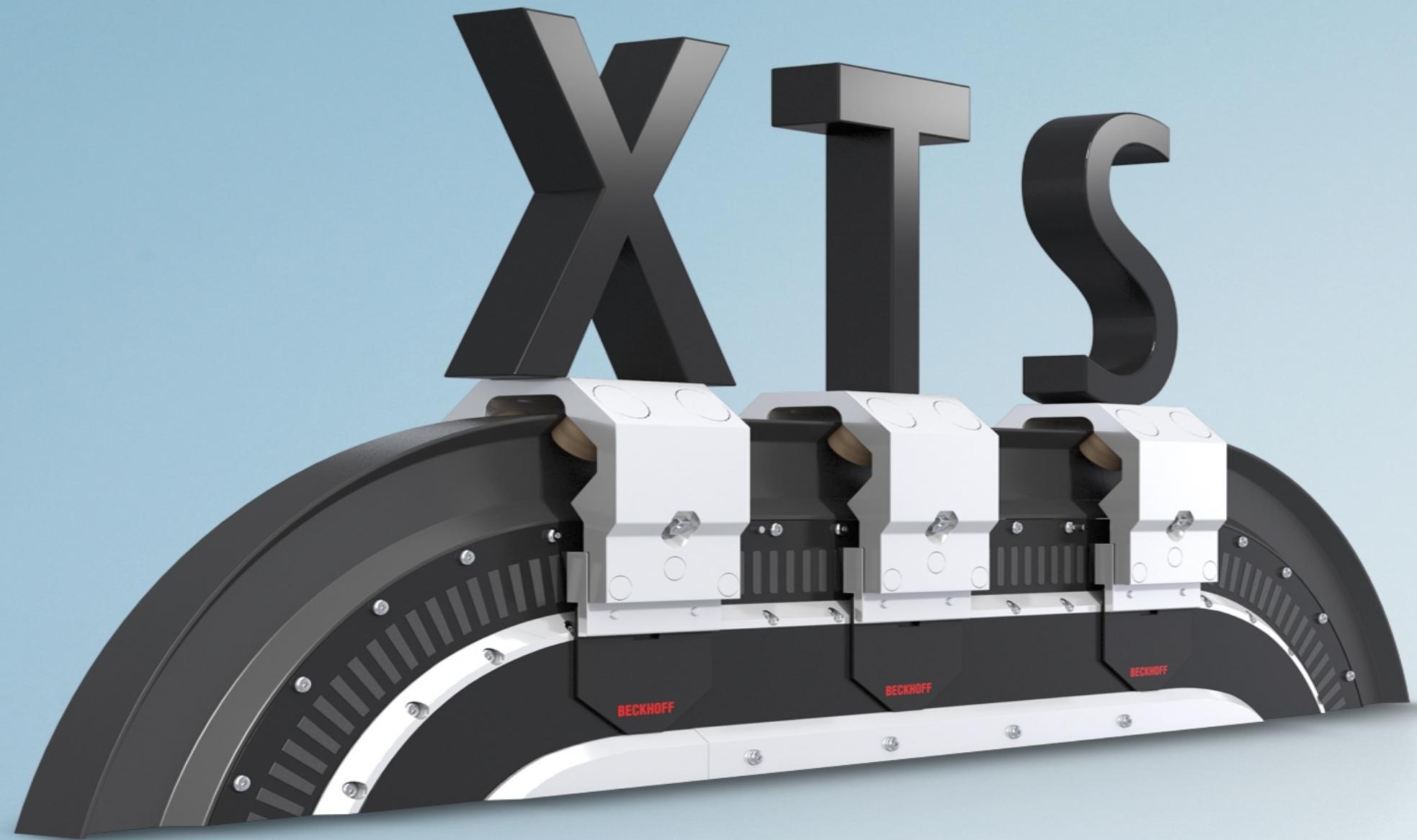


New Automation Technology

Beckhoff Automation

BECKHOFF





1. XTS-StarterKit
2. XTS Module
3. Preparation and Assembly
4. First Test
5. Rail mounting
6. Rerailing of Mover





- **AT2000-0500**
starter kit small, 500 mm straight length
- **AT2000-1000**
starter kit medium, 1000 mm straight length
- **AT2000-1500**
starter kit large, 1500 mm straight length



1. XTS-StarterKit
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XTS Modules

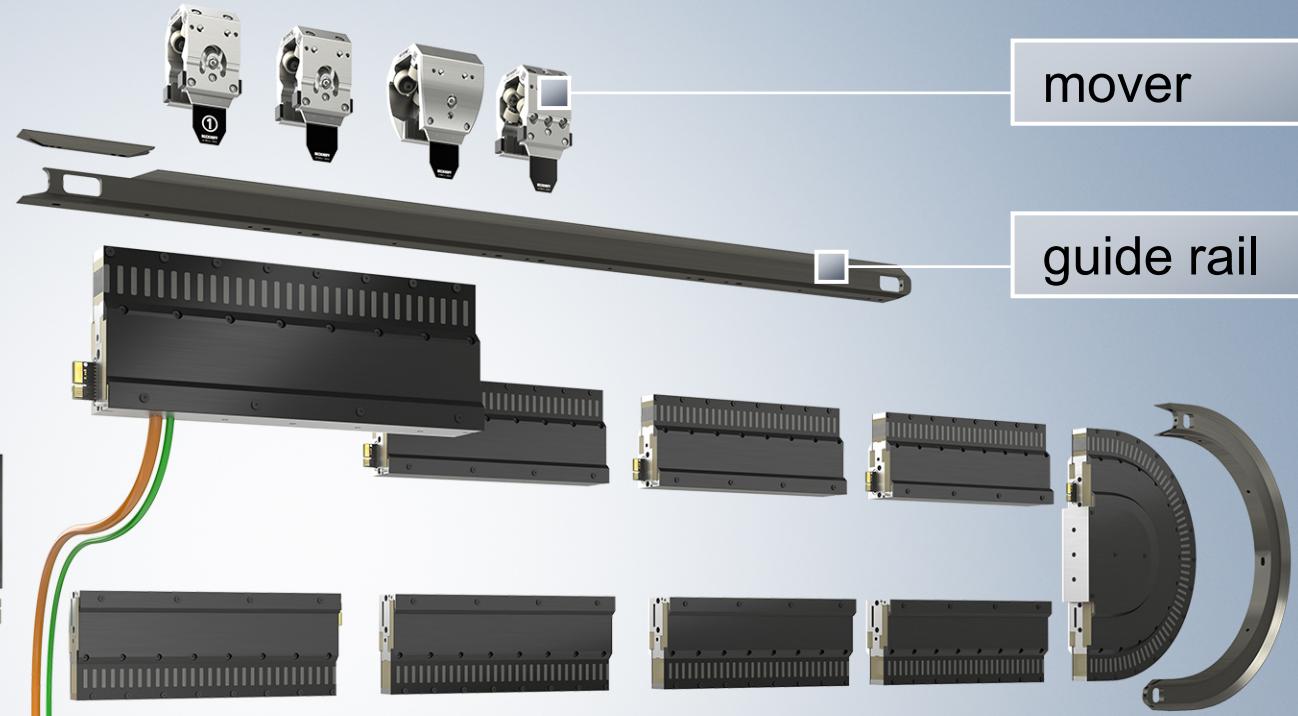
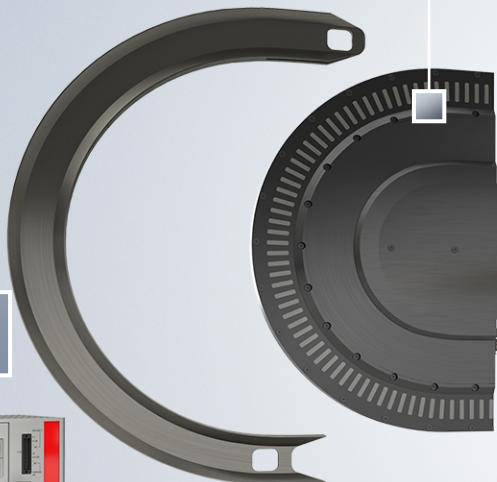
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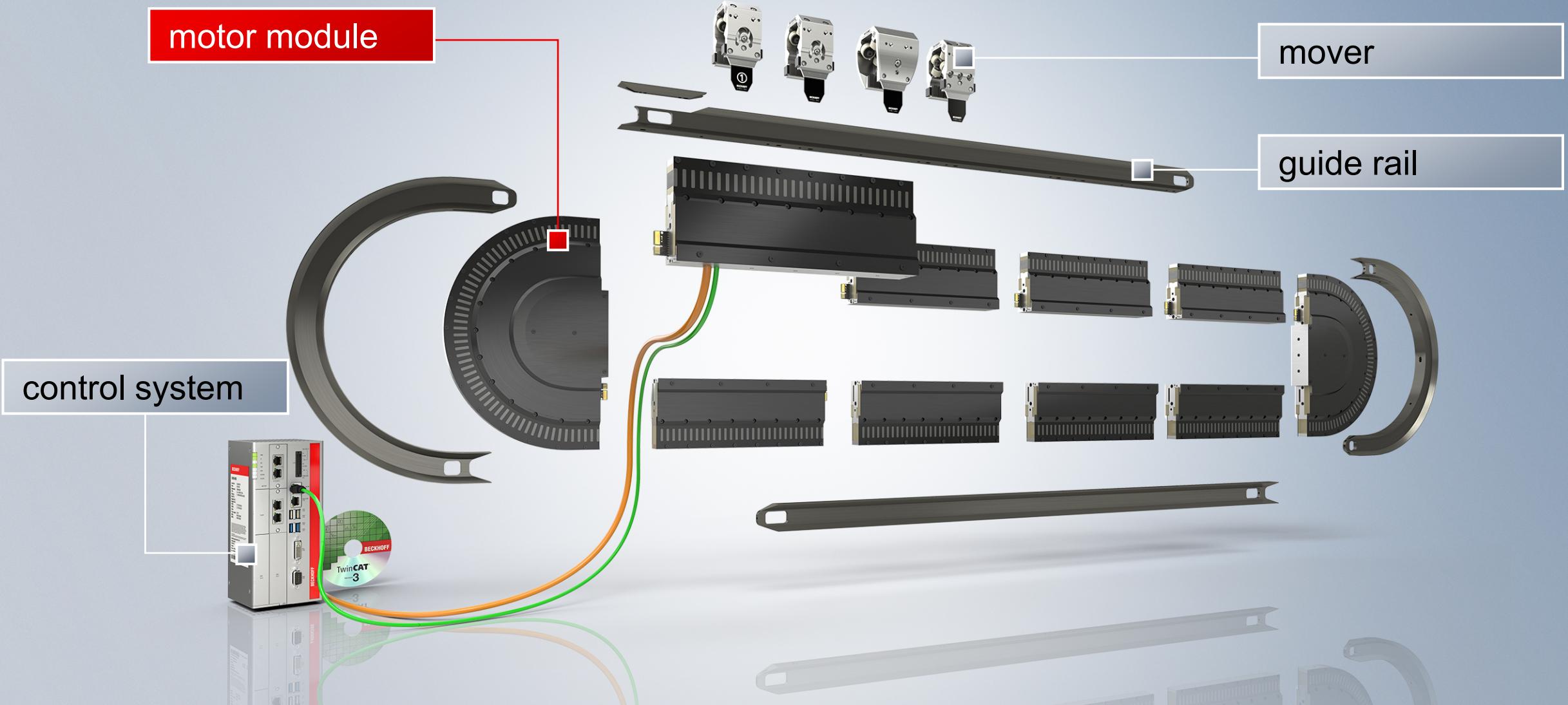
motor module

