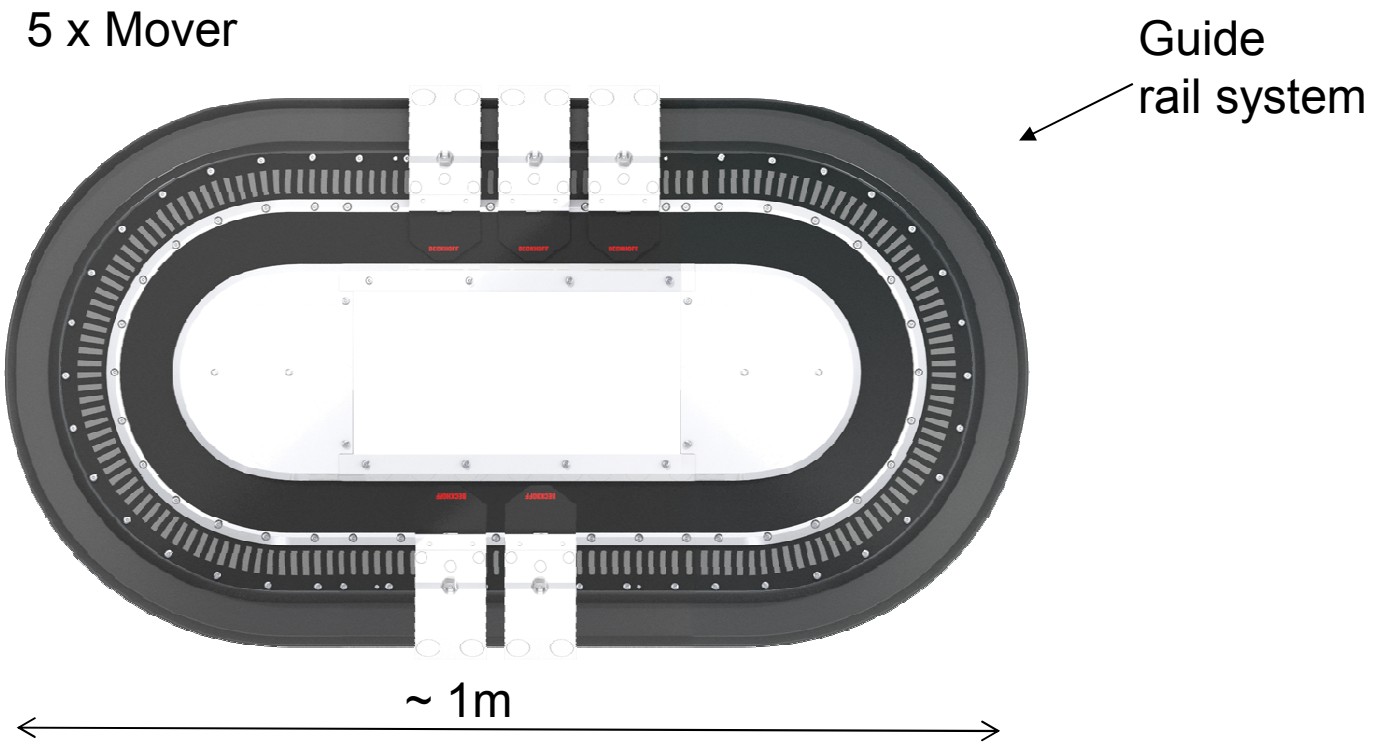
- From the point of view of application programming, a mover looks like a „standard“ servo axis.
- New standard tasks are available:
  - Collision avoidance
  - Accumulation
  - Group building
  - Synchronous mechanisms
- Runs on all powerful Beckhoff Standard IPCs with EtherCAT-Port
- All those axes are contolled and programmed with IEC 61131-3 from PLC OPEN



XTS | the important technical data

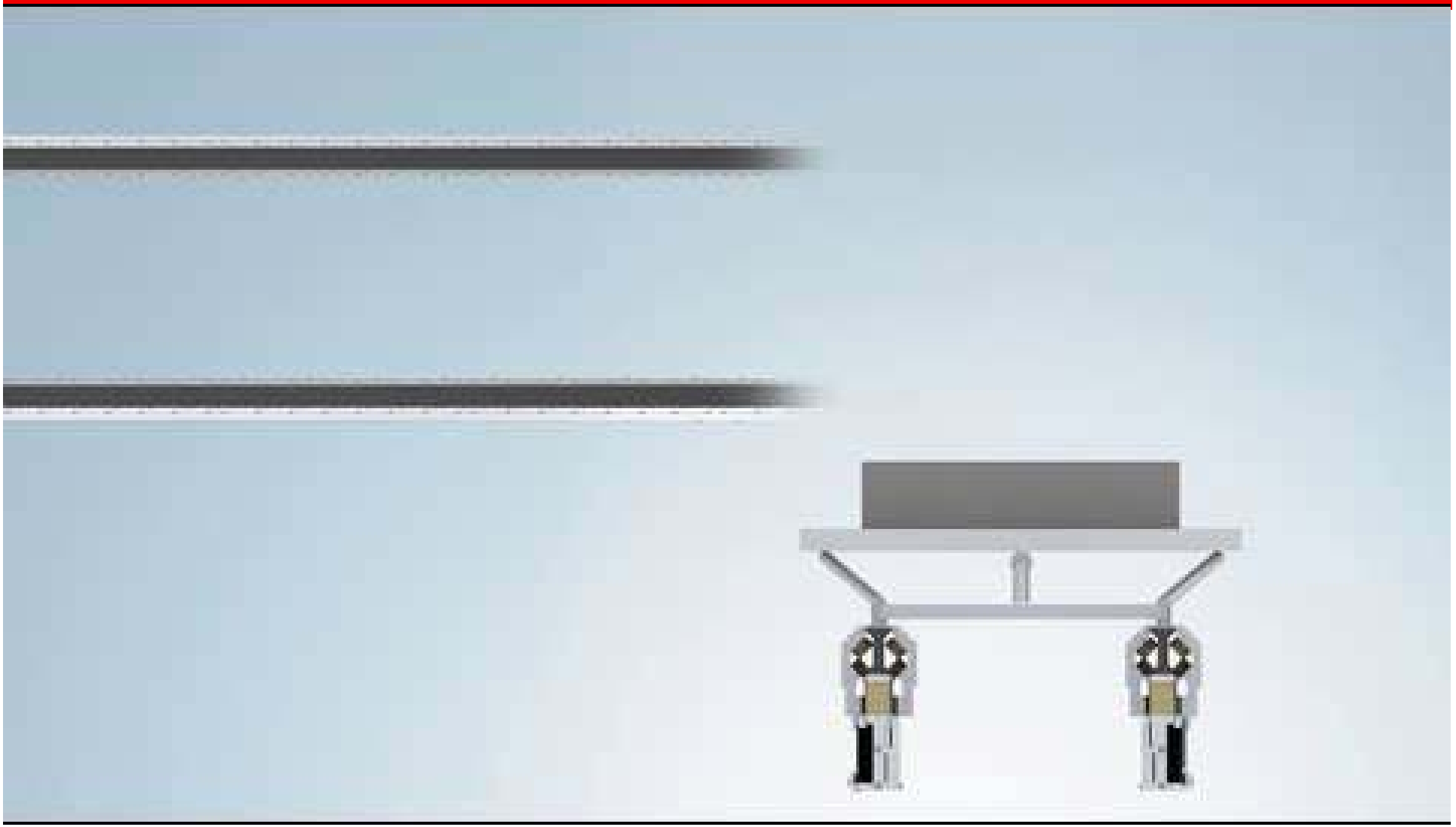
Maximum speed:	4m/s
Continuous force:	30N
Peak force:	100N
Mover weight:	350g
Mover length:	50mm (minimum product length)
Positioning accuracy:	<10µm
Maximum system length:	>>10m, no system limit
Mounting position:	any
Protection class:	up to IP67
Dimensions motor module (straight):	38 mm x 96 mm

