

igus® the-chain ... moving energy made easy  
...e-chainsystems® ...e-chains® ...readychain® ...chainflex® cables



# Controlled operation & increased life time





**igus® the-chain ... moving energy made easy**

**More than 4,100 employees worldwide**



# igus® - Headquarter, Cologne Germany

- **35 igus® subsidiaries world wide (and more to come)**
- **More than 44 certified igus® distributors around the world**

**the-chain® ... moving energy made easy**

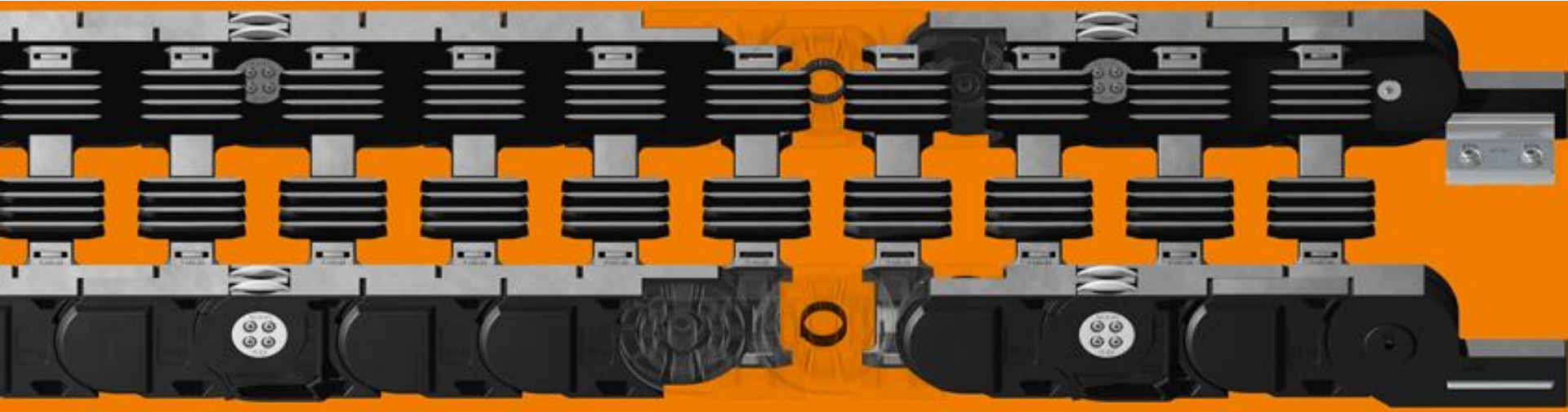


**dry-tech® ... Lubrication free bearing & linear systems**





## P4.1 profile roller chain® – for a high service life



- ▶ Longer service life with integrated tribo-polymer plain bearing
- ▶ Less friction between pin & bore connection
- ▶ High speed(360m/min. & more)
- ▶ Low noise operation
- ▶ Low vibration



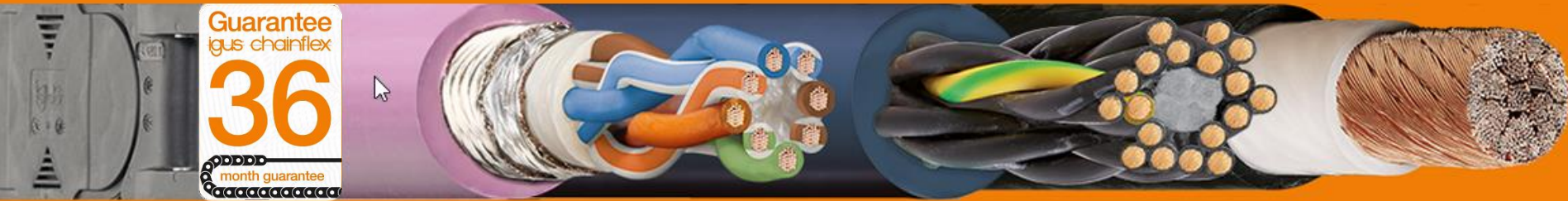
# P4.1 profile rol e-chain® – for a high service life