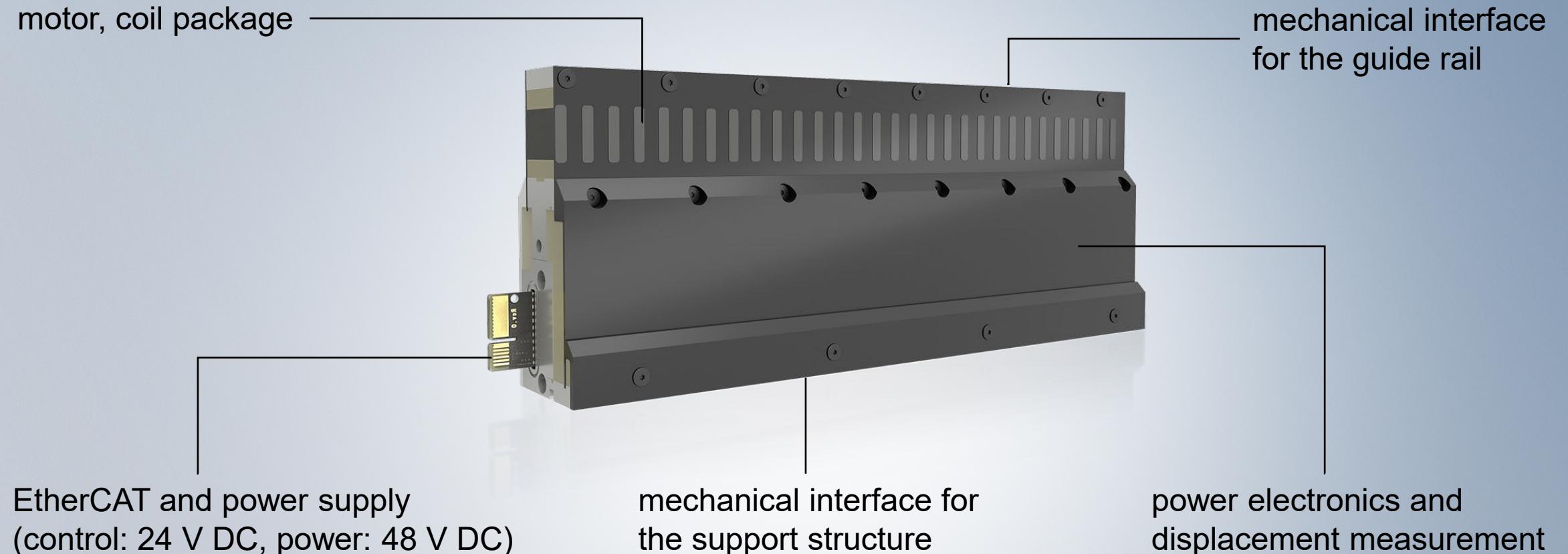
control system

mover

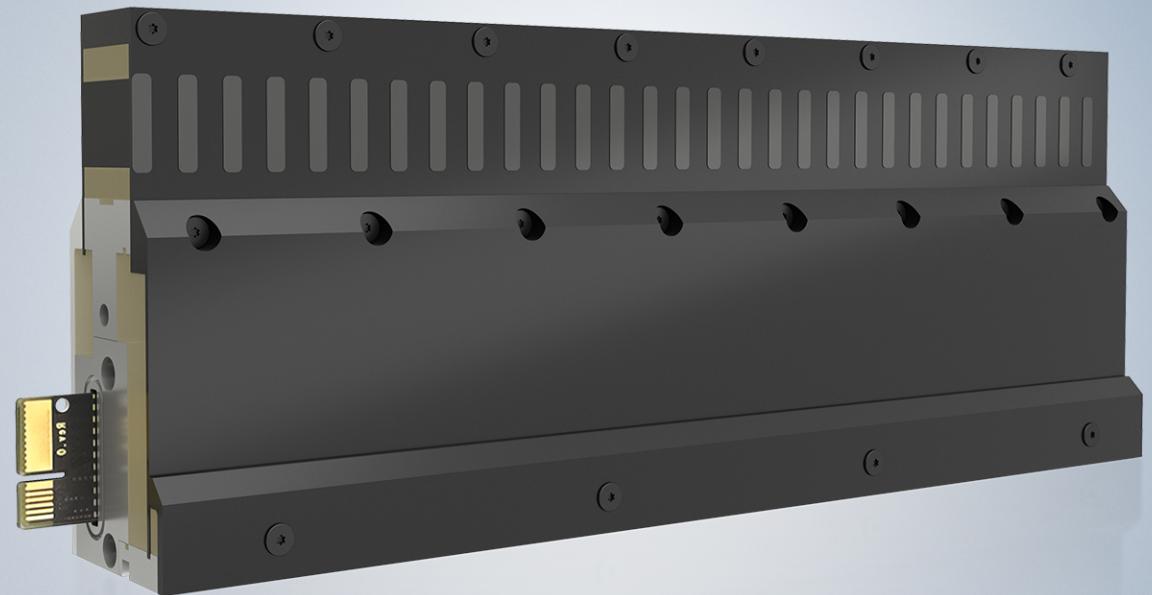
guide rail



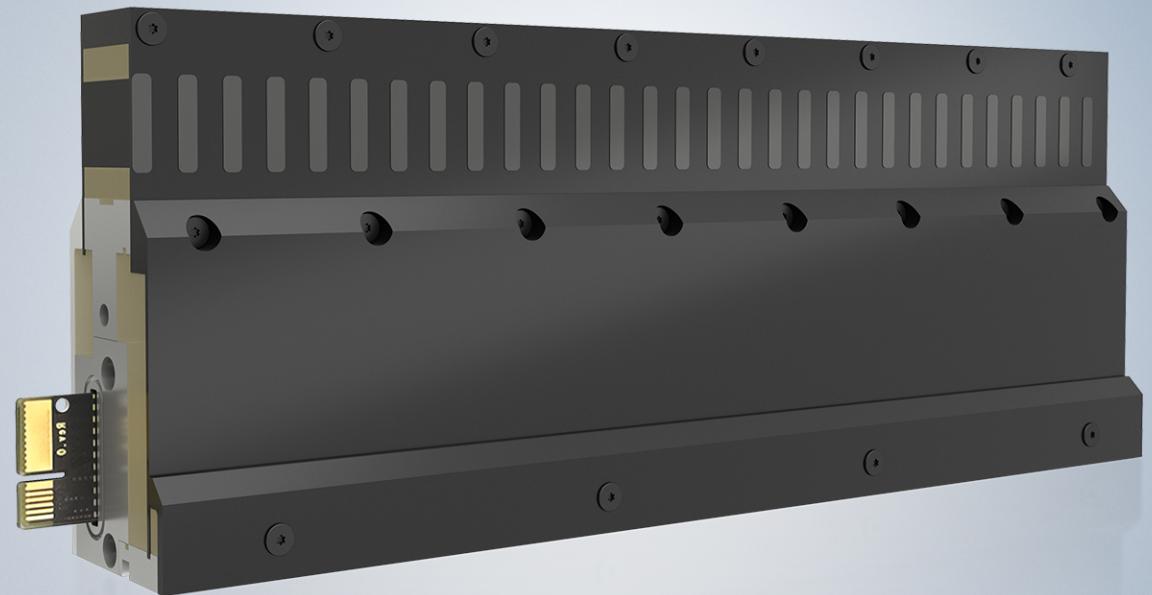


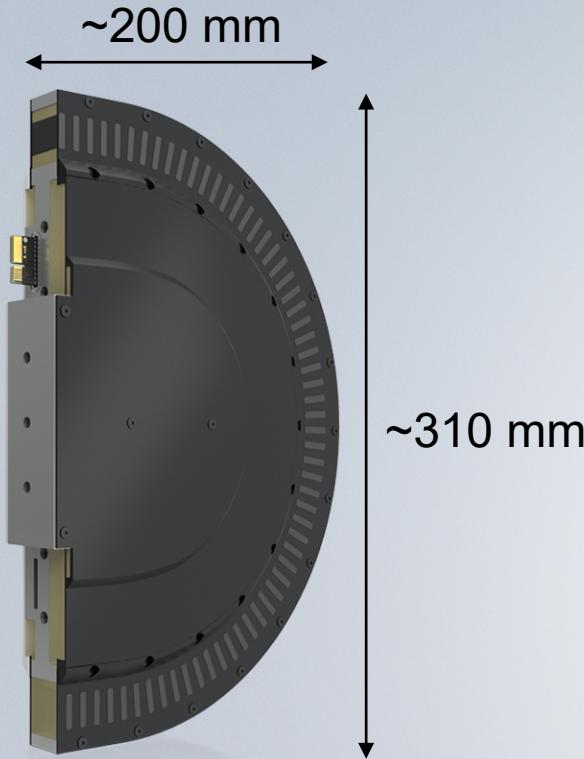


- power supply, EtherCAT
 - motor modules with/without supply cables
 - supply can be connected internally across motor modules
 - supply voltage in the protective low voltage range
- power electronics
 - output stages integrated in coil package
 - temperature monitoring of output stage
 - temperature model of the coils for optimum peak load utilisation (I^2T model)

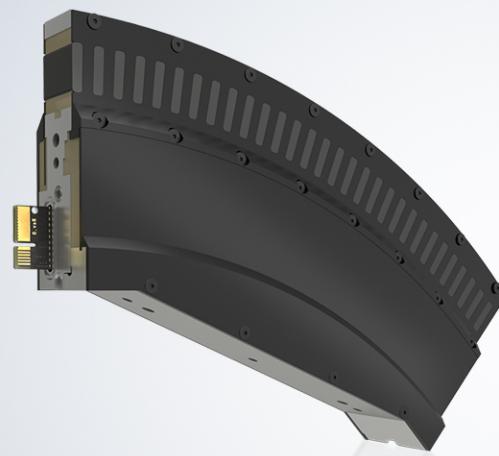


- position feedback
 - non-contact position detection with an encoder flag attached to the mover
 - absolute accuracy of ± 0.25 mm
 - positions are available immediately after switching on
→ no homing necessary
 - multi-position detection: no position restrictions even at the module limits

