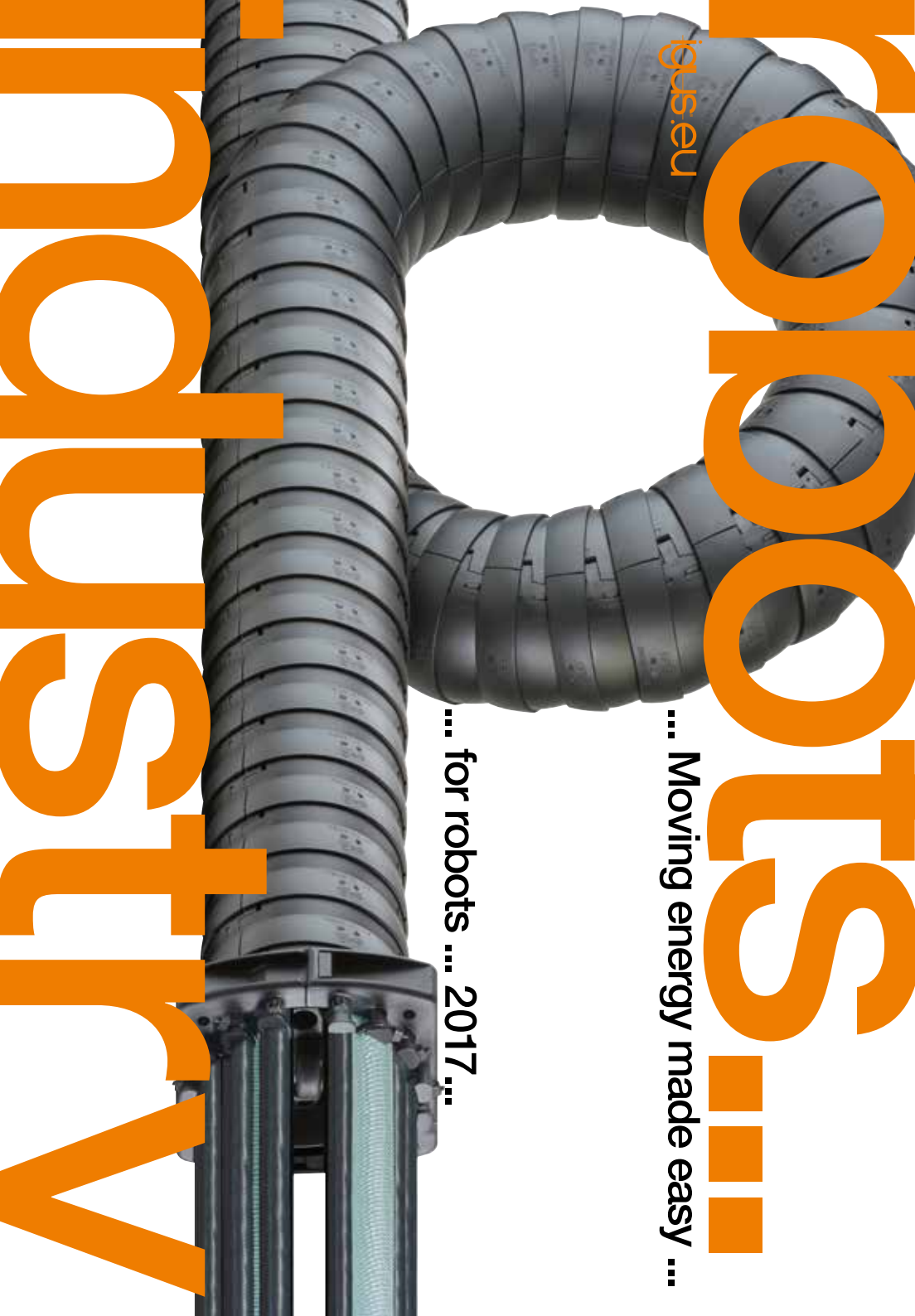




robotics ■■■

igus.eu

... Moving energy made easy ...

... for robots ... 2017 ...

industry

QuickRobot

Complete energy supply tool for robots

Robotic equipment



Type: KUKA
KR 120 R2500 pro

☒ Structure

E-Chain®: TRC
Size: 100 mm
☐ Cover

☒ Lateral connection

E-Chain®: TRL
Size: 60 mm

☐ Foot equipment

We will be glad to make you an offer for this axis. Please use the Help/Contact function for your enquiry.

Help/Contact | Parts list (PDF) | 1 Piece Price: 2.208,03 EUR | Add to shopping basket

User friendly online tool offers around 2,000 component selection options for energy supply systems in the robotics sector

igus® QuickRobot – Complete energy supply tool for robots

Thanks to this selection tool for robot equipment, a complete cable guide system can be specified from the available robot types. One can select either full system or a system for an individual axis.

- Selection of robot types according to manufacturer and the required e-chain® sizes according to diameter
- Other optional parts can be selected
- Equipment option for each axis can be conveniently ordered with one article number

- The entire robot can be equipped with just three article numbers.
- Enquiry or ordering option
- Also available for download from iTunes free of charge as an iOS iPad app



More information

www.igus.eu/quickrobot

Moving energy made easy – for robot applications

The modular igus® robot construction kit comprises over 5,000 different parts. We can offer you the optimum, customised solution for almost any robot application. Our "Quick Robot" online tool can be used to create the ideal configuration in seconds – try it for yourself: www.igus.eu/quickrobot

All igus® robotic components are tested in our laboratory and have already been used reliably in many applications for years. Our goal is to ensure that the whole energy supply on your robots is reliable. We do not simply focus on mechanical protection but instead look at the entire application including cables that have also been especially developed for use on robots. We will gladly find a solution for your application too, and look forward to receiving your enquiry.



Jörg Ottersbach

Head of Industry Management
Robotics
Phone: +49-2203 9649-688
jottersbach@igus.de



Markus Hörter

Project Manager
Robotics
Phone: +49-2203 9649-940
mhoerter@igus.de



Matthias Meyer

Technical Sales
Robotics
Phone: +49-2203 9649-161
mmeyer@igus.de

We will gladly visit your site and demonstrate the benefits of the igus® triflex® R robot e-chain®.

Further details on the igus® robotic e-chain® are available online:

www.igus.eu/best/triflexTR

www.igus.eu/best/triflexTL



igus® solutions for the robot industry

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Available from stock.

Ready for delivery in 24-48h*

*The delivery times indicated correspond to the average time until the ordered goods are dispatched.



No minimum order quantity!

No surcharges!

You can find us online at ► www.igus.eu



Guarantee

Beyond the legal warranty we also vouch for wear and tear. With a warranty certificate!



7 to 8 plus Saturday service

Monday to Friday 7:00 am to 8:00 pm

Saturday from 8:00 am to 12:00 pm



Order hotline

Phone +49 2203 9649-800

Fax +49 2203 9649-222



Onlineshop ► www.igus.eu

Product finder, configurator, online catalogues, CAD modules and many more. Order around-the-clock!

plastics for longer life® -

increase the service life of your machines with igus® e-chains®

Reducing maintenance, while cutting costs and extending service life; everything delivered immediately from stock - this is our aim. This catalogue contains more than 100,000 products available from stock or with short delivery times, and starting from a batch size of one. We look forward to your call or email.

Orders can be placed until 8:00 pm local time.

Phone +49 2203 9649-800

"Emergency-Service" around the clock.

100,000 products from stock.

No minimum order quantities.

No surcharges.

igus® is certified in accordance with DIN EN ISO 9001:2008 and ISO/TS 16949:2009 in the field of energy chains® with cables and harnessing, as well as plastic plain bearings.

© igus® GmbH - 08/2017

24h/100.000
DIN EN ISO 9001:2008
ISO/TS 16949:2009

Quality from the igus[®] laboratory

Tested thousands of times, proven millions of times.

Applications involving high duty cycles, speeds and accelerations or demanding environmental conditions require proven systems especially for e-chains[®], cables, polymer bearings and linear systems. igus[®] constantly conducts tests at its own laboratory under real-world conditions. Every year, we conduct more than 4,100 tests on e-chains[®] and cables, and over 9,600 tests on plain bearings. These tests focus on push/pull forces, friction values and wear rates. Other factors like dirt, weathering, cold and impact are also tested. Our laboratory is also at your disposal. If we don't have data for your type of application, we can conduct a test representative of your requirements. ► www.igus.eu/test



Electronic checking and archiving for every e-chain[®] production batch



Noise level test inside an igus[®] acoustic cell



igus[®] dynamic bending test



Long-term wear and life-time test



Speed up to 10 m/s and acceleration up to 200 m/s² are tested by igus[®]



Long travel test field - 125 m travel length, speed 300 m/min

Global Warranty Certificate

Global warranty for

We hereby confirm the following warranty for the igus[®] e-chain[®] application described on the back page of this certificate.

For a period of 24 months upon delivery, we will replace parts for any igus[®] components that fail due to wear and tear, free of charge (labor and service). This does not include failure due to mechanical impact and damage due to incorrect assembly. Shipping of replacement parts does not enter the warranty period.

We reserve the right of inspecting the installed e-chain[®] prior to its first operation.

Other agreements:

Warranty confirmed:

Date:

igus[®] GmbH

Stamp and signature

igus[®] GmbH, Sauerbrunn Str. 1a, 51147 Köln
Phone: +49-203-9640-200
Fax: +49-203-9640-222
Internet: www.igus.eu
E-Mail: info@igus.de

igus[®] system warranty - every application is different. igus[®] warranty certificates can be issued for your individual application. Ask for the igus[®] warranty: "chain, cable, guarantee"



All products are tested and available from a single source. Examples of test certificates and quality seals for igus[®] products ... more upon request

2,750 m² igus[®] lab. The largest test lab in the e-chain[®] industry with 65 e-chain[®] test machines and about 7,515 test results per year. 253 simultaneous tests for e-chain[®] and chainflex[®] cables with more than 10 billion e-chain[®] cycles (in the e-chains[®] and chainflex[®] lab per year) ensure reliable energy supply systems for all industries and installation types.

Worldwide, quick and reliable.

The igus® service.

Delivery and consultation daily from
7 am to 8 pm, Saturday from 8 am to 12 pm!

Innovation and service are the focal points of our corporate philosophy. We have therefore put together an extensive package of services for you: no minimum order quantity, speedy delivery from 24 h, more than 100,000 products from stock. Order an iglidur® bearing or a pre-assembled standard portal from stock in 24 hours at no extra cost. Rapid delivery worldwide guaranteed. Spare parts are delivered ex stock in the shortest possible time.

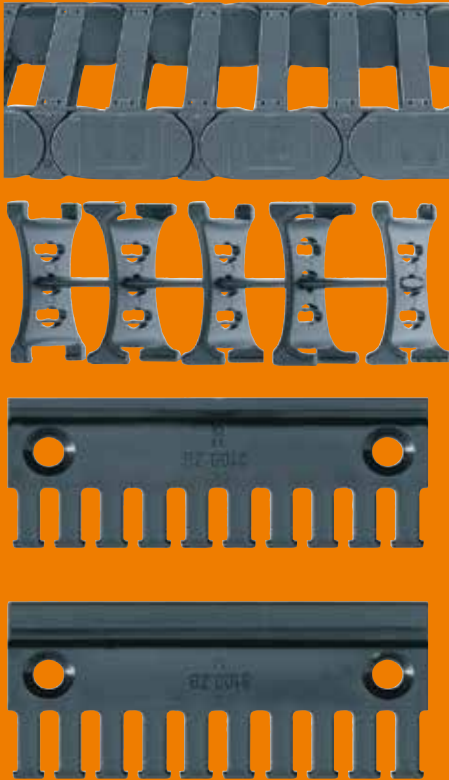
Take advantage of further service options from igus®:

- **Free samples:** we will be happy to send you free samples for testing in your application. Order here
▶ www.igus.eu/samples
- The **monthly newsletter** keeps you regularly informed about new igus® solutions. Register here
▶ www.igus.eu/newsletter

Order at igus®: no minimum order quantities, no surcharges.

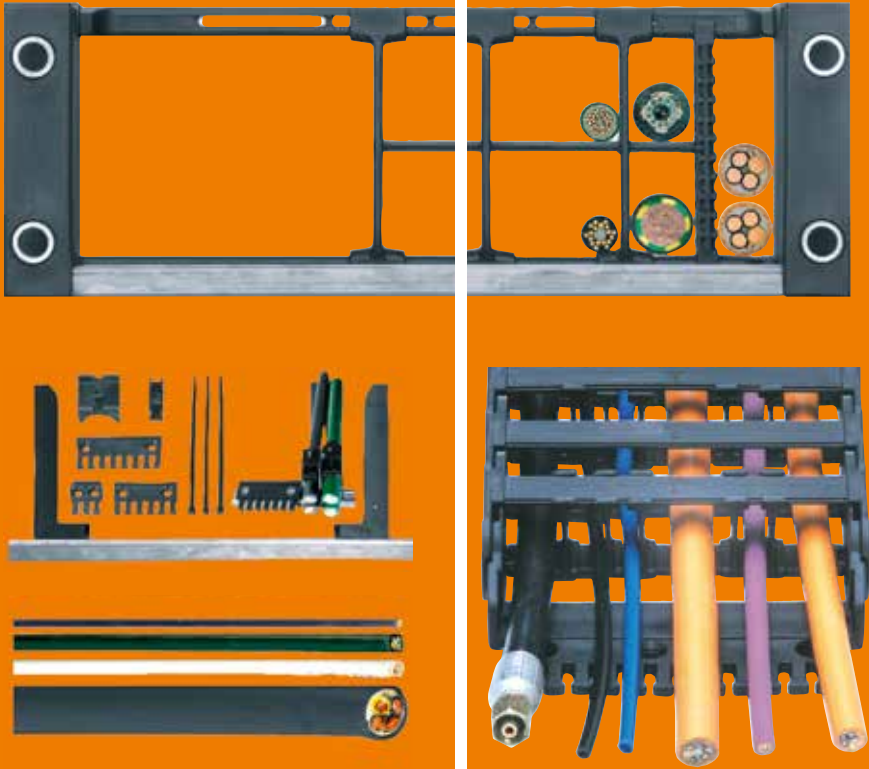
24 hrs

Single components
For example:
One e-chain® link, 6 m of e-chain®,
3 strain-relief elements, etc.



