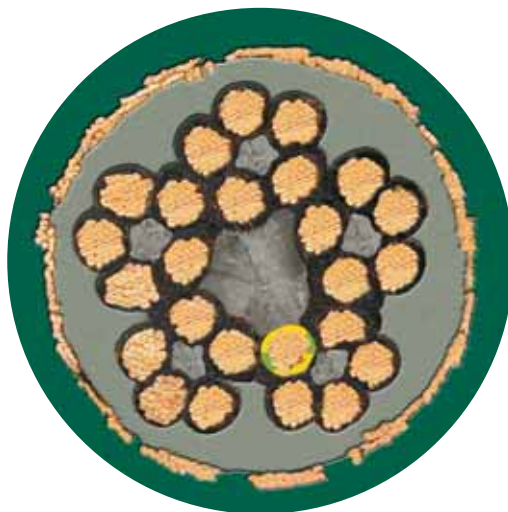


...E-ChainSystems[®] and Chainflex[®] Cables for
cranes.
...increase life with an approved igus[®] system...



...igus[®] E-Chains[®] for cranes/...igus-cranes.com
plastics.
...plastics for longer life...igus.de

Where to find igus[®] in cranes



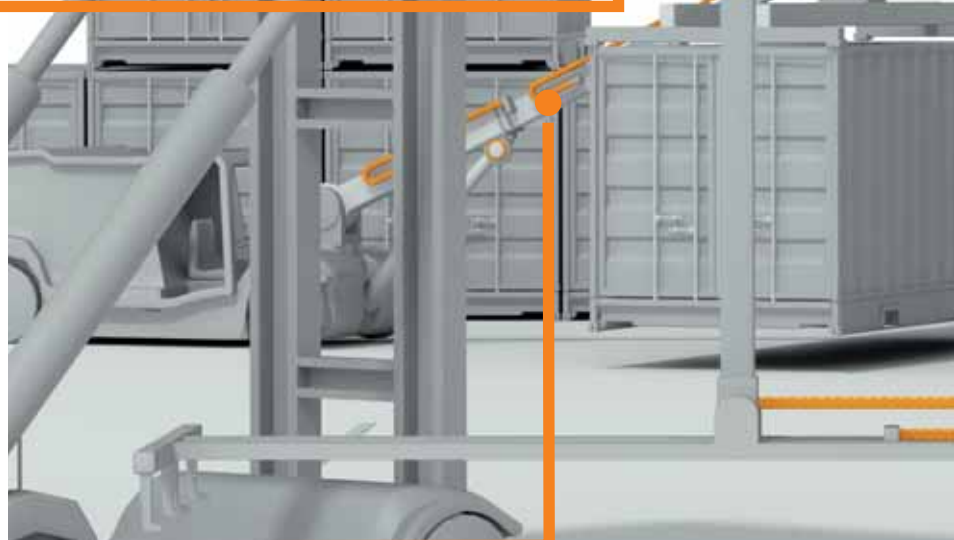
P4 – quiet, wear-resistant,
for high speed
▶ page 12



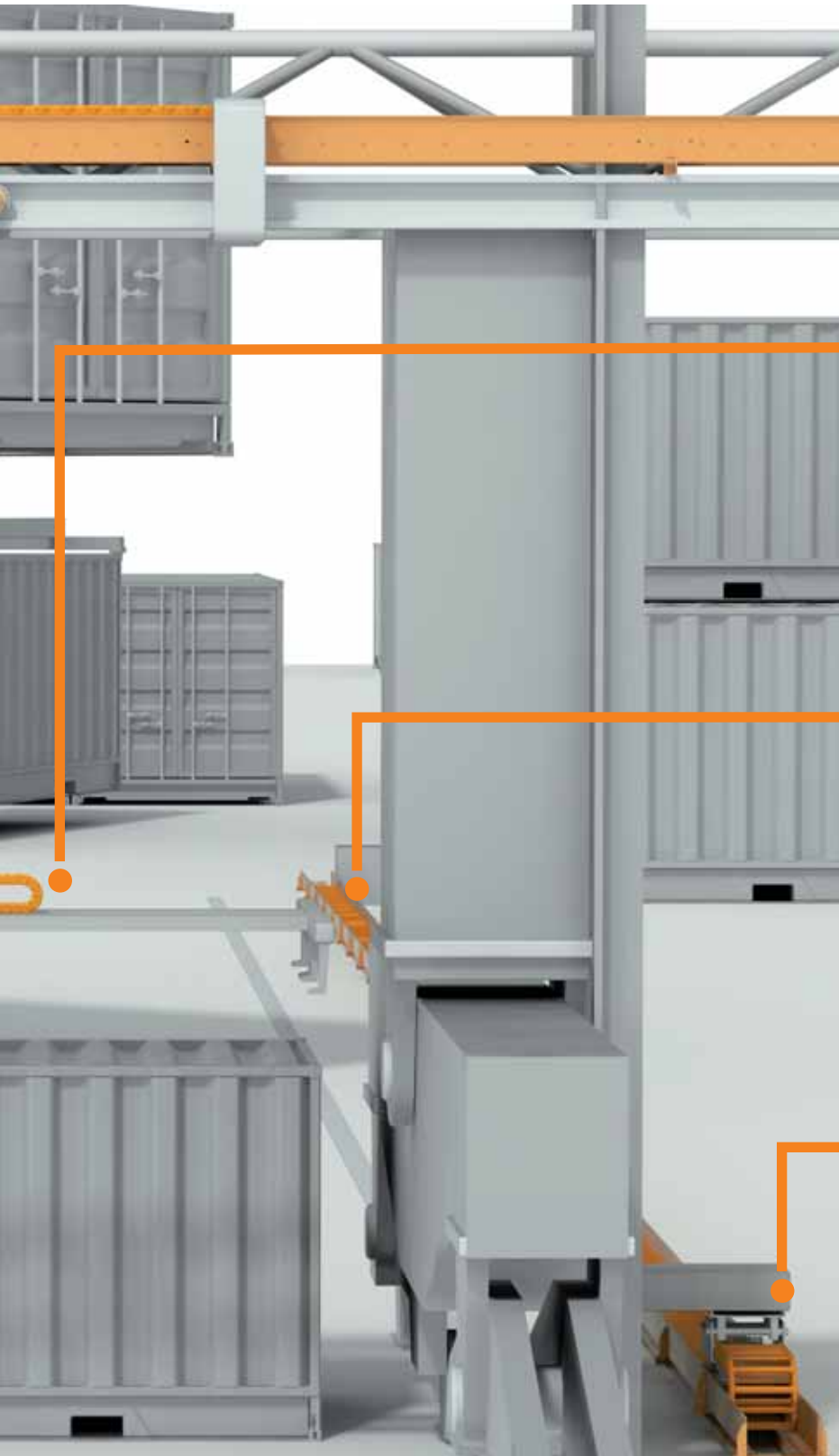
System E4/00 – E-Chains[®]
with the product range
▶ page 8



XXL material
– E-Chains[®] for long
unsupported applications
▶ page 15



and harbors



System E4.1 – Large
E-Chains® for all
cases ► page 6



E4/4 Heavy Duty
E-Chains® and troughs
– for high fill weights
► page 9-11



PPDS – Remote Condition
Monitoring for heavy duty
units ► page 25



Benefits of E-ChainSystems®

igus® solutions for Crane builders and users: Reduce cost. Improve life. Proven.

Reduced cost with improved life is the “bottom” of using igus® E-ChainSystems®. Some of the detailed technical aspects are:

- Speeds up to 600 m/min possible, grab Cranes and STS Crane applications with 300 m/min in use
- Space-saving design reduces length and height
- No additional drives or control system necessary
- All media in one system – power, data, air, water, etc.
- Low maintenance
- Wind and weather resistant
- Other lines and cables can be added easily (e.g. Chainflex® fibre optics)
- Fast assembly
- Possible travel up to 800 m with igus® Rol E-Chain®, applications with 500 m on STS Cranes travels in use
- Possible reduction of cable length > 50 %
- No loop station required
- Overall steel structure can be shortened
- Approved on more as 2500 RTG/RMG and over 375 STS cranes

No loop station required – igus® E-ChainSystem® example on STS Crane in Antwerp. System delivered as ReadyChain®.



igus® E-ChainSystems®

Product range

On the next pages you will find special products for the Crane Industry. The huge igus® E-Chain®-program contains over 70,000 products ex stock – incl. usefull accessories and Chainflex® cables – developed and tested for Chains.

The series E4 (4-piece designed E-Chain®) was designed especially for long travel applications with high fill rates and for difficult environments.

Find more products in the igus® main E-Chain®-Catalogue, for example for:

- Robotics
- Heady Duty
- Cleanroom
- Machine tools
- and many more



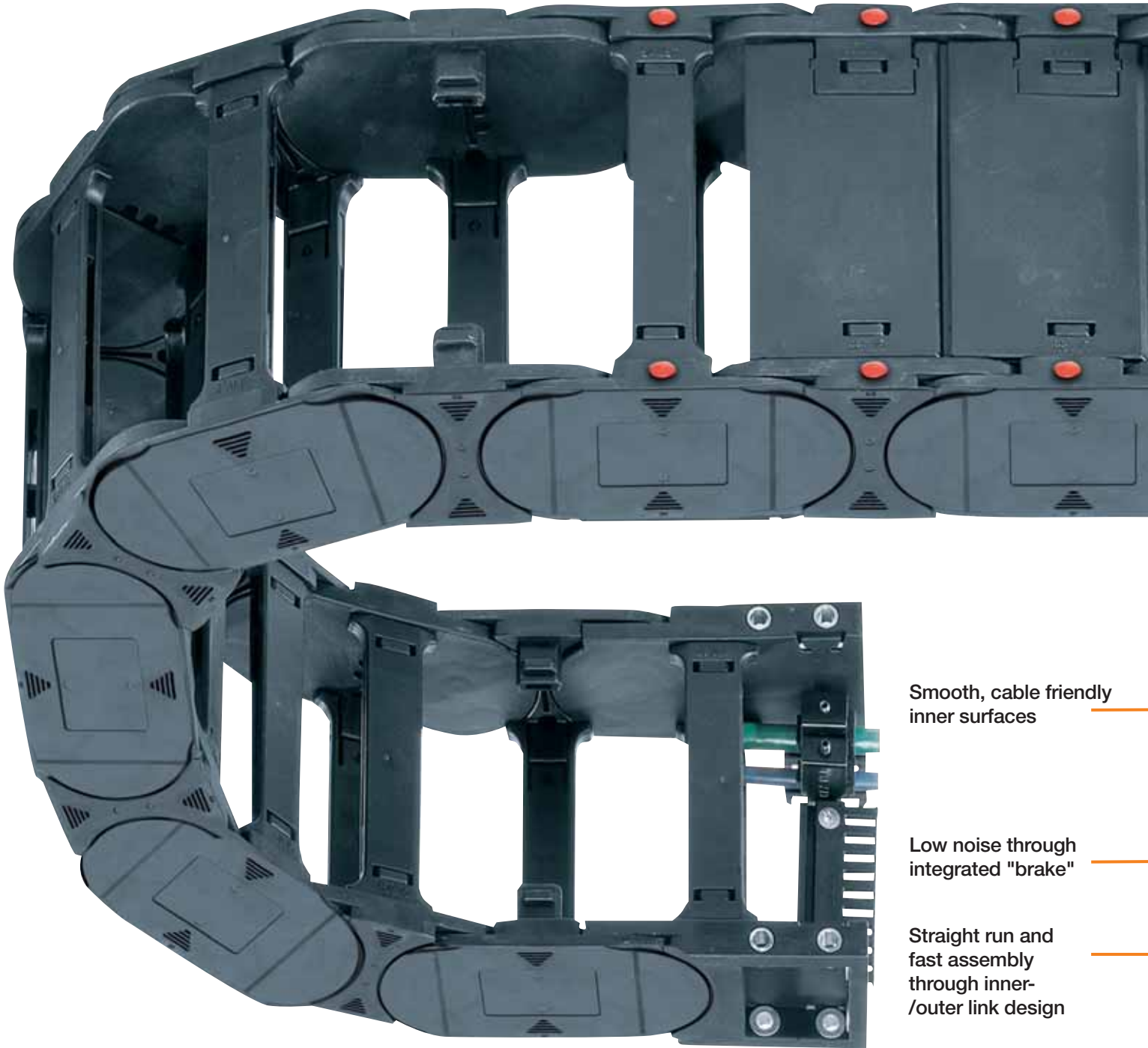
Order your personal Catalogue:
www.igus.de/catalogue