Starter kit XTS

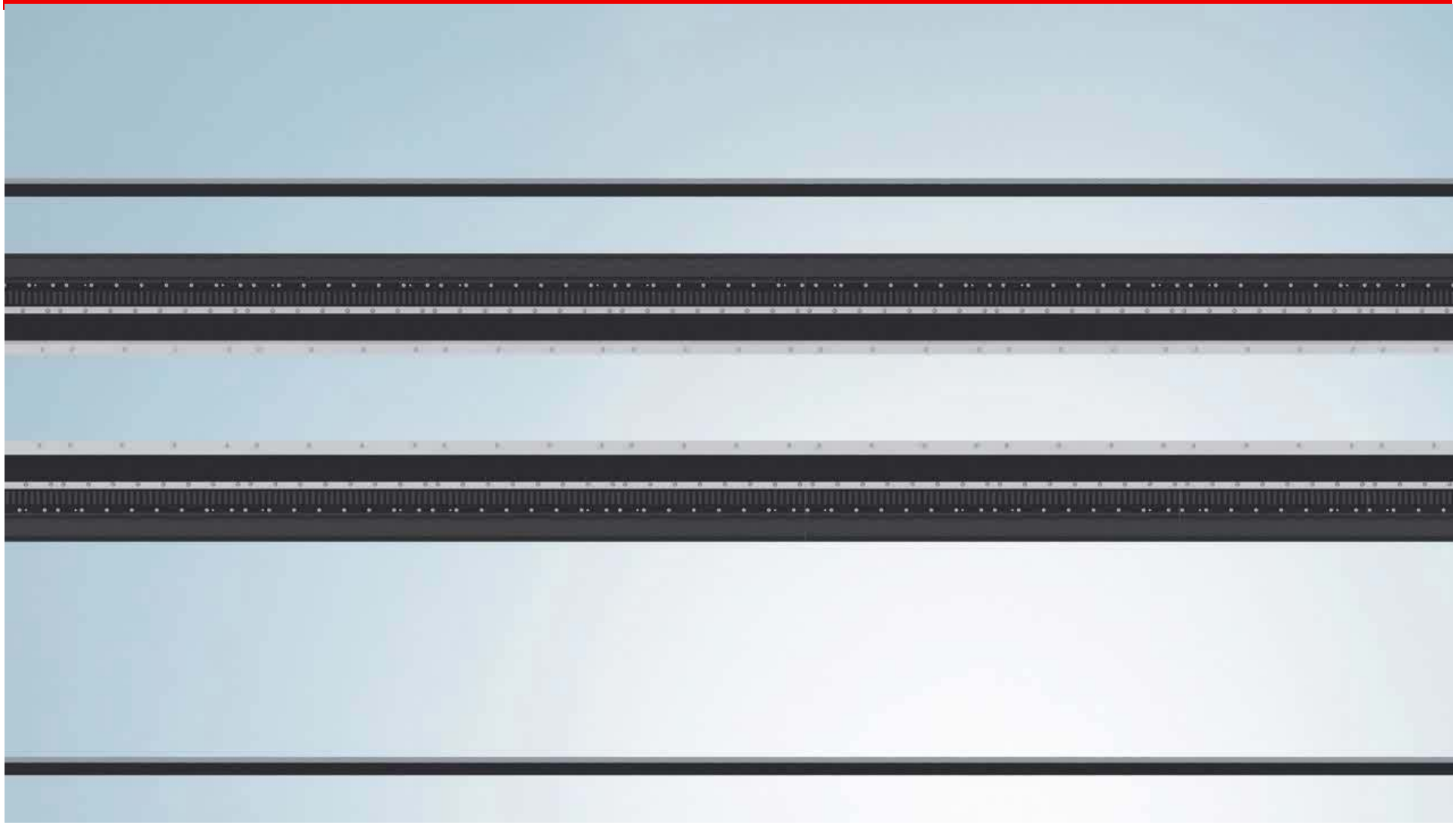


All components which are required for the operation of an XTS system are included in the Starter Kit. The construction is fully functional and completely pre-assembled. Just plug in.