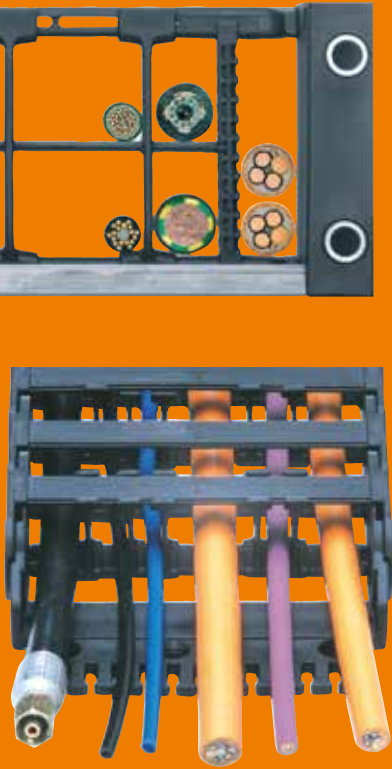
24-48 hrs

Customised e-chainsystems®
For example:
11.46 m of e-chains® with interior separators, mounting brackets and strain relief elements according to your specifications. Also with loose accessories: chainflex® cables, guide troughs, mounting brackets and strain reliefs



3-5 business days

Harnessed systems
For example:
readychain® "basic"
Simple, harnessed e-chainsystems® including installed cables with out plug connections, labelled and tail lengths to your specifications



10 business days

Complex pre-fabricated systems
For example:
readychain® "premium"
Complex customised e-chainsystem® including cables as well as plug connections, mounting brackets, tail-lengths and other components to your specifications



myigus space online



igus® Newsletter



igus® - close to the customer since 1964

From a garage to the global market with tribopolymers

What began in 1964 with a single injection moulding machine in a garage in Cologne has within half a century become a global enterprise. It all started more than 50 years ago when Günter Blase, who established the company, had an idea about the potential of polymer materials. A mere one year after the company was established, an injection moulding machine about the size of a sewing machine was used to make the very first products. In 1971, igus® delivered the first energy chain®. The company's own design engineering team has been developing the range of plastic e-chains® since 1983. In accordance with the igus® slogan "Moving energy made easy", the company configures, produces and assembles the appropriate energy chain system® - the "umbilical cord" of all modern machines - in line with the wishes of the customer. In the course of its history, igus® gradually grew to become a systems supplier. In 1989, the company developed the CF1, which was its own first chainflex® cable specially designed for use in energy chains®.

Today, the 3,180 employees come up with new ideas daily, make high-quality products, ensure streamlined processes and delivery times and, above all, stay close to the customer. On average, igus® dispatches around 5,500 consignments per day. In order to ensure speedy and individual delivery, the customers receive exactly the product they need for their application from 14 storage and assembly centres worldwide: as a single component or as a complete system, also installed or assembled on site upon request.

products with variants	
staff	
sales	
subsidiaries	



The flexible igus[®] factory

Investments in better technology and faster delivery times

Nearly 200,000 customers worldwide trust "plastics for longer life[®]" - manufacturing products at low-cost, while also ensuring quality. Plastics are becoming increasingly affordable and technical benefits continue to grow. We have been developing, making and selling our products according to this principle for years. In view of the potential of plastics technology, we offer a wide and varied range of Tribo components. Wear resistant parts as Catalogue items are to be on stock, to allow us to complete customer requests within hours and ship. igus[®] is continuing its growth trend and is focusing more than ever on sophisticated yet simpler solutions for all applications and budgets.



Material preparation



Injection moulding



Warehouse



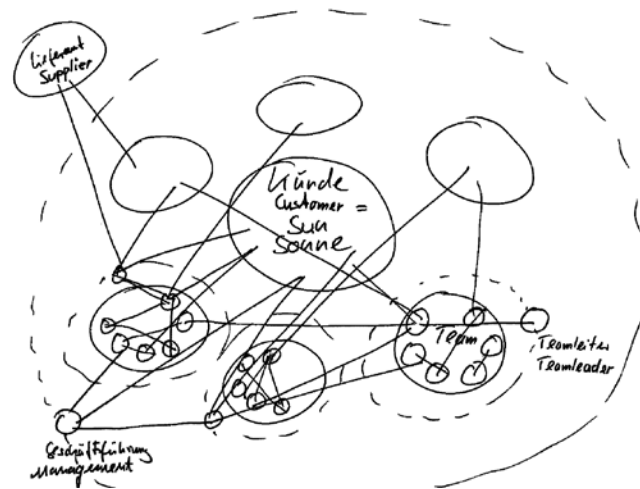
Assembly factory



Toolmaking



Open offices



"For us, customers have the same significance as the sun to life on earth. The sun gives light, warmth and energy; our customers give us ideas, work and money."



QuickRobot

Online tool - reduce process costs

igus® QuickRobot - robot energy supply configured online in an instant

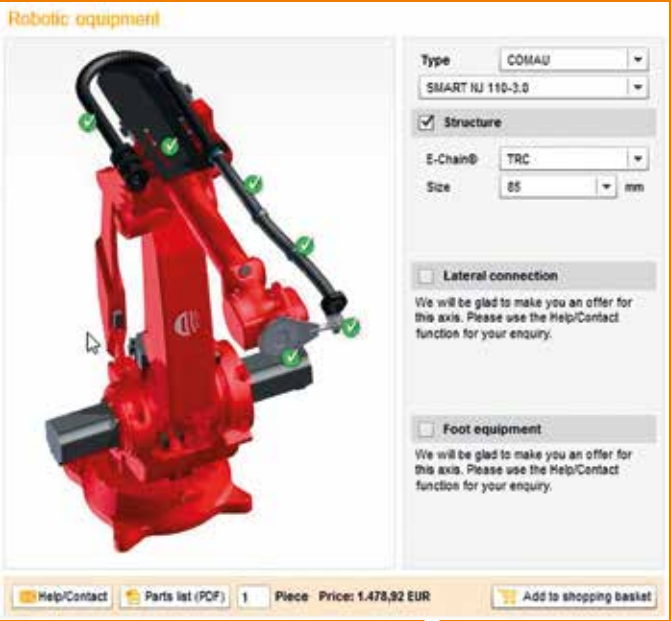
igus® is expanding its range of intuitive online tools for the selection, configuration and ordering of energy supply systems. "QuickRobot" makes it possible to configure the complete system for 79 types of robots in an instant. The configuration via the QuickRobot goes hand in hand with an integrated ordering system. In this way the custom product package can be created and ordered very quickly. You immediately receive parts lists as PDF, options for each axis can be conveniently ordered with one article number. You can also choose other optional items. No matter which equipment option is selected, the order is always clear and easy to understand.



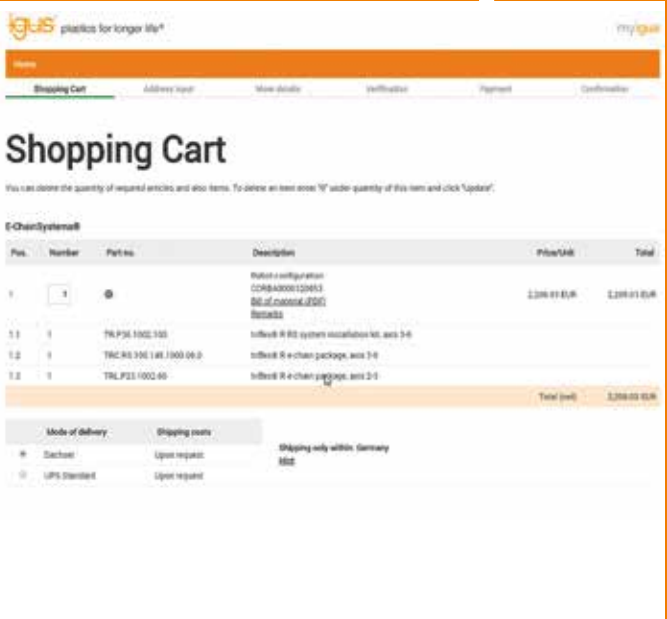
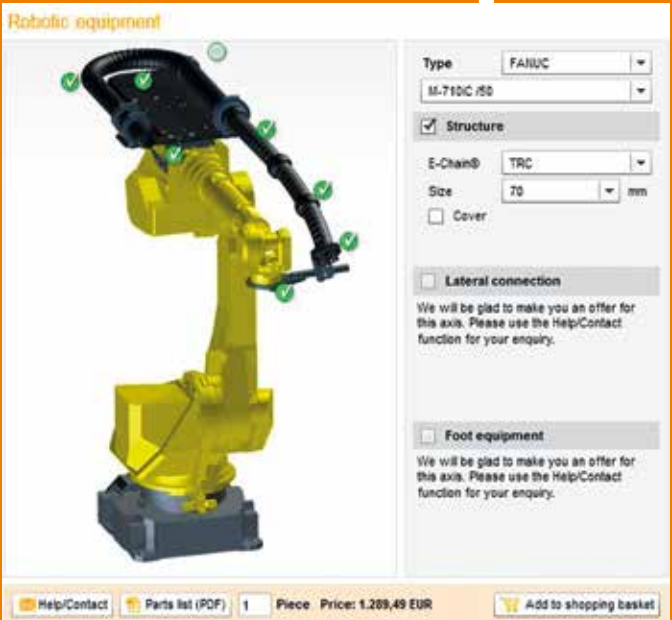
User friendly online tool offers
around 2,000 component selection
options for energy supply
systems in the robotics sector



Selection of robot types according to
manufacturer and the required e-chain®
sizes according to diameter. Other op-
tional parts can be selected. Equipment
option for each axis can be convenient-
ly ordered with one article number. The
entire robot can be equipped with just
three article numbers.



Thanks to the selection tool
for robot equipment, the
complete system including
cable guide systems can be
specified for the available ro-
bot types. One can either se-
lect full system or system for
an individual axis.



Creating parts lists as PDF, options for
each axis can be conveniently ordered
with one article number. Query or order-
ing option

KR 120 R2500 pro

Configuration example

Axis 3-6

with igus® e-chain® TRC.100

Installation package for retraction system on the robot - TR.P36.1002.100			
Item	Part No.	Specification	Quantity
❶	TR.907.667.140	Clamp, axis 6, 140 mm	1
❷	TR.100.21.01.30	Mounting bracket for axis 6, for attachment on clamp, strain relief with cable tieswraps	1
❸	TR.907.595	The RS system alignment device allows the adjustment of the installation position by ± 250 mm	1
❹	TR.RS.100.L	Retraction system, fixed end left, without e-chain® and fibre-rod module	1

e-chains® pack for retraction system - TRC.RS.100.145.1000.09.0			
Item	Part No.	Specification	Quantity
❺	TRC.100.145.0	e-chain® TRC	61
❻	TR.100.10	Protector for e-chains® TRC, TRE, TRL. Ø-Index 100, with screw connection	4
❼	TRC.F.100.0900.1.0	Fibre rod module, complete set	1

Axis 2

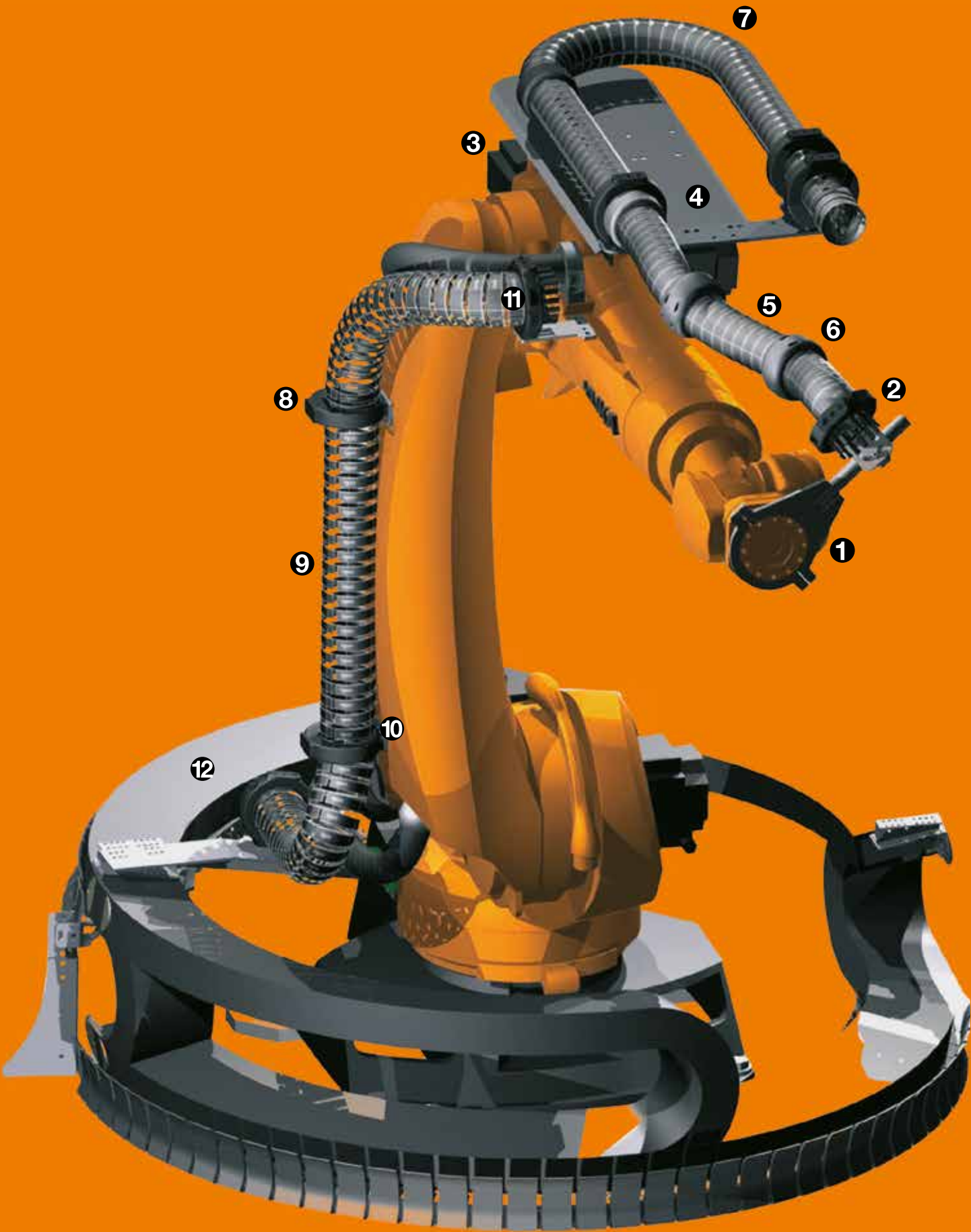
with igus® e-chain® TRL.60

e-chain® pack for axis 2 - TRL.P23.1002.60			
Item	Part No.	Specification	Quantity
❸	TR.60.02	Mounting bracket without strain relief	2
❹	TRL.60.087.0	e-chain® TRL	123
❺	TR.909.011	Adapter console axis 2	2
❻	TR.908.080	Adapter console axis 3	1
❼	TR.60.01	Mounting bracket with strain relief	2

You can find the right equipment here also for axes 1 and 7 of your robot system.
Please contact us.

KUKA

robot system - 3D-model



R-2000iB/1 25L

Configuration example

Axis 3-6

with igus® e-chain® TRC.70

Installation package for retraction system on the robot - TR.P36.2001.70			
Item	Part No.	Specification	Quantity
❶	TR.907.992	Clamp, axis 6, with groove, 160/165 mm	1
❷	TR.70.21.01.30	Mounting bracket for axis 6, for attachment on clamp, strain relief with cable tieswraps	1
❸	TR.907.270	Mounting bracket axis 3	1
❹	TR.RS.70.R	Retraction system, fixed end right, without e-chain® and fibre-rod module	1

e-chains® pack for retraction system - TRC.RS.70.110.1750.09.0			
Item	Part No.	Specification	Quantity
❺	TRC.70.110.0	e-chain® TRC	105
❻	TR.70.10	Protector for e-chains® TRC, TRE, TRL. Ø-Index 70, with screw connection	6
❼	TRC.F.70.0900.1.0	Fibre rod module, complete set	1

Axis 2

with igus® e-chain® TRL.100

e-chain® pack for axis 2 - TRL.P23.2001.100			
Item	Part No.	Specification	Quantity
❸	TR.100.02	Mounting bracket without strain relief	2
❹	TRL.100.145.0	e-chain® TRL	81
❺	TR.907.260	Adapter console axis 2	2
❻	TR.100.01.M8	Mounting bracket with strain relief, internal thread M8	2

You can find the right parts here also for axes 1 and 7 of your robot system.
Please contact us.