E-Chain® Catalogue pages with an overview of the igus® E-ChainSystems®:

Contents				
<p>igus® Plastics for longer life®</p> <p>On the following pages you will find application examples, design specifications, and more than 70,000 E-Chain® products, which are ready for delivery to you from stock. They are arranged in 12 chapters, and an index is provided for locating products quickly.</p> <p>The most important innovations of this catalog are:</p> <ul style="list-style-type: none"> ● More selection in all product lines, including selected specialists for ESD, clean room, and noise reduction, etc. ● More accessories ● More solutions and practical tips ● More detailed selection possibilities ● Assembly instructions ● "Quicklinks" on the internet for additional details on your product. (3D-CAD data, configurations, pdf downloads) <p>www.igus.de</p> <p>This catalog by no means covers the entire igus® product range. Visit our website www.igus.de to discover further products, new developments and benefit from our online program – 24 hours a day.</p> <p><small>Legal Information: The information in this catalog and the data in the Design section in particular, is based on our current knowledge of the products described. An legally binding contractual agreement of characteristics or liability in a specific intended application can be derived from it. igus® is unable to assume liability of any damages, loss or injury resulting from application of the products. We recommend that you always check the suitability of the products for a specific intended application in a professional oriented test phase (consult igus®). For reasons relating to ongoing technical developments, we reserve the right to implement technical modifications and improvements of the products at any time. Subject to printing errors.</small></p> <p><small>The terms "igus", "E-chain", "Chainflex", "E-Chain", "E-ChainSystems", "EnergyChain", "EnergyChain System", "E-Adapter", "E-MultibendChain", "Flex", "FlexChain", "FlexChain System", "igus®", "igus®", "Polytrac" and "Polytrac for longer life" are legally protected trademarks for igus® in the Federal Republic of Germany and, where applicable, in some foreign countries.</small></p>		Designing with E-Chains®	Design and calculation aids, Applications, Diagrams page 1.1	1
		Triflex®, Triflex®R TwisterChain®	3-D axis E-Chains® for Robots or 3-D movements page 2.1	2
		EasyChain® System E1	Low-priced E-Chains®, easy to fit, 1-part per link page 3.1	3
		Zipper E-Chains® Zipper E-Tubes	Quick opening and closing of lids due to "Zipper-design" page 4.1	4
		E2 micro, mini E2/000	Small and medium size E-Chains® 1- and 2-parts per link page 5.1	5
		E2 Tubes	Dirt- and chip protection, fully closed, 2-parts per link page 6.1	6
		System E4	Standard E4 modular system for nearly all applications, 4-parts per link E-Chains® and E-Tubes page 7.1	7
		System E3 System E6	Extremely low-noise and low vibration E-Chains®, 3-resp. 6-parts per link page 8.1	8
		Guide Troughs Accessories	Solutions for long travels page 9.1	9
		Chainfix Strain relief	Lengthen the service life of cables page 10.1	10
		PMA Cable protection	Cable protection for static applications page 11.1	11
		Classic-series Technical annex	Old products which can still be supplied Fax forms, Glossary, igus® Adresses page 12.1	12

E-ChainSystems® E4.1

E-Chain® family for all applications

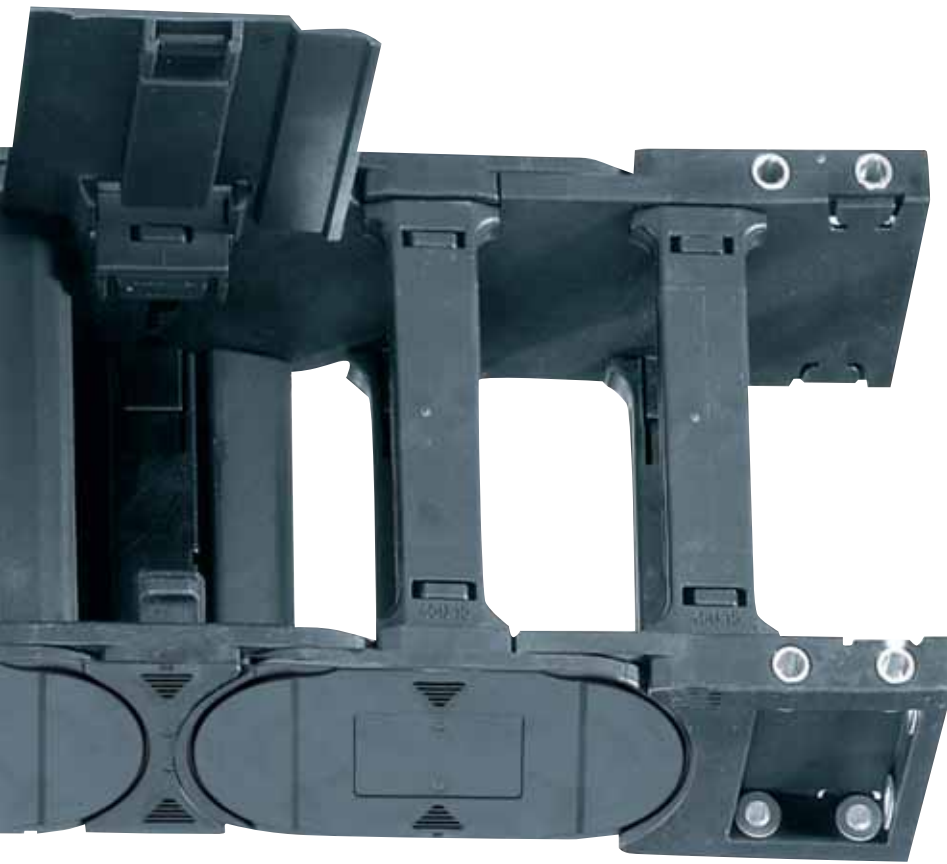
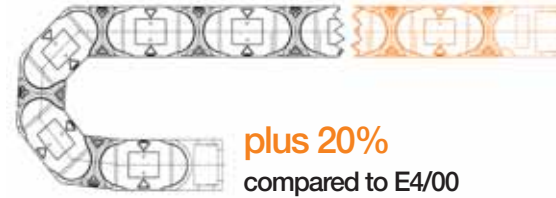


Smooth, cable friendly
inner surfaces


Low noise through
integrated "brake"

Straight run and
fast assembly
through inner-
/outer link design


For sidemounted
applications



1. Large unsupported length

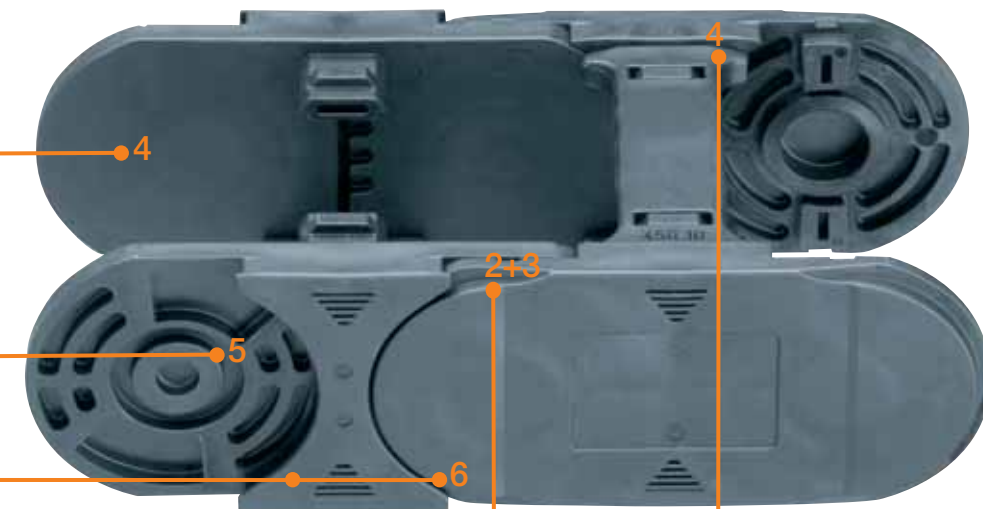
 Large unsupported length (+20% compared to E4/00) possible thanks to special stop dog, tongue and groove combination.

2. Rigidity for shear forces

 Interlocking side link guarantees optimum lateral stability.

3. Sidemounted application


 Also best suited for sidemounted applications due to tongue and groove design




High rigidity and carrying capacity for shear forces thanks to tongue and groove design

Cable-friendly rounded crossbar


4. Cable protection

 Smooth, wide solid polymer support for cables, many quickly mounted shelving options.

5. Low noise

 Integrated "brake", smooth gliding surfaces; rubber dampers optional.