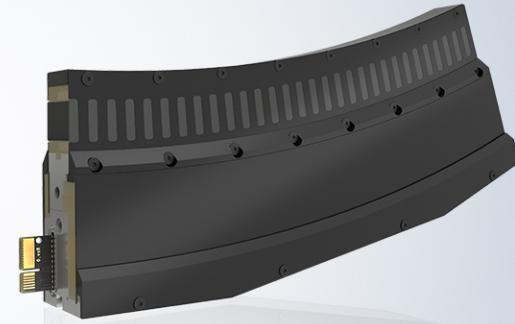




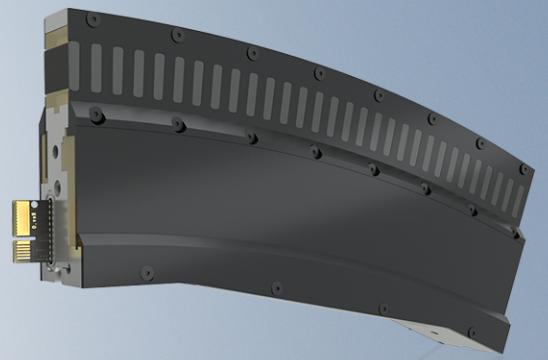
180° curve
(clothoid)
in 500 mm



45° curve
in 250 mm for
Ø 637 mm



-22.5° curve
in 250 mm for
Ø 1273 mm



22.5° curve
in 250 mm for
Ø 1273 mm

S-shape



Rectangle



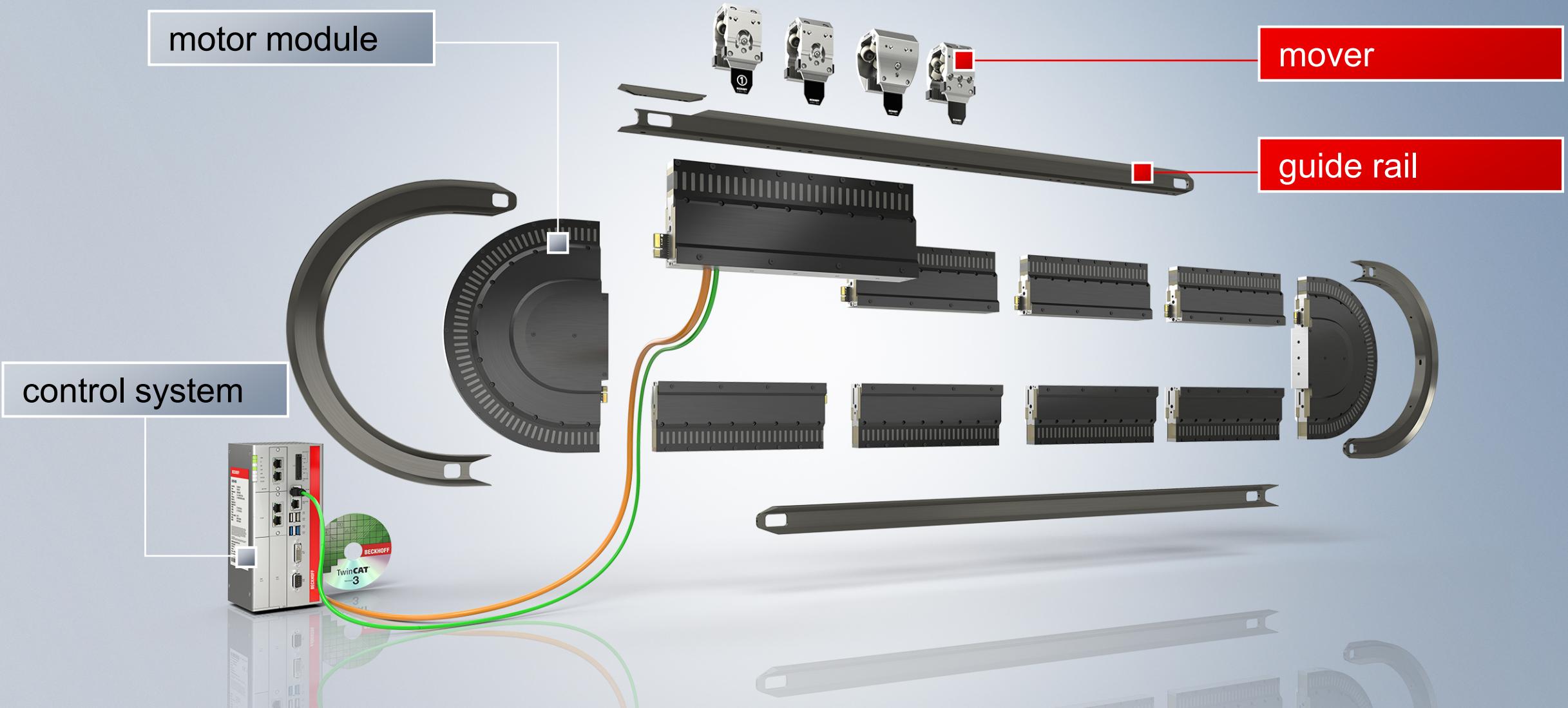
Square



Straight, open track



... and others

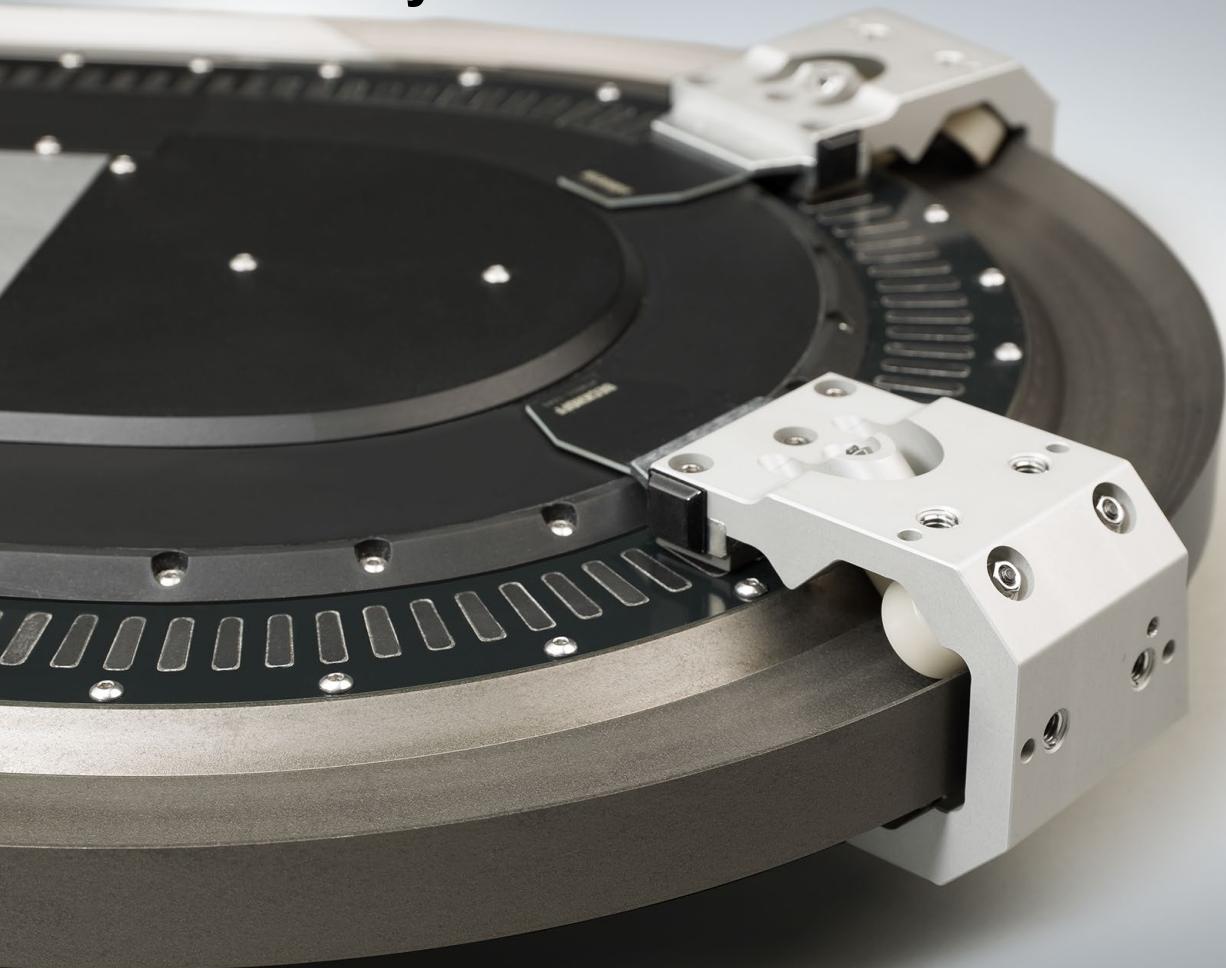


XTS Modules

System solution – guide rail and movers

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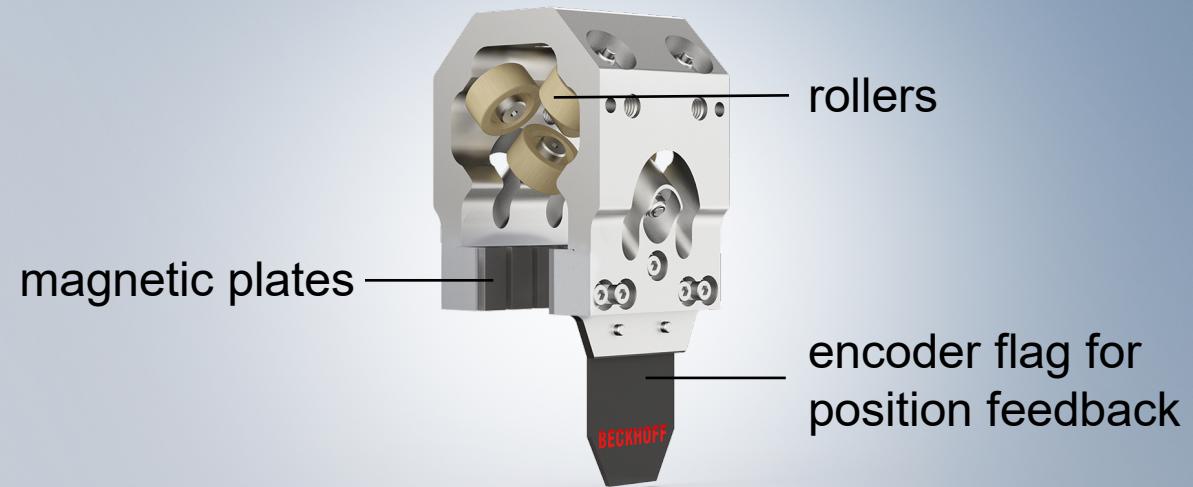
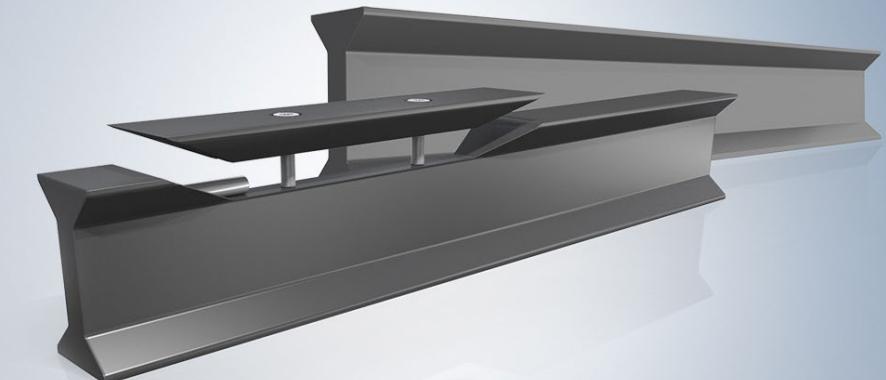
Beckhoff system solution



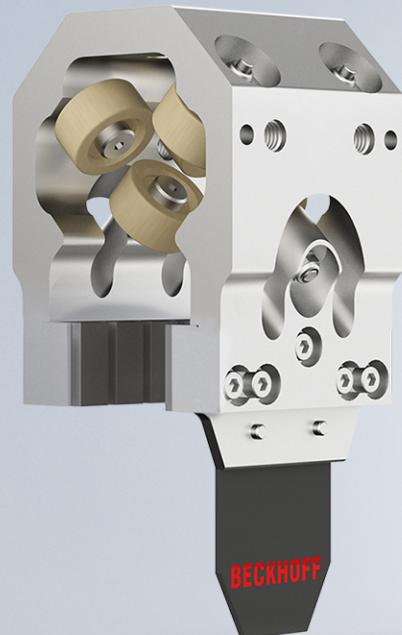
HepcoMotion system solution



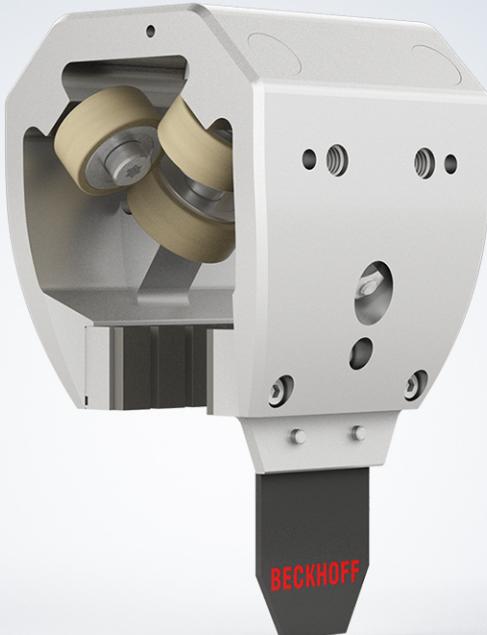
- guide rail made of aluminium
 - straight and curved segments
 - abrasion-resistant hard anodised aluminium surface
 - simple assembly of the guide rail via mechanical interface on the motor module
- mover with plastic rollers
 - backlash-free running through optimised geometry
 - no lubrication necessary



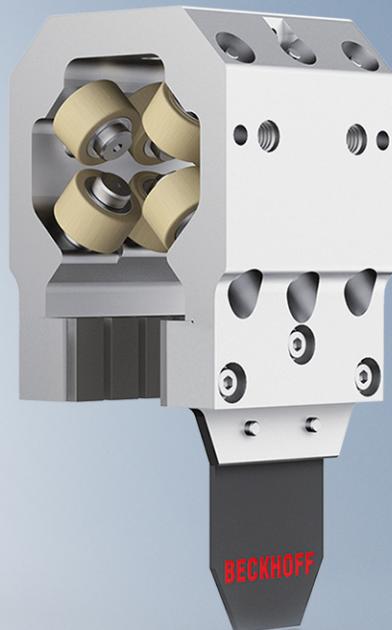
Various product versions for different application requirements



Standard mover



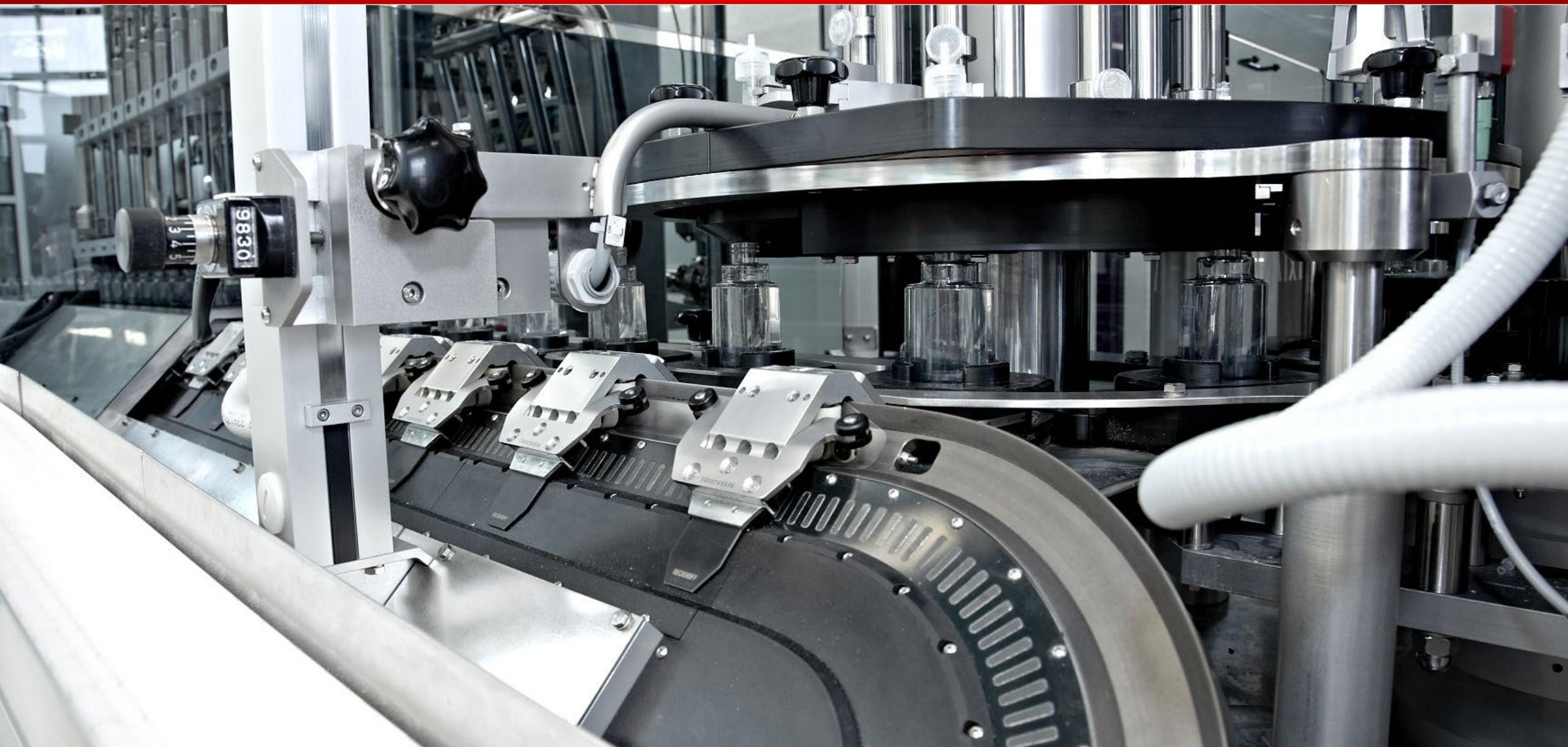
Mover for increased
payload



Mover for longer
service life

Application example:
Cosmetics filling line – Groninger & Co. GmbH, Germany

BECKHOFF

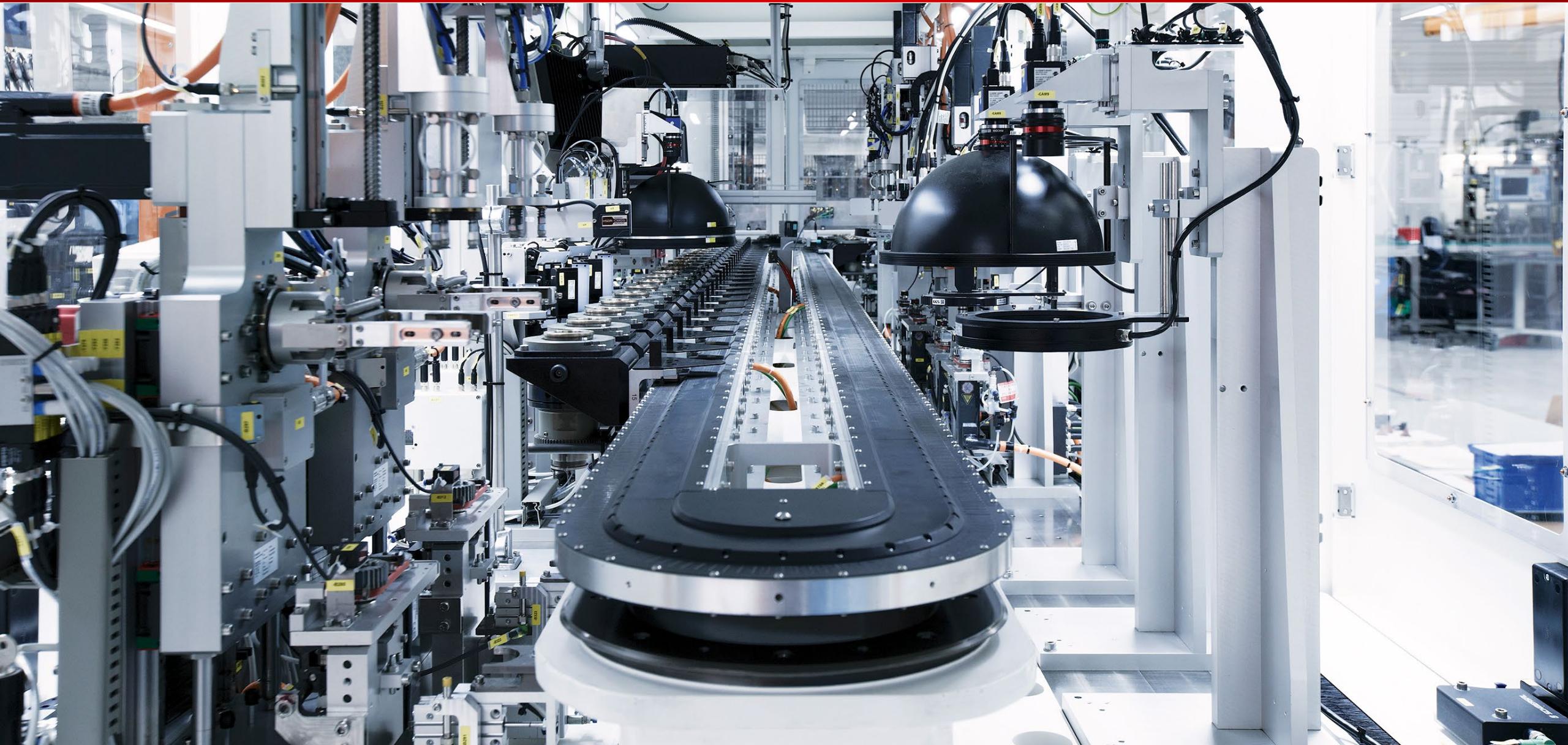


- guidance system routed in parallel to accept higher process forces
- hardened steel V-guide to ensure high accuracy over prolonged periods of time
- with automatic lubrication system
→ lubricant is fed to the guide surfaces of the rails
- 1-track: rail system for 180° curve (clothoid)
- PRT2: rail system for round, oval and rectangular systems
- motor modules available with upper profile without drill holes
→ increased ease of cleaning