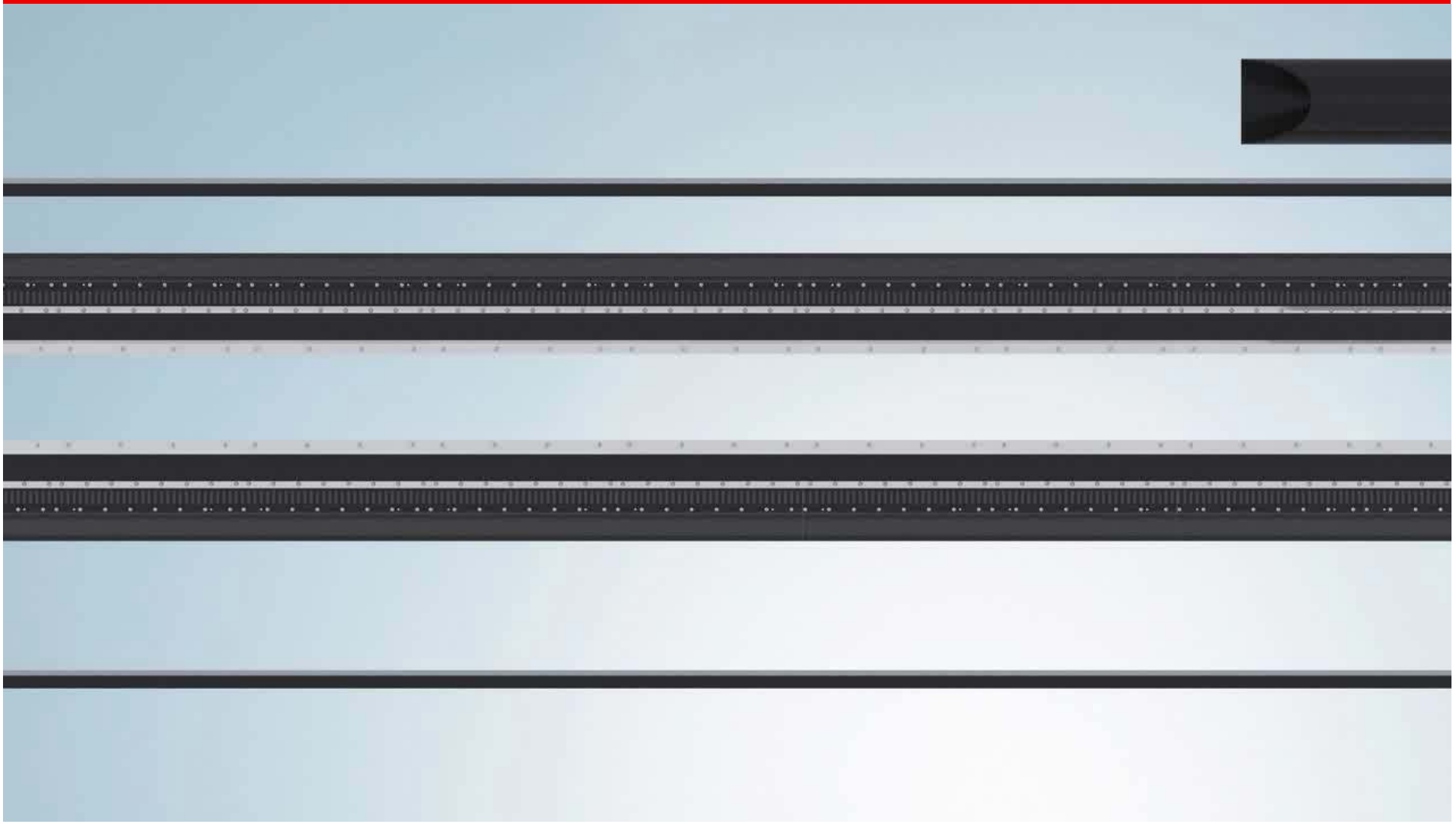
Samples and Kinematics



Samples and Kinematics

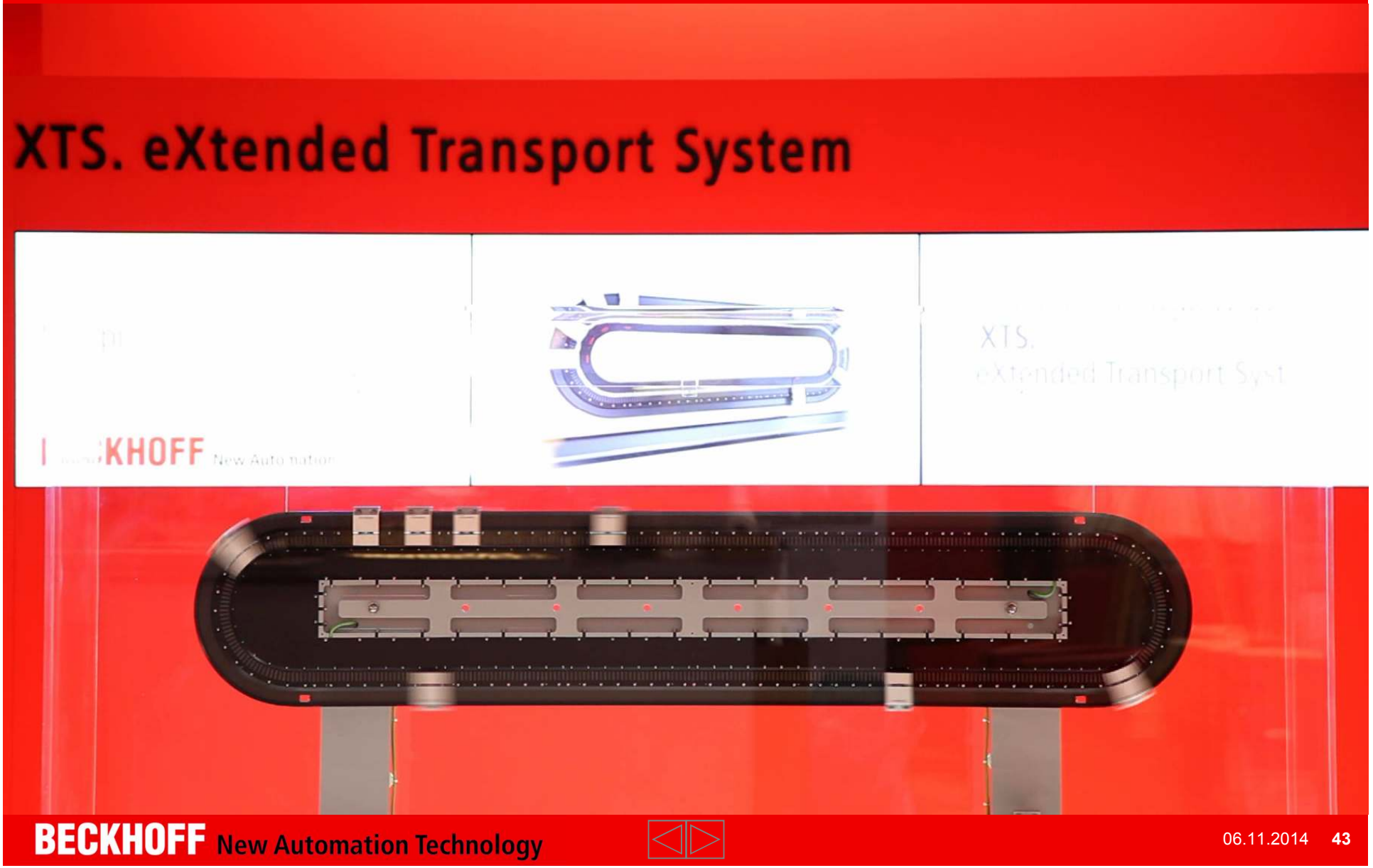


Samples and Kinematics



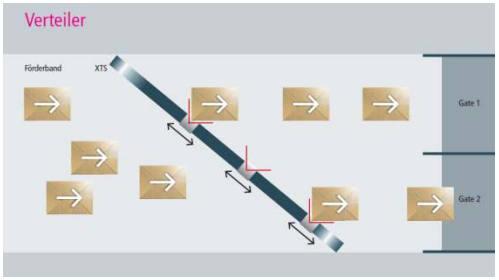
Application: Filling Application

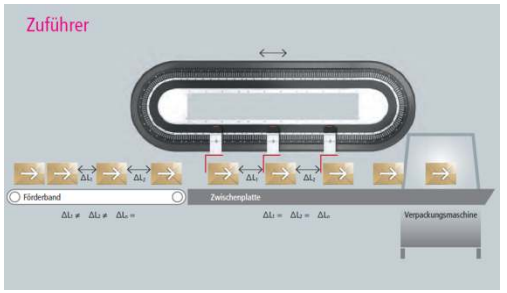
XTS | New degrees of freedom for mechanical engineering



Standard applications

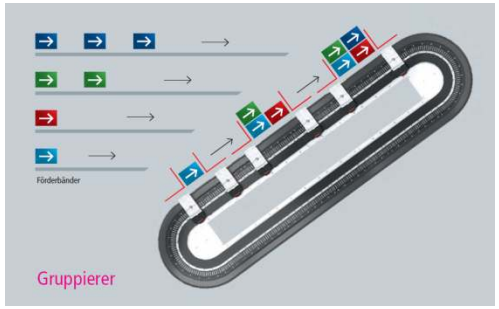
- XTS
  - Distributor
    - The distributor is splitting a product stream into two different streams.
    - It is possible to do that according to a definite pattern.
  - Feeder with adaption of the product distances
    - The distances between products will be adapted by the XTS in order to synchronize the products on a downstream process i.e. a packaging machine.
  - Oval motion system for asynchronous transport with synchronized infeed of material
    - Good for assembly stations or work stations with different kind of functions.
    - Infeeding a constant product stream and handling the stream on the XTS discontinuously by starting and stopping

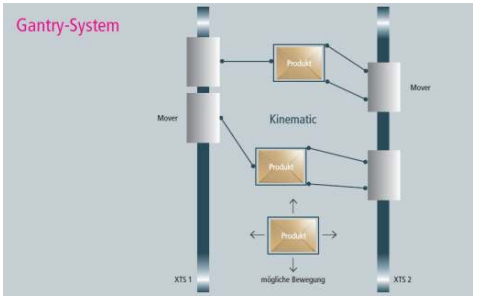




Standard applications

- Group-System
  - Group orientated transport of products. Between the modules can be transported different kind of product groups.
  - Creating individual groups, which are composed out of different products and sizes
- Sorter
  - Products can be sorted by definite patterns.
  - On the tradeshow you will find the so called ball sorter application.
- Gantry-System
  - Synchronized feeding of two parallel orientated XTS systems in two dimensions (x and y direction)
  - Between two parallel movers it is possible to execute individual kinematics.





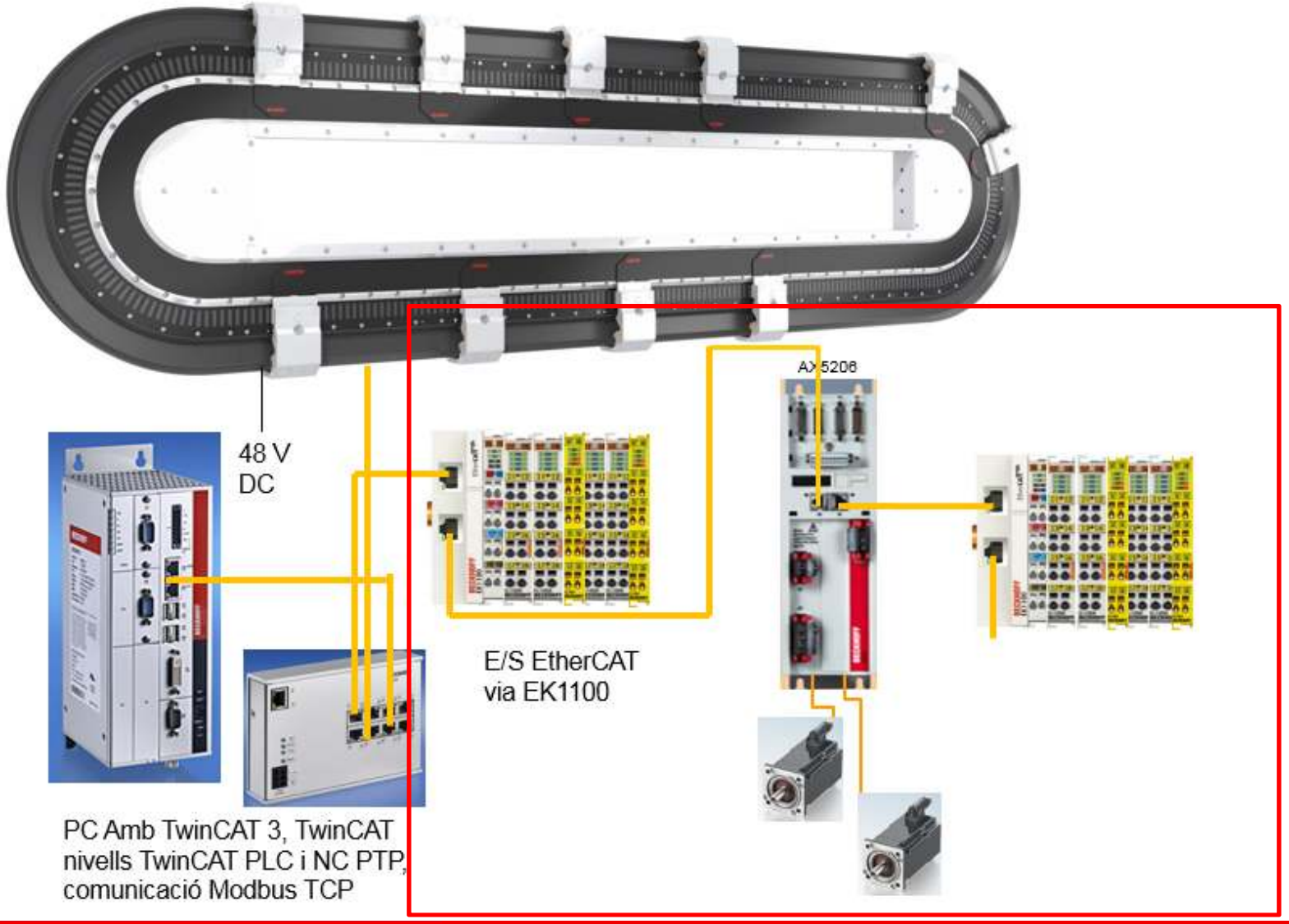
XTS | que más puede controlar un sistema XTS

Que más puede controlar el PLC que gobierna el XTS?

