


igus® the-chain ... moving energy made easy  
Modular toolbox for almost every application and industry

igus



light & quick  
for heavy-weights...

10<sup>th</sup> Southern Asia  
Ports, Logistics and Shipping 2015  
India



# igus® - Headquarter, Cologne Germany

- 35 igus® subsidiaries world wide (and more to come)
- More than 55 certified igus® distributors around the world

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


Local service and support

igus

# igus® (India) Pvt. Ltd, Bangalore


- 80 employees in departments:
- e-chainsystems®
- Polymer Bearings,
- Cranes & Projects,
- readychain® & harnessing
- **More than 35 employees:**
- Outside sales & customer support incl. project department



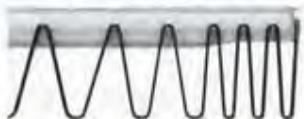


# e-chains® - one system for energy, data, media

Motorized cable reels



Conductor or BusBar-Systems

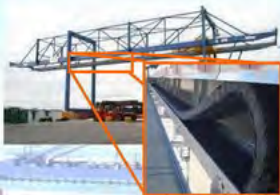


Festoon System



Cable tender

- ▶ Space saving design
- ▶ No cable loop station & no additional steel structure for loop station



Required installation space for  
e-chainsystem® h = approx. 800 mm



- ▶ No additional drives or control system necessary to move the chain system
- ▶ Synchronous run of trolley and e-chainsystem®
- ▶ All kind of media (power, data, hydraulics, pneumatics, ...) can be conveyed in one system
- ▶ Quick and easy installation of additional cables or hoses
- ▶ igus® field service (inspection, installation, supervisor service)
- ▶ Low maintenance extravagance – less downtime of the crane
- ▶ Wind an weather resistant system
- ▶ Spare part guarantee for 10 years and more

e-chains./...  
installation  
/service./....



# Crane components & services



## e-chain® series E4/4



- ▶ Rugged stop dog design
- ▶ Outer link with rear catch for high stability
- ▶ High torsion rigidity
- ▶ Wide, cable friendly plastic crossbars, made from the same material as the e-chain® itself
- ▶ Large interior separation kit

Successfully used in various port applications since 1995!







- ▶ Per e-chain® side part, two large stop dogs, where the impact area lays 100% flat on, determined by the design (best possible force distribution, maximum e-chain® stability).
- ▶ Interlocking side links – tongue & groove design, for additional functions reliability





- ▶ Complete chain link incl. stop dog & gliding surface made from highly abrasion-resistant polymer plastics, developed by igus

(no glide shoes or other protections needed)

(40 years material design for polymer bearings)



- ▶ No additional parts (like screws or bolts) required to mount the chain
- ▶ Only a screw driver is needed to assemble / disassemble the chain



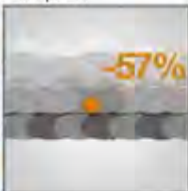
### rol-e-chain® series E4/4



18 years experience –  
chains with integrated rollers!

Successfully used in various port  
applications since 1999!

- ▶ Rolling instead of gliding – major reduction in driving power
- ▶ Rollers integrated into the side link, no interfering edges inside or outside
- ▶ Rollers with stainless steel bearings as standard
- ▶ Consistent rolling resistance for applications in dirty environments
- ▶ Various roller types for optimum application adaption



## Heavy Duty rol-e-chain® series



16 years experience -  
chains with integrated rollers!

- ▶ Larger pin / bore connection surface (Y)
- ▶ Enlarged gliding surface, less wear (X)
- ▶ Widened stop dog surface
- ▶ High tensile stability
- ▶ Robust steel mounting brackets

Successfully used in various port  
applications since 2004!

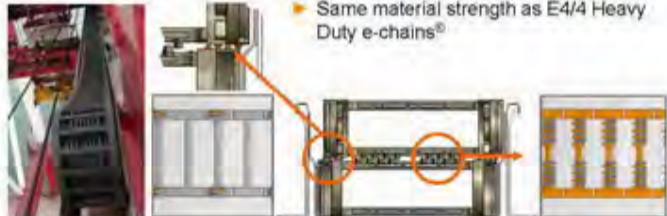


## e-chain® series P4



Successfully used in various port applications since 2008!