Use of tribologically optimised iglidur® plain bearings

Service life comparison\* igus® rol e-chains® generations

4040CR		135,000km
P4		226,500km
P4.1		450,000km



- ▶ Largest e-chain® cable range from stock – 1,354 different types
- ▶ No minimum order quantity
- ▶ More than 30 years experience in e-chain® cable development
- ▶ 36 months guarantee\*

\* igus® chainflex® cable selection and installation according to igus® specifications

chainflex® cable stock



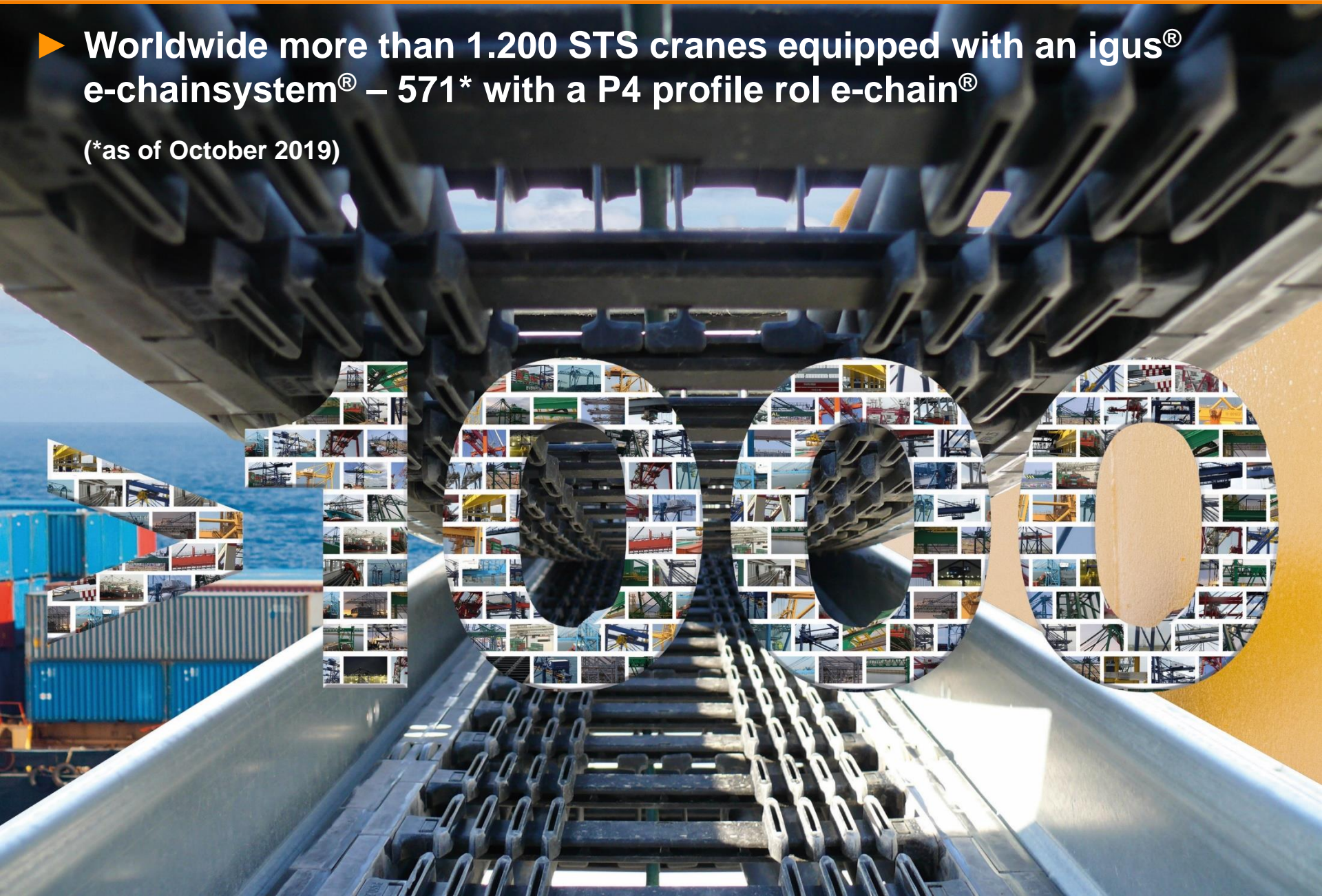
chainflex® cables in life span test. Millions of cycles guarantee: chainflex® lasts or money back!