Application example: Optical inspection system – GEFASOFT, Germany

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XTS Modules guide rail and movers Comparison

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Beckhoff system solution



- highest level of dynamics
- low costs
- lubricant-free

HepcoMotion system solution



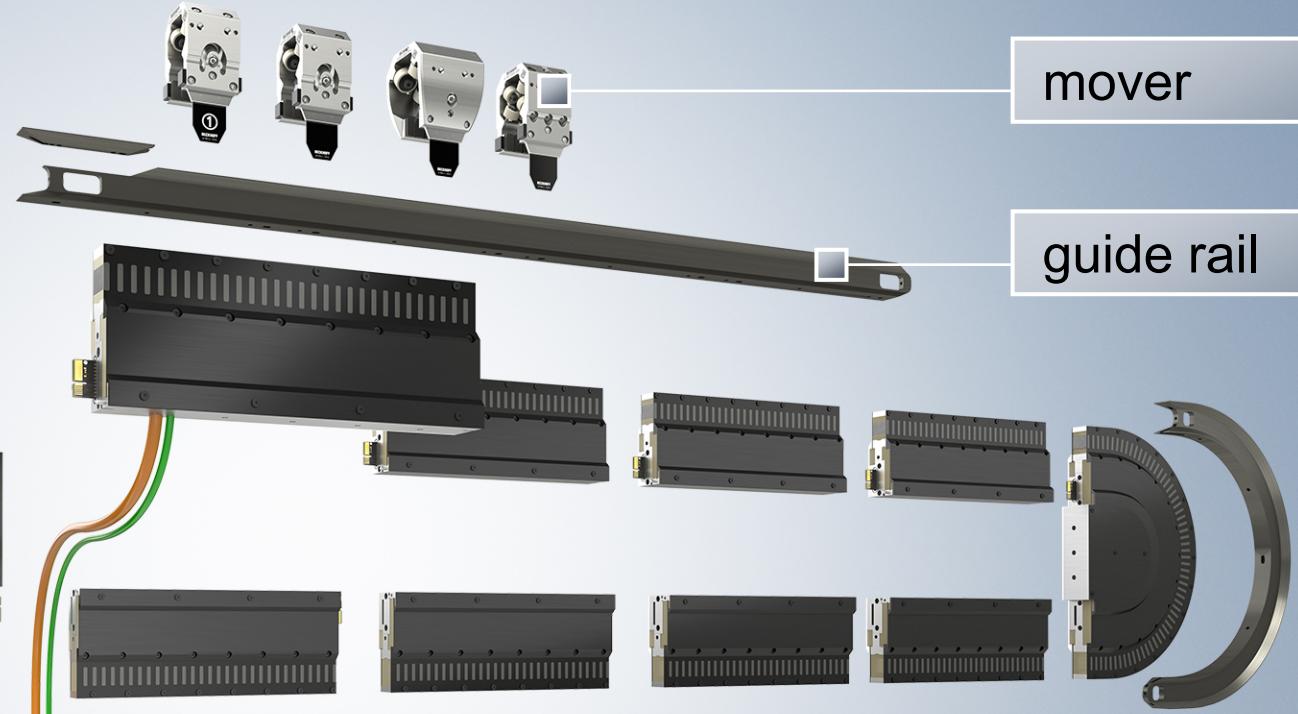
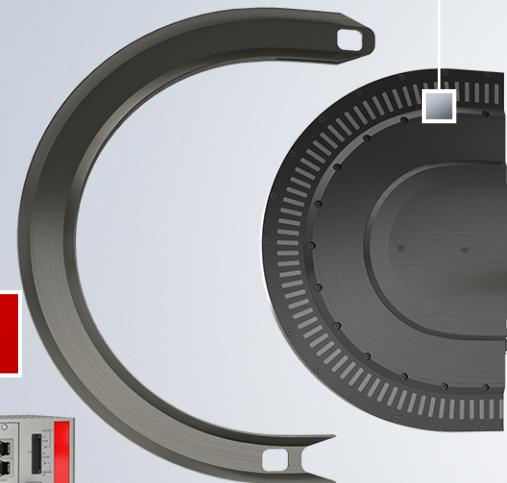
- higher loads
- higher process forces
- maximised service life

motor module

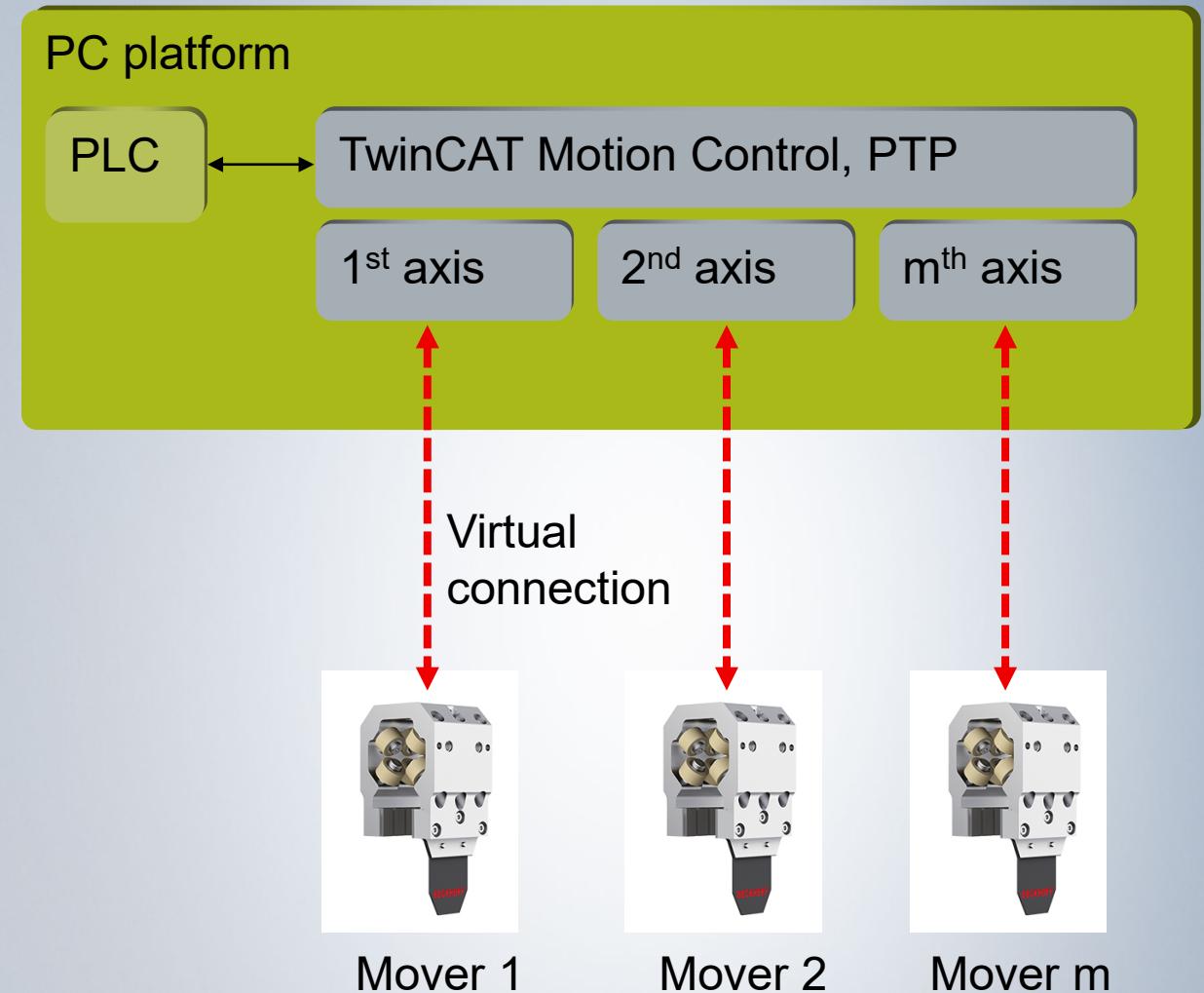
control system

mover

guide rail

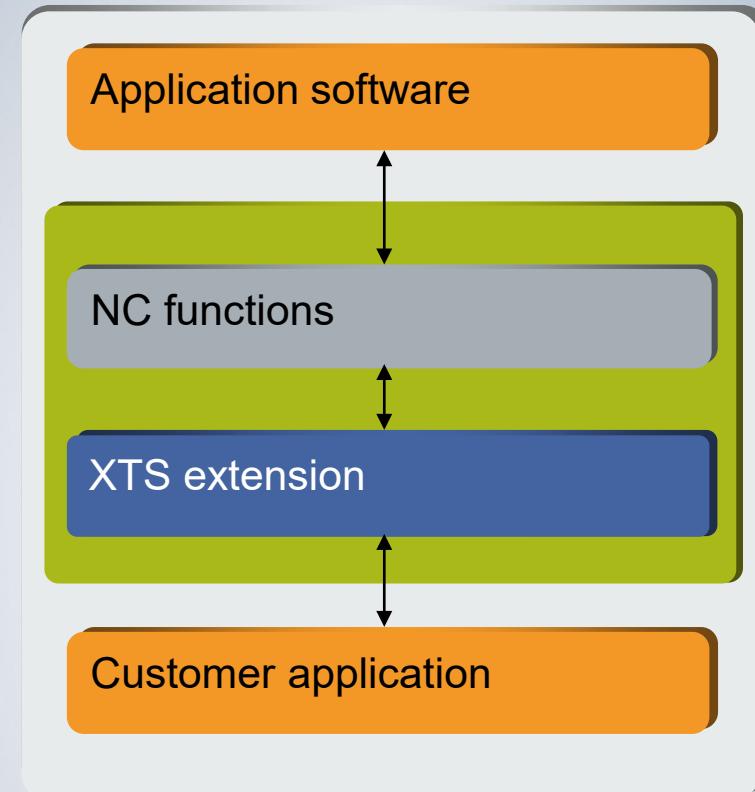


- The XTS extension in TwinCAT decouples servo algorithms from the hardware components and calculates them centrally.



**From the point of view of application
programming, a mover appears like a
“normal” servo axis**

- all motion control functions are available,
e.g.
 - flying saw
 - electrical gear unit
 - cam plates
- functional extensions handle typical XTS
requirements
 - automatic accumulation
 - collision and jerk avoidance
 - centrifugal force limitation



1. XTS-StarterKit
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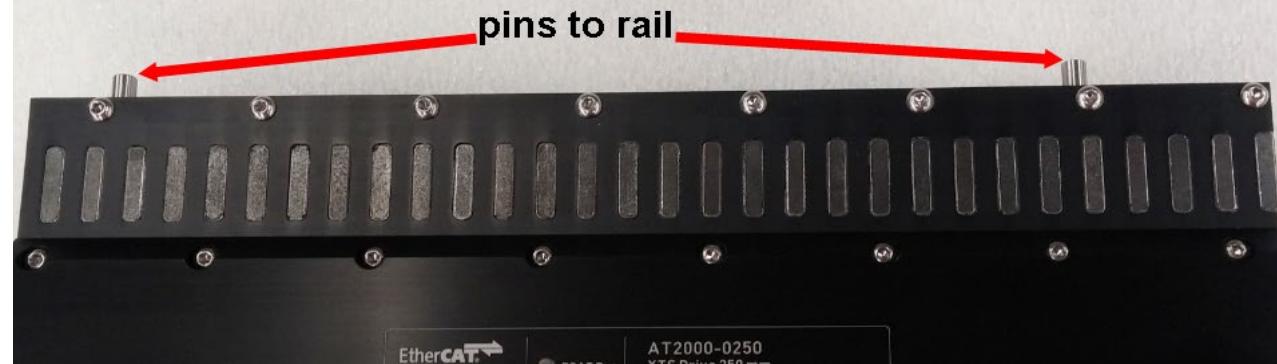


Prepare the XTS Modules

BECKHOFF

- Insert all pins on the bottom side of the frame
- Insert the pins to the rail
- Insert the pins to the neighbor modules