FANUC

robot system - 3D-model



IRB 6640-xxx / 2.55

Configuration example

Axis 3-6

with igus® e-chain® TRC.70

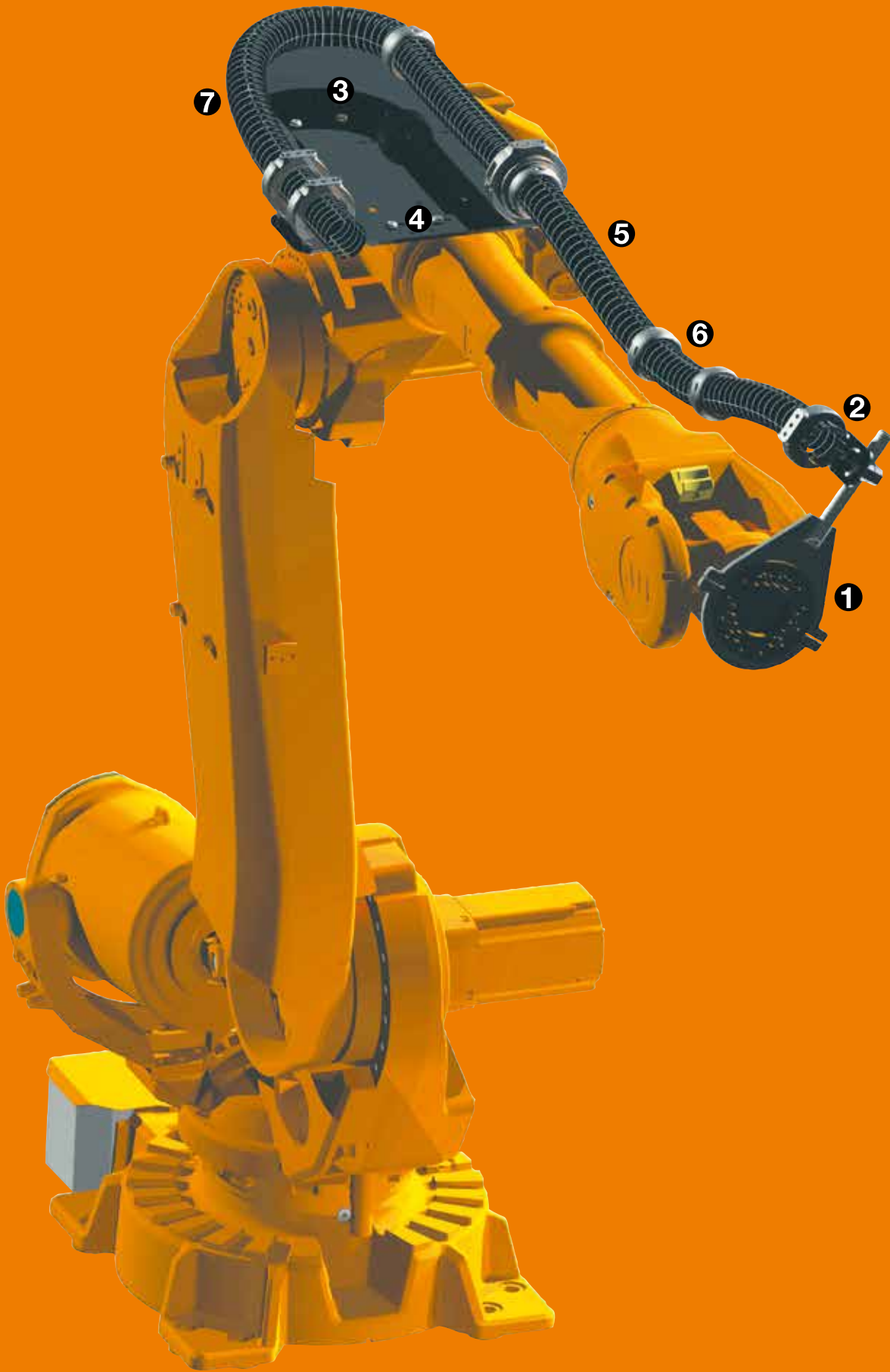
Installation package for retraction system on the robot - TR.P36.3001.70			
Item	Part No.	Specification	Quantity
❶	TR.907.667.200	Clamp, axis 6, 200 mm	1
❷	TR.85.21.01.30	Mounting bracket for axis 6, for attachment on clamp, strain relief with cable tiewraps	1
❸	TR.907.347	Adapter console, short for axis 3	1
❹	TR.RS.70.R	Retraction system, fixed end right, without e-chain® and fibre-rod module	1

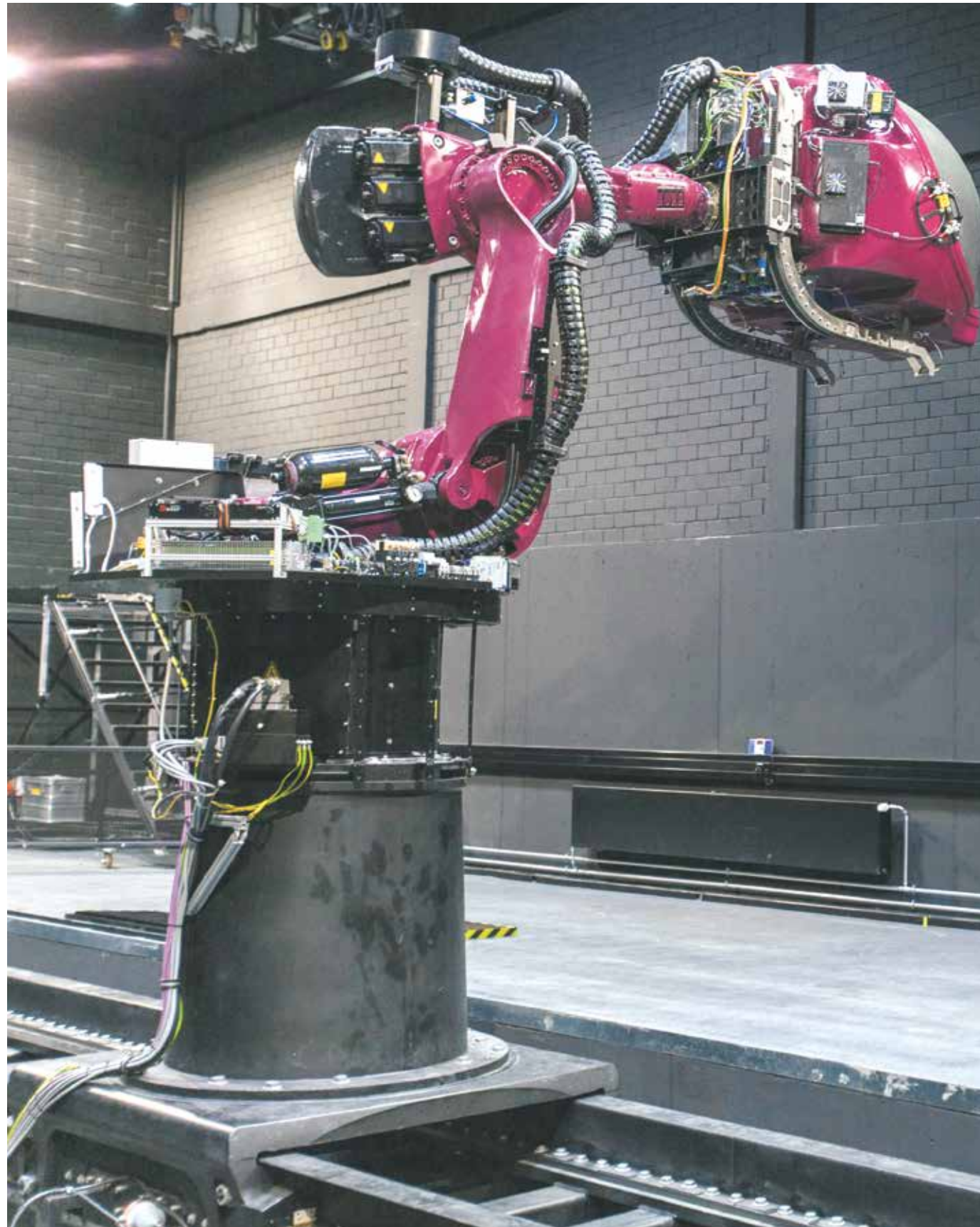
e-chains® pack for retraction system - TRC.RS.70.110.1250.09.0			
Item	Part No.	Specification	Quantity
❺	TRC.70.110.0	e-chain® TRC	85
❻	TR.70.10	Protector for e-chains® TRC, TRE, TRL. Ø-Index 70, with screw connection	5
❼	TRC.F.70.0900.1.0	Fibre rod module, complete set	1

You can find the right parts here also for axes 1, 2 and 7 of your robot system.
Please contact us.

ABB

robot system - 3D-model





triflex® R in a motion simulator. Depending on the test, the simulator must perform a cabin rotation of up to 360° and is equipped with additional data and supply cables. A triflex® RSP retraction system is installed here.



triflex® R in storage and retrieval system



Flexible production - plant for the production of plastic vehicle tanks. In order to provide the end customer in the automotive industry with maximum flexibility, the production facilities are equipped completely with robots. The igus® RSP systems prevent loop formation of the e-chains® due to the multi-axis movements of the robot.



Reliable energy supply even outdoors



triflex® R installed on a robot arm



Use in harsh, dirty environments



triflex® R at axis 1-6, E4.1 at axis 7 of the robot



Close routing on the robot arm without loop formation



triflex® TRL - lightweight, for quick cable removal



Process security with the igus® installation service



triflex® R e-chains® for multi-axis and linear application with E2 mini e-chain® on the tool unit



E4 RBR- application in a telescope - cold temperatures and snow - failsafe



Laser measuring telescope with triflex® R. Rotary motion in both directions $\leq 310^\circ$



An igus® twisterband guides the energy of the 5-axis cutting heat in this wood working machine, safe and cost-effective



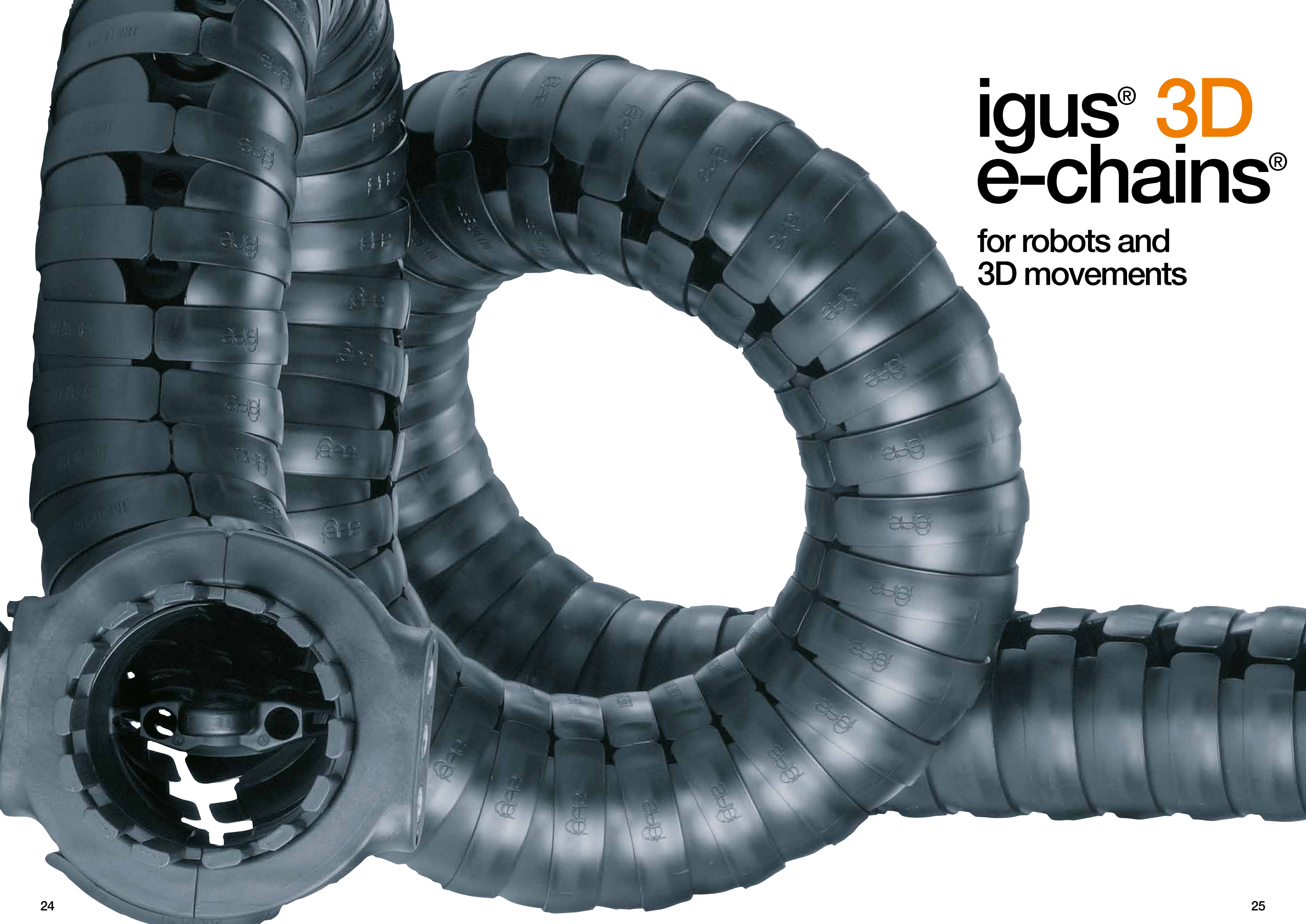
System E4 "RBR" supplies harbour crane with energy - rotary movements



triflex® R in a magnesium die-casting industry (heat, dirt, oil, metal chips, dust) - failsafe



E2 mini, Series B15 - The motor spindle has a swivelling range of approx. 210°



igus[®] 3D e-chains[®]

for robots and
3D movements

For multi-axis movements and robots - triflex® R

triflex® R (R for "round") is the third generation of multi-axis igus® e-chains®. The key design characteristics of igus® triflex® R have made this product very successful in the robot industry.

- Defined torsion stop-dog on each e-chain® link
- Defined minimum bend radius
- High tensile strength ball-and-socket joint
- Compact retraction system options to prevent loop formation
- Fibre-rod option for partial directional control and reinforcement
- No extra support elements required e.g. steel cables, spring suspensions etc.
- Wide range of accessories

triflex® R available in 5 versions from stock

TRC closed design with smooth and robust exterior

TRE "easy" design, easy to fill from outside

TRCF closed design with snap lock mechanism

TRL very lightweight, with "easy"-design

TRLF light version with snap lock mechanism

Typical industries and applications

- The first choice for multi-axis robots
- Machine tools
- Handling machines - 6-axis
- Conveyor systems
- Packaging machines
- General mechanical engineering, etc.

 Assembly video available online at
▶ www.igus.eu/triflexR_assembly

 Available from stock. Ready for delivery in 24-48h*

*The delivery times indicated correspond to the average time until the ordered goods are dispatched.