- ▶ Smooth & low noise operation
- ▶ Integrated grooved roller, running on a large, even & plain surface
- ▶ 2 rectangular shaped stop dogs
- ▶ Interlocking side links - tongue & groove design
- ▶ Designed for high fill weights & fast travel speeds
- ▶ Same material strength as E4/4 Heavy Duty e-chains®



## Guide trough systems for cranes (Steel or Aluminum)



Heavy Duty installation sets, with reinforced brackets & special installation profiles

## chainflex® cables



UV-resistant



Oil



Flame-retardant



Silicone-free



Halogen-free



Lead-free



UL



CSA



CE



EAC



GL



More than 26 years experience in the development of cables for e-chains®

## Bus Cables



chainflex® bus cables are available for all continuous bus systems within e-chains®

## Fibre Optic & Coaxial Cables



Plastic (980/1000) or fibre glass (62.5/125 or 50/125), 1, 2, 6 or 12 fibres  
(they are all tested for several million cycles)

## Control Cables



PVC, PUR, TPE – A wide selection of materials for all applications - shielded and unshielded control cables with various combinations of cores and cross sections.

## chainflex® cables



UV-resistant



Oil



Flame-retardant



Silicone-free



Halogen-free



Lead-free



UL



CSA



CE



EAC



GL



More than 26 years experience in the development of cables for e-chains®

### Motor & Servo Cables

Shielded servo cables for inverter operation up to 600/1000 V.  
Shielded & unshielded motor cables from 1,5 to 95mm<sup>2</sup>

### Single Core Motor Cables

Shielded & unshielded single core motor cables for most demanding requirements.

### Single Core CF Crane

Shielded, highly flexible single core for up to 6/10kV.  
Medium voltage cable for most demanding requirements in crane building.



## Test lab

- ▶ 1750 m<sup>2</sup> test area
- ▶ More than 80 e-chain® & chainflex® tests running at a time
- ▶ Function & life time testing
- ▶ Simulating real conditions (travels of up to 300 m and speeds up to 300 m/min)



Climatic tests for all e-chain® & chainflex® cables  
Material tests from -40°C up to +199°C

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



## Test lab

- ▶ Cable outer jacket wear tests with interior separation and crossbars
- ▶ Cable friendly design for longer life time



## readychain®



- ▶ The selected igus® chainflex® are inserted in the e-chain®
- ▶ The defined cable projecting lengths are marked and fixed
- ▶ Project-specific cable connections are mounted
- ▶ The complete readychain®-system is delivered on a special wooden drum



## Special part – EMA (e-chain® maintenance alert)

News'15

- ▶ Diagnostic tool to indicate necessary maintenance, prevents unexpected down time
- ▶ Can be combined with the igus® PPDS (Push-/Pull-Force detection system)



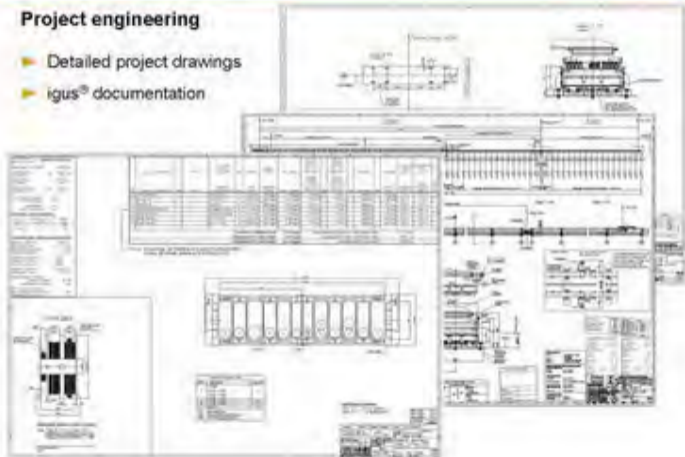
Alarm through autonomous detection of a defect/partial defect of the e-chain®



PPDS – continuous real push/pull-force measurement and limit comparison

## Project engineering

- ▶ Detailed project drawings
- ▶ igus® documentation



# Technical details



▶ **Speed up to 600 m/min**

The fastest crane with igus® e-chain® is running at 300m/min

▶ **Acceleration up to 10 m/s<sup>2</sup>**

▶ **Travel length up to 900 m**

The longest crane application running with igus® e-chain® is 500 m long  
(STS, Port of Singapore, since 2002)

The longest igus® e-chain® application is 645 m\*

▶ **No limit to cable load**

▶ **Possible to use hydraulic-, pneumatic- and water hoses**

▶ **Possible to use 6/10kV power-cables**

# igus® e-rover – Automatic coupling system for RTGs



Switch of your diesel engines!!!