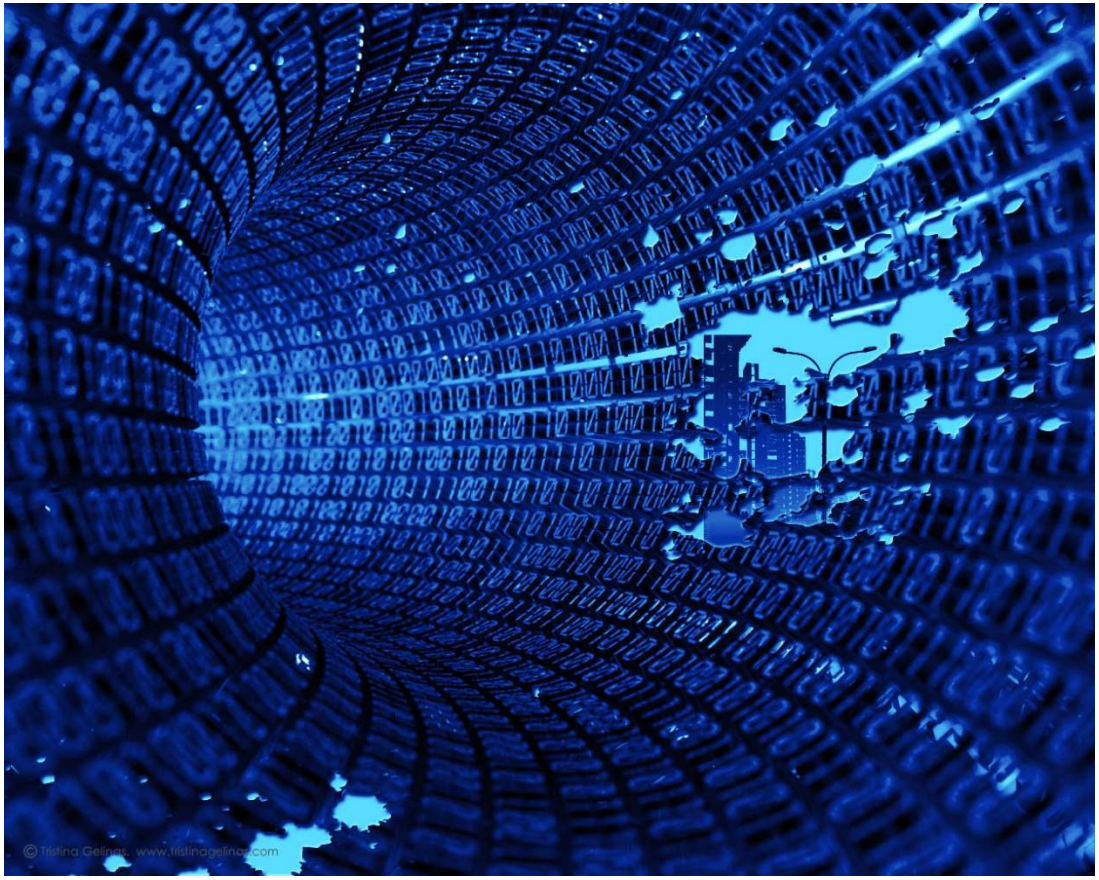
De forma natural podemos añadir muchos otros controles como verán a continuación

De esta forma el XTS no es una isla incomunicada en su proceso de fabricación

XTS | que más puede controlar un sistema XTS



Qué nos depara el futuro Industrial?



IoT

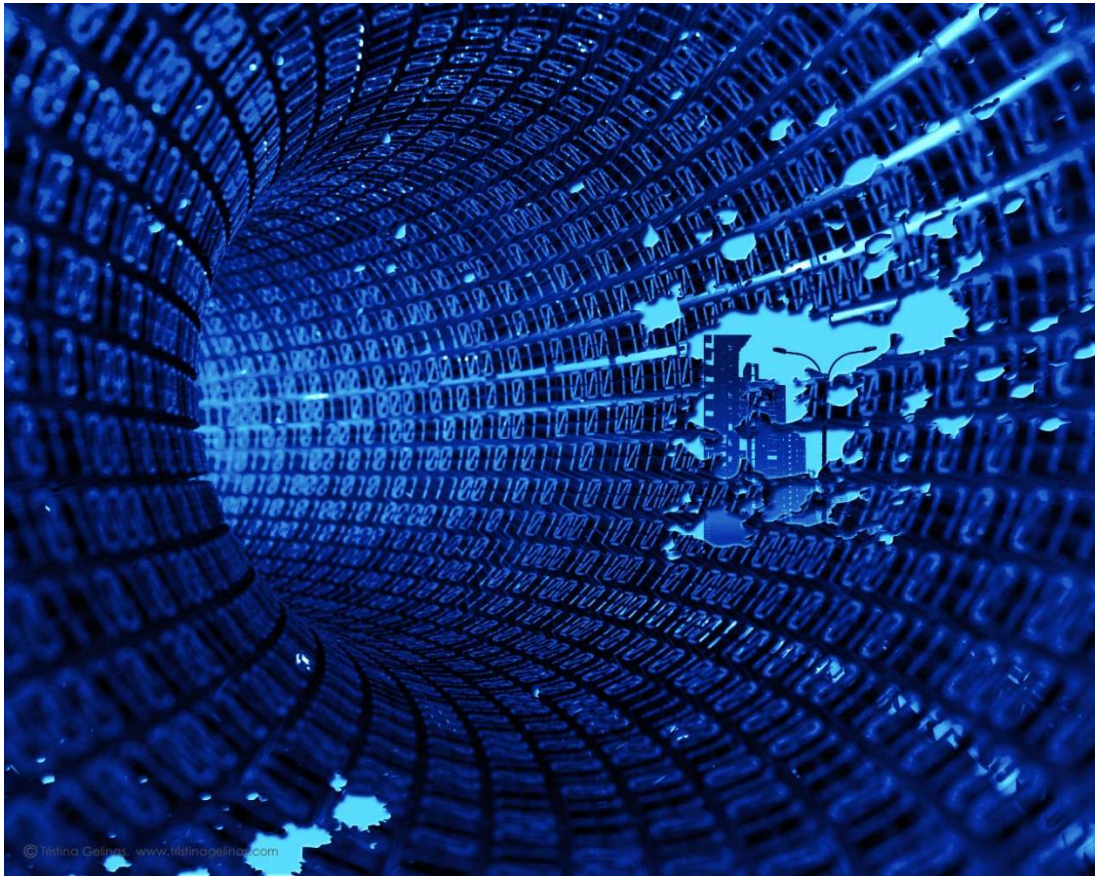
Pentacores

Track and trace

Googleglass

Cloud computing

Qué nos depara el futuro Industrial?



Cómo me conecto a...
Lo que me pide el departamento informático es imposible de realizar con los PLCs tradicionales que dispongo, y ahora qué?

Cómo me conecto con estas tendencias y necesidades inmediatas para algunos otros?

Integración del XTS en nuestra fábrica

XTS | Métodos informáticos de comunicación del XTS/TwinCAT3 en fábrica/oficinas??

XTS | Métodos informáticos de comunicación del XTS en fábrica??

Microsoft®
SQL Server®

XTS | Métodos informáticos de comunicación del XTS en fábrica??

Microsoft®
SQL Server®

SQL

XTS | Métodos informáticos de comunicación del XTS en fábrica??

Microsoft®
SQL Server®

SQL

APACHE

XTS | Métodos informáticos de comunicación del XTS en fábrica??

Microsoft® SQL Server®

SQL

APACHE

MySQL

XTS | Métodos informáticos de comunicación del XTS en fábrica??

Microsoft® SQL Server®

SQL

Windows Azure

APACHE

MySQL

XTS | Métodos informáticos de comunicación del XTS en fábrica??

Microsoft® SQL Server®

SQL

Windows Azure

APACHE

MySQL

amazon web services™

XTS | Métodos informáticos de comunicación del XTS en fábrica??

Microsoft® SQL Server®

SQL

Windows Azure

APACHE

MySQL

OPC UA™

amazon web services™

XTS | Métodos informáticos de comunicación del XTS en fábrica??

Integración del XTS en nuestra fábrica

XTS | Cómo conseguimos esta conexión a Base de Datos?