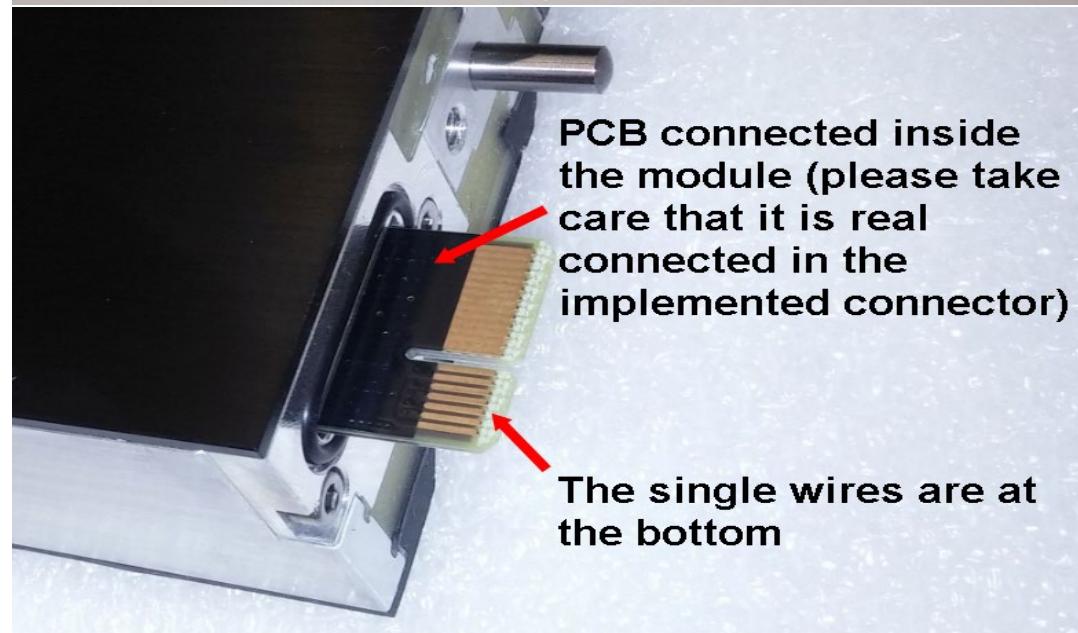
- 4x D5x10 A2 DIN 7
- 1x D5x30 A2 DIN 7



Prepare the XTS Modules

BECKHOFF

- Insert O-ring (as sealing) on the side of the module
- Insert the connection PCB



Prepare the XTS Modules

BECKHOFF



Module frame mounting

BECKHOFF

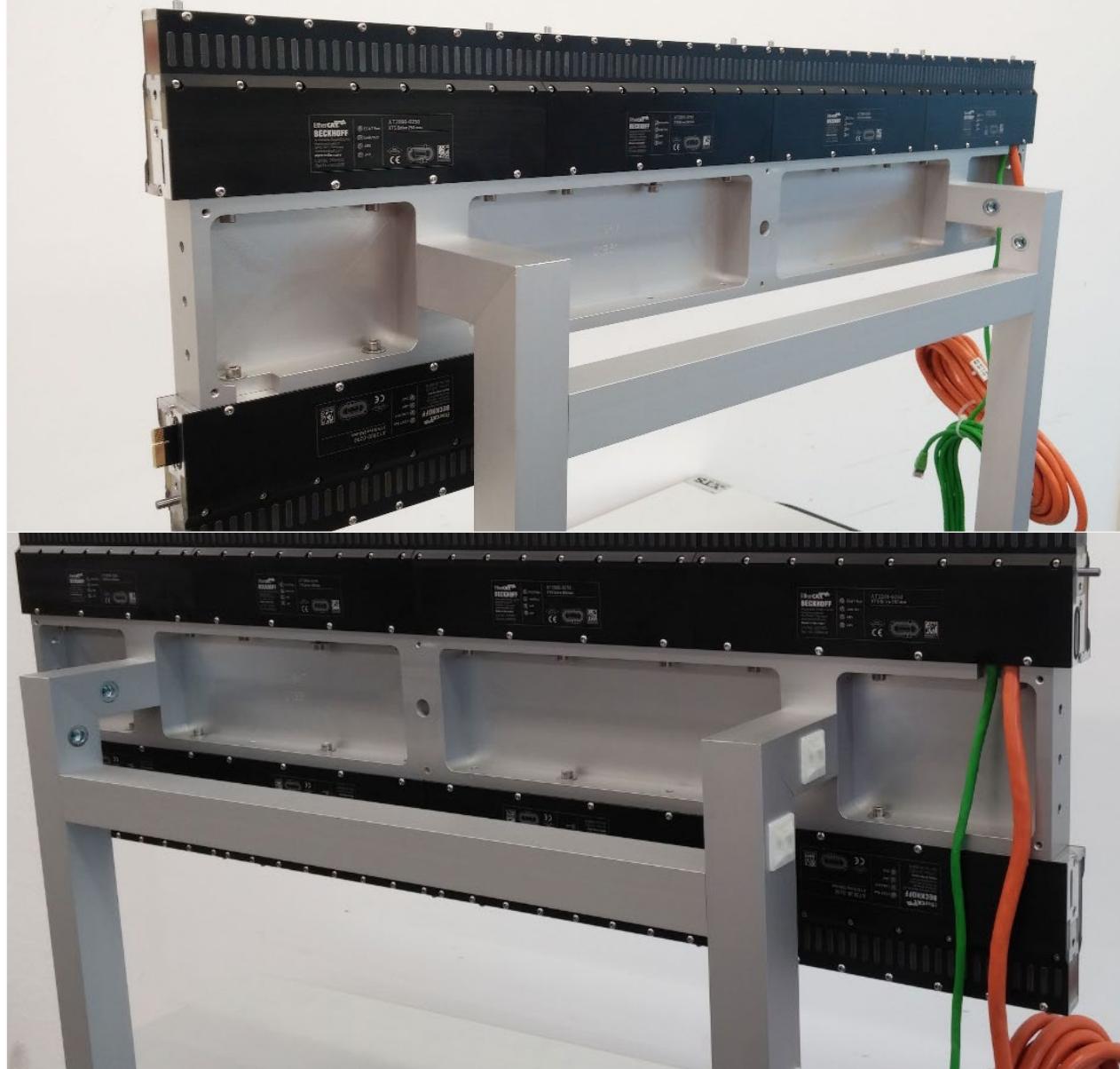
- Beginning with the straight infeed module
- Following with all other straights from both sides of the frame
- The electrical connection is done by sliding the connection PCB in the neighbouring module



- Fix the modules with

- Screw M5x20 Cyl. A2 DIN 912
- Washer M5 A2 DIN 9021

! Do not tighten the screws to allow
for adjustment of the modules



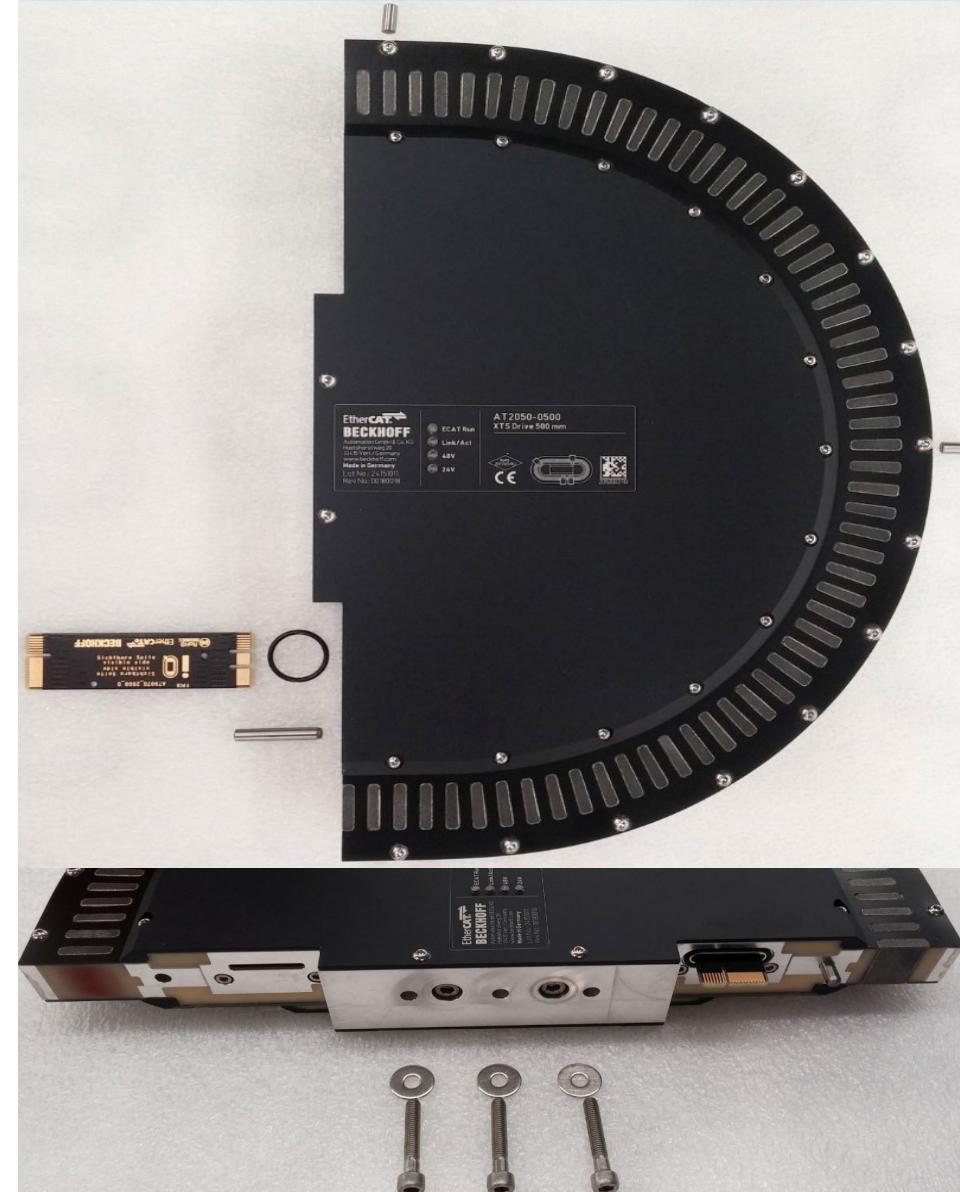
Prepare the XTS Modules

BECKHOFF

- Mount the curve modules last
- The curves will meet the straights as you tighten the screws to the frame

- 1 x Pin D5x30 A2 DIN 7
- 3 (2)x Pin D5x10 A2 DIN 7
- (1) x Pin D5x8 A2 DIN 7 → lower HW28

- 1 x O-ring (as sealing)
- 1 x Connection PCB
- Screw M5x30 Cyl. A2 DIN 912 &
- Washer M5 A2 DIN 9021

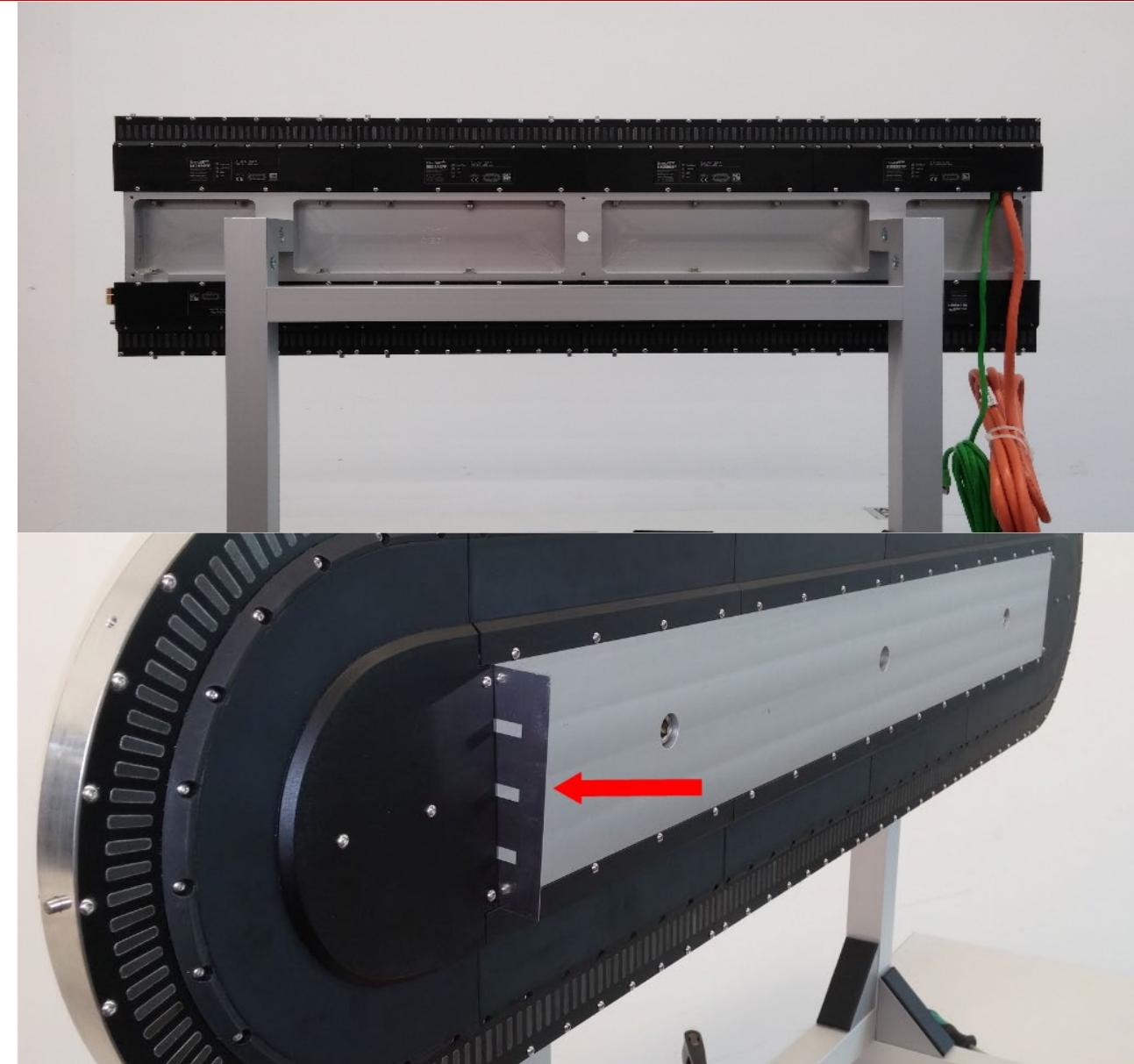


Module frame mounting

BECKHOFF

- insert 1mm aluminum sheet at one side
 - Only before HW..