The defined torsion stop ensures an even distribution of the torsional load across the entire cable length



A tough, bend radius stop-dog actively prevents cables and hoses from kinking



Interior separation: two or three chamber system for a reliable cable guide



Openable - series TRCF and TRLF have snap lock mechanism for quick filling



Tensile strength is absorbed directly by the e-chain® - no additional supports are necessary



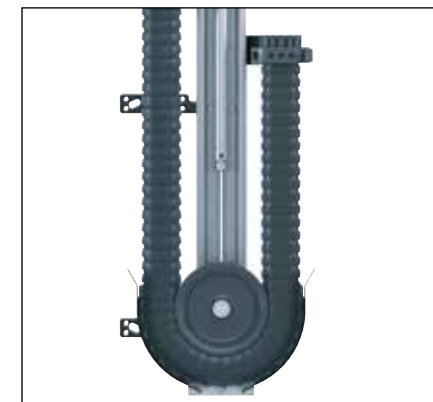
Standard and light mounting brackets available with or without integrated strain relief. Some versions available in ESD material, from stock



Mounting brackets options with gliding feed-through and swivel bearing. Bearing with a maintenance-free igubal® ball and socket joint



Various heavy duty and compact connections and quick-change units are available for your application



4 retraction system options available to prevent formation of loops in the robot's working area



Series TRC - electrically conducting ESD/ATEX versions available



UL94-V2 classification



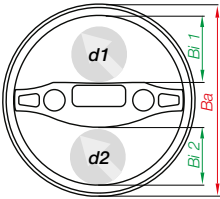
iF product design award
2004 for igus® series TRC
2007 for igus® series TRL
2013 for igus® series TRLF

Selection table

Series	Inner height		≤ ø cable		Outer width	Bend radius	Pitch	Links	Page
	Bi1 [mm]	Bi2 [mm]	d1 [mm]	d2 [mm]	Ba [mm]	R [mm]	[mm]	per m	



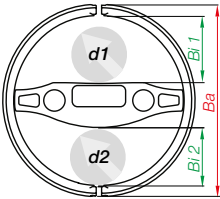
Series TRC - closed design
chip protection,
smooth exterior



TRC.30	12	10	10	8	34.5	50	11.3	89	32
TRC.40	15	13	13	11	43	58	13.9	72	32
TRC.50	18.8	16.2	16.5	14	54	80	17.4	58	32
TRC.60	22.5	19.5	20.5	17.5	65	87	20.4	49	32
TRC.70	28	24	26	22	81	110	25.6	39	32
TRC.85	33	28	31	26	94.5	135	30.6	33	32
TRC.100	37.5	32.5	35.5	30.5	108	145	34.5	29	32
TRC.125 ²⁾	43.3	43.3	41	41	135	182	44.6	23	32



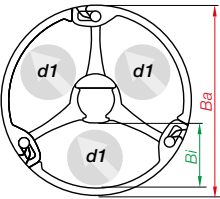
Series TRE - "easy" design
very easy to fill,
cables are simply pushed in



TRE.30	12	10	10 ¹⁾	8 ¹⁾	34.5	50	11.3	89	34
TRE.40	15	13	13 ¹⁾	11 ¹⁾	43	58	13.9	72	34
TRE.50	18.8	16.2	16.5 ¹⁾	14 ¹⁾	54	80	17.4	58	34
TRE.60	22.5	19.5	20.5 ¹⁾	17.5 ¹⁾	65	87	20.4	49	34
TRE.70	28	24	26 ¹⁾	22 ¹⁾	81	110	25.6	39	34
TRE.85	33	28	31 ¹⁾	26 ¹⁾	94.5	135	30.6	33	34
TRE.100	37.5	32.5	35.5 ¹⁾	30.5 ¹⁾	108	145	34.5	29	34
TRE.125 ²⁾	43.3	43.3	41 ¹⁾	41 ¹⁾	135	182	44.6	23	34



Series TRCF - closed design with snap lock mechanism
chip protection,
smooth exterior



TRCF.65	22.3	–	20	–	70.2	100	23.1	44	36
TRCF.85	30	–	28	–	94.5	135	30.6	33	36
TRCF.85 ⁴⁾	30	–	28	–	94.5	240	30.6	33	36
TRCF.100	34.3	–	32	–	108	145	34.5	29	36

1) For quick and easy fitting or removal of cables using the "easy" design, we recommend a maximum cable diameter of 70% of the specified value

2) Max. cable diameter Ø 41 mm. Max. cable diameter changes to Ø 36 mm, if lengthening or shortening an already populated triflex® R

3) TRL 30 with 2-chamber system

4) Special size TRCF.85.240.0 with 240 degree bend radius and a range of accessories



Available from stock. Ready for delivery in 24-48h*

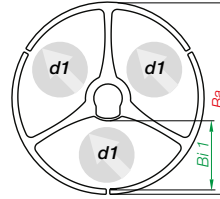
*The delivery times indicated correspond to the average time until the ordered goods are dispatched.

Selection table

Series	Inner height		≤ ø cable		Outer width	Bend radius	Pitch	Links	Page
	Bi1 [mm]	Bi2 [mm]	d1 [mm]	d2 [mm]	Ba [mm]	R [mm]	[mm]	per m	



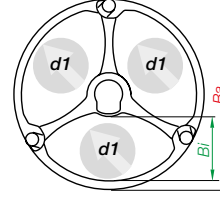
Series TRL - the "light" version of the "easy"-design
easy to fill and cost-effective



TRL.30 ³⁾	12.5	11	10 ¹⁾	8 ¹⁾	34.5	50	11.3	89	38
TRL.40	15	–	13 ¹⁾	–	45	58	13.9	72	38
TRL.60	23	–	20.5 ¹⁾	–	65	87	20.4	49	38
TRL.70	28	–	26 ¹⁾	–	81	110	25.6	39	38
TRL.100	38	–	35.5 ¹⁾	–	108	145	34.5	29	38



Series TRLF - light version with snap lock mechanism
lightweight and cost-effective e-chain®



TRLF.65	24.4	–	22	–	70.2	100	23.1	44	40
TRLF.85	32.8	–	30	–	94.5	135	30.6	33	40
TRLF.100	37.5	–	35.5	–	108	145	34.4	29	40
TRLF.125	46.8	–	44.5	–	135	182	44.1	23	40

triflex® R | Retraction system overview

Series	System	For triflex® R e-chains®	For ø Index [mm]	Page
	RSP - pneumatic retraction system	TRC·TRE·TRCF	60 - 125	66
	RS - modular retraction system	TRC·TRE	40 - 100	72
	RSE linear cost-effective retraction system, linear	TRC·TRE·TRCF	40 - 125	78
	RSE cost-effective retraction system, for small robots	TRC·TRE	40 - 50	84

Technical data

	Speed / acceleration	Upon request
	Material - permitted temperature °C, igumid G (TRLF/TRCF)	-40°C / +120°C
	Material - permitted temperature °C, igumid NB (TRC/TRE/TRL)	-40°C / +80°C
	Flammability class, igumid G (TRLF/TRCF)	VDE 0304 IIC UL94-HB
	Flammability class, igumid NB (TRC/TRE/TRL)	VDE 0304 IIC UL94-V2

Reduce installation times with easy-to-use disassembly tools



Easy-to-use disassembly tools for triflex® TRE (B version) and TRCF. Easy disassembling at any position of TRE B-series even when full.

More information
► www.igus.eu/triflex_B_disassemblytool

 Assembly video available online at
► www.igus.eu/triflexR_assembly

 Assembly instructions
► From page 98

For series	Part No.
TRE.B	Disassembly tool
TRE.40.B	MAT0050175
TRE.50.B	MAT0051190
TRE.60.B / TRE.70.B	MAT0051135
TRE.85.B	MAT0050170
TRE.100.B	MAT0050172

For series	Part No.
TRE.B	Disassembly tool
TRCF.65	MAT0051135
TRCF.85	MAT0050170
TRCF.100	MAT0050172

Applications



igus® triflex® R TRLF - light version, easily openable by hand or with a screwdriver



igus® triflex® R TRCF - closed 3D e-tube, openable with a screwdriver



triflex® RS for a lean e-chain® guide. Integrated spring rods generate the directed pretension so that loops do not form in the working area



Pneumatic retraction system triflex® RSP - prevents loop formation on the robot



triflex® TR.RSE.40.L or R, cost-effective and lightweight retraction system with guide roller for small robots



TR.RSE linear retraction system for triflex® R, sizes 40-125

triflex® R TRC

TRC - enclosed, chip-repelling design

High tensile strength thanks to special ball-and-socket design

Defined torsion stop, allows free movement in multiple directions but still protects the cables

Impact-resistant, abrasion resistant and dirt resistant

Easy assembly and disassembly

High strength - thanks to external stop-dogs

Small bend radii and short pitch

Easy attachment and special accessories for the robot or machine

Closed and chip-resistant - TRC

- Secure, closed and chip-resistant energy supply for multi-axis movements
- Smooth but robust outer contours
- High torsional stability
- Easy to lengthen and shorten

Typical industries and applications

- Robotics and automation
- Multi-axis machine tools
- Wet and cold cells
- Painting applications and ESD
- Sand and dust exposure

 Electrically conductive ESD/ATEX versions several series available from stock

 **iF product design award**
2004 igus® series TRC

Product range

Robotic applications, closed, chip-resistant



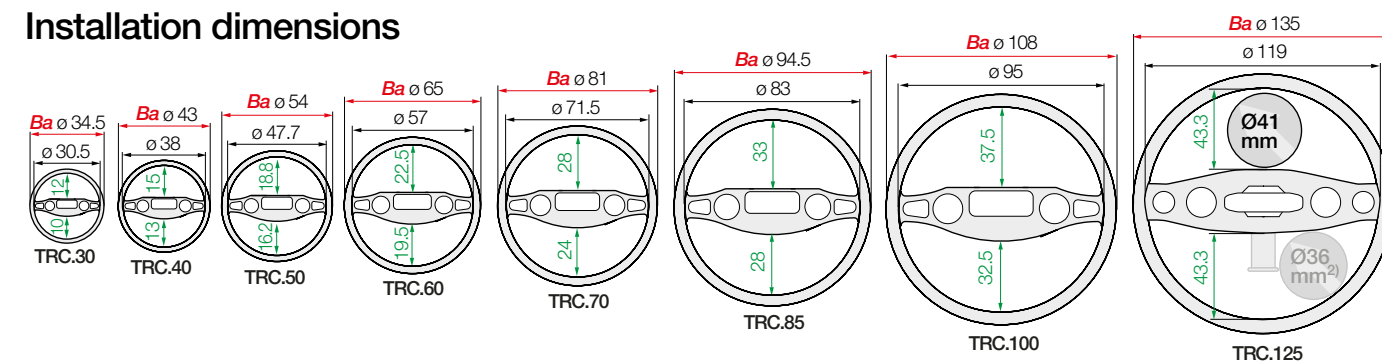
e-tubes | Series TRC | Totally enclosed, non-openable

Part No.	Bi1	Bi2	Ba	R	d1	d2	Pitch	Links per m	TRC
e-tubes	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]		[kg/m]
TRC. 30. 050 .0	12	10	34.5	050	10	8	11.3	89	≈ 0.27
TRC. 40. 058 .0 ¹⁾	15	13	43	058	13	11	13.9	72	≈ 0.37
TRC. 50. 080 .0	18.8	16.2	54	080	16.5	14	17.4	58	≈ 0.59
TRC. 60. 087 .0 ¹⁾	22.5	19.5	65	087	20.5	17.5	20.4	49	≈ 0.85
TRC. 70. 110 .0 ¹⁾	28	24	81	110	26	22	25.6	39	≈ 1.32
TRC. 85. 135 .0	33	28	94.5	135	31	26	30.6	33	≈ 1.75
TRC. 100. 145 .0	37.5	32.5	108	145	35.5	30.5	34.5	29	≈ 2.38
TRC. 125. 182 .0	43.3	43.3	135	182	41	41 ²⁾	44.6	23	≈ 4.70

1)  Available as ESD-Version from stock

2) TRE 125 max. cable diameter Ø 41 mm. Max. cable diameter changes to Ø 36 mm when an already populated e-chain® needs to be shortened or lengthened

Installation dimensions



ESD/ATEX e-chains® - many sizes from stock

- ESD material tested with over 10 million cycles for the toughest requirements
- Standardised product - igumid ESD with PTB certificate
- Short delivery times including mounting brackets and interior separation; 24hrs, from stock

More information ► www.igus.eu/esd



 Available from stock. Ready for delivery in 24-48h*

*The delivery times indicated correspond to the average time until the ordered goods are dispatched.

More information ► www.igus.eu/TRC



 3D CAD, lifetime calculation, configurators and more ► www.igus.eu/triflexR

triflex® R TRE

TRE - "easy" design - simply press cables in

High tensile strength thanks to special ball-and-socket design

Defined torsion stop, allows free movement in multiple directions but still protects the cables

Easy opening mechanism for fast filling with cables and hoses

Simple tool for fast disassembly of the triflex® B versions

High strength - thanks to external stop-dogs

Small bend radii and short pitch

Easy attachment and special accessories for the robot or machine

Easy to fill - simply press cables in - TRE

- Easy to fill energy supply for multi-axis movements
- High torsional stability
- Easy to shorten and lengthen.
- **B version** - 4x increase in radial stability, allows larger torsion forces
- **C version and TRE.125** - fast assembly due to pin connection and spherical igubal® joint allowing 50% higher tensile forces

Typical industries and applications

- Robotics and automation
- Spot welding and pick and place applications
- When fast cable replacement is needed



Series TRE - electrically conductive ESD/ATEX version upon request



Save time - easy disassembly tool available for triflex® R



TRE - very easy to fill, cables are simply pushed in



Available from stock. Ready for delivery in 24-48h*

*The delivery times indicated correspond to the average time until the ordered goods are dispatched.