## Special part – e-rover

Main power supply for RTG's



- ▶ Fast & secure automatic coupling system
- ▶ Coupling arm compensation  
+/- 400mm horizontally &  
+/- 300mm vertically
- ▶ Travels up to 800m possible
- ▶ Interference-free, high speed  
data transfer through igus®  
fiber optic cables
- ▶ All media can be conducted in  
one system
- ▶ Almost maintenance free

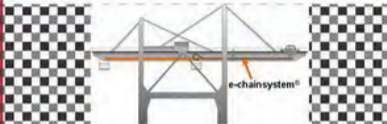




# Crane applications for e-chainsystem®



## Trolley travel STS



# ... STS trolley travel & aluminum guide trough system ...

samskip

Travel length: 69,64 m

Speed: 3,0 m/s

Acceleration: 0,63 m/s<sup>2</sup>

e-chain: 4040RHD.25.250.S10.0.E

chainflex: CP300, CFPE, CF10, CF9, CFLG

guide trough: HD aluminum



## STS trolley travel (3 Anupam cranes with P4 chain) India



Travel length: 89,3 m  
Speed: 4,0 m/s  
Acceleration: 0,5 m/s<sup>2</sup>

e-chain®: P4, 56R, 25, 300, S40, 0, AG  
chainflex®: CF37, CF10, CF9, CF11, CFLG  
guide trough: Stainless steel HD version

## Trolley travel RMG

P4.56R-System is running successfully on Kilnz RMG's



Travel length: 113 m  
Speed: 2.5 m/s  
Acceleration: 0.5 m/s<sup>2</sup>

e-chain®: P4.56R.20.300.S40.0.AG  
chainflex®: CF300, CF330, CF34, CF9, CFLG  
guide trough: stainless steel HD



## Trolley travel RTG

4040(R)HD chain is running successfully on ZPMC,  
Konecranes, Kalmar and Terex Noell RTG's



## Crane and Trolley travel



Travel length, crane / trolley: 441 / 90 m  
Speed, crane / trolley: 0,5 / 3,2 m/s  
Acceleration, crane / trolley: 0,1 / 1,0 m/s<sup>2</sup>

e-chain® crane / trolley: 5050R rol e-chain®  
chainflex®: CFCRANE, CF330, CF31, CF11, CFLG  
guide trough: stainless steel HD

## Crane travel



### 12 Container Cranes, Mainpower Supply

Travel:	500 m
Speed max.:	46 m/min
Acceleration max.:	0,2 m/sec <sup>2</sup>
energychain®:	5050RHD
chainflex® Types:	CFCrane
Location:	Asia



## Elevator applications



Spreader applications



e-chainsystem®



## Reachstacker applications

e-chain®



## Retrofit STS crane

Before: Festoon System



After: igus® e-chain®



## Retrofit RMG & RTG crane

Before: Festoon System



After: igus® e-chain®



## Retrofit RTG crane

Before: Cable tender



After: Iigus® e-chain®



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

igus





### Worldwide:

- ▶ Over 4.650\* RTG's / RMG's (100 with P4 chain)
- ▶ Over 720\* STS (200 with P4 chain)
- ▶ Over 15.500\* Spreader
- ▶ Over 26.000\* Indoor-, Gantry-, Bulkhandling-, Shipyard- and Special Cranes

\* November 2014





**DEMAG**  
Cranes & Components

**SIEMENS**

**ABB**



Trans Gulf Port Cranes  
معدات الميناء للبحر الأحمر



**Kalmar**

mibe

McNally Bharat  
Engineering & Services Limited

**BANG**  
KRANENFABRIK

**MORRIS**  
MOTORISED HANDLING

**ZPMO**

**BROMMA**

**LIEBHERR**



**Kw**  
Kramwerke AG

**SANY**

**FLSMIDTH**



**LARSEN & TOUBRO**  
We all move things together

Kühn  
Kühn & Wittenberg

**kühz**



**TEREX**

**DOOSAN**

**MIMES** WITELS ENGINEERING & SHIPBUILDING CO. LTD

**NOELL**

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**JFE**

**STAHL**  
Crane Systems

**MI-JACK**

**VETTER**  
Kran- & Hebezeugbau

**ANUPAM**

**RAM**  
SPREADERS

**INNOKRAN**

**igus® GmbH**  
**Crane-Department**

**Spicher Straße 1a**  
**51147 Köln (Cologne)**  
**Germany**

Tel: +49(0)2203/9649-800

Fax: +49(0)2203/9649-222

E-mail: [cranes@igus.de](mailto:cranes@igus.de)  
[www.igus-cranes.com](http://www.igus-cranes.com)



**Theo Diehl**  
Tel. +49 (0)6162 / 6808  
[tdiehl@igus.de](mailto:tdiehl@igus.de)



**Jens Göbel**  
Tel. +49 (0)2203 / 9649-114  
[jgoebel@igus.de](mailto:jgoebel@igus.de)