- ▶ Worldwide more than 1.200 STS cranes equipped with an igus® e-chainsystem® – 571\* with a P4 profile rol e-chain®

(\*as of October 2019)





igus® the-chain ... moving energy made easy

igus® - isense controlled operation



isense - smart plastics

Motion plastics® turns into smart plastics



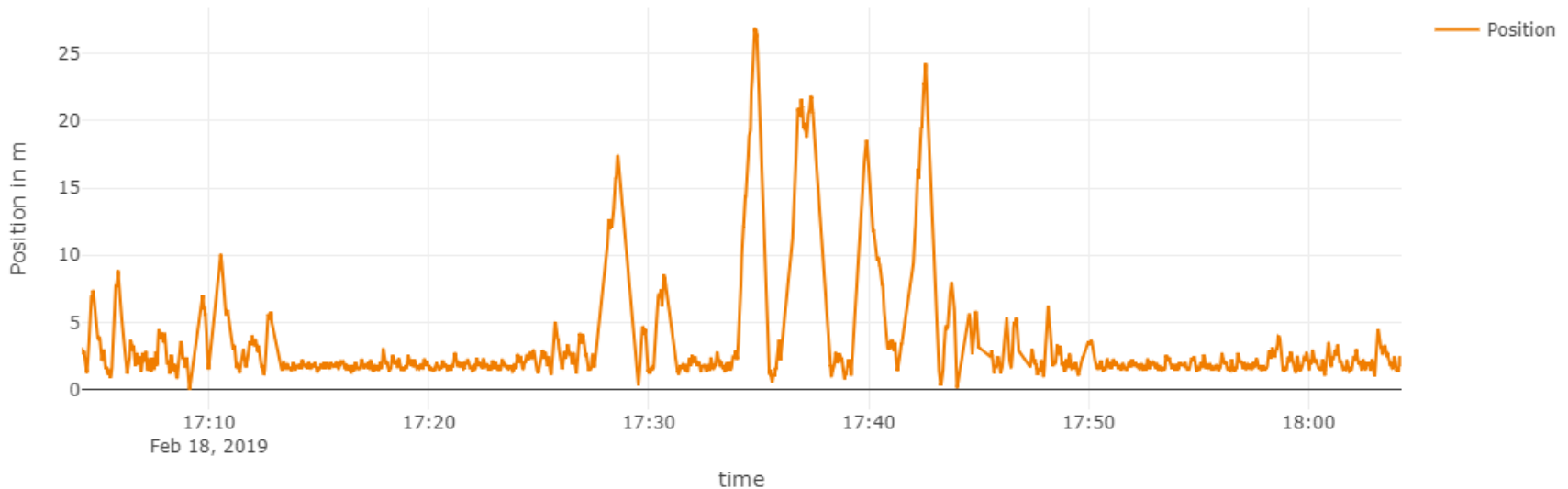
Sensors record the condition of igus® components such as cables or energy chains. Among other things, they measure wear during operation and give an alarm as soon as maintenance or replacement is required.



## isense – EC.M e-chain® motion



Travelled distance



- ▶ EC.M: Recording of the motion profile (measurement of acceleration, speed & temperature). Partial travels, speed changes and breaks are taken into account. Output of the service life (e.g. days) in which the chain system is expected to work trouble-free.



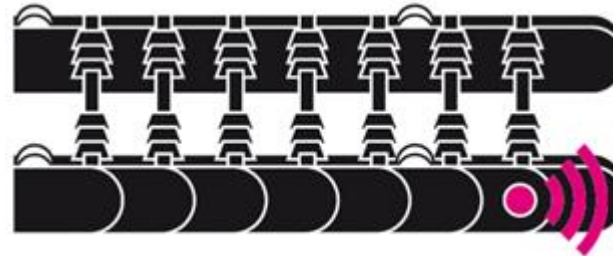
## isense – EC.W e-chain® wear



- ▶ EC.W: Integration of an abrasion sensor for gliding e-chains. Enables „learning“ of the entire system by detecting a defined percentage wear and thus makes it possible to adapt the service life statements to the actual operating conditions.