More information ► www.igus.eu/TRE



Product range

Robotic applications, easy filling



e-chains® | Series TRE | "easy" design - simply press cables in

Part No.	Bi1	Bi2	Ba	R	d1 ²⁾	d2 ²⁾	Pitch	Links per m	TRE
e-chains®	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]		[kg/m]
TRE.30. 050.0	12	10	34.5	050	10	8	11.3	89	≈ 0.26
TRE.40. 058.0.B	15	13	43	058	13	11	13.9	72	≈ 0.36
TRE.50. 080.0.B	18.8	16.2	54	080	16.5	14	17.4	58	≈ 0.56
TRE.60. 087.0.B	22.5	19.5	65	087	20.5	17.5	20.4	49	≈ 0.83
TRE.70. 110.0.B	28	24	81	110	26	22	25.6	39	≈ 1.30
TRE.85. 135.0.B	33	28	94.5	135	31	26	30.6	33	≈ 1.67
TRE.100. 145.0.B / C ¹⁾	37.5	32.5	108	145	35.5	30.5	34.5	29	≈ 2.35
TRE.125. 182.0	43.3	43.3	135	182	41	41 ³⁾	44.6	23	≈ 4.40

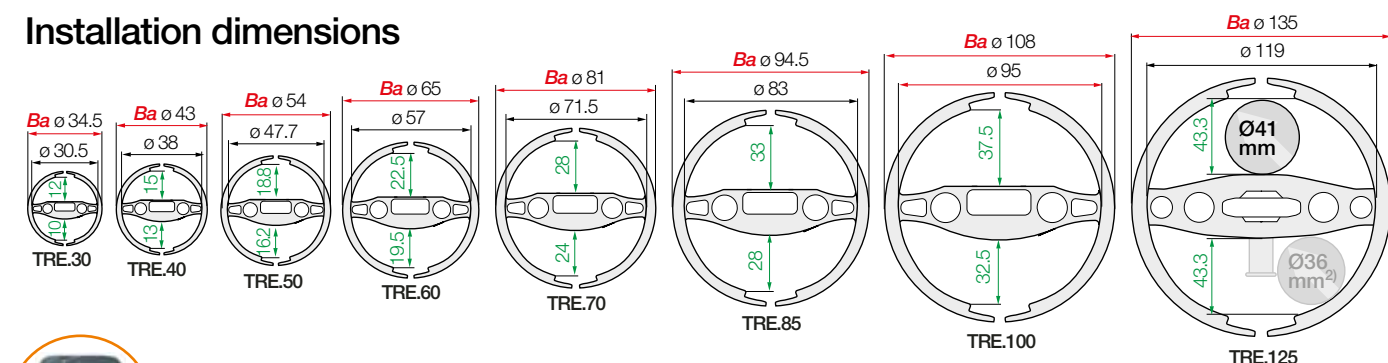
B-Series = 4-x higher torsion forces C-Series = quick assembly, 50% higher forces

1) Available as C-Version Part No. TRE.100.145.0.C

2) For quick and easy fitting or removal of cables using the "easy" design, we recommend a maximum cable diameter of 70% of the specified value

3) TRE 125: max. cable diameter Ø 41 mm. Max. cable diameter changes to Ø 36 mm when an already populated e-chain® needs to be shortened or lengthened TRE.LOCK

Installation dimensions



TRE.LOCK clips

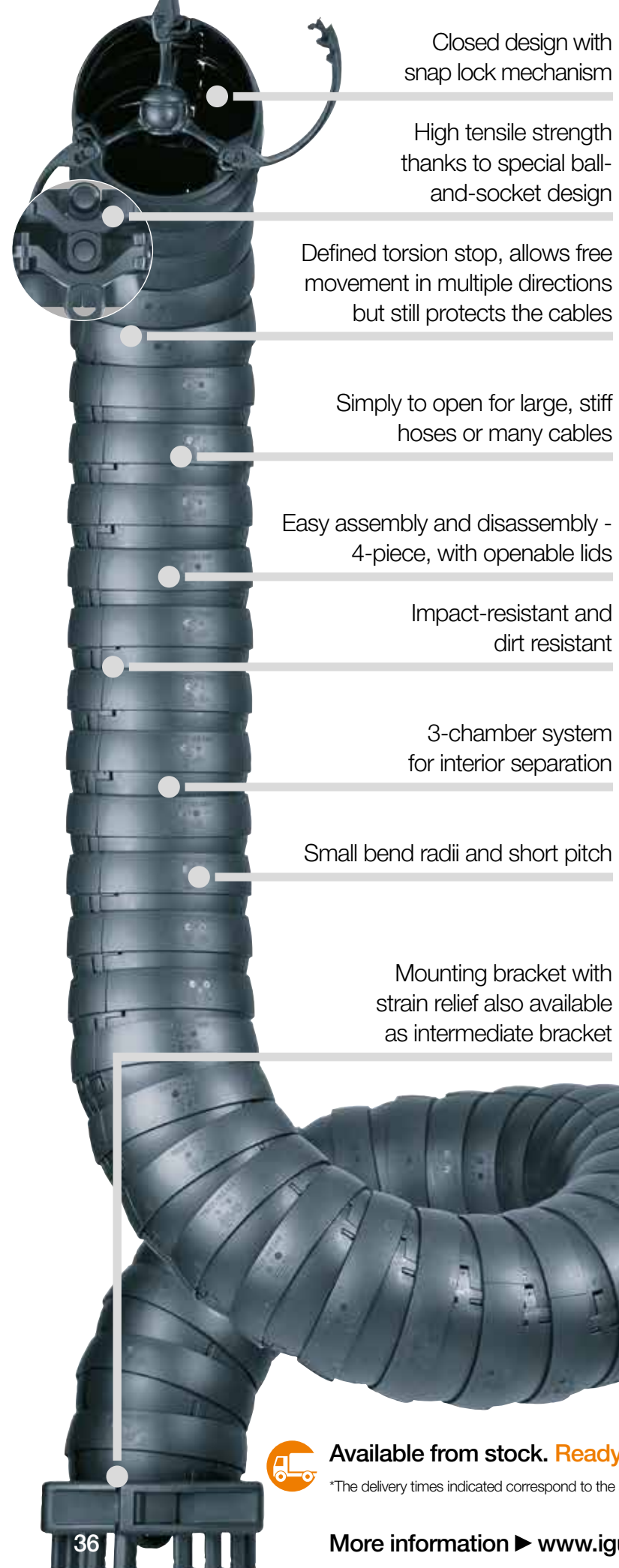
Clips for a secure fit in the mounting bracket. Supplied automatically with every mounting bracket. Please use the Part No. on the right for reordering.

Part No.	Size	Part No.	Size
as a single part	[mm]	as a single part	[mm]
TRE.30/40.LOCK	30/40	TRE.70.LOCK	70/85
TRE.50.LOCK	50	TRE.100.LOCK	100
TRE.60.LOCK	60	TRE.125.LOCK	125



3D CAD, lifetime calculation, configurators and more ► www.igus.eu/triflexR

triflex® R TRCF



Closed design with snap lock mechanism

High tensile strength thanks to special ball-and-socket design

Defined torsion stop, allows free movement in multiple directions but still protects the cables

Simply to open for large, stiff hoses or many cables

Easy assembly and disassembly - 4-piece, with openable lids

Impact-resistant and dirt resistant

3-chamber system for interior separation

Small bend radii and short pitch

Mounting bracket with strain relief also available as intermediate bracket

Enclosed design with snap lock mechanism - TRCF

- Snap lock mechanism for fast opening to insert large cables or hoses
- Snap lock mechanism openable with a screwdriver
- Defined minimum bend radius and torsion stop-dog for optimum cable protection
- Enclosed version, for use with dirt and chip exposure
- 3 chamber design for ideal cable distribution and separation
- Can be easily lengthened and shortened

Typical industries and applications

- Robotics and automation
- Painting applications
- Large hydraulic hoses
- Screw and rivet feeds
- Tool changer applications
- Robot for laser welding
- Robot for screw and rivet applications



Flip open, insert cable, and close snap lock mechanism - then ready to run!

Save time - easy disassembly tool available for triflex® R



Available from stock. Ready for delivery in 24-48h*

*The delivery times indicated correspond to the average time until the ordered goods are dispatched.

More information ► www.igus.eu/TRCF

Product range

Closed design, dirt resistant, quick filling

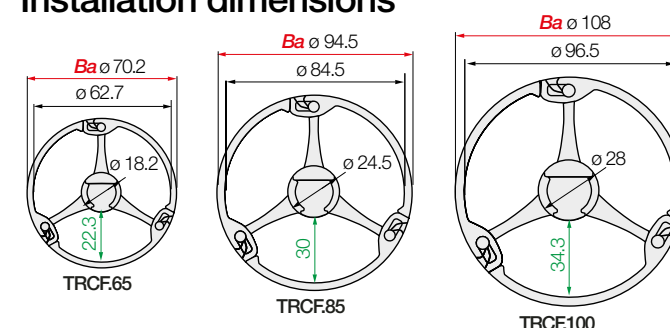


e-tubes | Series TRCF | Fully enclosed design, with snap lock mechanism

Part No.	Bi1	Ba	R	d1	Pitch	Links per m	TRCF
e-tubes	[mm]	[mm]	[mm]	[mm]	[mm]		[kg/m]
TRCF.65 100 .0	22.3	70.2	100	20	23.1	44	≈ 1.10
TRCF.85 135 .0	30	94.5	135	28	30.6	33	≈ 2.10
TRCF.85 240 .0 ¹⁾	30	94.5	240	28	30.6	33	≈ 2.10
TRCF.100.145 .0	34.3	108	145	32	34.5	29	≈ 2.70

1) Special size Part No. TRCF.85.240.0 with 240 degree bend radius and a range of accessories

Installation dimensions



Snap lock mechanism for fast opening, igus® video online
► www.igus.eu/TRLFlip

Special size TRCF.85.240.0 with 240 degree bend radius and a special range of accessories

- For secure guidance of laser light cables on robots
 - The large bend radius (R 240 mm) increases the service life of the laser light cable by preventing kinking
- More information ► www.igus.eu/TRCF



triflex® R TRL

TRL - light and cost-effective with "easy" design

High tensile strength thanks to special ball-and-socket design

Defined torsion stop, allows free movement in multiple directions but still protects the cables

Easy filling and swapping of pre-harnessed cables

Easy assembly and disassembly

Extremely lightweight due to one-piece design

Small bend radii and short pitch

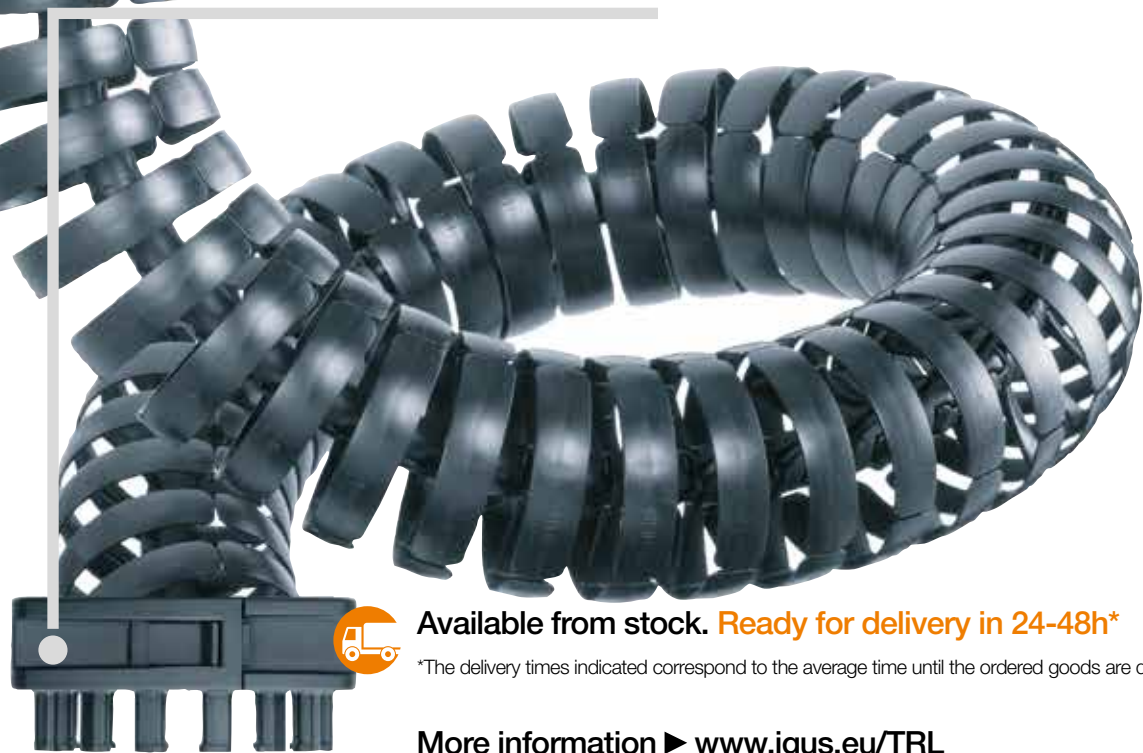
Mounting bracket with strain relief also available as intermediate bracket

Lightweight and cost-effective - TRL

- Very easy to fill
- Multi-axis e-chain® for simple applications
- Easy to lengthen and shorten

Typical industries and applications

- Robot axes 1-3
- Non-robotic applications
- Bundling cables for operator controls
- Filament feeds on 3D printers
- Office applications



Available from stock. Ready for delivery in 24-48h*
*The delivery times indicated correspond to the average time until the ordered goods are dispatched.

Product range

Robotic applications, light and cost-effective

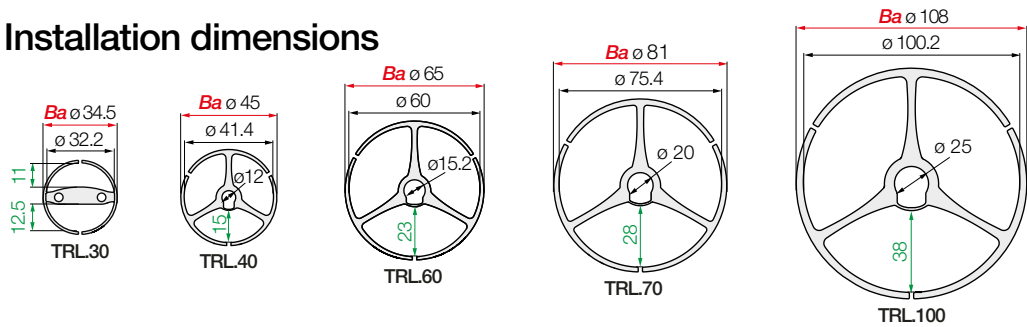


e-chains® | TRL series | Light version with "easy" design - simply press cables in

Part No.	Bi1	Bi2	Ba	R	d1 ²⁾	d2 ²⁾	Pitch	Links per m	TRL
e-chains®	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]		[kg/m]
TRL.30. 050 .0 ¹⁾	12.5	11	34.5	050	10	8	11.3	89	≈ 0.26
TRL.40. 058 .0	15	—	45	058	13	—	13.9	72	≈ 0.29
TRL.60. 087 .0	23	—	65	087	20.5	—	20.4	49	≈ 0.49
TRL.70. 110 .0	28	—	81	110	26	—	25.6	39	≈ 0.82
TRL.100.145 .0	38	—	108	145	35.5	—	34.5	29	≈ 1.42

1) Only available with 2-chamber system
2) For quick and easy fitting or removal of cables using the "easy" design, we recommend a maximum cable diameter of 70% of the specified value

Installation dimensions



triflex® R TRLF

TRLF - light and cost-effective with snap lock mechanism

High tensile strength thanks to special ball-and-socket design

Defined torsion stop, allows free movement in multiple directions but still protects the cables

Simply to open for large, stiff hoses or many cables

Easy assembly and disassembly

3-chamber system for interior separation

Small bend radii and short pitch

Lightweight mounting bracket available with strain relief or as intermediate bracket

Lightweight, with snap lock mechanism - TRLF

- Snap lock mechanism for fast opening
- Openable by hand or with a screwdriver
- For large, stiff hoses or many cables
- Economical multi-axis e-chain® for less demanding applications
- Easy to lengthen and shorten

Typical industries and applications

- Painting hoses
- Rivet feeds
- Robot axes 1-3
- Non-robotic applications
- Special machine construction
- High-tech design

iF product design award
2013 igus® series TRLF



Flip open, insert cable, and close snap lock mechanism - then ready to run!