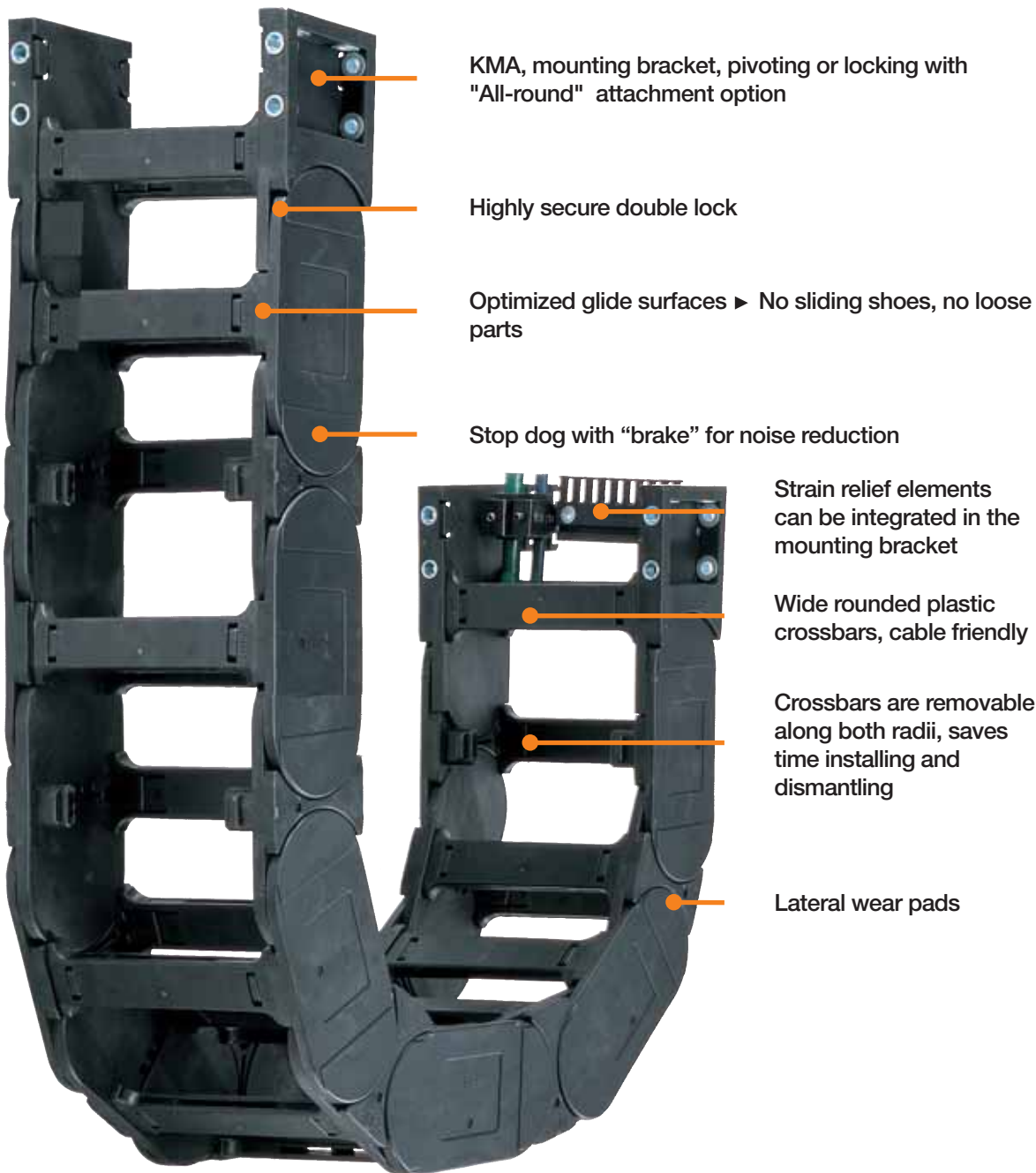
6. Straight run

 High push-/pull forces through tongue and groove, no "camber" option by flipping the outer link.



E-ChainSystems® E4/00

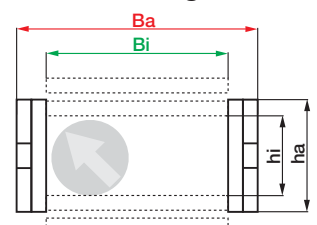
E-Chain® family for Cranes with the biggest product range



Series	Inner height <i>hi</i> [mm]	Inner width <i>Bi</i> [mm]	Outer width <i>Ba</i> [mm]	Outer height <i>ha</i> [mm]	Bending radius <i>R</i> [mm]
210	21	30 - 120	44 - 134	28	38 - 200
220	28	40 - 300	60 - 320	42	55 - 250
280	32	50 - 400	73 - 423	54	63 - 300
380	42	50 - 400	76 - 426	64	75 - 350
400	56	50 - 600	84 - 634	84	135 - 500
600	108	200 - 600	252 - 652	140	200 - 1000
640	112	87 - 562	139 - 614	140	200 - 1000
800	200	200 - 600	260 - 660	236	325 - 1000
840	204	100 - 563	160 - 623	236	325 - 1000

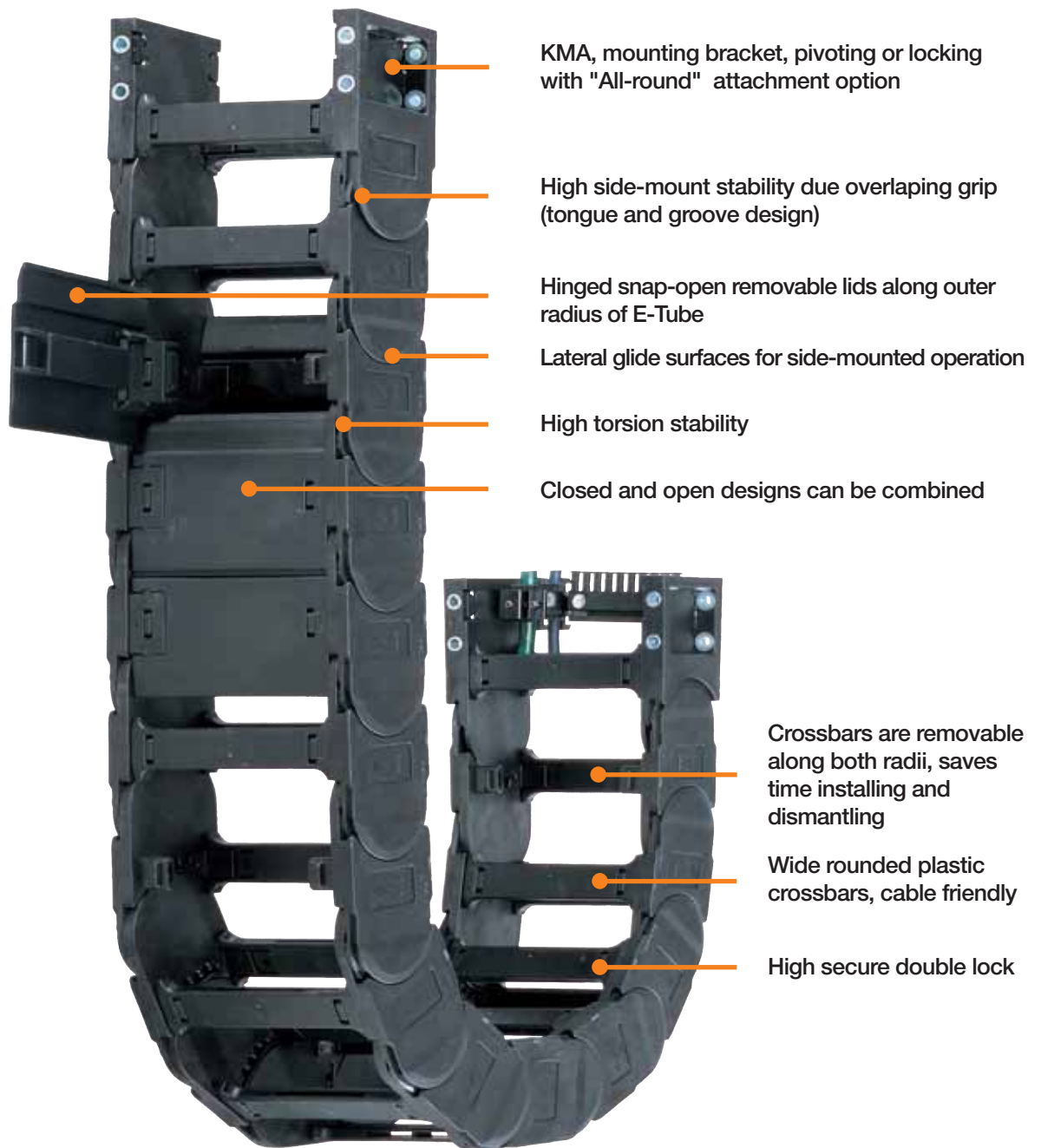
Typical Crane applications:
RTG's, RMG's, Spreader,
Indoor Cranes, Man lift,
Reach Stacker, ...

Dimensioning



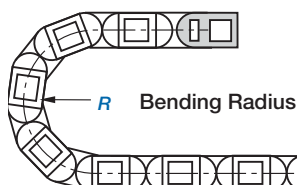
E-ChainSystems® E4/4

E-Chain® family for Cranes available as gliding and rolling version



Typical Crane applications:
STS, Goliath Cranes, RTG's,
RMG's, Indoor Cranes, Bulk
handling Cranes, ...

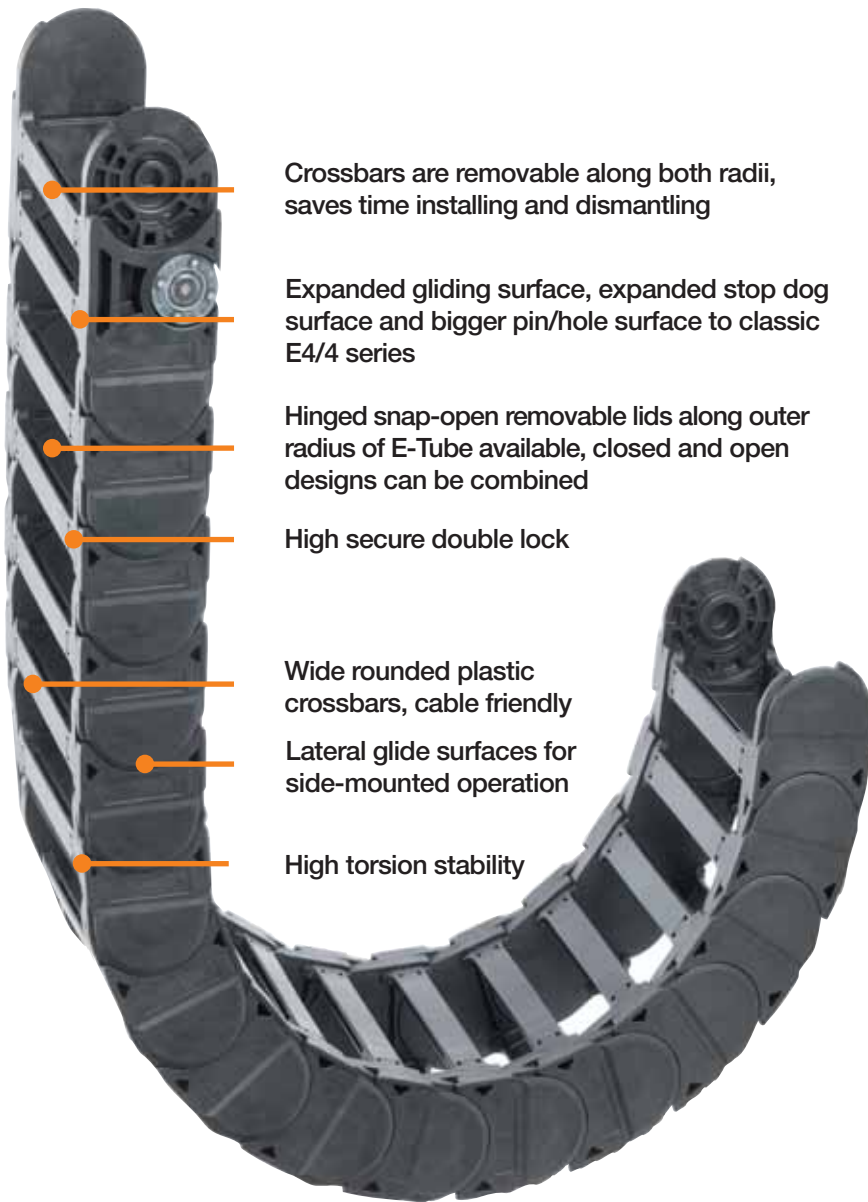
Bending radius



Series	Inner height <i>hi</i> [mm]	Inner width <i>Bi</i> [mm]	Outer width <i>Ba</i> [mm]	Outer height <i>ha</i> [mm]	Bending radius <i>R</i> [mm]
2828	32	50 - 400	73 - 423	54	63 - 300
3838	42	50 - 400	77 - 427	64	75 - 350
4040	56	50 - 600	86 - 636	84	135 - 500
5050	80	50 - 600	100 - 650	108	150 - 1000