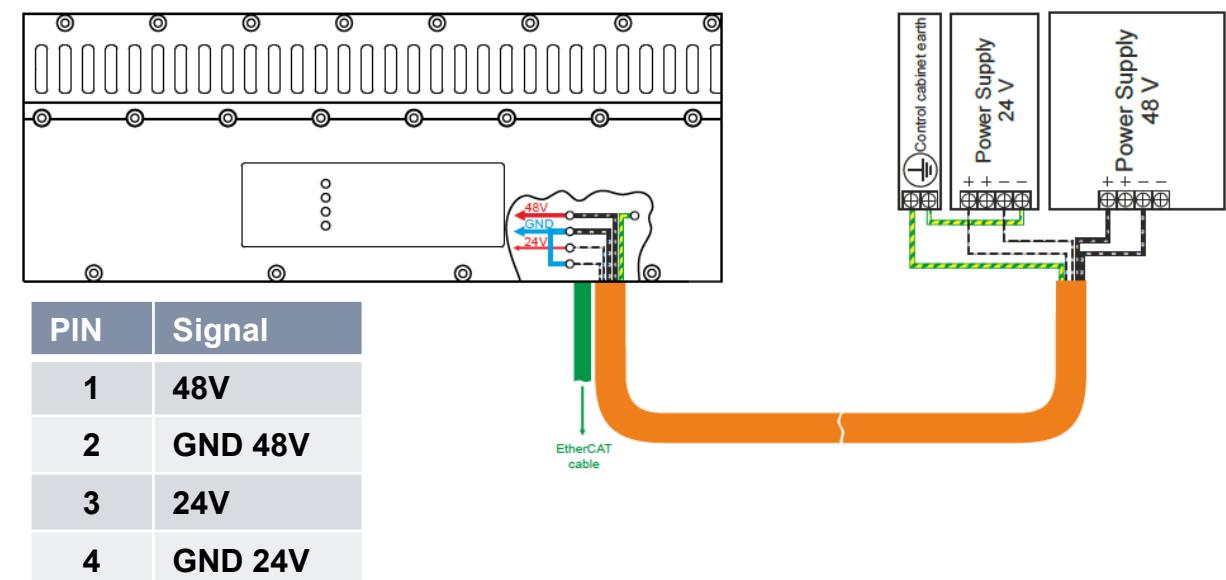
HW03 at 0.5m
HW02 at 1.0m
HW02 at 1.5m



Module frame mounting

BECKHOFF

- Pin out of the infeed module as labelled on the name plate and cable
- Connect EtherCAT to the IPC or CU2508



- 1. XTS-StarterKit
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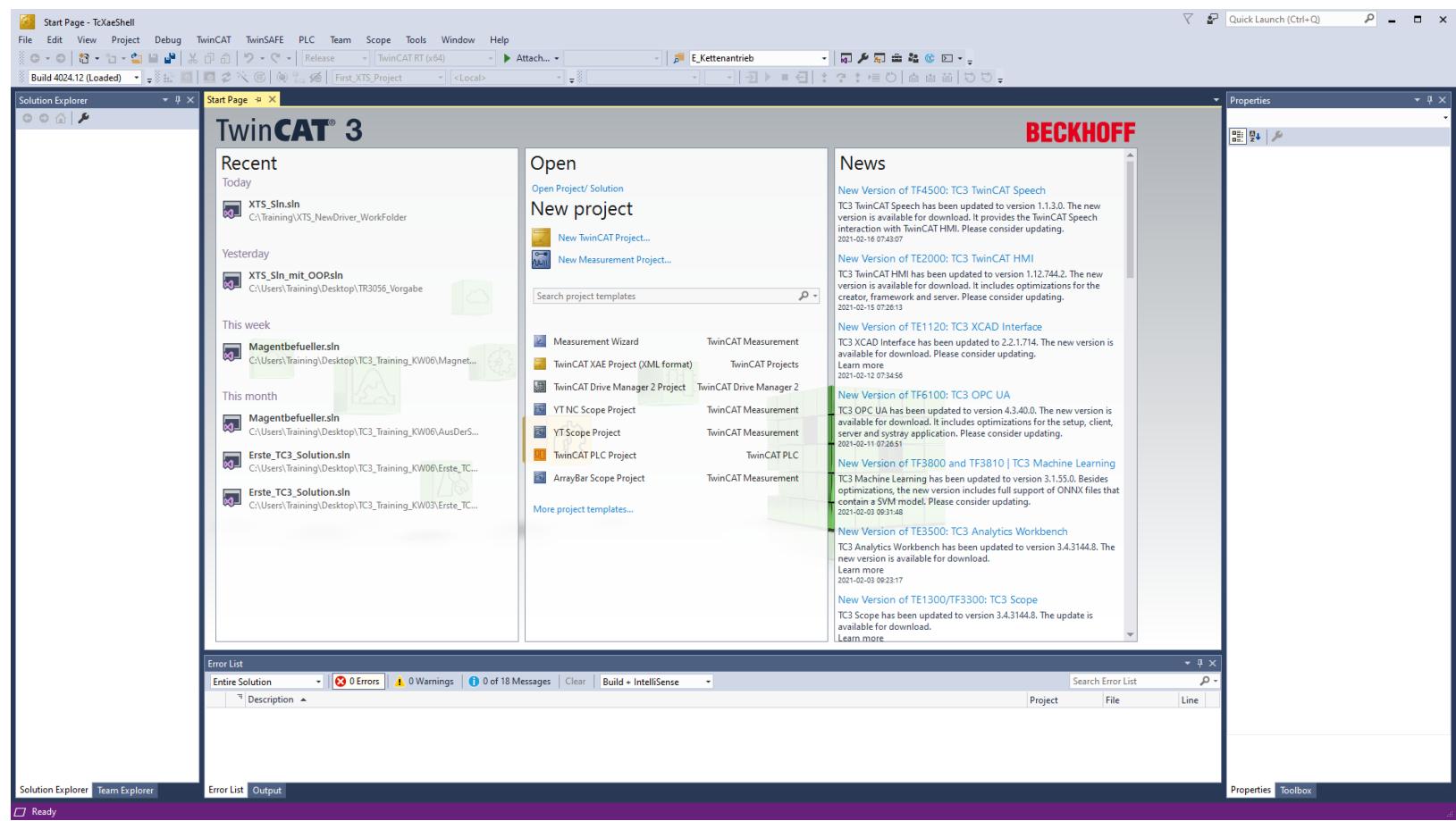
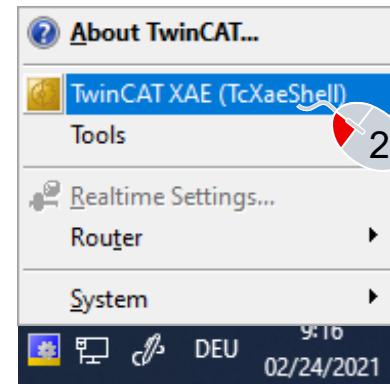
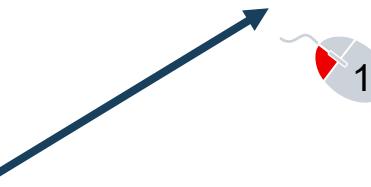
HardWare Scan | Opening a TC3 solution

BECKHOFF

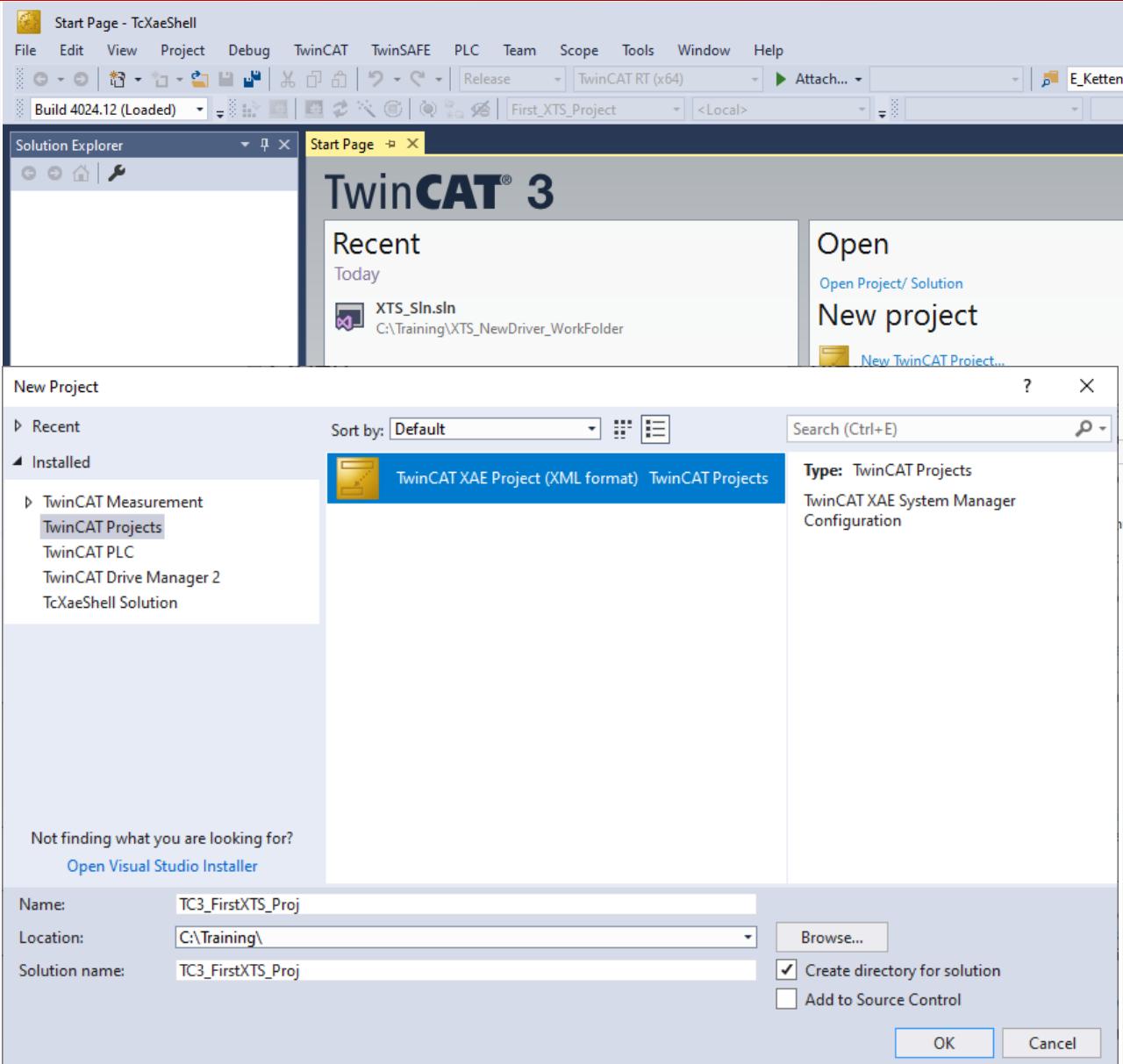
- TwinCAT 3 Engineering (XAE) is started via the TwinCAT icon.



TwinCAT 3 icon

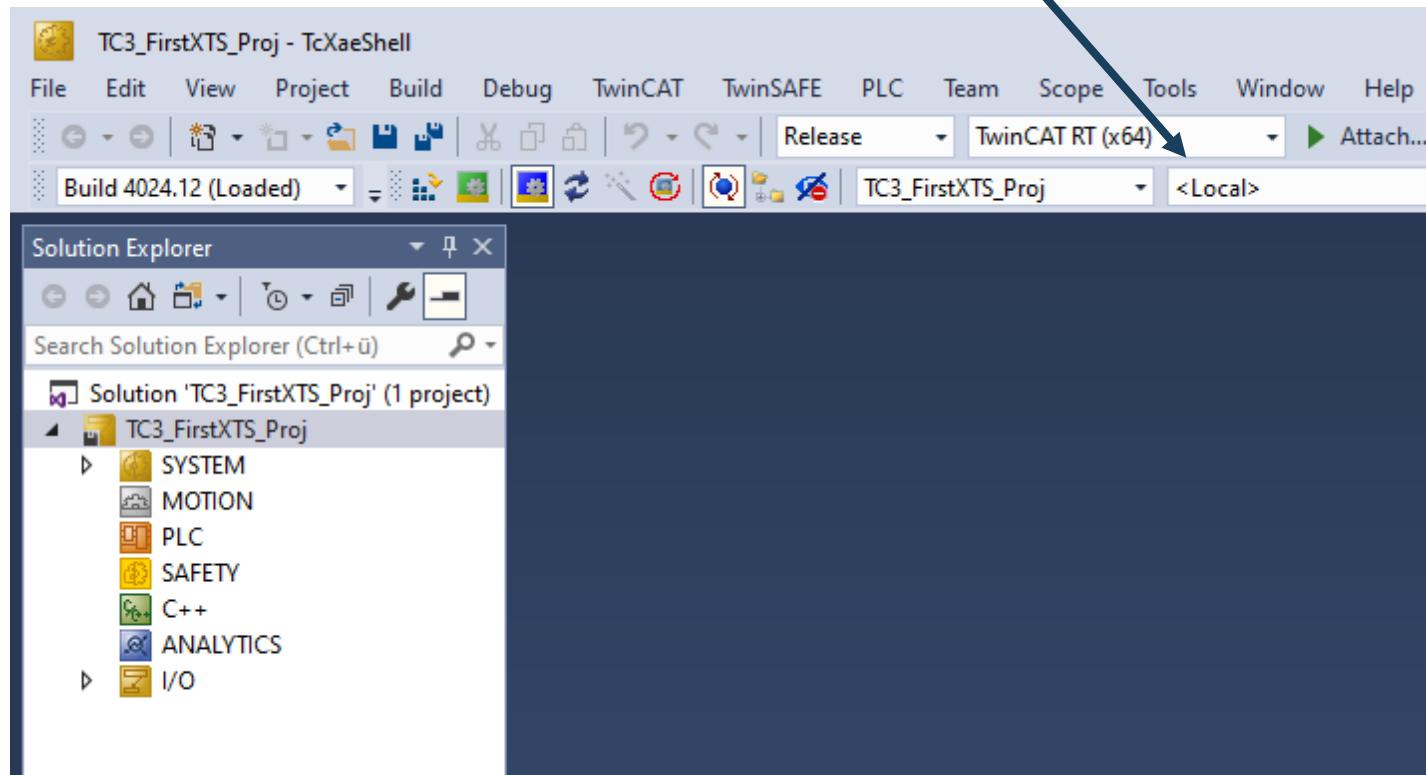


- Create a new project via the start page or the New Project icon.
- Select a project name and storage location and confirm with OK.