Product range

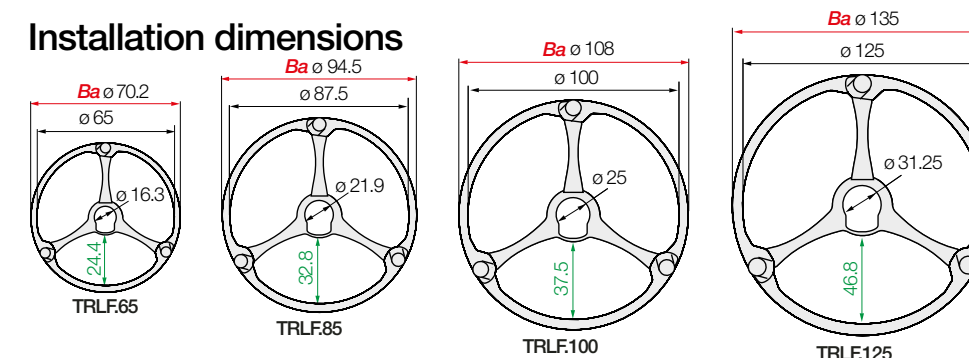
Quick filling with larger hoses and cables



e-chains® | Series TRLF | Light version with snap lock mechanism

Part No.	Bi1	Ba	R	d1	Pitch	Links per m	TRLF
e-chains®	[mm]	[mm]	[mm]	[mm]	[mm]		[kg/m]
TRLF. 65. 100 .0	24.4	70.2	100	22	23.1	44	≈ 0.79
TRLF. 85. 135 .0	32.8	94.5	135	30	30.6	33	≈ 1.45
TRLF. 100. 145 .0	37.5	108	145	35.5	34.5	29	≈ 1.90
TRLF. 125. 182 .0	46.8	135	182	44.5	44.1	23	≈ 4.13

Installation dimensions



Snap lock mechanism for fast opening, igus® video online
► www.igus.eu/TRLF



Available from stock. Ready for delivery in 24-48h*

*The delivery times indicated correspond to the average time until the ordered goods are dispatched.

More information ► www.igus.eu/TRLF

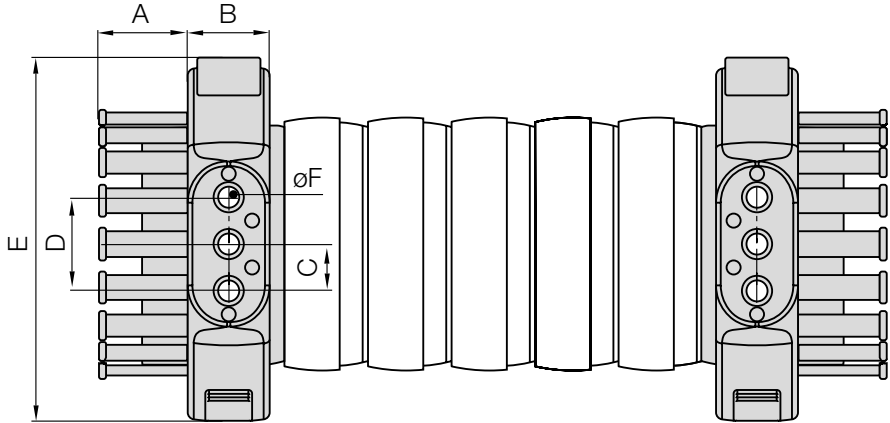
igus

igus 3D CAD, lifetime calculation, configurators and more ► www.igus.eu/triflexR

triflex® R accessories

Standard mounting brackets with strain relief

With integrated strain relief tie-wrap plates
TR.40.01 - TR.100.01



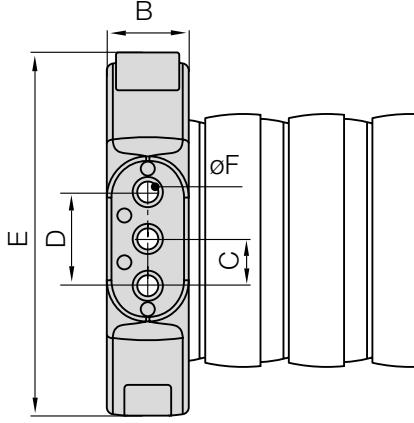


- Recommended for TRC/TRE/TRCF, also compatible with TRL/TRLF
- Standard fixation onto the robot or machine with strain relief

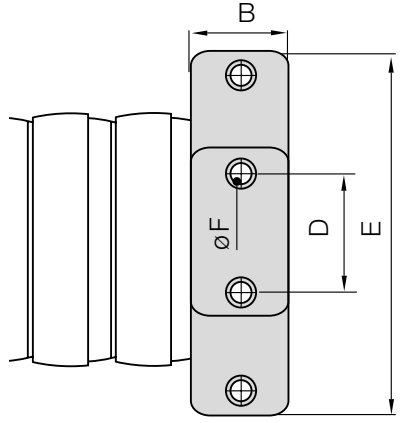
triflex® R accessories

Standard mounting brackets without strain relief

Without strain relief, only for
TR.40.02 - TR.100.02



Without strain relief, only for
TR.125.02





- Recommended for TRC/TRE/TRCF, also compatible with TRL/TRLF
- Standard fixation onto the machine/robot without strain relief
- Can also serve as intermediate bracket

Standard mounting brackets | With strain relief | For TRC·TRE·TRCF·TRL·TRLF



Ø	Part No.	A	B	C	D	E	F
Index	with strain relief	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
30.	Alternative: light mounting bracket	—	—	—	—	—	—
40.	TR.40.01.M6 ^{1) 2)}	17.8	21	13.5	27	84.5	6.5
50.	TR.50.01.M6 ¹⁾	21	21	13.5	27	84.5	6.5
60.	TR.60.01.M8 ^{1) 2)}	25	32	20	40	126	9
65.	TR.65.01.M8 ^{1) 5)}	25	32	20	40	126	9
70.	TR.70.01.M8 ^{1) 2)}	25	32	20	40	126	9
85.	TR.85.01.M8 ¹⁾	38	35	20	40	155	9
85. (R 240)	TR.85.240.01.M8 ^{1) 4)}	38	35	20	40	155	9
100.	TR.100.01.M8 ¹⁾	38	35	20	40	155	9
125.	Alternative: standard mounting bracket without strain relief	—	—	—	—	—	—

Strain reliefs are for use on the fixed end and/or moving end.

Standard: through holes in Ø F - 1) option: with threaded bushings, steel, M6/M8

2)  Available as ESD-Version from stock

4) Only for special size TRCF.85.240.0 with 240 degree bend radius 5) Available for delivery upon request. Please consult igus® for delivery time.

Standard mounting brackets | Without strain relief | For TRC·TRE·TRCF·TRL·TRLF

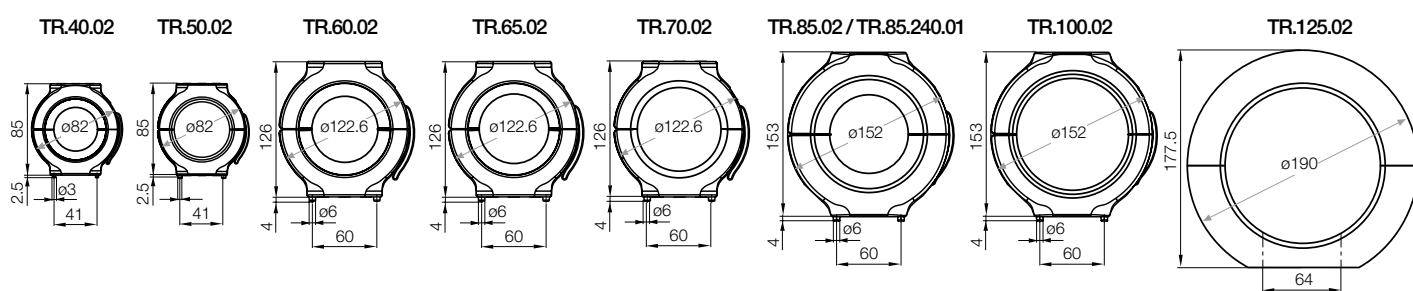
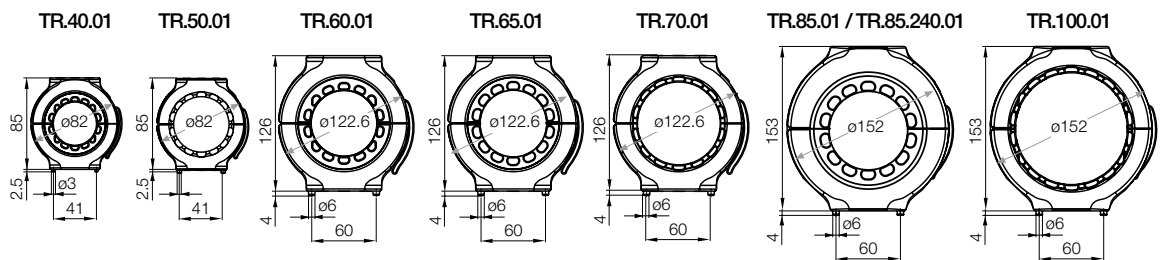


Ø	Part No. without strain relief	A	B	C	D	E	F
Index	or as intermediate bracket	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
30.	Alternative: light mounting bracket	—	—	—	—	—	—
40.	TR.40.02.M6 ¹⁾	—	21	13.5	27	84.5	6.5
50.	TR.50.02.M6 ¹⁾	—	21	13.5	27	84.5	6.5
60.	TR.60.02.M8 ¹⁾	—	32	20	40	126	9
65.	TR.65.02.M8 ¹⁾	—	32	20	40	126	9
70.	TR.70.02.M8 ¹⁾	—	32	20	40	126	9
85.	TR.85.02.M8 ¹⁾	—	35	20	40	155	9
85. (R 240)	TR.85.240.02.M8 ^{1) 4)}	—	35	20	40	155	9
100.	TR.100.02.M8 ¹⁾	—	35	20	40	155	9
125.	TR.125.02.M8 ¹⁾	—	40	—	64	190	9

Standard: through holes in Ø F - 1) option: with threaded bushings, steel, M6/M8

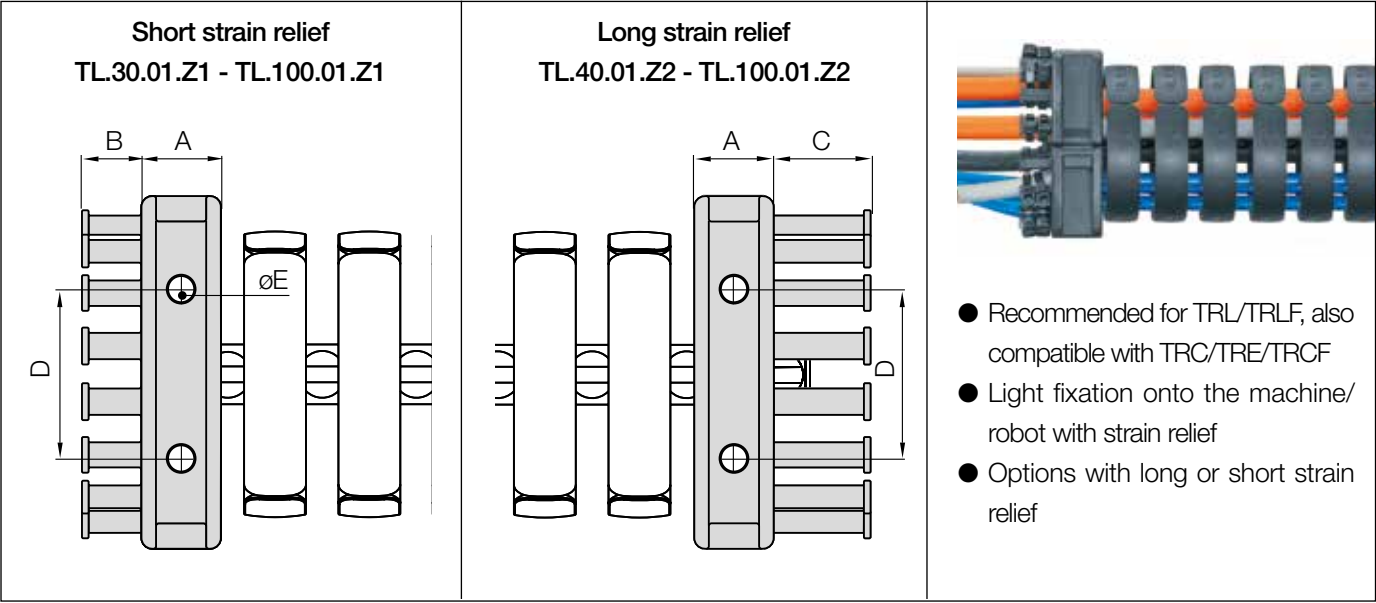
2)  Available as ESD-Version from stock

4) Only for special size TRCF.85.240.0 with 240 degree bend radius



triflex® R accessories

Light mounting brackets with strain relief



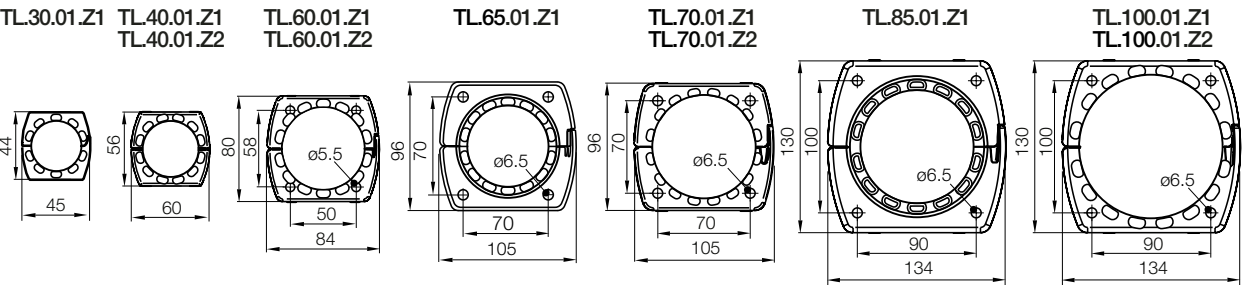
Light mounting brackets | With strain relief | For TRC·TRE·TRCF·TRL·TRLF

TL.30.01.Z1 - TL.100.01.Z1

TL.40.01.Z2 - TL.100.01.Z2

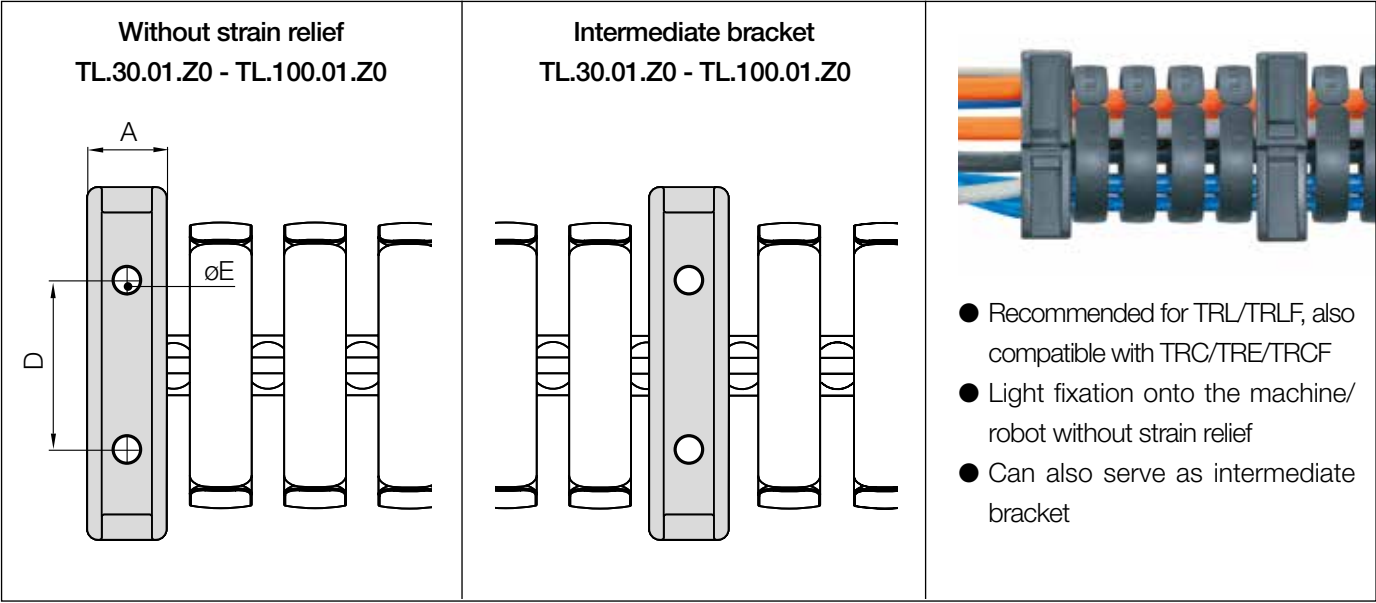
Ø Index	Part No. with short strain relief	Part No. with long strain relief	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
30.	▶ TL.30.01.Z1	–	13	12.5	–	24	4.5
40.	▶ TL.40.01.Z1 ¹⁾	TL.40.01.Z2	14	12.5	20	36	5.8
50.	▶ Alternative: standard mounting bracket		–	–	–	–	–
60.	▶ TL.60.01.Z1 ¹⁾	TL.60.01.Z2	20	17	27	48	5.8
65.	▶ TL.65.01.Z1 ¹⁾	–	27	13.5	–	64	6.5
70.	▶ TL.70.01.Z1 ¹⁾	TL.70.01.Z2	27	17.5	27.5	64	6.5
85.	▶ TL.85.01.Z1	–	30	26.5	–	64	6.5
85. (R 240)	▶ Alternative: standard mounting bracket		–	–	–	–	–
100.	▶ TL.100.01.Z1 ¹⁾	TL.100.01.Z2	30	22.5	42.5	64	6.5
125.	▶ Alternative: standard mounting bracket		–	–	–	–	–