## isense – EC.I

### Integrated wear detection



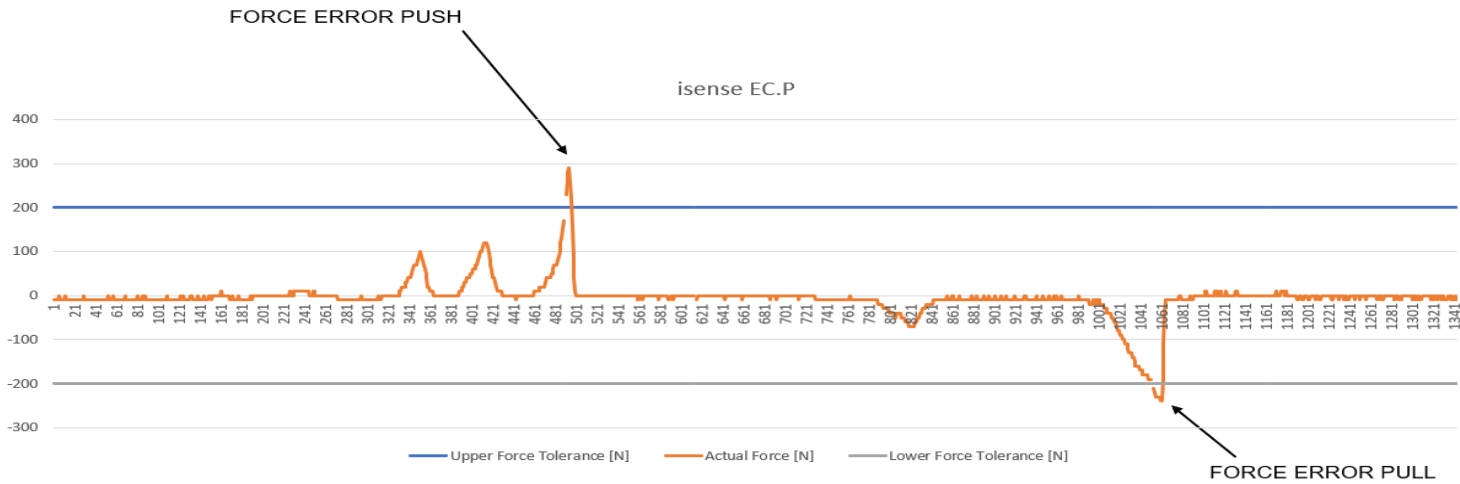
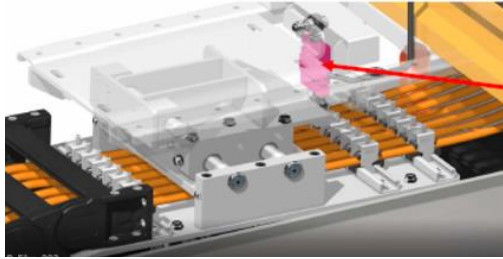
EC.I Integrated wear detection



- ▶ EC.I: Contactless measurement of the wear of the pin & bore connection, allowing for precise service life prediction in consideration of actual operating conditions.



# isense – EC.P Push/pull force monitoring



- ▶ EC.P: Measurement of the push and pull forces at the moving end, with a load cell & evaluation unit, during operation.

## isense – EC.B e-chain® breakage detection

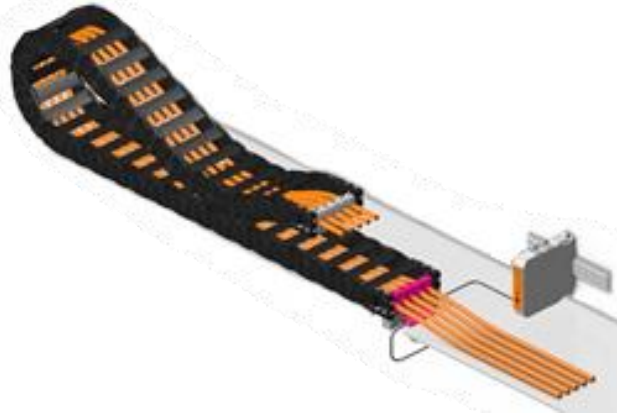


- ▶ EC.B: Sensor detects a chain link breakage at its initial stage. The signal can be used to stop the operation before extensive damage occurs.