Microsoft®
SQL Server®

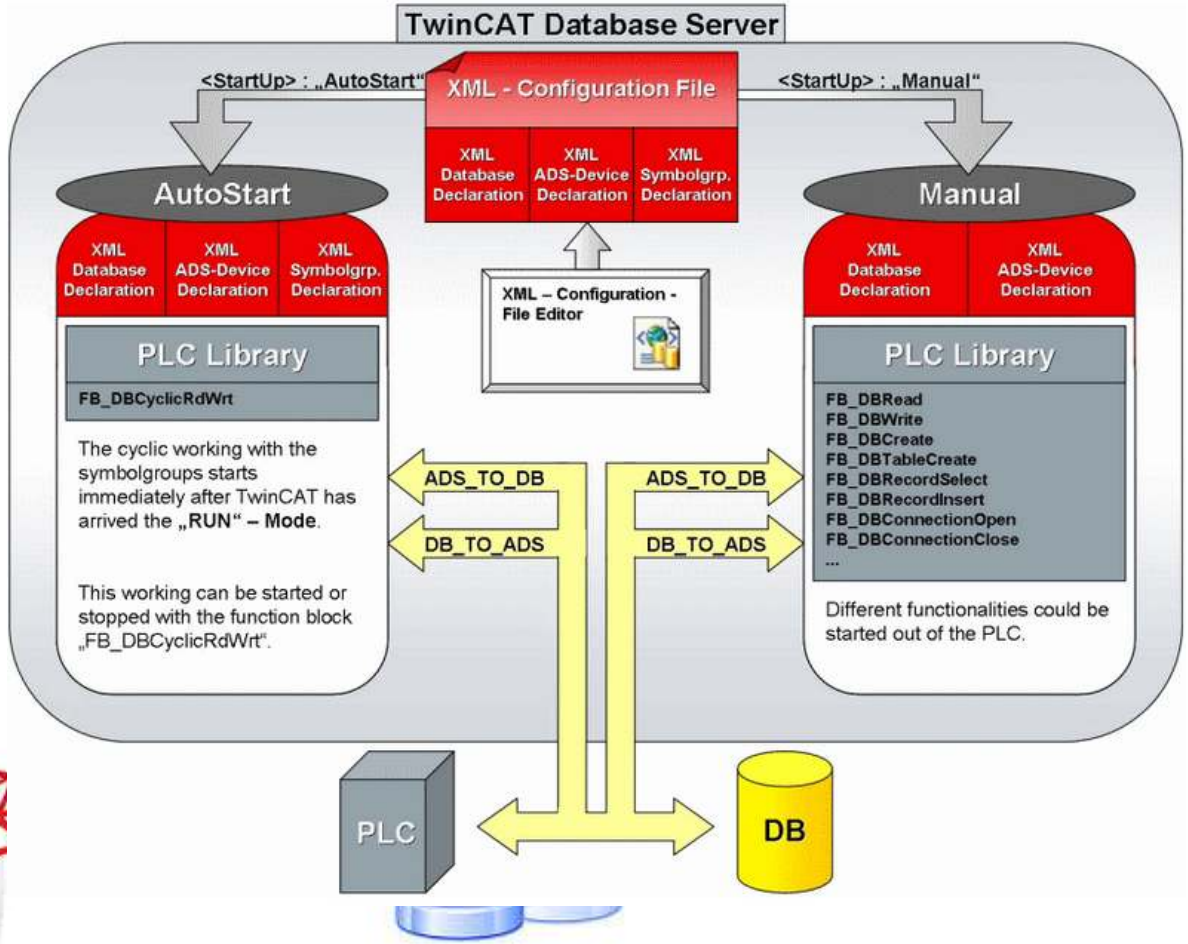
SQL

APACHE

MySQL

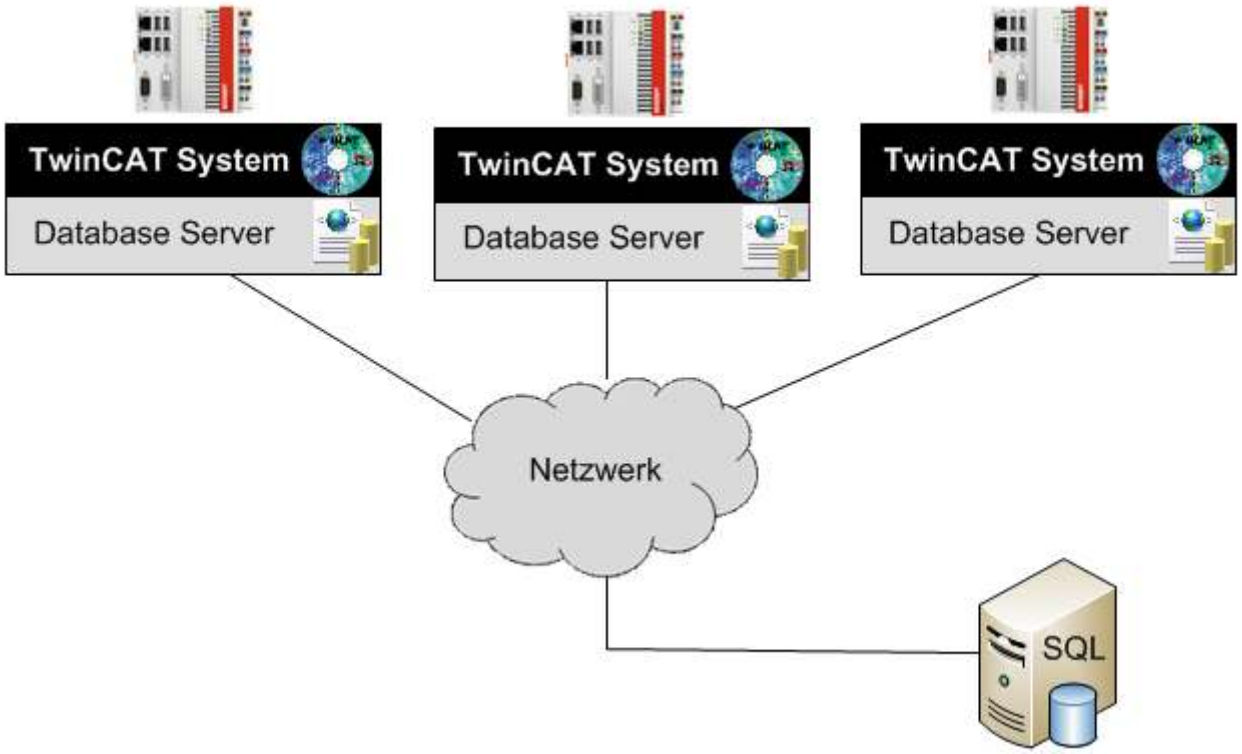
Integración del XTS en nuestra fábrica

XTS | Cómo conseguimos esta conexión?



Microsoft® SQL Server®

XTS | Cómo conseguimos esta conexión?



Integración del XTS en nuestra fábrica

XTS | Cómo conseguimos esta conexión a Nubes, tabletas, Googleglass, IoT Internet of Things?

XTS | Cómo conseguimos esta conexión a Nubes, tabletas, Googleglass , IoT Internet of Things?

Integración del XTS en nuestra fábrica

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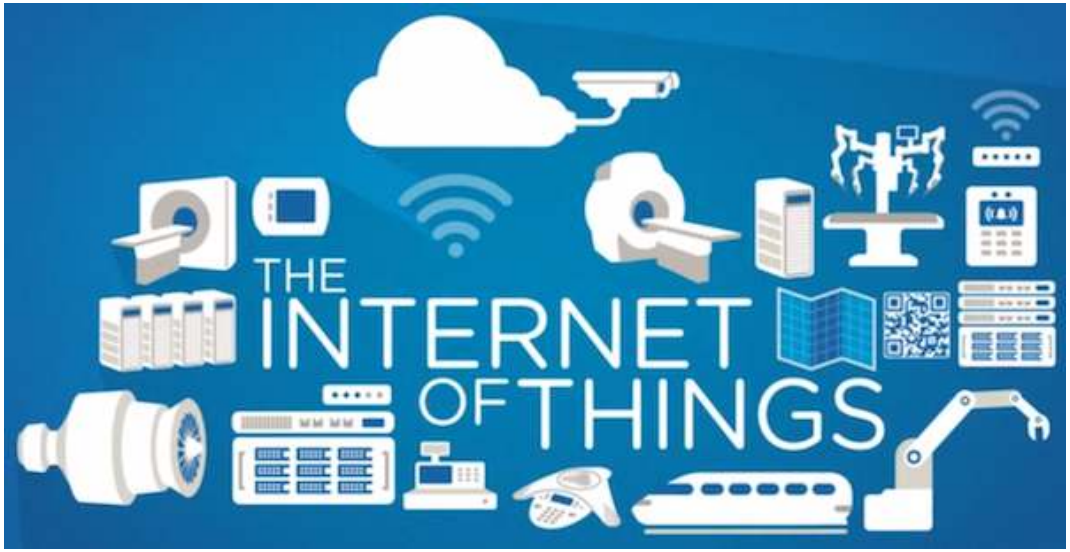

Integración del XTS en nuestra fábrica

XTS | Cómo conseguimos esta conexión a Nubes, tabletas, Googleglass , IoT Internet of Things?