1) For moving end (ball) suitable only for series TRL/TRLF



triflex® R accessories

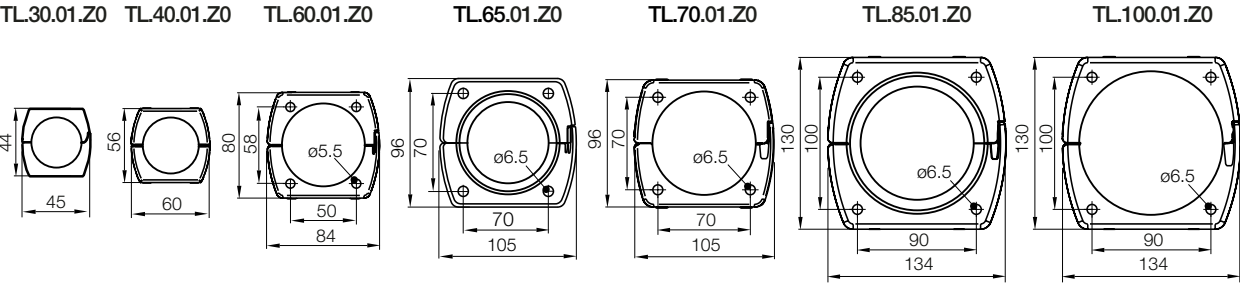
Light mounting brackets without strain relief



Light mounting brackets | Without strain relief | For TRC·TRE·TRCF·TRL·TRLF

TL.30.01.Z0 - TL.100.01.Z0

Ø Index	Part No. without strain relief or as intermediate bracket	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
30.	▶ TL.30.01.Z0	13	–	–	24	4.5
40.	▶ TL.40.01.Z0	14	–	–	36	5.8
50.	▶ Alternative: standard mounting bracket	–	–	–	–	–
60.	▶ TL.60.01.Z0	20	–	–	48	5.8
65.	▶ TL.65.01.Z0	27	–	–	64	6.5
70.	▶ TL.70.01.Z0	27	–	–	64	6.5
85.	▶ TL.85.01.Z0	30	–	–	64	6.5
85. (R 240)	▶ Alternative: standard mounting bracket	–	–	–	–	–
100.	▶ TL.100.01.Z0	30	–	–	64	6.5
125.	▶ Alternative: standard mounting bracket	–	–	–	–	–



triflex® R accessories

Mounting brackets with radius support

Mounting bracket
with radius support, only for
TR.40.09 - TR.100.09

Mounting bracket
with radius support, only for
TR.125.09

- The triflex® R radius support assists the triflex® R energy supply at the most highly stressed points (axis 6)
- Provides higher operational reliability for robotic applications

Mounting brackets | With radius support| For TRC·TRE·TRCF·TRL·TRLF

TR.40.09 - TR.100.09

TR.125.09

Ø Index	Part No. with radius support	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]
30.	▶ –	–	–	–	–	–	–
40.	▶ TR.40.09.M6 ¹⁾	28	21	13.5	27	84.5	6.5
50.	▶ TR.50.09.M6 ¹⁾	38	21	13.5	27	84.5	6.5
60.	▶ TR.60.09.M8 ¹⁾	38	32	20	40	126	9
65.	▶ TR.65.09.M8 ¹⁾	45	32	20	40	126	9
70.	▶ TR.70.09.M8 ¹⁾	43	32	20	40	126	9
85.	▶ TR.85.09.M8 ¹⁾	49	35	20	40	155	9
85. (R 240)	▶ –	–	–	–	–	–	–
100.	▶ TR.100.09.M8 ¹⁾	67	35	20	40	155	9
125.	▶ TR.125.09.M8 ¹⁾	72	40	–	64	190	9

Standard: through holes in Ø F - 1) option: with threaded bushings, steel, M6/M8

triflex® R accessories

Gliding feed-throughs

Gliding feed-through, only for
TL.30.05

Gliding feed-through, only for
TR.40.05 + TR.60-85.05

Gliding feed-through, only for
TR.50.05 + TR.100.05-TR.125.05

- The gliding feed-through enables easy guidance of the e-chain® and can also be used as an additional guide
- Gliding feed-through with swivel bearing ▶Page 50

Gliding feed-through | For TRC·TRE·TRCF

TL.30.05

TR.40.05 + TR.60-85.05

TR.50.05 + TR.100.05 - TR.125.05

Ø Index	Part No. Gliding feed-through	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]
30.	▶ TL.30.05	56	60	36	28	14	36	5.8
40.	▶ TR.40.05.M6 ¹⁾	85	84.5	46	32	21	27	6.5
50.	▶ TR.50.05.M6 ¹⁾	96	102	58	67	21	27	6.5
60.	▶ TR.60.05.M8 ¹⁾	126	126	70	50	32	40	9
65.	▶ TR.65.05.M8 ¹⁾	126	126	75	75	32	40	9
70.	▶ TR.70.05.M8 ¹⁾	153	155	86	70	35	40	9
85.	▶ TR.85.05.M8 ¹⁾	153	155	100	84	35	40	9
85. (R 240)	▶ TR.85.05.M8 ¹⁾	153	155	100	84	35	40	9
100.	▶ TR.100.05.M8 ¹⁾ *	162.5	169.5	115	85	28	40	8.5
125.	▶ TR.125.05.M8 ¹⁾	179	190	142	84	40	64	9

*TR.100.05 with 3 holes
 Standard: through holes in Ø G 1) Option: with insert nuts, steel, M6/M8

46 More information ▶ www.igus.eu/triflexR

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igus 3D CAD, lifetime calculation, configurators and more ▶ www.igus.eu/triflexR

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triflex® R accessories

Swivel bearing mounting brackets with strain relief

With integrated strain relief tiewrap plates
TR.40.03 - TR.100.03

- Standard mounting bracket with strain relief and maintenance-free igubal® spherical bearing
- Pivoted mounting for extreme rotating and reverse bending motions
- For TRC·TRE·TRCF·TRL·TRLF

Swivel bearing-mounting brackets | With strain relief | For TRC·TRE·TRCF·TRL·TRLF

TR.40.03 - TR.100.03

Ø	Part No.	A	B	C	D	E	F	G
Index	with strain relief	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
30.	▶ –	–	–	–	–	–	–	–
40.	▶ TR.40.03	105	89	47	8.4	4.1	65	51.8
50.	▶ TR.50.03	105	89	47	8.4	4.1	65	55
60.	▶ TR.60.03	152	118	65	10.5	5.5	87.5	73.5
65.	▶ TR.65.03 ⁵⁾	152	118	65	10.5	5.5	87.5	73.5
70.	▶ TR.70.03	152	118	65	10.5	5.5	87.5	73.5
85.	▶ TR.85.03	179	118	65	10.5	5.5	87.5	88
85. (R 240)	▶ TR.85.240.03 ⁴⁾	179	118	65	10.5	5.5	87.5	88
100.	▶ TR.100.03	179	118	65	10.5	5.5	87.5	88
125.	▶ –	–	–	–	–	–	–	–

⁴⁾ Only for special size TRCF.85.240.0 with 240 degree bend radius

⁵⁾ Available upon request. Please consult igus® for delivery time.

triflex® R accessories

Swivel bearing-mounting bracket without strain relief

Without strain relief
TR.40.04 - TR.100.04

- Standard mounting bracket without strain relief and maintenance-free igubal® spherical bearing
- Pivoted mounting for extreme rotating and reverse bending motions
- For TRC·TRE·TRCF·TRL·TRLF

Swivel bearing mounting brackets | Without strain relief | For TRC·TRE·TRCF·TRL·TRLF

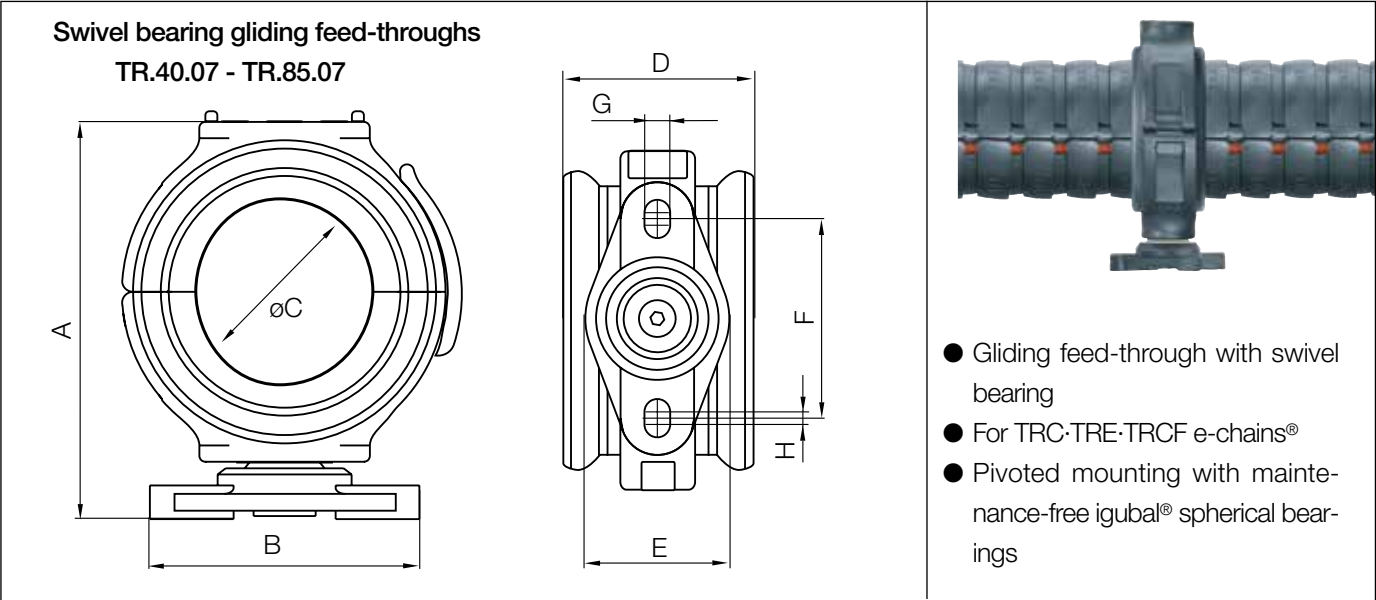
TR.40.04 - TR.100.04

Ø	Part No.	A	B	C	D	E	F	G
Index	without strain relief	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
30.	▶ –	–	–	–	–	–	–	–
40.	▶ TR.40.04	105	89	47	8.4	4.1	65	–
50.	▶ TR.50.04	105	89	47	8.4	4.1	65	–
60.	▶ TR.60.04	152	118	65	10.5	5.5	87.5	–
65.	▶ TR.65.04	152	118	65	10.5	5.5	87.5	–
70.	▶ TR.70.04	152	118	65	10.5	5.5	87.5	–
85.	▶ TR.85.04	179	118	65	10.5	5.5	87.5	–
85. (R 240)	▶ TR.85.240.04 ⁴⁾	179	118	65	10.5	5.5	87.5	–
100.	▶ TR.100.04	179	118	65	10.5	5.5	87.5	–
125.	▶ –	–	–	–	–	–	–	–

⁴⁾ Only for special size TRCF.85.240.0 with 240 degree bend radius

triflex® R accessories

Swivel bearing gliding feed-throughs



Swivel bearing gliding feed-throughs | For TRC·TRE·TRCF

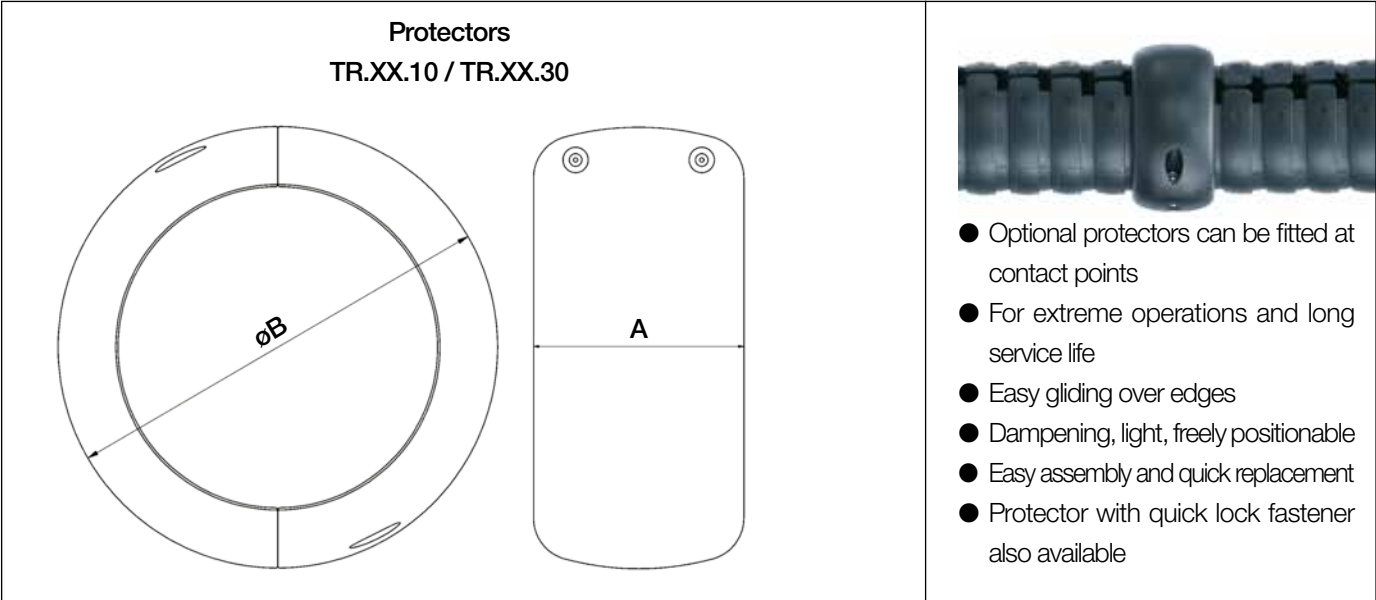
TR.40.07 - TR.85.07

Ø Index	Part No. with swivel bearing	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]
30.	▶ –	–	–	–	–	–	–	–
40.	▶ TR.40.07	108	89	46	32	47	65	8.4
50.	▶ TR.50.07	119	89	58	67	47	65	8.4
60.	▶ TR.60.07	156	118	70	50	65	87.5	10.5
65.	▶ TR.65.07	156	118	75	75	65	87.5	10.5
70.	▶ TR.70.07	183	118	86	70	65	87.5	10.5
85.	▶ TR.85.07	183	118	100	84	65	87.5	10.5
85. (R 240)	▶ TR.85.07 4)	183	118	100	84	65	87.5	10.5
100.	▶ –	–	–	–	–	–	–	–
125.	▶ –	–	–	–	–	–	–	–