- When a new project is created,
- the local target system “<Local>” is automatically selected.
- Change to your XTS target system

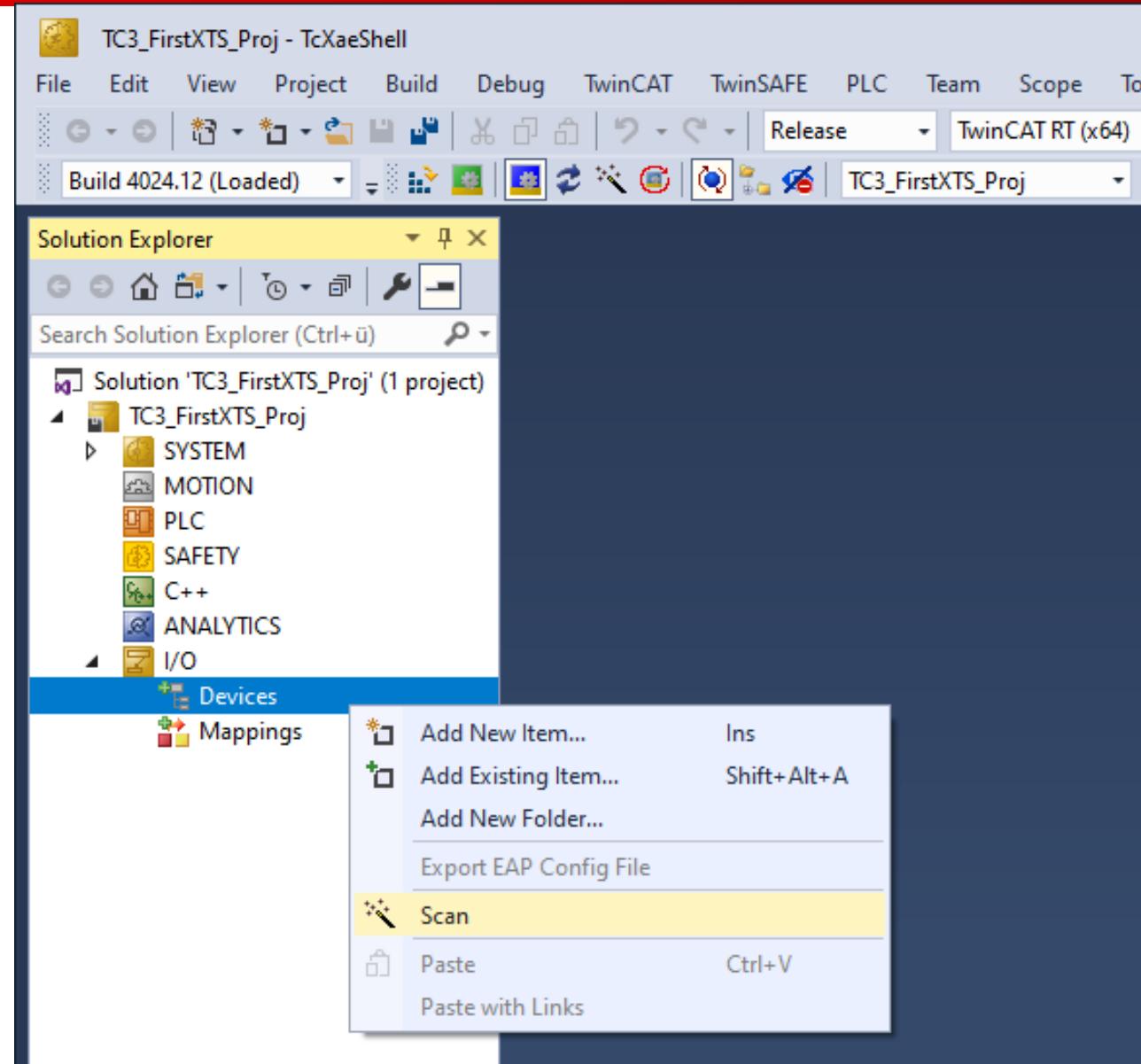
The target system selection box shows the active target system.



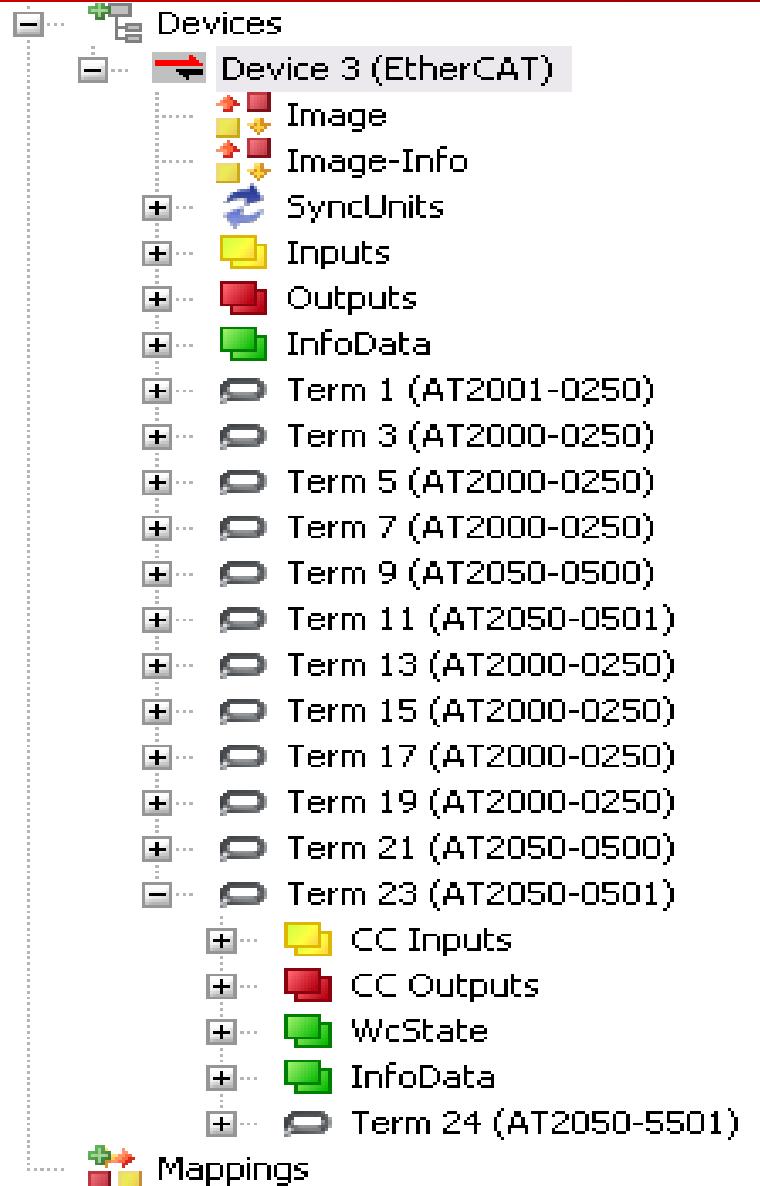
- The devices connected to the target system can be scanned.
i.e. the fieldbus connections or the device specific modules such as the Novram in the IPC
- In the Solution Explorer, right-click on “Devices” under I/O and select



 A device scan is only possible from a target system that is in Config mode.



- Once the scan has been completed all the hardware should have been found
- The first module is the straight section infeed module.
 - AT2001-0250
- Each module includes
 - a motor module
(AT200X-0250 or AT2050-0500)
 - and a sensor lines
(AT200X-5250 or AT2050-5501)



- 1. XTS-StarterKit
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Rail module mounting

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- Screw the rail onto the system, beginning with the straight and finish with the two curves

➤ Screw M4x40 Cyl. A2 DIN 912

! Do not tighten the screws to allow for adjustment of the rail



- **Important:**

If the transition between straight and curve does not fit well it may push out the pin between straight and curve rail.

- **Important:**

If the pins between curve rail and curve motor module will not fit you may leave them out

! Do not tighten the screws to allow for adjustment of the rail

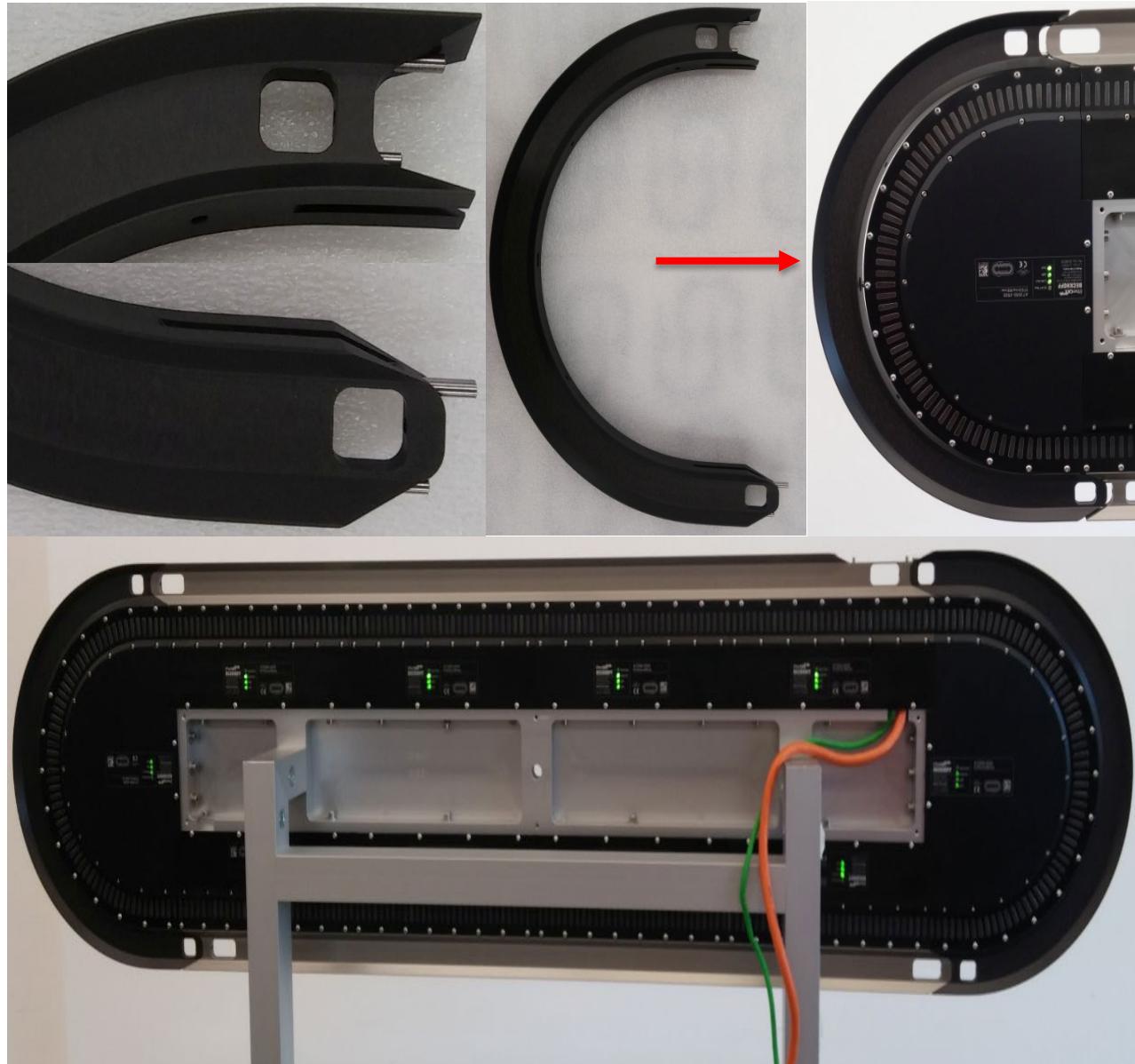


Rail module mounting

BECKHOFF

- Construction after mounting the straight rails

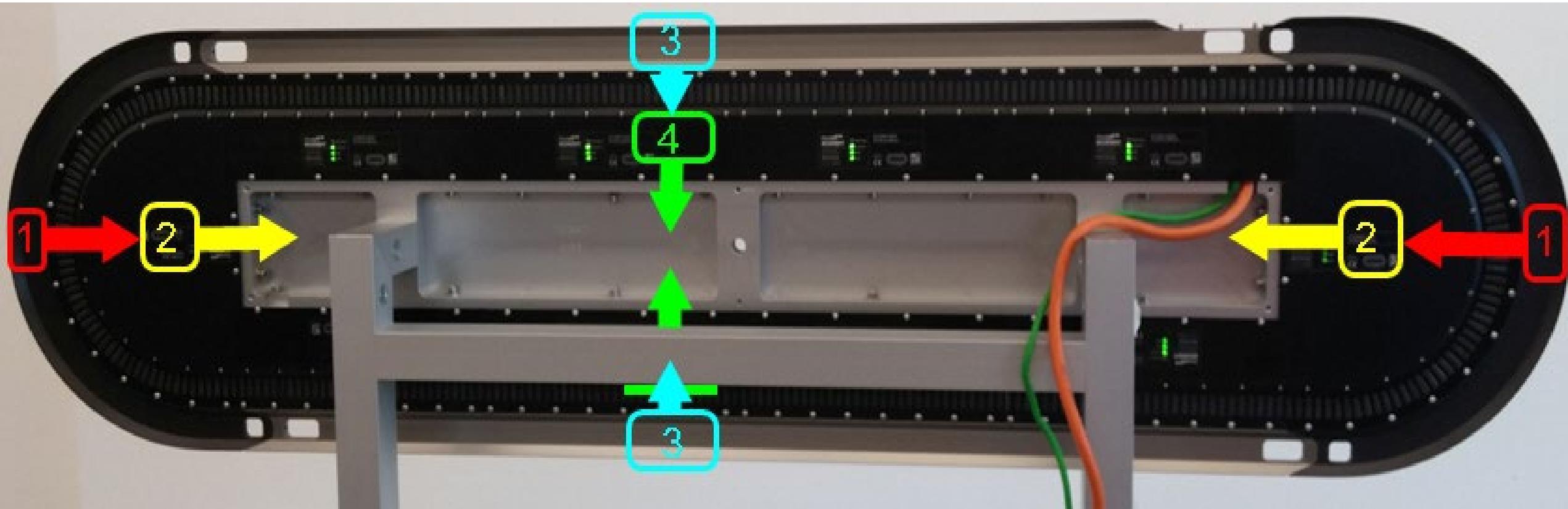
➤ Pin D4x16 A2 DIN 7



Now tighten the screws to the specified torque in this sequence:

- ▼ 1st - two curved rails with
- ▼ 2nd - two curved motor modules with
- ▼ 3rd - the straight rails with
- ▼ 4th - the straight modules with

2x 4	Screw M4x40	4Nm
2x 3	Screw M5x30	6Nm
22x	Screw M4x40	4Nm
24x	Screw M5x20	6Nm



- 1. XTS-StarterKit
- 2. XTS Module
- 3. Preparation and Assembly
- 4. First Test
- 5. Rail mounting
- 6. **Rerailing of Mover**

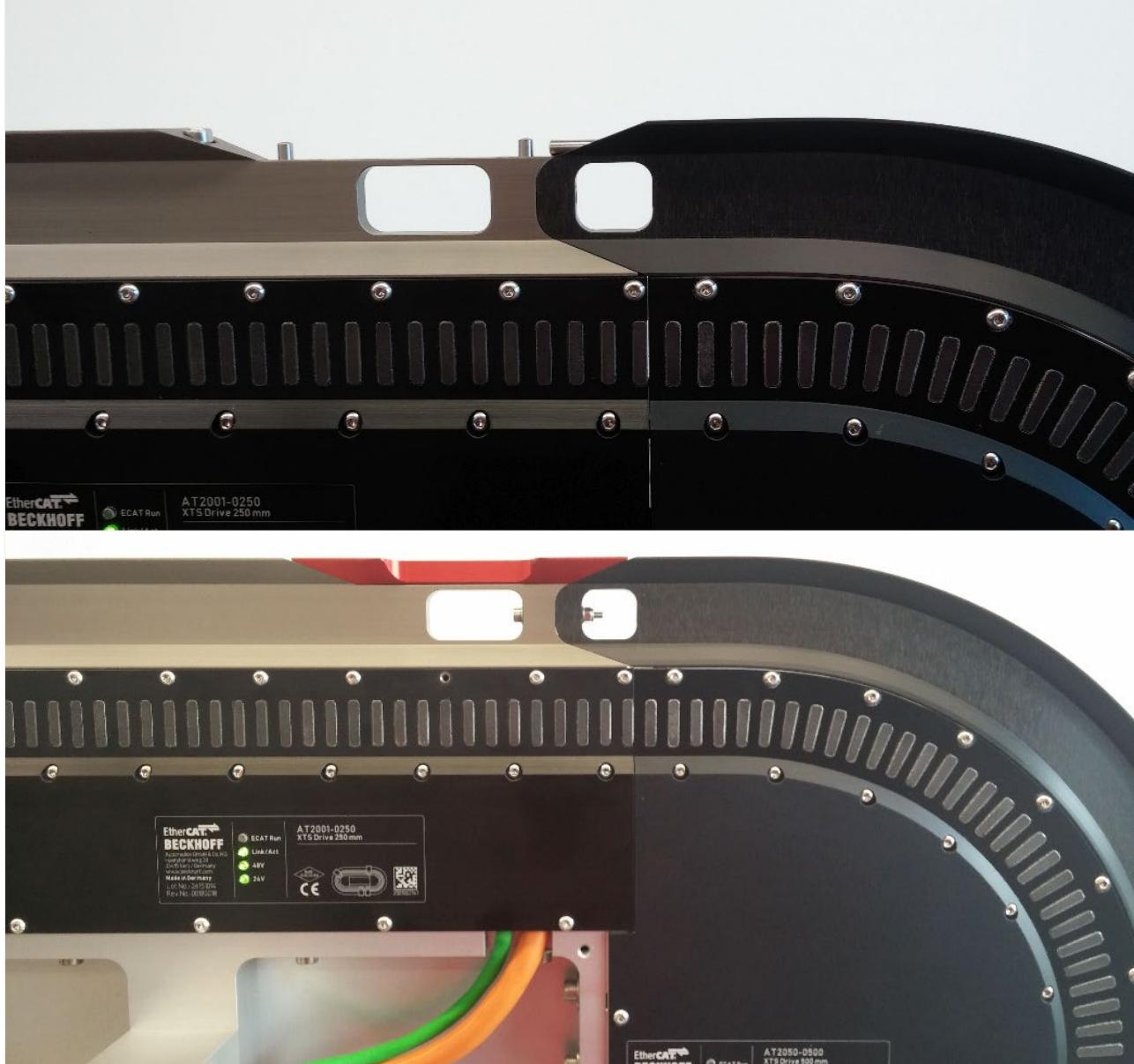


- Construction after mounting the curved rails

- Close the red auxiliary lock cover

➤ Pin D4x12 A2 DIN 7
➤ Screw M4x10 Cyl. A2 DIN 91

- **Important:**
Don't forget the pins for the gate

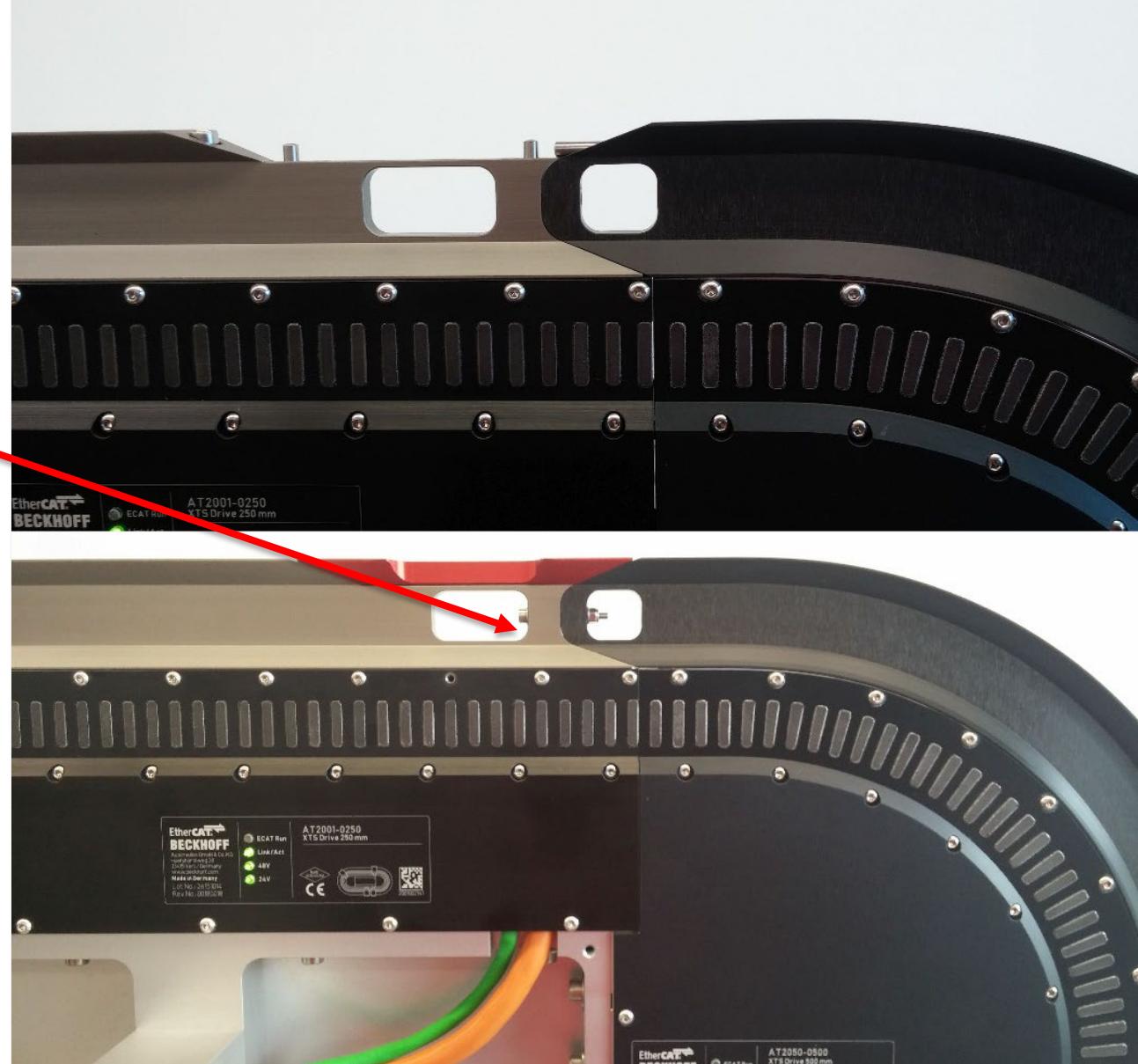


- Construction after mounting the curved rails

- Connect curved and straight rail

➤ Screw M3x30 A2 DIN 912
➤ Washer M3x30 A2 DIN 125
➤ Nut M3 A2 DIN 985

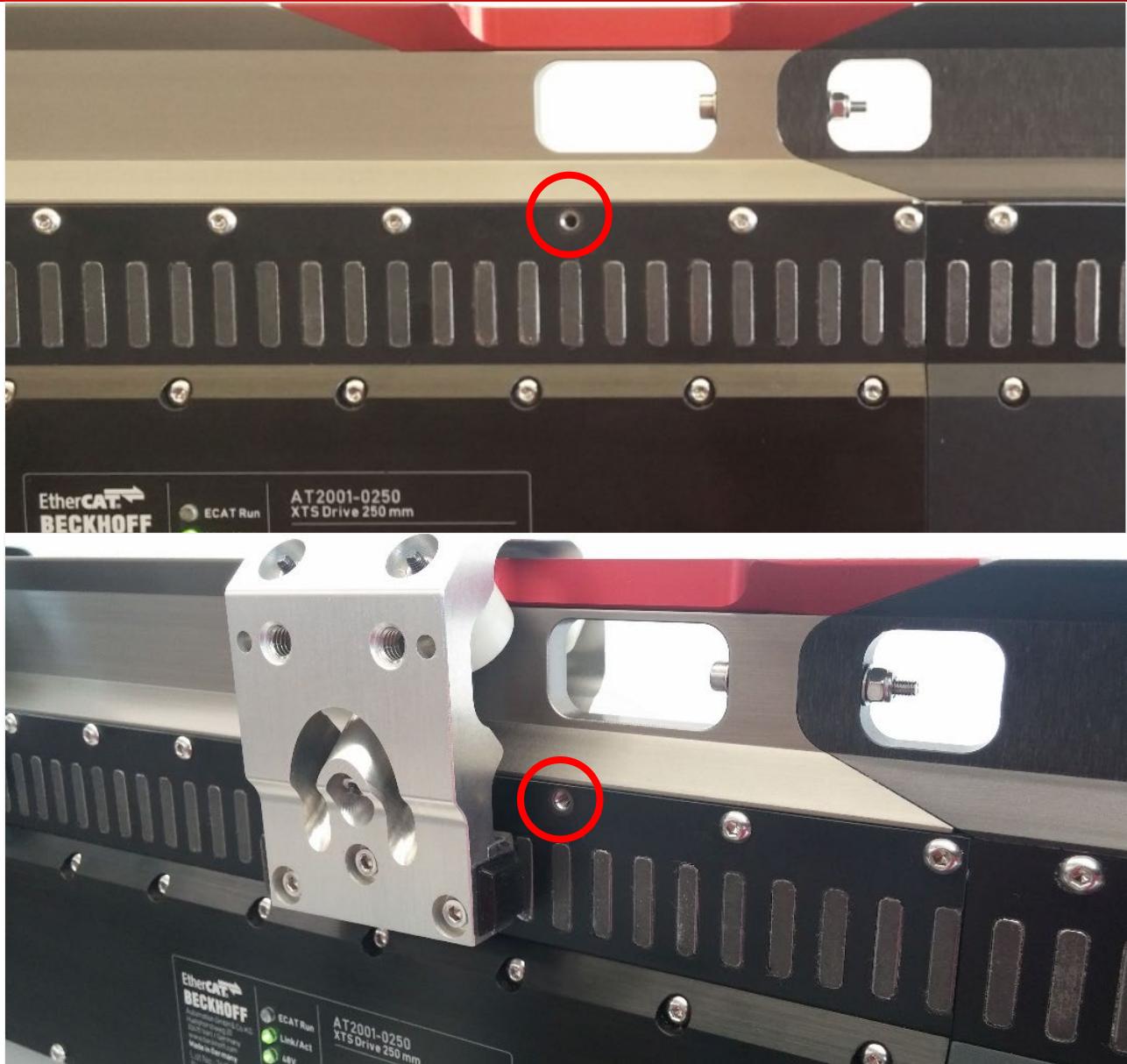
- **Important:**
Don't forget the screws for connecting



- It may be necessary to remove one motor module screw for easy insertion of the mover (lower HW22)
- Insert the Mover

➤ **Attention:**

The encoder flag should be on the same side as the XTS sensor (not the side of the name plate and LEDs)



- Remove the red auxiliary lock cover to replace the lock cover again,

➤ Pin D4x12 A2 DIN 7
➤ Screw M4x10 Cyl. A2 DIN 91

- **Important:**
Don't forget the pins for the gate



Encoder flag must
be at the same side
then XTS sensor
(not the side of the
name plate an
LEDs)



XTS | New Freedom in Machine Building

BECKHOFF



**Complex sequences – simplified solution:
XTS**

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