XTS | Puede hablar el PLC BECKHOFF con SAP??

SAP®

Windows Azure

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Integración del XTS en nuestra fábrica

XTS | Puede [illegible] AP??

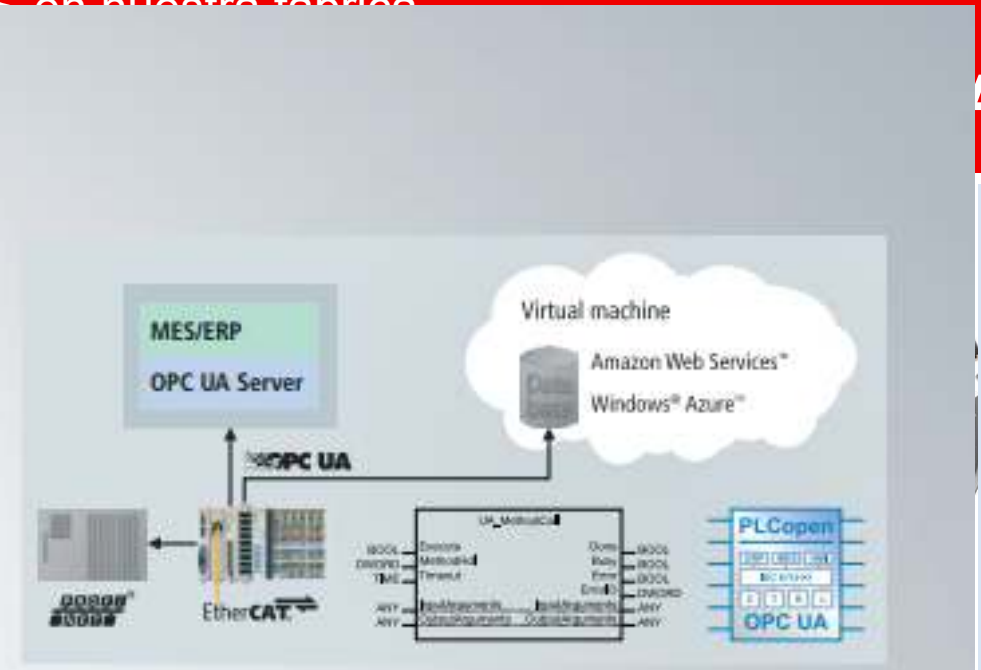
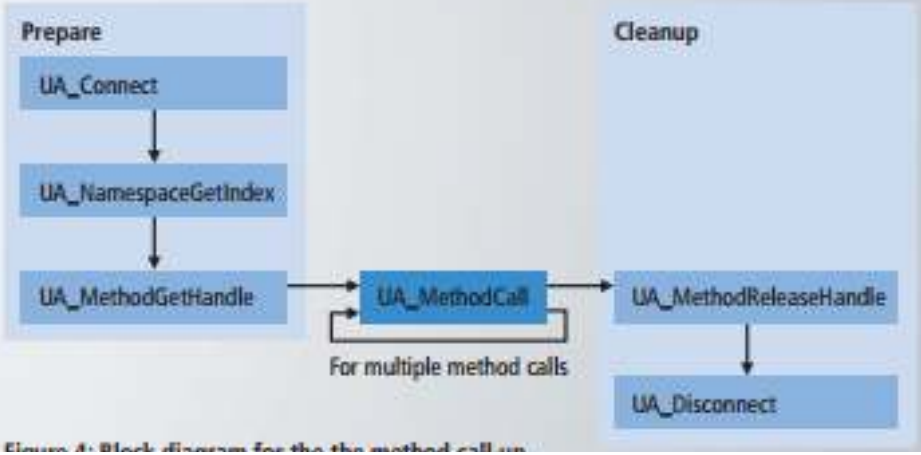


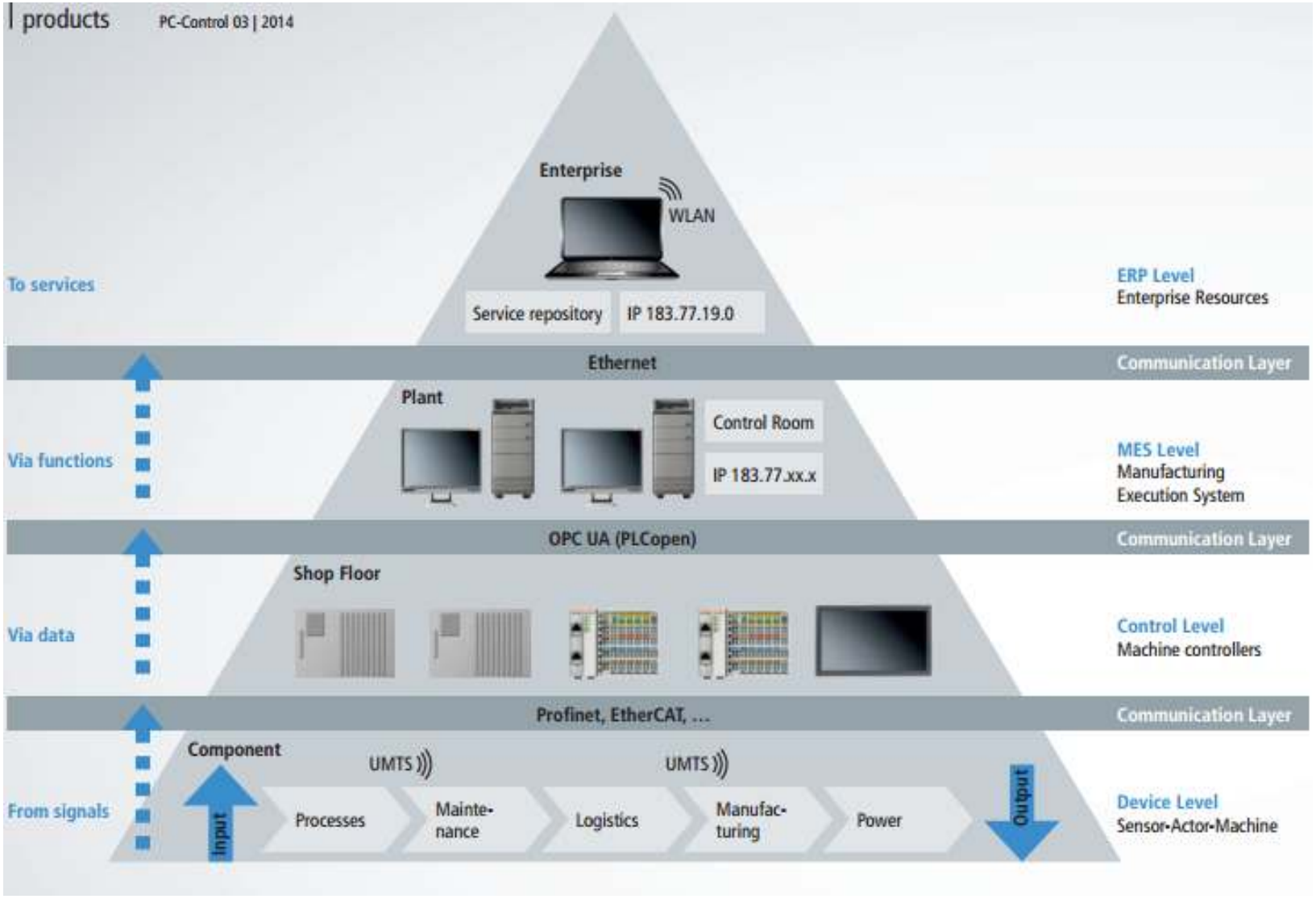
Figure 3: The PLCopen/OPC UA client blocks enable fieldbus-independent, fast communication. The TwinCAT PLC with integrated OPC UA client initiates the data communication.