## isense – CF.P

### Cable tensile force monitoring



- ▶ CF.P: Detects increased tensile forces on cables in e-chainsystems®. Allows for corrective actions before cable damage occurs.

Solutions for igus® energy chains



Solutions for chainflex® cables



Production monitoring

Module/system

Suitable sensors

Predictive maintenance



icom.plus/  
isense offline  
(preinstalled data set)

EC.W  
EC.I  
EC.PP



icom/isense online  
(data match with igus® cloud via IoT)

EC.M  
EC.W  
EC.I  
EC.PP

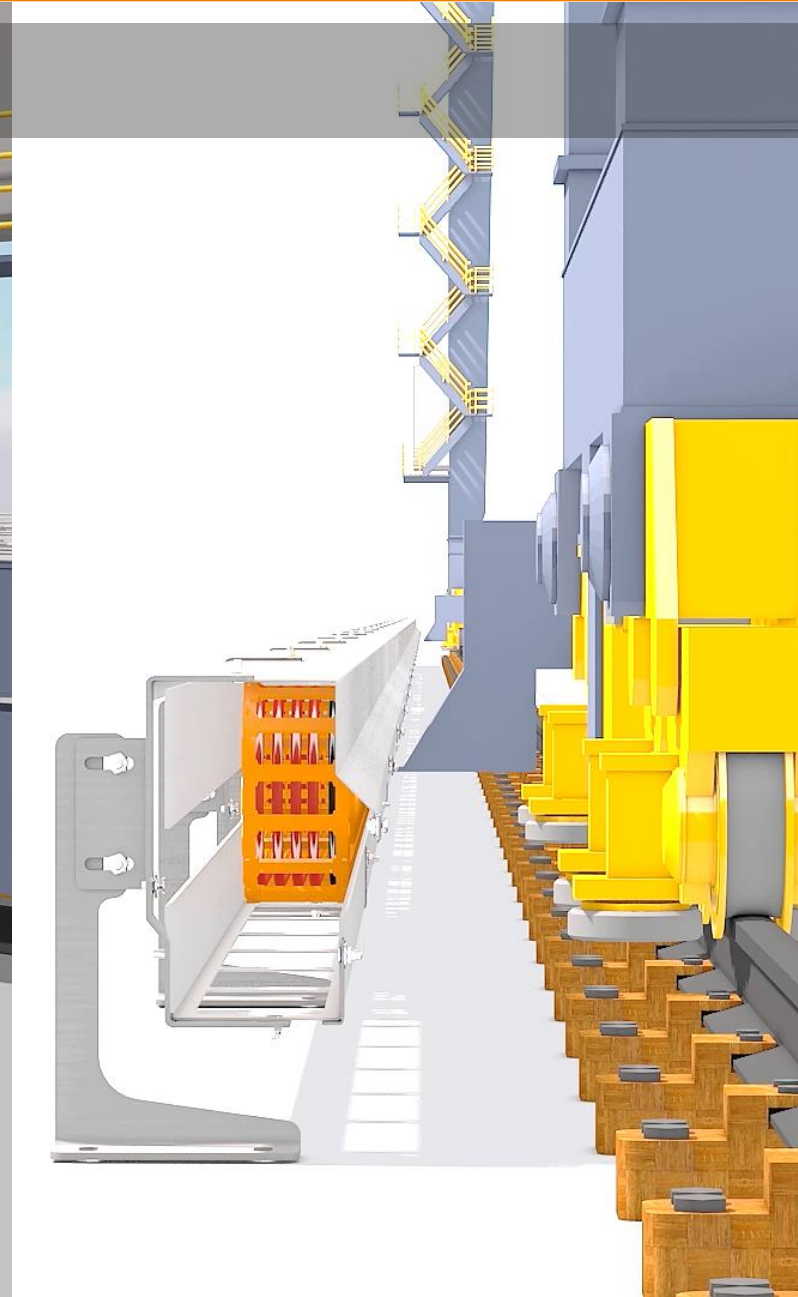
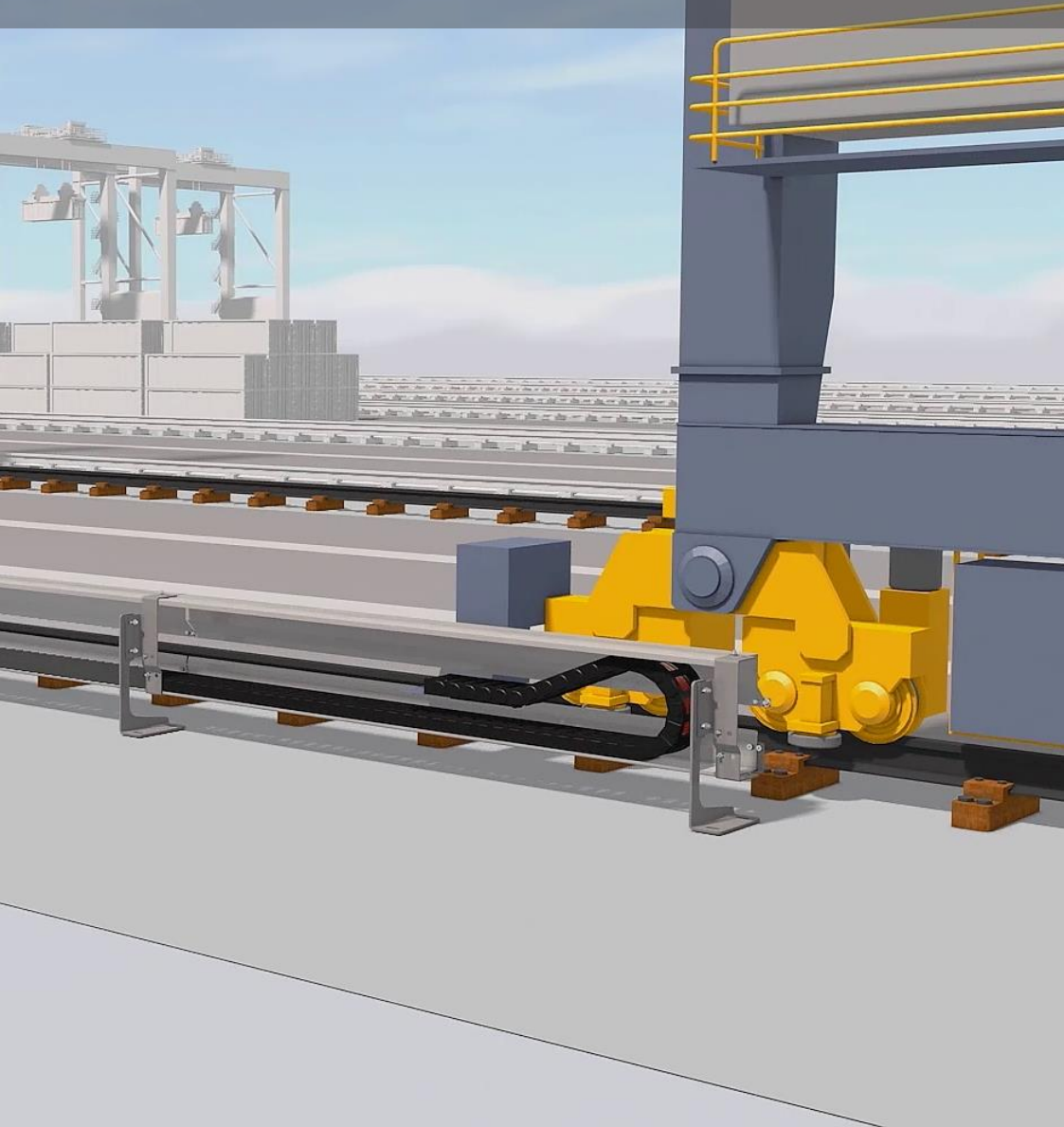
Crash avoidance

No module  
necessary  
isense stand-alone

EC.P  
EC.B  
CF.P  
EC.T  
CF.Q



# ASC / RMG crane travel





**3 STS crane retrofit in China**







## Worldwide:

- ▶ Over 6800\* RTG's / RMG's (220 with P4 e-chain®)
- ▶ Over 1200\* STS (571 with P4 e-chain®)
- ▶ Over 16.500\* Spreader applications
- ▶ Over 45.000\* Indoor-, Gantry-, Bulkhandling-, Shipyard- and Special Cranes

\* October 2019



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igus® - Crane references



It's all about Imagineering



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