E-Chains® Heavy Duty series

E-Chain® family for Cranes for highest requirements



Crossbars are removable along both radii, saves time installing and dismantling

Expanded gliding surface, expanded stop dog surface and bigger pin/hole surface to classic E4/4 series

Hinged snap-open removable lids along outer radius of E-Tube available, closed and open designs can be combined

High secure double lock

Wide rounded plastic crossbars, cable friendly

Lateral glide surfaces for side-mounted operation

High torsion stability

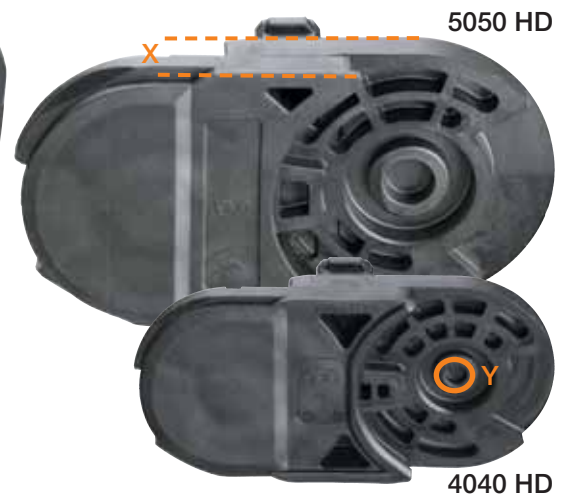
The Heavy Duty Chain family was developed in view of the following applications:

- High cable loads
- High speeds
- Long travel lengths
- Strong dirt loads

The improved E4/4 Heavy Duty takes cable carrier stability to new levels.

Strength and cycle life are improved by significantly increased gliding and load bearing surfaces.

E4/4 Heavy Duty takes higher push/pull forces, at the same inner dimensions as regular E4/4 series.



5050 HD to classic 5050:
Y: +120%, X: +7,5 mm

4040 HD to classic 4040:
Y: +140%, X: +9 mm

Typical Crane applications:
STS, Goliath Cranes, Indoor Cranes, Bulk handling Cranes, Mining Crane, ...

Supplied from stock for the HD series:

- Roller glide for the reduction of the tensile/shear forces
- Extension link for large widths and for raising the load capacity
- Separators for the adaptation of the interior separation in the cable layout
- Mounting brackets for the fastening of the chain at fixed and moving ends

Series	Inner height <i>hi</i> [mm]	Inner width <i>Bi</i> [mm]	Outer width <i>Ba</i> [mm]	Outer height <i>ha</i> [mm]	Bending radius <i>R</i> [mm]	With roles
4040HD	56	50 - 600	104 - 664	84	135 - 500	4040RHD
5050HD	80	50 - 600	110 - 660	108	150 - 1000	5050RHD

Rol E-Chain® series

Save 75 % power – Driving force reduction and life time extension

8 Benefits of the Rol E-Chains®:

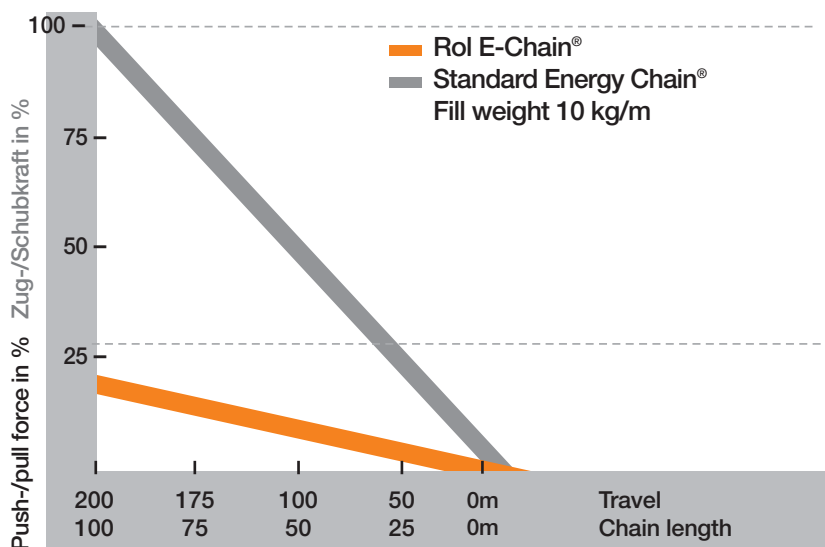
1. Strong reduction of the driving force required for moving the Energy Chain® to below 25 %
2. Rollers with stainless steel roller bearings as standard
3. Travels up to 800 m possible
4. Possible speeds of up to 600 m/min
5. Different types of rollers for optimum results in different situations
6. Even rolling resistance for dirty applications
7. As ready-to-fit, made-to-specifications system
8. System guarantee for made-to-specifications system (depends on application)

Rol E-Chain®, rolling, not gliding:

Traditional Energy Chains® operating over long distances generally “gliding”. Rol E-Chain® has been developed with the aim of pushing back the technical limits of this kind of operation. The demands placed on Energy Chains® used over long distances have continuously increased in recent years. Travel over several hundred meters sets new challenges, as do extreme Crane movement speeds at cable loads of up to 50 kg/m.



Higher fill weights with Rol-E Extension Links



441 m – one of the longest travels of igus®. Travels up to 800 m possible

Comparison of the power requirement between Rol E-Chain® and a standard Energy Chain®

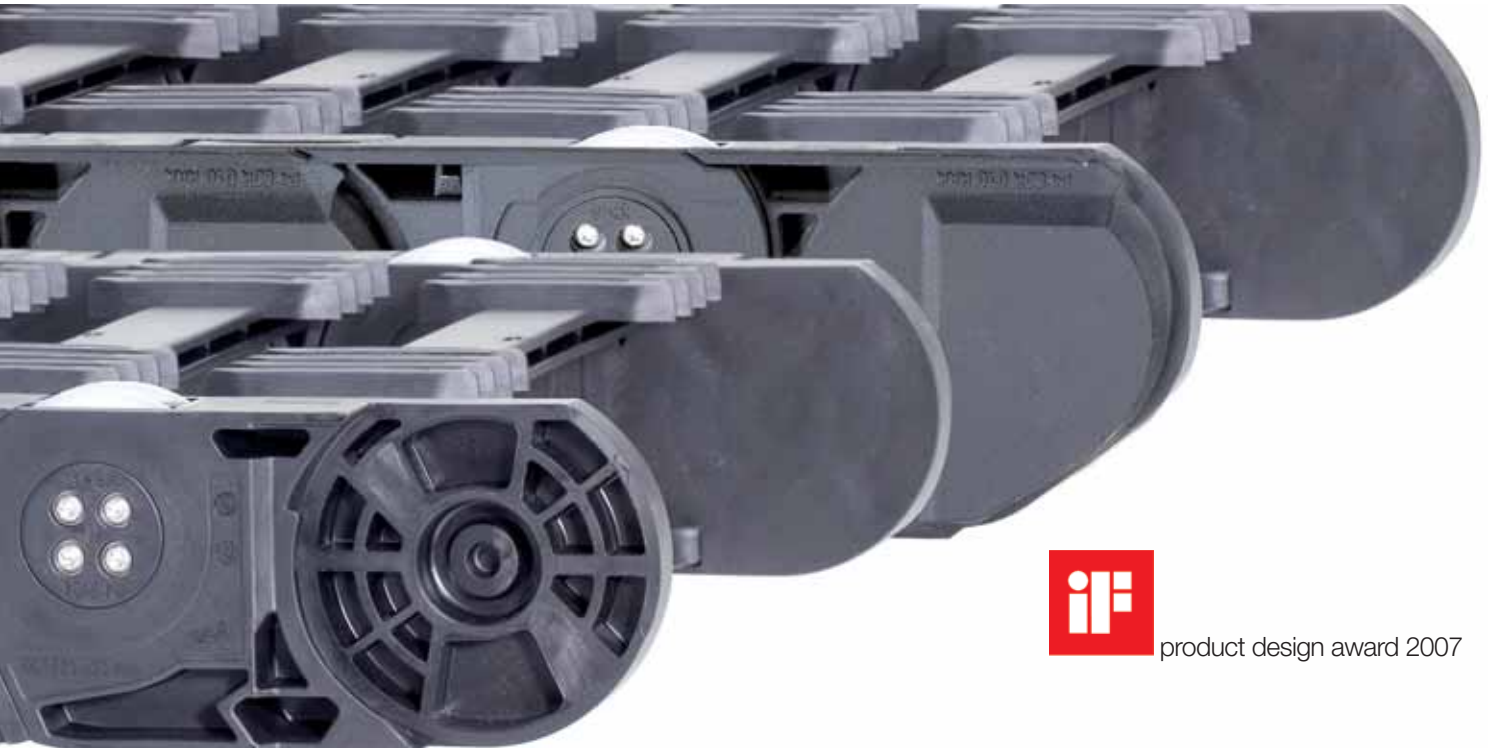
Series	Inner height <i>hi</i> [mm]	Inner width <i>Bi</i> [mm]	Bending radius <i>R</i> [mm]
2828R	32	50 - 400	125 - 300
3838R	42	50 - 400	150 - 350
4040R	56	50 - 600	200 - 500
5050R	80	50 - 600	250 - 500
4040RHD	56	50 - 600	200 - 500
5050RHD	80	50 - 600	250 - 500



Test rig for lifetime test

System P4 – quiet, wear-resistant

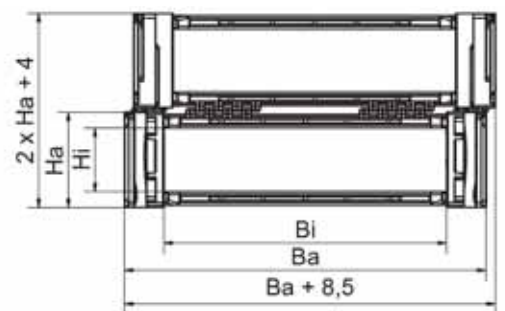
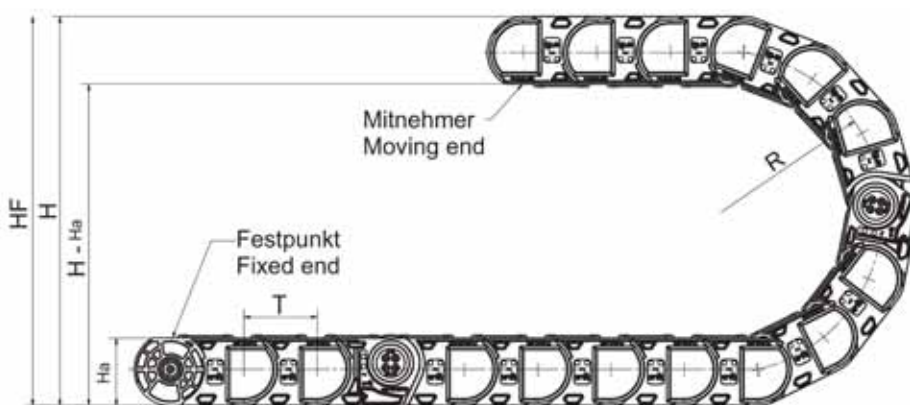
New: Inner height 80 mm, additional widths, more bending radii, ...



product design award 2007

Standard Rol E-Chain® has been used in over 1000 installations worldwide. Some industries – cranes, for example – have ever-increasing demands for length of travel, fill weight and speed. Rol E-Chain® P4 with shaped rollers meets these demands through these design features.