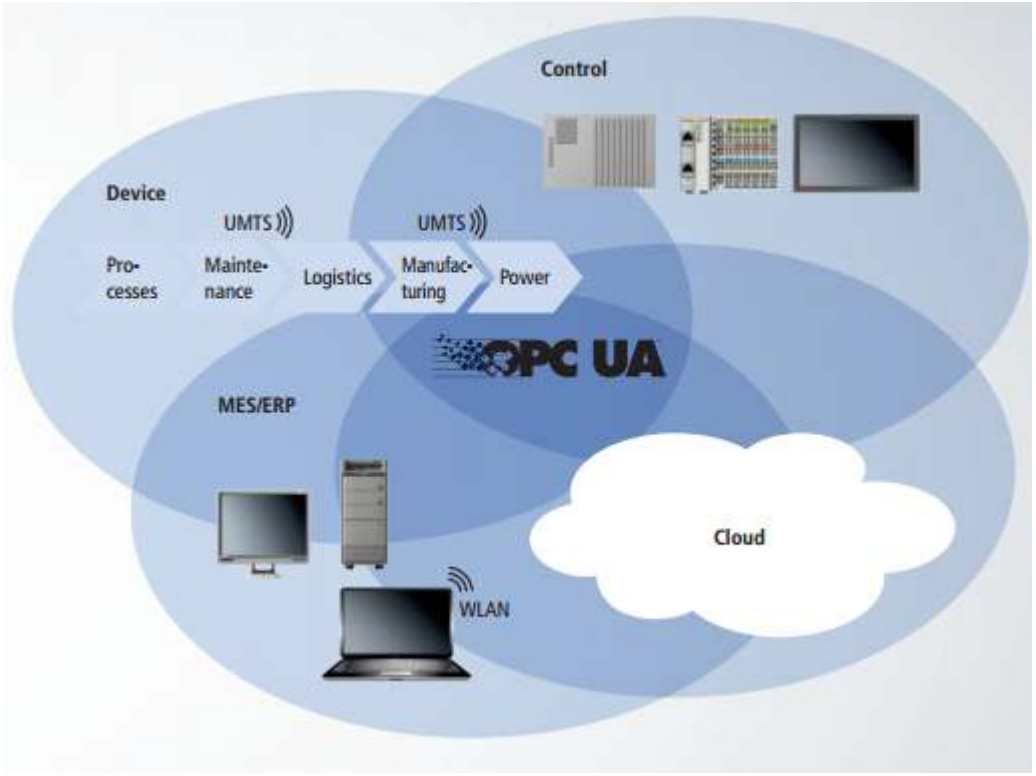
BECKHOFF New Au[illegible]

Que conseguimos con todos estos métodos y comunicaciones en nuestra fábrica?

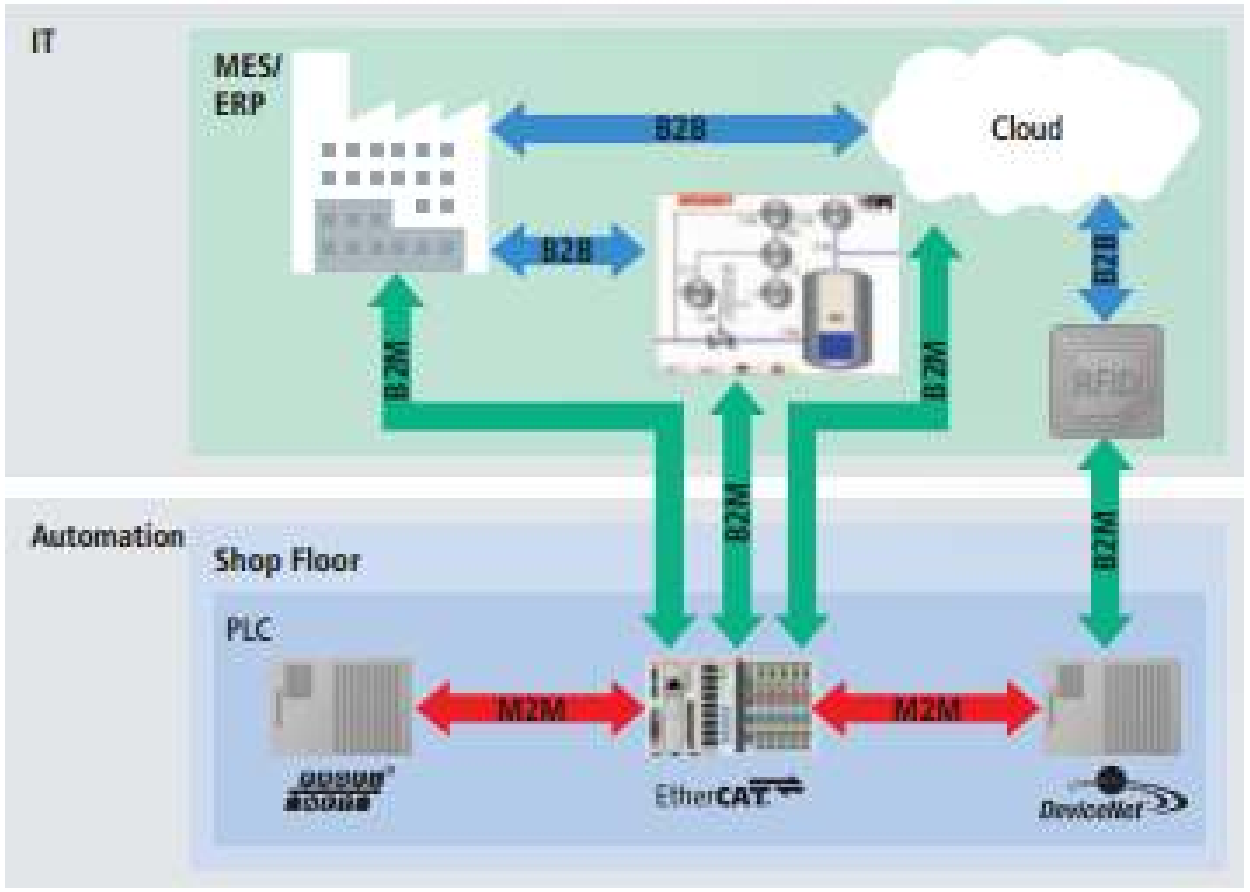
XTS | Métodos de comunicación del Comunicación del Sensor a la empresa