- Smooth, low noise operation through identical pitch length for links with and without rollers
- Grooved roller running on continuous, plain surface
- Large glide area for rollers
- Rollers are integrated in to side link



Part No.	Inner height	Outer height	Inner width	Outer width	Bending radii	Pitch	Max. travel	Max. speed	Max. Load
	hi [mm]	ha [mm]	Bi [mm]	Ba [mm]	R [mm]	[T]	[m]	[m/s]	[kg/m]
P4.56R.Bi. R .0	56	84	200 - 400**	270 - 470	250 - 350**	91	800	10	20
Neu P4.80R.Bi. R .0	80	108	200 - 400**	276 - 476	250 - 500**	100	800	10	30
Extension links									
Neu P4.56R.Bi./Bi ₂ /Bi ₃ . R	56	84	200 - 400**	270 - 470	250 - 350**	91	800	10	30

** More sizes upon request.

stant, long travels, high speed

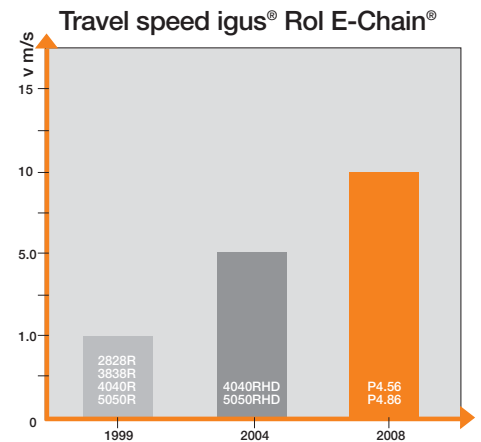
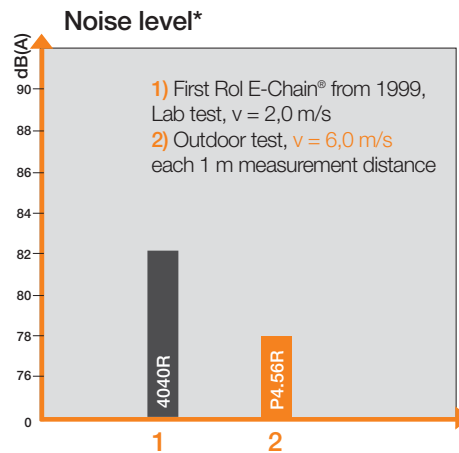
New: Large modular tool box system of P4 Rol E-Chain® now available

New technical data:

Modular P4 system for very long travels and high speed:

- 800 m travels and more are possible
- >10 m/s speed
- Heavy fill weight up to 10 kg/m
- Large rolling and gliding surfaces for long cycle life
- Safely on track through AUTO-GLIDE cross bars and guide trough
- Same pitch for roller links/chain links

* A reduction of 3 dB(A) sounds like a 50 % reduction in the noise level to the human ear.



New: 80 mm inner height

- **New:** P4.80 – 80 mm inner height
- **New:** Tribo-optimized roller material
- Higher fill weights and longer travels
- Same pitch for all links
- Large rolling and gliding surfaces
- Interior separation systems series 5050 available

New: Additional widths

- System P4 now comes in 5 widths
- 250 mm inner width and new 300, 350 and 400 mm inner width
- AUTO-GLIDE version for all widths
- Crossbars in cable friendly, rounded plastic
- Safe due double lock mechanism

New: More bending radii

- System P4 now comes in 3 new bending radii: 250, 300 and 350 mm
- Large radii for stiff cables and hoses
- Small radii for limited space



New: Extension link – heavy fill weights

- New roller extension link for series P4.56
- 50% higher fill weight possible
- Increased unsupported span
- Maximum rigidity
- Divides cross section into reasonable compartments (electric/hydraulic)

New: Long-life rollers

- New tribo-optimized plastic rollers for all P4 systems
- Wear optimized
- Long cycle life
- Improved rolling
- Lower noise and vibration
- Same pitch for roller links/chain links

New: Standard guide trough system

- New guide trough system
- Special geometry in combination with AUTO-GLIDE cross bars allows for offset upper and lower run
- Strong installation kits for long life
- Stainless trough segments resist corrosion and sea water

Extreme glider

New: Larger gliding surface for long cycle life



New: More width available for more series. For further increase of E-Chain® cycle life in extreme applications and very long travels. Highly wear-resistant igus® plastic gliding elements with up to 70% larger gliding surface.

- **New:** 7 additional sizes
- **New:** For additional E-Chain® series
- **New:** Optimized gliding surface geometry
- For long travels and highest fill weights
- Gliding applications without additional components (Crossbar and glide surface are made of one piece)

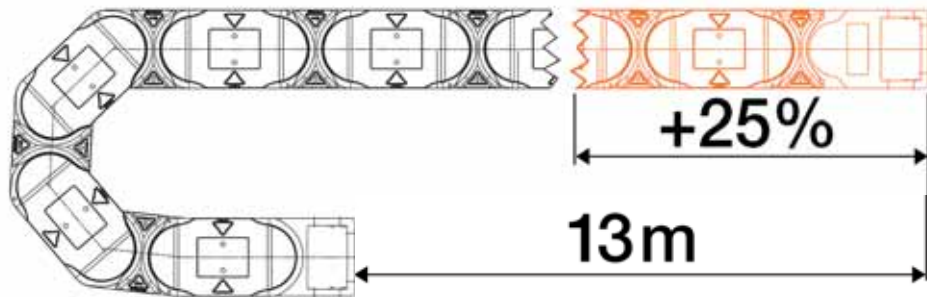
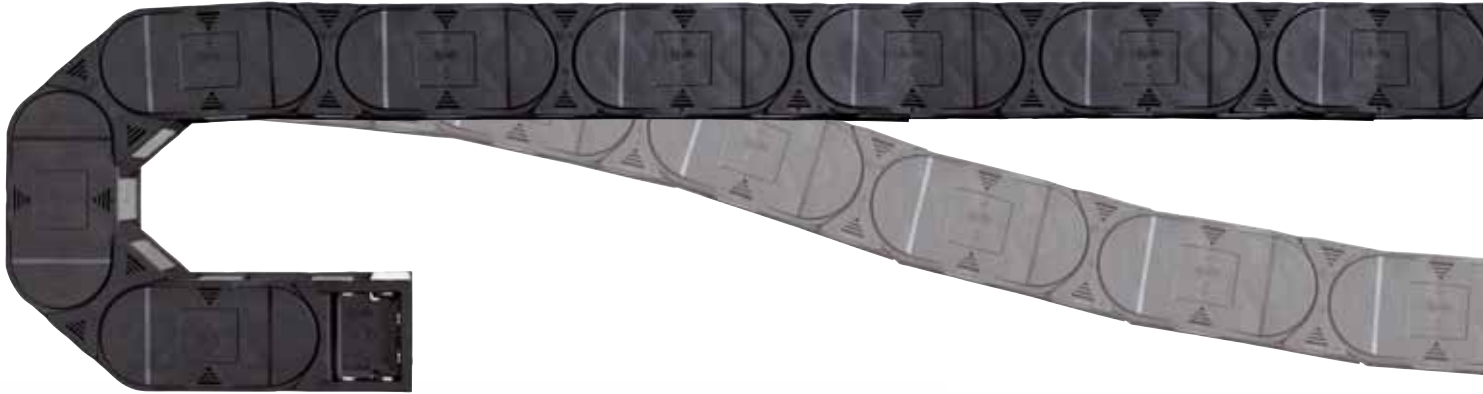
- Extremely wear-resistant and quiet through enlarged gliding surfaces (up to 70 %) and 150 % thicker wear pads
- 4 times longer cycle life
- Smooth motion through optimized surface geometry and cushioned gliding elements
- For use on new E-Chains® or to retrofit existing systems

For series	Widths								Gliding surface width [mm]	Part No. GN Version**	Part No. GS Version**
	xx [mm]										
14040, 15050	.20*	.25	.27*	.28*	.30	.32	.35	.37*	32	450.xx.GN.S	450.xx.GS.S
4040, E4.56, 400	.20*	.25	.27*	.28*	.30	.32	.35	.37*	38	450.xx.GN.M	450.xx.GS.M
5050	.20*	.25	.27*	.28*	.30	.32	.35	.37*	43	450.xx.GN	450.xx.GS

New * in preparation **GN = New E-Chain® GS = Retrofit for your existing E-Chain®

XXL material

New material for E4.1 – for even longer unsupported travels



Program extension E4.1

New: XXL-material: Allows for up to 25 % more unsupported span and for up to 13 m of unsupported travel. Solutions with gliding E-Chains® are often more elaborate and expensive than unsupported applications, because a slightly longer E-Chain® and a guide trough system becomes necessary. Usually, gliding E-Chains® also require more space. The new XXL-material for E-Chain® series E4.1 allows for 25 % longer unsupported span and makes unsupported travels of up to 13 m possible. The strong stop dog mechanism and interlocking side links underscore the "XXL unsupported" aptitude. For XXL material: speed $v_{max}=1$ m/s, acceleration $a_{max}=2$ m/s²

- Longer unsupported travels
- Higher fill weights
- Eliminates guide troughs and supports
- Higher speed
- Lower wear and longer cycle life
- More flexibility for your application
- Less space required

Load capacity test – E4.56 XXL vs. larger E4.80 (right): Centered load of 11.25 kg at 4.5 m unsupported span



Series	Inner height	Outer height	Inner width	Outer width	Max. unsupported span	Bending radii	Pitch	Links/m
	hi [mm]	ha [mm]	Bi [mm]	Ba [mm]	[m]	R [mm]	T [mm]	[mm]
New E4.28.XXL	28	42	40 - 300	60 - 320	2,75	55 - 250	46,0	22
New E4.32.XXL	32	54	50 - 400	73 - 423	3,50	63 - 300	56,0	18
New E4.42.XXL	42	64	50 - 400	76 - 426	4,20	75 - 350	67,0	15
New E4.56.XXL	56	84	50 - 600	84 - 634	5,25	135 - 500	91,0	11
New E4.80.XXL	80	108	50 - 600	100 - 650	6,25	150 - 1000	111,0	9

Customized E-Chains[®]

igus[®] Accessories – new interior separation modules and strain reliefs



Interior separation modules for system E4.1

New: Modular interior shelving system – the ideal igus[®] separation for every application. Modules are interchangeable and can be combined. New accessories complete the system. We look forward to discussing your application!