XTS | Métodos de comunicación del Comunicación del Sensor a la empresa



XTS | Métodos de comunicación del Comunicación del Sensor a la empresa



XTS | Métodos de comunicación del Comunicación del Sensor a la empresa

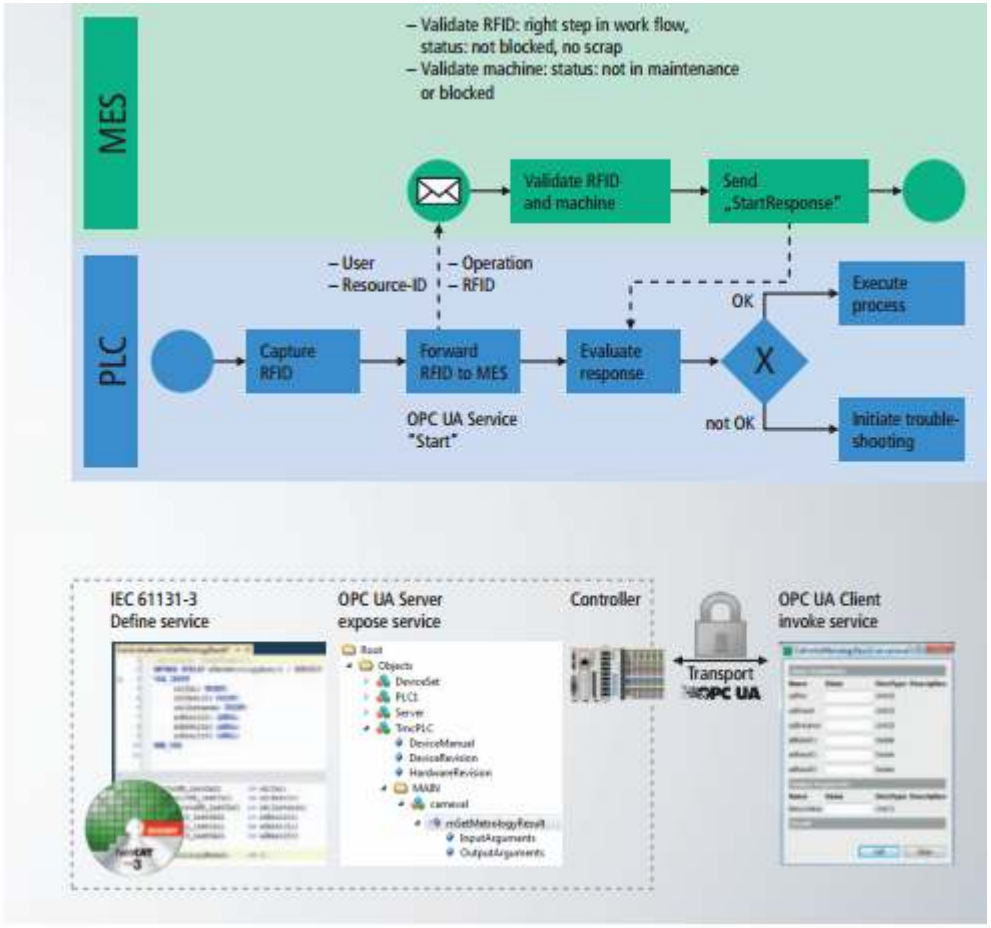
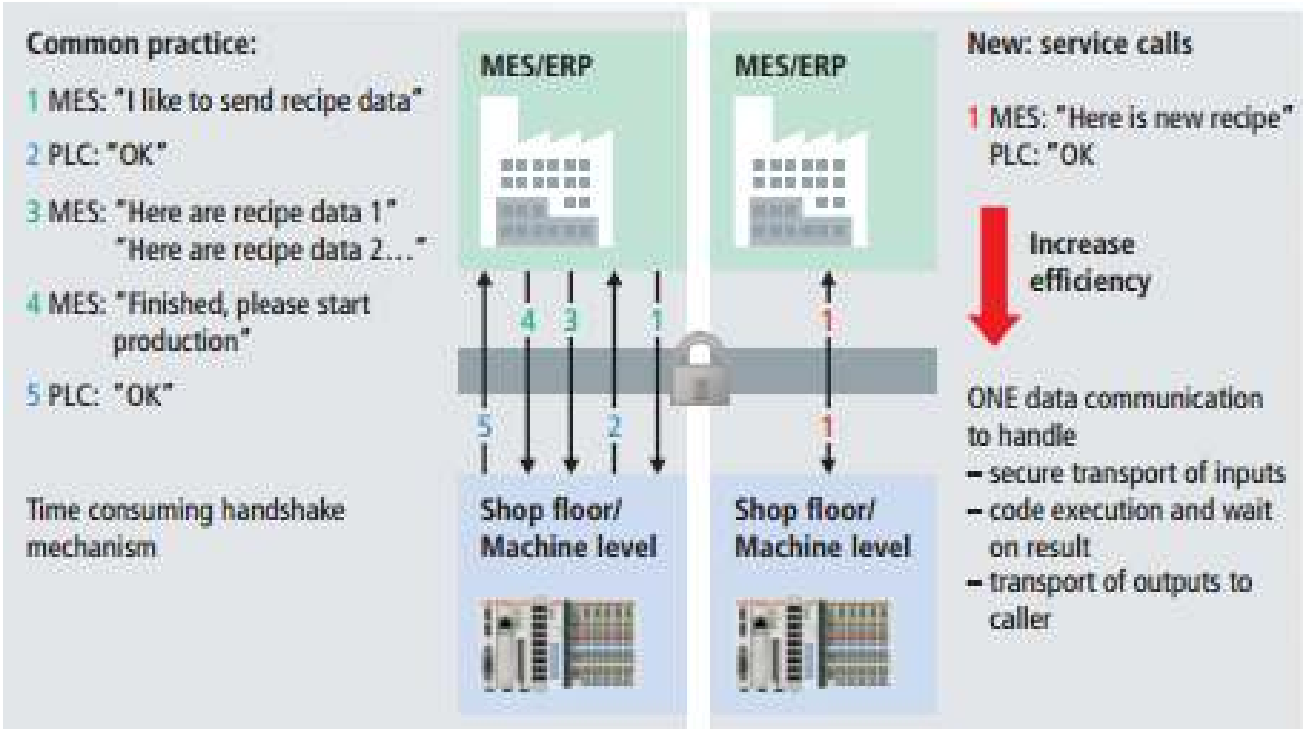


Figure 5: Efficient communication without hand-shaking: The TwinCAT PLC transfers the RFID information to the MES system via an OPC UA method call-up and receives an instruction for the next step as a return parameter.

Figure 6: Methods in the IEC 61131-3 PLC can be approved for external application simply.

XTS | Métodos de comunicación del Comunicación del Sensor a la empresa



Plataforma de control TwinCAT de BECKHOFF
Resúmen

-. Confie en una empresa con más de 30 años de experiencia en el control basado en PC y Pionera en usar Ordenadores como controlador

-. Empresa con valor altamente tecnológico y con logros tecnológicos de elevadas prestaciones

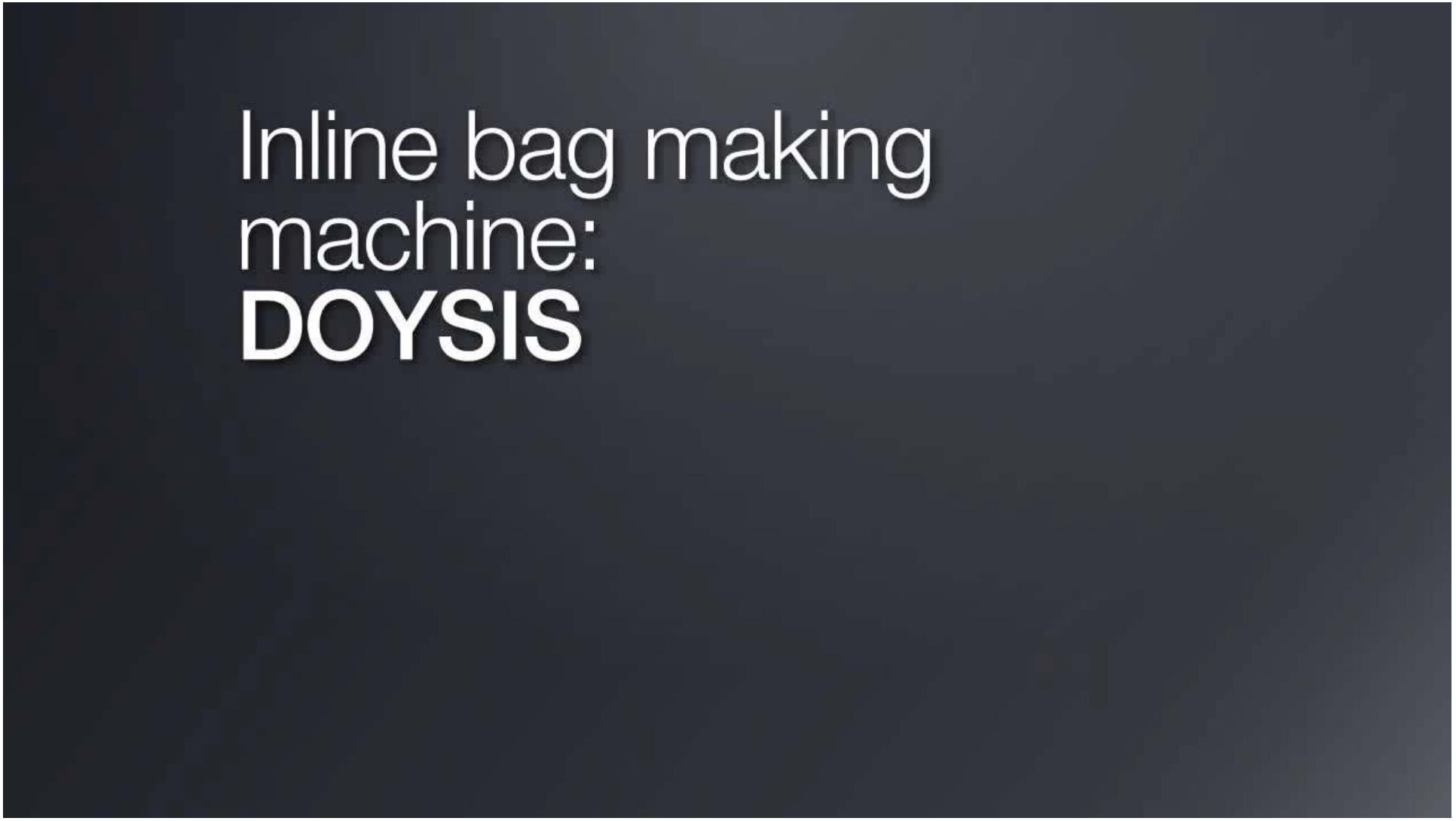
-. Empresa con gran desarrollo económico y estable a nivel internacional, presentes en más de 67 paises

-. Empresa creadora y promotora del bus Industrial EtherCAT, con más de 2.800 empresas internacionales que dan muestra del gran hito tecnológico. Actualmente EtherCAT es un stándard tecnológico para el Gobierno de China

-. Confíe sus procesos, control de fábrica o bién maquinaria a BECKHOFF es una apuesta de futuro para usted, una realidad para nosotros

-. Por favor, háganos saber si usted tiene alguna pregunta o inquietud, estaremos encantados de hablar sobre a ella

XTS | Aplicación real de XTS así como control motion en máquina formadora de bolsas de plástico y dosificacion de picadura de Tabaco



Muchas gracias por su atención