Classics

- Suits most applications
- Range of slotted separators and shelves
- Vertical and horizontal separation
- Proven modular system for safe interior separation

HDX series

- For maximum loads and fill weights
- Very strong for a safe fit inside the links
- Ideal for humid environment, like composting plants, etc.
- For stiff media hoses, hydraulic hoses, etc.

R series (notched)

- Defined raster through projections on separators and raster cross bars
- Ideal for applications "on the side"
- No additional spacers required



Vertical Separator, Locking Separator and Spacer for Chain inner separation



Side Plate, Vertical Separator, Slotted Separator and Shelves for customized inner separation



KMA connection element with integrated C-profile and Chainfix

Characteristic features of the igus[®] own Chainfix product series:

- igus[®] Chainfix reduces the overall height due to optimum housing height
- Long-term durability for dynamic applications due to improved press-fit elements
- Suitability for integration in the KMA connection element: space-saving and time-saving assembly; possibility of delivery for complete systems, with cables and assembled strain relief device included
- Improved foot for facilitated installation on the C profile



igus[®] Chainfix stainless-steel* (photo) and steel version available ex stock

* Material high-grade steel: 1.4301

Chainflex® – Design Features

More than 850 igus® cable types ex stock

The igus® Chainflex®-programm contains over 850 cables ex stock – especially designed for the use in Chains – and tested, tested and tested. Chainflex® lasts. Or your money back.

igus® Chainflex® – power cable

igus® Chainflex® – control cable



Order your personal Catalogue:

www.igus.de/catalogue

Chainflex® Catalogue pages with an overview of the igus® Chainflex® types:

	Control cables													Bus/Data/Measuring System cables/FOC										Servo cables			Power cables				Fire cables																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
Chainflex® Quick 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New Chainflex® for Cranes

Overview

New: Single core CF330.D and CF340



Type	Cable type	Specially developed for
CF330.D	TPE Power cable	Outdoor Cranes
CF340	TPE Power cable	Outdoor Cranes

New: Halogen-free power cable CF37.D and CF38



Type	Cable type	Specially developed for
CF37.D	TPE Power cable	Outdoor Cranes
CF38	TPE Power cable	Outdoor Cranes








New Chainflex® for Cranes

Overview

The new halogen-free single conductor for extra high mechanical demands on cranes and for plant engineering

- TPE UV-resistant outer jacket
- PVC-free/halogen-free








- Oil-resistant/Bio-oil-resistant
- Low-temperature-flexible
- Nominal voltage 0,6/1kV
- Bending radius inside E-Chain®: 7,5 x d

Shielded	Nominal voltage	Temperature range	Number of cores	Cross section	Regulations
No	0,6/1 kV	-35 °C to +90 °C	1	6 - 185 mm ²	   
Yes	0,6/1 kV	-35 °C to +90 °C	1	4 - 185 mm ²	  

The new halogen-free power cable for extra high mechanical demands on cranes and for plant engineering

- TPE UV-resistant outer jacket, gusset filled extruded
- PVC-free/halogen-free

- Oil-resistant/Bio-oil-resistant
- Low-temperature-flexible
- Nominal voltage 0,6/1kV
- Bending radius inside E-Chain®: 7,5 x d

Shielded	Nominal voltage	Temperature range	Number of cores	Cross section	Regulations
No	0,6/1 kV	-35 °C to +90 °C	3 - 5	1,5 - 50 mm ²	   
Yes	0,6/1 kV	-35 °C to +90 °C	3 - 4	0,5 - 50 mm ²	  

Chainflex® Cables for Cranes

Overview

Four core power cables



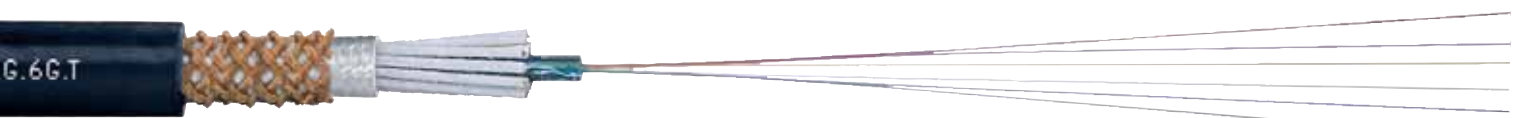
Type	Cable type	Specially developed for
CF30	PVC Power cable	Indoor Cranes
CF31	PVC Power cable	Indoor Cranes
CF34.UL.D	TPE Power cable	Outdoor Cranes
CF35.UL	TPE Power cable	Outdoor Cranes

Single core motor cables



Type	Cable type	Specially developed for
CF300.UL.D	TPE Power cable	In- and Outdoor Cranes
CF310.UL	TPE Power cable	In- and Outdoor Cranes

Fibre optic cables



Type	Cable type	Specially developed for
CFLG.G LWL 50/125	TPE Fibre optic cable	In- and outdoor Cranes
CFLG.G LWL 62,5/125	TPE Fibre optic cable	In- and outdoor Cranes

Chainflex® Cables for Cranes

Overview

* other numbers of cores/fibres on request

Shielded power cable for converter operation up to 600/1000 V. and up to 70 mm².

Shielded	Nominal voltage	Temperature range	Number of cores	Cross section	Regulations
No	0,6/1 kV	-5 °C to +70 °C	4 - 5	1,5 - 50 mm ²	CE E SP RJ
Yes	0,6/1 kV	-5 °C to +70 °C	4 - 5	1,5 - 70 mm ²	CE E SP RJ
No	0,6/1 kV	-35 °C to +90 °C	3 - 5	1,5 - 50 mm ²	CE E SP RJ
Yes	0,6/1 kV	-35 °C to +90 °C	3 - 4	05 - 50 mm ²	CE E SP RJ

Shielded and unshielded single core motor cables for the most demanding requirements.

Shielded	Nominal voltage	Temperature range	Number of cores	Cross section	Regulations
No	0,6/1 kV	-35 °C to +90 °C	1	4 - 185 mm ²	CE E SP RJ
Yes	0,6/1 kV	-35 °C to +90 °C	1	4 - 185 mm ²	CE E SP RJ

Fibre glass (62.5/125 or 50/125), 2, 6 or 12 fibres – all fibre optic cables are tested for over several million flexing cycles.

Shielded	Nominal voltage	Temperature range	Number of cores	Cross section	Regulations
No		-40 °C to +90 °C	6/12/*	50/125 µm	CE
No		-40 °C to +90 °C	6/12/*	62,5/125 µm	CE

Chainflex® Cables for Cranes

Overview

Single core CF Crane



Type	Cable type	Specially developed for
CFCRANE	iguprene Power cable	Outdoor Cranes

Data cables



Type	Cable type	Specially developed for
CF211	PVC Data cable	Indoor Cranes
CF240	PVC Data cable	Indoor Cranes
CF11	TPE Data cable	In- and outdoor Cranes

Control cables




Type	Cable type	Specially developed for
CF5	PVC Control cable	Indoor Cranes
CF6	PVC Control cable	Indoor Cranes
CF9	TPE Control cable	In- and outdoor Cranes
CF10	TPE Control cable	In- and outdoor Cranes

Chainflex® Cables for Cranes







Overview

** CF9.25.18 (18x2.5 mm²) at 600/100V cable available.







Shielded highly flexible single core for up to 6/10kV.
Medium voltage cable for the most demanding requirements
in Crane building, heavy machinery, etc.
Cross sections: 1 x 25/16 to 1 x 95/16.

Shielded	Nominal voltage	Temperature range	Number of cores	Cross section	Regulations
Yes	6/10 kV	-20 °C to +80 °C	1	25 - 95 mm ²	CE 

Chainflex® data cables are available for all continuous data systems for the E-Chain® application. Also in big cross sections, for example 3 x 2 x 2.5 mm² or with voltage supply cores in a cable.

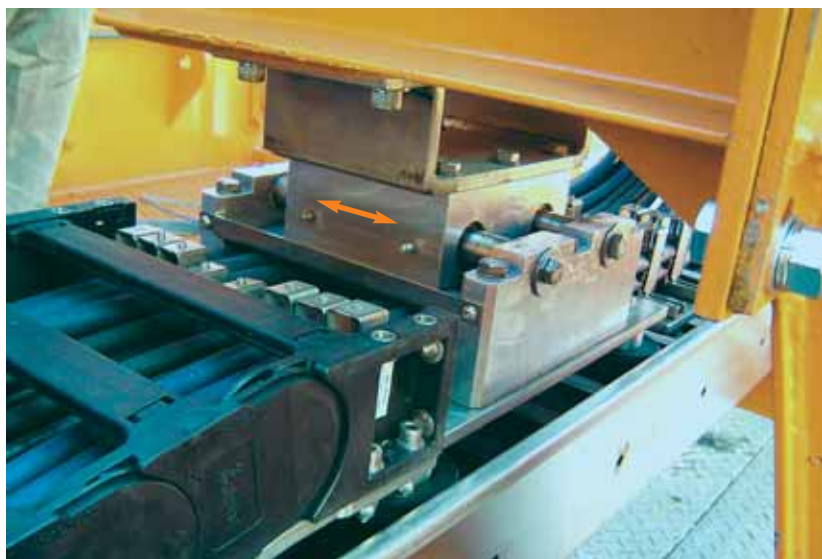
Shielded	Nominal voltage	Temperature range	Number of cores	Cross section	Regulations
Yes	300/300 V	-5 °C to +70 °C	2 - 28	0,25 - 0,5 mm ²	CE   
Yes	300/300 V	-5 °C to +70 °C	3 - 24	0,14 - 0,34 mm ²	CE   
Yes	300/300 V	-35 °C to +100 °C	4 - 36	0,14 - 2,5 mm ²	CE

PVC, PUR (see Chainflex® Cable catalog), TPE – A wide range to select from for all application areas – between shielded and unshielded cables and a large number of cross sections and number of cores.

Shielded	Nominal voltage	Temperature range	Number of cores	Cross section	Regulations
No	300/500 V	-5 °C to +70 °C	2 - 42	0,25 - 6,0 mm ²	CE   
Yes	300/500 V	-5 °C to +70 °C	3 - 25	0,25 - 2,5 mm ²	CE   
No	300/500 V**	-35 °C to +100 °C	2 - 36	0,25 - 35,0 mm ²	CE
Yes	300/500 V	-35 °C to +100 °C	2 - 25	0,14 - 4,0 mm ²	CE

Customized Crane-parts

Necessary products for proper running E-ChainSystems®



Floating moving arm "Ship to Shore" Crane for compensation of the lateral mismatch between trolley travelling path and Crane travelling path and the ReadyChains®. Optionally with electronic push/pull-force control with permanent nominal/actual parameter check and emergency stop function.



Hinge point guide trough: Port Cranes are equipped with a lifting boom. To make sure that the boom and the girder sides of the Crane are connected without misalignment of the guide trough igus® has developed a special fixing for the swivel point. This means that the chain can run on top, beside or below the Crane girder.



Downholding devices: ReadyChains® operate safely on long travels and with high acceleration. The retention device prevents the ReadyChains® from climbing when the Crane accelerates.



Hinge clutch at the hinge point incl. limit switch for connection control.



igus® Housing installed on Maintrrolley for STS: igus® offers special customized housings for protection of the ReadyChains® against several weather conditions.

Condition Monitoring PPDS

Push-Pull Force Detection System (PPDS) in "Full" and "Easy" versions

Benefits:

- Prevents down time
- Prevents damage to equipment
- Saves money
- Improves operational safety through preventative maintenance and fine tuning of the system

Full PPDS System:

● Data input

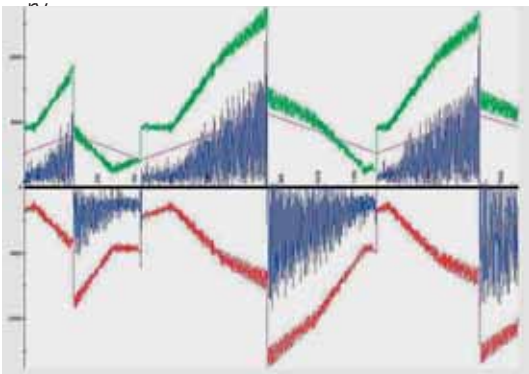
Nominal/actual comparison of force value at the tow arm, measured 4 times per second, relative to the position of the E-ChainSystem®.

● Data exchange options

Malfunction alerts as defined – through SMS, e-mail, fax. Remote data exchange, online or through e-mail.

● Data log

System data logout, retrospectively for up to 3 months, with a 128 MB memory chip. Alternatively incident-driven logout through modem memo-



PPDS – continuous real force measurement and position-sensitive analysis.



Push-/Pull-force monitoring with the igus® PPDS System

Typical Crane applications:
STS, Goliath Cranes, RMG's, Indoor Cranes,
Bulk handling Cranes, ...

Easy PPDS System:

● Low Cost Solution

● Data input

Push-/Pullforces with freely selectable parameters.
Measurement of the real force on moving end

● Data exchange

Emergency shut-down of the system in case of overstepping of optional limit values.

● Data log

Data log for up to 40,000 entries



Easy PPDS – continuous real force measurement and limit comparison.



Easy PPDS exhibition principle model. In reality integrated in the floatin moving arm.

Guide Troughs for Cranes

Safe guide for E-Chains® on long travels – Stainless steel



Trough without glide bars – Chain glides on chain



Trough with glide bars – Chain glides on glide bars



Centre mounted – 1/2 Travel with glide bars
– 1/2 Travel without glide bars



HD-Installation set



igus® Guide Troughs

Guide troughs are used for long travels from 5 to 10 m and more, depending on the chain type.

They allow igus® Energy Chains® and Energy Tubes to continue smooth, low-friction operation in these long-travel situations.

If the Energy Chains®/Tubes are installed in the centre of the travel ("centre-mounted"), they glide on themselves for half the travel.

For the other half, we recommend glide bars, which are assembled in the trough and on which the Energy Chains®/Tubes glide. igus® guide troughs are available from stock with these highly abrasion-resistant polymer glide bars, which perform well with igus® Energy Chains® and Tubes regarding noise, abrasion and friction.

Type of Trough

igus® provides guide troughs made of

- Aluminum (sea water resistant according to DIN)
- Stainless steel (1.4301 + 1.4571)
- Steel (zinc plated)

Troughs assembling

If the igus® installation sets are used, the guide troughs are particularly easy to assemble. All the troughs are constructed according to the same basic principle. All sizes use a common C-profile on which the guide parts are assembled. The assembly brackets used vary in height only.

Typical Crane applications:

STS, Goliath Cranes, RMG's, Bulk handling Cranes, ...

For heavy applications: HD-Installation set for joint and attachment surface connections secure connection without misalignment and without welding

New fixed end module for steel troughs

Until now, the steel trough had to be modified on site to fit the mounting brackets at the stationary end of the E-Chain®. That is now history. With its prefabricated boreholes, the 2.000 mm long kit can be used for middle-feed, end-feed and opposed installation.

- Fast fixation of mounting brackets thanks to prefabricated boreholes
- Fast installation of C-rails for strain relief
- Fast bolting of glide bars
- Available immediately for series 4040/5050, all other series on request

Super Alu Guide Trough

A light version of long travel guides in aluminium



Super Alu Guide Trough – Crane version

It is possible to extend the Super Alu Guide Trough for the demanding plant sector to a heavy duty version. This trough has got stronger installation brackets and also additional parts like glide pads for protection of wear and friction and silencer profiles to reduce the noise level of the roll of the E-Chain®.

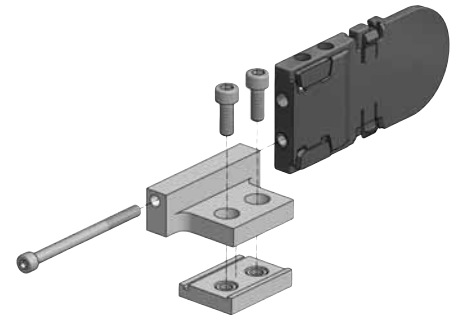


Super Alu Guide Trough – installed on a RTG-application

Modular Trough System

- Tool box with basic version and add-on items for upgrading to heavy duty industrial applications
- Very quick and easy, universal and flexible assembly – connects with underground, independent from profile length and location of trough section interfaces
- Various fixation methods with installation brackets, slide-on fasteners and interface connectors
- Wear protective, side-mount glide bars for high speed applications
- Corrosion proof through seawater resistance
- Available for most igus® E-Chain® series

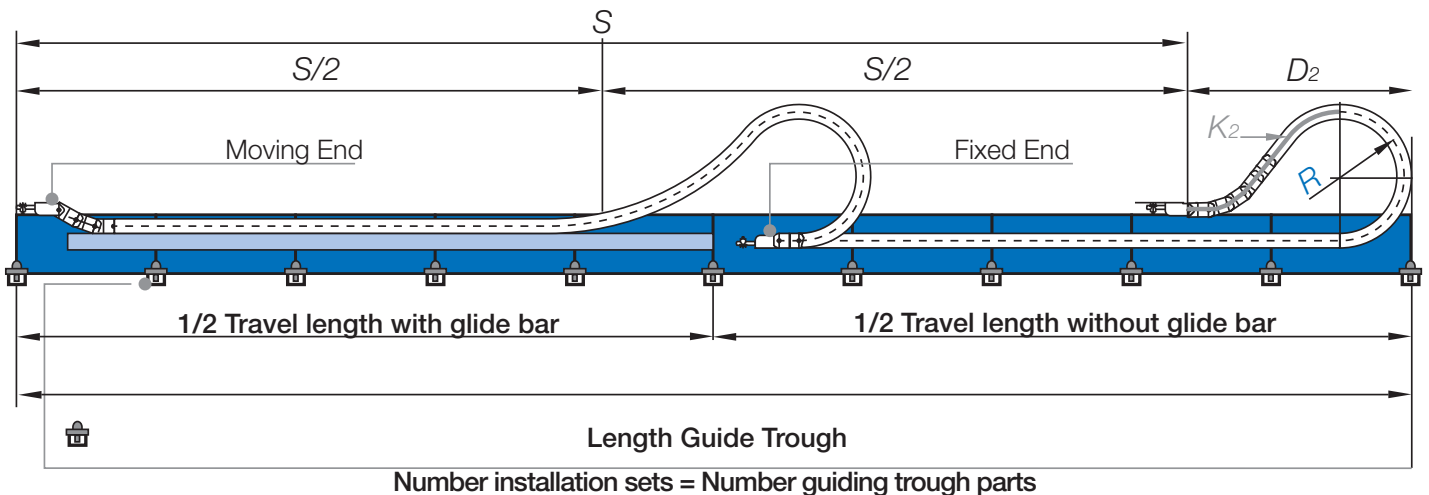
Typical Crane applications:
RTG's, RMG's, Indoor Cranes, ...



New fixed end module for Aluminum SuperTrough

A quick fix for mounting the stationary end of an E-Chain®, now also available for the Super AluminumTrough. With this new module for the fixed end, fast and easy mounting onto the Super AluminumTrough is now possible without any drilling.

- Fast mounting of the E-Chain® by clamping onto the aluminum trough
- Quick relocation of the stationary end
- No drilling necessary



Schematic operating mode of an E-ChainSystem® for long travel application with centre-mount configuration. (Fixed end in the middle of the travel length)

igus® Project Engineering

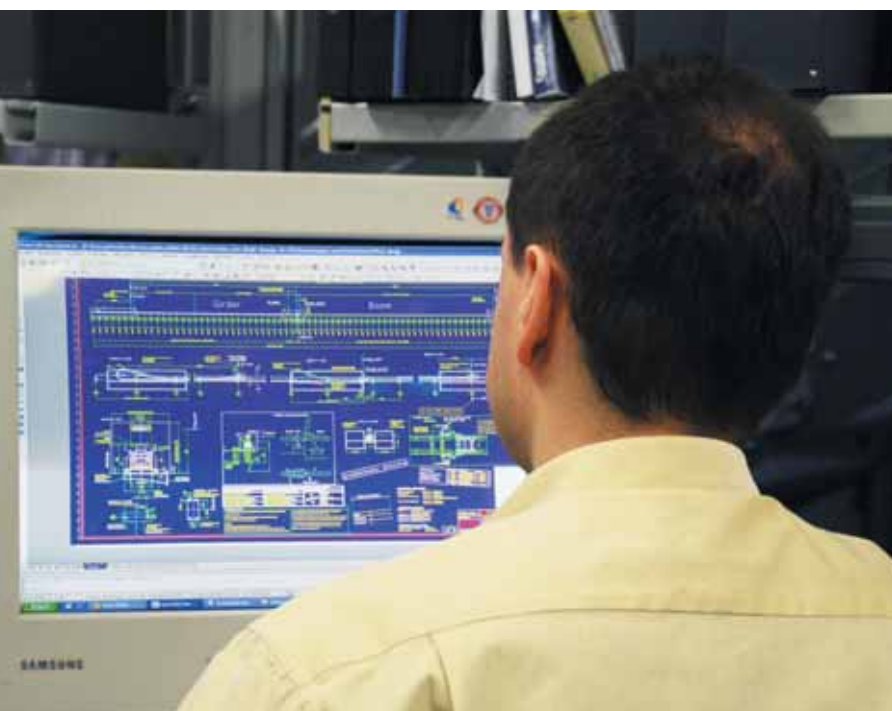
Complete project service – from design to after sales service



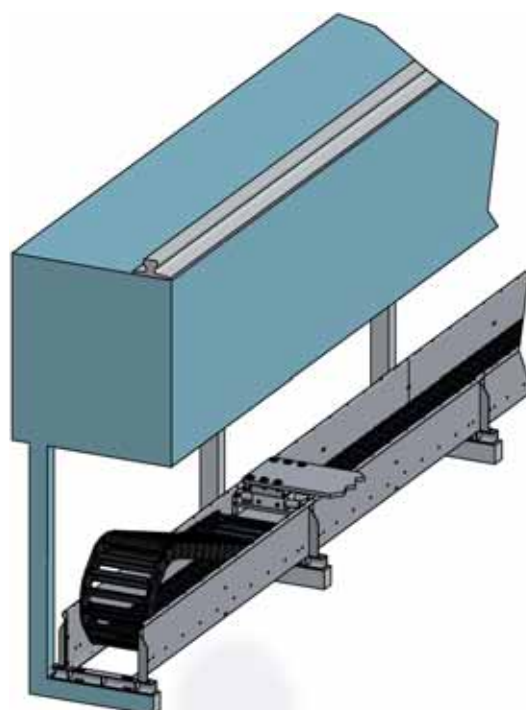
On-site support is part of the worldwide service and system guarantee.

- Specific application solutions from igus® standard products to special designs
- Assistance from the layout up to the start of operations of every Crane project

- After Sales Service in 48 countries, even after the end of the guarantee
- All supplied components are available for a minimum of another 10 years after the delivery
- Supply of most parts from stock is guaranteed



igus® project drawings, developed in cooperation with the customer



Customized 3D sketch

ReadyChains® for Cranes

From single components to fully harnessed E-ChainSystems®

ReadyChain® is the pre-harnessed igus® E-Chain®.

- The E-Chain® is cut into sections for the application-specific travel length
- Assembled systems are already supplied and installed for up to 200 m travel length
- Assembly sets are mounted for the fastening of the chain at the fixed and moving ends

- The selected igus® Chainflex® cables 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
- igus® assembly supervisors are happy to assist in any way in the installation process.



Ready for filling. Harnessed systems up to 200 m are possible.



ReadyChain® – ready for delivery



System harnessing by specialists according drawing



ReadyChain® installation by igus® supervisor on a bulkhandling Crane. Weight of the E-Chain® incl. Chainflex® more than 2 t.

igus® Testing

Proven product features guarantee long life



Check of the solution on the igus® test facilities: The flagship is a test application where we are able to test long travel applications of up to 125 m travel and speeds of up to 300 m /min. For more than 4 years this application has been simulating applications for E-ChainSystems® like trolley travels of a container Cranes. This way new products engineered by igus® can be put to the acid test.



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



Always more than 80 tests of E-Chains® and Chainflex® cables. igus® conducts tests continuously in the in-house laboratory under real conditions.



Climatic tests for all E-Chains® and Chainflex® cables. Material tests from -40 °C up to +199 °C.

References: Bulk handling

Examples of the use of igus® E-ChainSystems® in Cranes – worldwide

Ship-unloader Crane

Travel 441 m
Speed max. 30 m/min
Acceleration max. 0,1 m/sec²

Energy Chain® 5050R.28.300.0
Chainflex® Types CFCRANE

Location Asia
More References Europe
Canada



Ship-unloader Crane

Travel 106 m
Speed max. 240 m/min
Acceleration max. 0,6 m/sec²

Energy Chain® 5050RHD.12/15/12.300.0

Location Europe
More References Worldwide



Ship-unloader Crane

Travel 151,5 m
Speed max. 300 m/min
Acceleration max. 0,5 m/sec²

Energy Chain® 4040CR.15.250.0
Chainflex® Types CF12 / CF11 / CF9

Location Canada
More References Europe
Asia



References: Ship to Shore

Examples of the use of igus® E-ChainSystems® in Cranes – worldwide



Ship-to-shore Crane

Travel 118,5 m
Speed max. 210 m/min

Energy Chain® 4040CR.22.250.0
Chainflex® Types CF300/CF9/CF10/CFLG

Location Europe
More References Worldwide



Container Crane

Travel 78,5 m
Speed max. 120 m/min
Acceleration max. 0,5 m/sec²
Cycles/year 42.000

Energy Chain® 5050R.27.250.0
Chainflex® Types CF300 / CF11 / CF9

Location Europe
More References Worldwide



Double Trolley Container Crane

Travel 48 m
Speed max. 180 m/min
Acceleration max. 0,5 m/sec²
Cable weight 40 kg/m

Energy Chain® 5050R.12/10/12.300.0
Chainflex® Types CF300 / CF9 / CF12 /
CFLG / CF KOAX 1

Location Europe
More References Worldwide

References: RTG/RMG

Examples of the use of igus® E-ChainSystems® in Cranes – worldwide

RTG

Travel 19,5 m
Speed max. 60 m/min
Acceleration max. 0,4 m/sec²

Energy Chain® 400.25.250.0
Chainflex® Types CF300 / CF34
CF9 / CF11

Location Panama
More References Worldwide



RMG

Travel 69 m
Speed max. 120 m/min
Acceleration max. 0,4 m/sec²

Energy Chain® 4040R.31.250.0

Location Europe / Europa
More References Worldwide



RTG

Travel 20 m
Speed max. 60 m/min
Acceleration max. 0,4 m/sec²
Cable weight 9,8 kg/m

Energy Chain® 4040.46.300.0
Chainflex® Types CF34 / CF9 / CF11 /
CFLG

Location Russia
More References Worldwide



Goliath Crane / Reach Stacker

Examples of the use of igus® E-ChainSystems® in Cranes – worldwide



Goliath Crane

Travel 195 m
Speed max. 40 m/min
Acceleration max. 0,1 m/sec²

Energy Chain® 5050R.40.250.0
Chainflex® Types CF300 / CF9 / CF11

Location Asia
More References USA



Goliath Crane

Travel 123 m
Speed max. 40 m/min
Acceleration max. 0,5 m/sec²

Energy Chain® 40.15/15.250.0

Location Asia
More References USA



Reach Stacker

Travel 7,8 m
Speed max. 15 m/min
Acceleration max. 0,25 m/sec²

Energy Chain® 4040.15.250.0

Location Europe
More References Worldwide

Reach Stacker / Spreader

Examples of the use of igus® E-ChainSystems® in Cranes – worldwide

Reach Stacker

Travel 7,2 m
Speed max. 0,5 m/min
Acceleration max. 0,25 m/sec²

Energy Chain® 5050.25.250.0

Location Europe
More References Worldwide



Spreader

Travel 8,4 m
Speed max. 18 m/min
Acceleration max. 0,1 m/sec²

Energy Chain® 3838.07.150.0

Location Asia
More References Worldwide



Spreader

Travel 8,4 m
Speed max. 18 m/min
Acceleration max. 0,1 m/sec²

Energy Chain® 3838.07.150.0

Location Asia
More References Worldwide



References: Indoor

Examples of the use of igus® E-ChainSystems® in Cranes – worldwide



Bulk Material Crane

Travel 160 m
Speed max. 20 m/min
Acceleration max. 0,5 m/sec²

Energy Chain® 4140.22.250.0
Chainflex® Types CF30 / CF7 / CF11

Location Europe
More References Europe



Grab Crane

Travel 28,6 m
Speed max. 80 m/min
Acceleration max. 0,3 m/sec²

Energy Chain® 400.25.300.0
Chainflex® Types CF30 / CF31

Location Europe
More References Worldwide



Indoor Crane

Travel 36 m
Speed max. 70 m/min
Acceleration max. 0,5 m/sec²

Energy Chain® 290.17.200.0
Chainflex® Types CF31 / CF6 / CF11

Location Europe
More References Worldwide

References: Heavy Duty

Examples of the use of igus® E-ChainSystems® in Cranes – worldwide

Gantry Crane

Travel 20 m
Speed max. 1 m/min
Acceleration max. 1 m/sec²

Energy Chain® 5050.40.200.0
Chainflex® Types CF9

Location Europe
More References Europe



Grab Crane

Travel 21,3 m (Trolley) / 52 m (Crane)
Speed max. 1,33 m/s
Acceleration max. 0,25 m/sec²

Energy Chain® 5050R.27.300.S10.0 / 5050R.35.350.S10.0
Chainflex® Types CF5, CF6, CF30

Location Europe
More References Europe



Mining Crane

Travel 10 m
Speed max. 0,1 m/s
Acceleration max. 0,5 m/sec²

Energy Chain® 600.35.300/4650.0
Chainflex® Types Power-, data- and control cables

Location Europe
More References Europe





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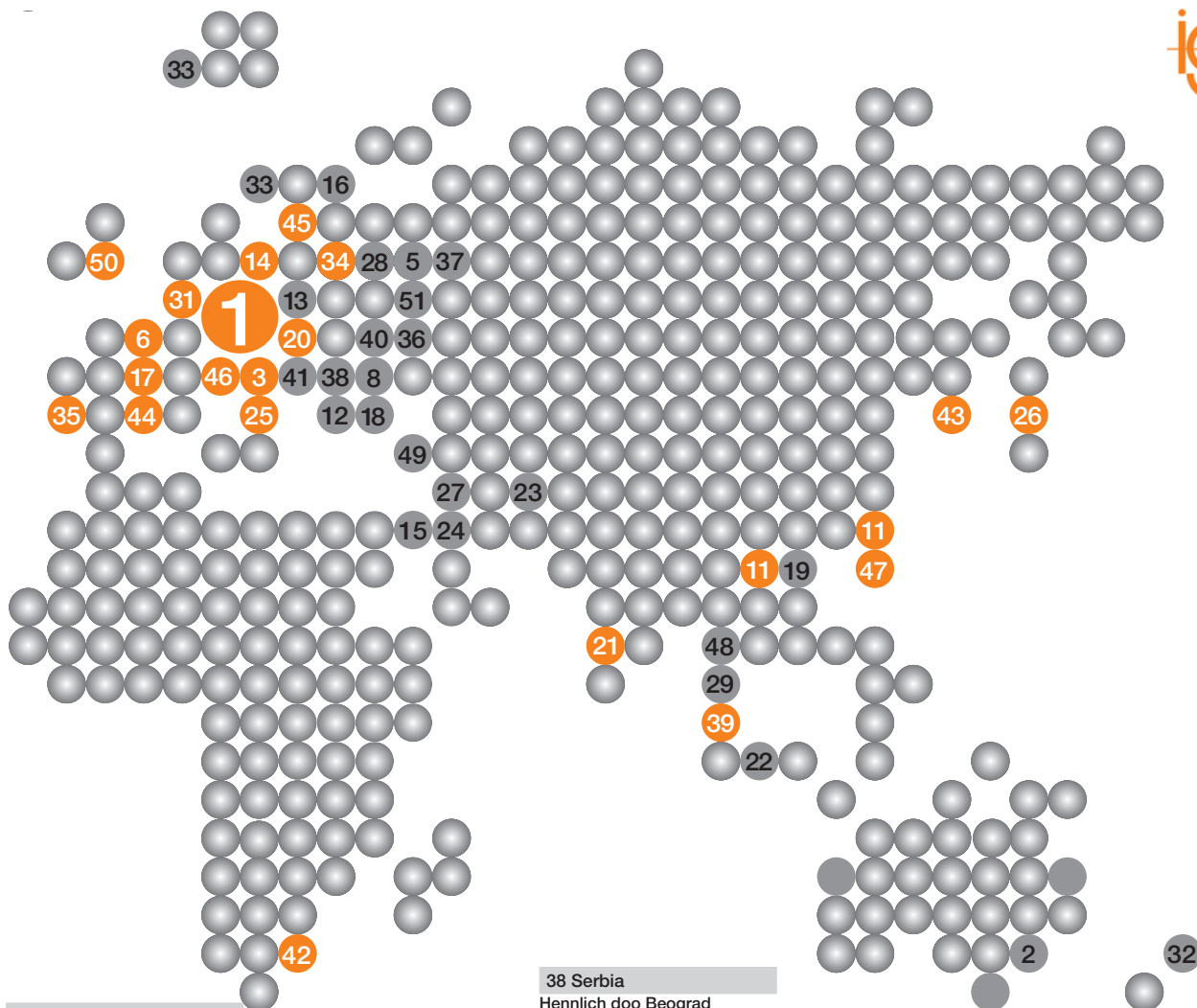
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CD-ROM
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