4) Only for special size TRCF.85.240.0 with 240 degree bend radius

triflex® R accessories

Protectors



Protectors | For TRC·TRE·TRCF

TR.40.10 - TR.125.10

Ø Index	Part No. with screw connection	Part No. with quick release	A [mm]	B [mm]
30.	▶ –	–	–	–
40.	▶ TR.40.10	TR.40.30 2)	27	55
50.	▶ TR.50.10	TR.50.30 1)	34	69
60.	▶ TR.60.10	TR.60.30 2)	40	80
65.	▶ TR.65.10	TR.65.30 1)	44	88
70.	▶ TR.70.10	TR.70.30	50	102
85.	▶ TR.85.10	TR.85.30	59	118
85. (R 240)	▶ TR.85.240.10 4)	TR.85.240.30 1) 4)	63	120
100.	▶ TR.100.10	TR.100.30	67	133
125.	▶ TR.125.10	–	82	170

1) Available upon request. Delivery time upon request
2) TR.40.30, TR.60.30 without an additional locking clip
4) Only for special size TRCF.85.240.0 with 240 degree bend radius

triflex® R accessories

Heavy duty connections, for axis 6

Heavy duty connection Standard
TR.60.20.XX - TR.125.20.XX

- Heavy duty connection - standard
- For cables with large cross section
- For heavy hydraulic hoses
- Double C-profile for CFX clamps
- igus® chainfix clamps must be ordered separately

triflex® R accessories

Heavy duty connections for axis 6 with radius support

Heavy duty connection - with radius support
TR.60.23.XX - TR.125.23.XX

- With radius support
- For cables with large cross section
- For heavy hydraulic hoses
- Double C-profile for CFX clamps
- igus® chainfix clamps must be ordered separately

Standard Heavy duty connections | For TRC·TRE·TRCF



TR.60.20.XX - TR.125.20.XX

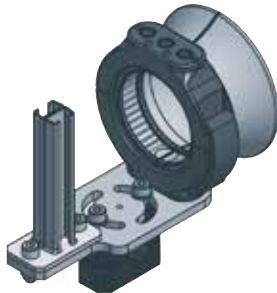
Ø Index	Part No. Standard	Clamp Ø [mm]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
30.	▶ -	-	-	-	-	-	-
40.	▶ -	-	-	-	-	-	-
50.	▶ -	-	-	-	-	-	-
60.	▶ TR.60.20.	30 32 34	175	126	126	122	-
65.	▶ TR.65.20.	30 32 34	175	126	126	122	-
70.	▶ TR.70.20.	30 32 34	175	126	126	122	-
85.	▶ TR.85.20.	30 32 34	175	153	155	149	-
85. (R 240)	▶ TR.85.240.20. 4)	30 32 34	175	153	155	149	-
100.	▶ TR.100.20.	30 32 34	175	153	155	149	-
125.	▶ TR.125.20.	30 32 34	180	190	190	175	-

Standard clamp for axis 6: ø 30 mm

4) Only for special size TRCF.85.240.0 with 240 degree bend radius

Part No. with desired diameter for the axis 6 clamp | 30 | 32 | 34 | e.g. TR.100.20.30

Heavy duty connections | With radius support | For TRC·TRE·TRCF



TR.60.23.XX - TR.125.23.XX

Ø Index	Part No. with radius support	Clamp Ø [mm]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
30.	▶ -	-	-	-	-	-	-
40.	▶ -	-	-	-	-	-	-
50.	▶ -	-	-	-	-	-	-
60.	▶ TR.60.23.	30 32 34	209	126	130	122	38
65.	▶ TR.65.23.	30 32 34	214	126	130	122	45
70.	▶ TR.70.23.	30 32 34	214	126	130	122	43
85.	▶ TR.85.23.	30 32 34	222	155	155	149	49
85. (R 240)	▶ -	-	-	155	-	149	-
100.	▶ TR.100.23.	30 32 34	240	155	155	149	67
125.	▶ TR.125.23.	30 32 34	252	190	190	175	72

Standard clamp for axis 6: ø 30 mm

4) Only for special size TRCF.85.240.0 with 240 degree bend radius

Part No. with desired diameter for the axis 6 clamp | 30 | 32 | 34 | e.g. TR.100.23.30

triflex® R accessories

Compact connections for clamp axis 6

Compact connection **with** strain relief
TR.40.21.01.XX - TR.100.21.01.XX

- With integrated strain relief tiwrap plates
- Safe and simple securing of the cables with cable ties
- Various adjustment options

triflex® R accessories

Compact connections for clamp axis 6

Compact connection **without** strain relief
TR.40.21.02.XX - TR.100.21.02.XX

- Without strain relief
- Space-saving
- Various adjustment options

Compact connections | **With** strain relief | For TRC·TRE·TRCF

TR.40.21.01.XX - TR.100.21.01.XX

Ø	Part No.	Clamp	A	B	C	D
Index	with strain relief	ø [mm]	[mm]	[mm]	[mm]	[mm]
30.	▶ –	–	–	–	–	–
40.	▶ TR.40.21.01.	30 32 34	110	85	84.5	17.8
50.	▶ TR.50.21.01.	30 32 34	110	85	84.5	21
60.	▶ TR.60.21.01.	30 32 34	110	126	126	25
65.	▶ TR.65.21.01. ⁵⁾	30 32 34	110	126	126	25
70.	▶ TR.70.21.01.	30 32 34	110	126	126	25
85.	▶ TR.85.21.01.	30 32 34	110	153	155	38
85. (R 240)	▶ TR.85.240.21.01. ⁴⁾	30 32 34	110	153	155	38
100.	▶ TR.100.21.01.	30 32 34	110	153	155	38
125.	▶ –	–	–	–	–	–

Standard clamp for axis 6: ø 30 mm

4) Only for special size TRCF.85.240.0 with 240 degree bend radius

5) Available upon request. Please consult igus® for delivery time.

Part No. with desired diameter for the axis 6 clamp | 30 | 32 | 34 | e.g. TR.100.21.30

Compact connections | **Without** strain relief | For TRC·TRE·TRCF

TR.40.21.02.XX - TR.100.21.02.XX

Ø	Part No.	Clamp	A	B	C	D
Index	without strain relief	ø [mm]	[mm]	[mm]	[mm]	[mm]
30.	▶ –	–	–	–	–	–
40.	▶ TR.40.21.02.	30 32 34	110	85	84.5	–
50.	▶ TR.50.21.02.	30 32 34	110	85	84.5	–
60.	▶ TR.60.21.02.	30 32 34	110	126	126	–
65.	▶ TR.65.21.02.	30 32 34	110	126	126	–
70.	▶ TR.70.21.02.	30 32 34	110	126	126	–
85.	▶ TR.85.21.02.	30 32 34	110	153	155	–
85. (R 240)	▶ TR.85.240.21.02. ⁴⁾	30 32 34	110	153	155	–
100.	▶ TR.100.21.02.	30 32 34	110	153	155	–
125.	▶ –	–	–	–	–	–

Standard clamp for axis 6: ø 30 mm

4) Only for special size TRCF.85.240.0 with 240 degree bend radius

Part No. with desired diameter for the axis 6 clamp | 30 | 32 | 34 | e.g. TR.100.21.02.30

triflex® R accessories

Quick exchange kit for axis 6

Quick exchange kit

TR.60.22.XX - TR.100.22.XX

- Exchange in seconds
- No repeat alignment required
- Exchange the triflex® R unit incl. cables without tools
- Option available with strain relief

Quick exchange kit | For TRC·TRE·TRCF



Ø Index	Part No. quick-change unit	Clamp Ø [mm]	A [mm]	B [mm]	C [mm]	D [mm]
30.	▶ —	—	—	—	—	—
40.	▶ —	—	—	—	—	—
50.	▶ —	—	—	—	—	—
60.	▶ TR.60.22.	30 32 34	191	126	126	126
65.	▶ TR.65.22.	30 32 34	191	126	126	126
70.	▶ TR.70.22.	30 32 34	191	126	126	126
85.	▶ TR.85.22.	30 32 34	191	153	155	153
85. (R 240)	▶ TR.85.240.22. 4)	30 32 34	191	153	155	153
100.	▶ TR.100.22.	30 32 34	191	153	155	153
125.	▶ —	—	—	—	—	—

Standard clamp for axis 6: ø 30 mm

4) Only for special size TRCF.85.240.0 with 240 degree bend radius

Part No. with desired diameter for the axis 6 clamp | 30 | 32 | 34 | e.g. TR.100.22.30

triflex® R accessories

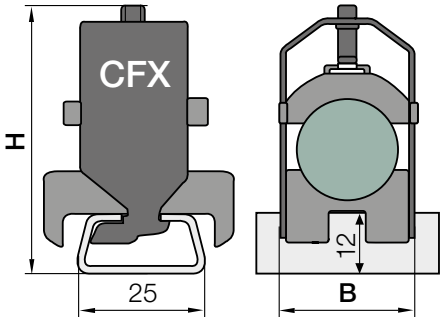
chainfix clamps

chainfix | Single clamp incl. bottom saddles

- For use with heavy-duty connection TR.XX.20 / TR.XX.23 and quick release unit TR.XX.22
- Reliably absorbs tensile forces even for larger cable diameters
- Specifically recommended when using solid welding cables and rigid hydraulic hoses
- Space- and time-saving assembly onto the C-profile
- Simple assembly with hex head set screw
- High strength for dynamic applications with improved stacker elements
- Built-in ribs on the stacker elements - give secure grip on the cables
- Steel (material galvanised steel) or stainless steel (material 1.4301/AISI 304) available



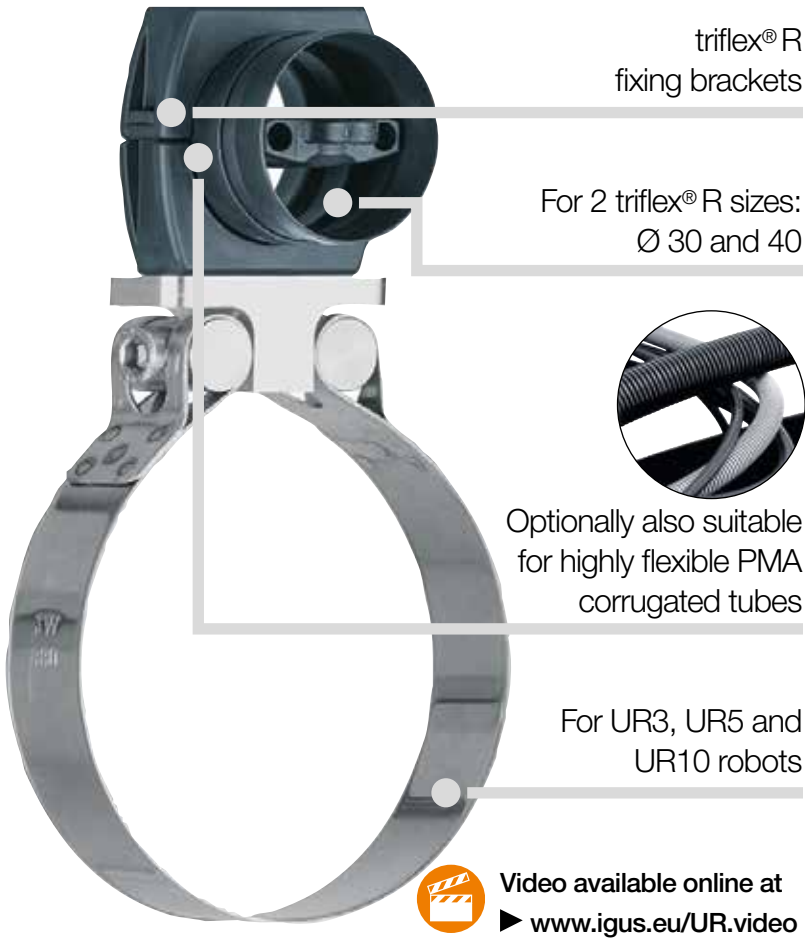
Part No. steel	Part No. stainless steel*	≤ Ø [mm]	B+2 [mm]	H [mm]	Part No. steel	Part No. stainless steel*	≤ Ø [mm]	B+2 [mm]	H [mm]
CFX12.1	CFX12.1.E	06 - 12	16	54	CFX22.1	CFX22.1.E	20 - 22	26	58
CFX14.1	CFX14.1.E	12 - 14	18	50	CFX26.1	CFX26.1.E	22 - 26	30	67
CFX16.1	CFX16.1.E	14 - 16	20	52	CFX30.1	CFX30.1.E	26 - 30	34	71
CFX18.1	CFX18.1.E	16 - 18	22	54	CFX34.1	CFX34.1.E	30 - 34	38	75
CFX20.1	CFX20.1.E	18 - 20	24	56	*Material stainless steel: 1.4301/AISI 304				



Individual strain relief for every cable allows security and easy replacement

triflex® R accessories

UR clips



Connections for "Universal Robots" - UR clips

The "Universal Robots" company makes easy-to-use, lightweight robot systems. The triflex® R 30 and 40 sizes are a perfect fit for the UR3, UR5 and UR10 robot systems, both technically and visually. Connecting to the systems is a breeze and can be achieved quickly using the UR clips.

- Safe cable routing with triflex® R for "universal robots"
- For easy connection with screw clips
- For UR3, UR5 and UR10 robots
- For TRC, TRE, TRL: Ø 30 and 40 mm
- Optionally also suitable for PMA corrugated tube I-PIST-29B

Overview triflex® R e-chains® | For TRC·TRE·TRL

Principle sketch	Part No. series	Bi1 [mm]	Bi2 [mm]	Ba [mm]	R [mm]	d1 [mm]	d2 [mm]	Pitch [mm]	Links per m
	Series TRC - enclosed design								
	TRC.30.050.0	12	10	34.5	050	10	8	11.3	89
	TRC.40.058.0	15	13	43	058	13	11	13.9	72
	Series TRE - "easy" design								
	TRE.30.050.0	12	10	34.5	050	10	8	11.3	89
	TRE.40.058.0.B	15	13	43	058	13	11	13.9	72
	Series TRL - light version of the "easy"-design								
	TRL.30.050.0	12.5	11	34.5	050	10	8	11.3	89
	TRL.40.058.0	15	–	45	058	13	–	13.9	72

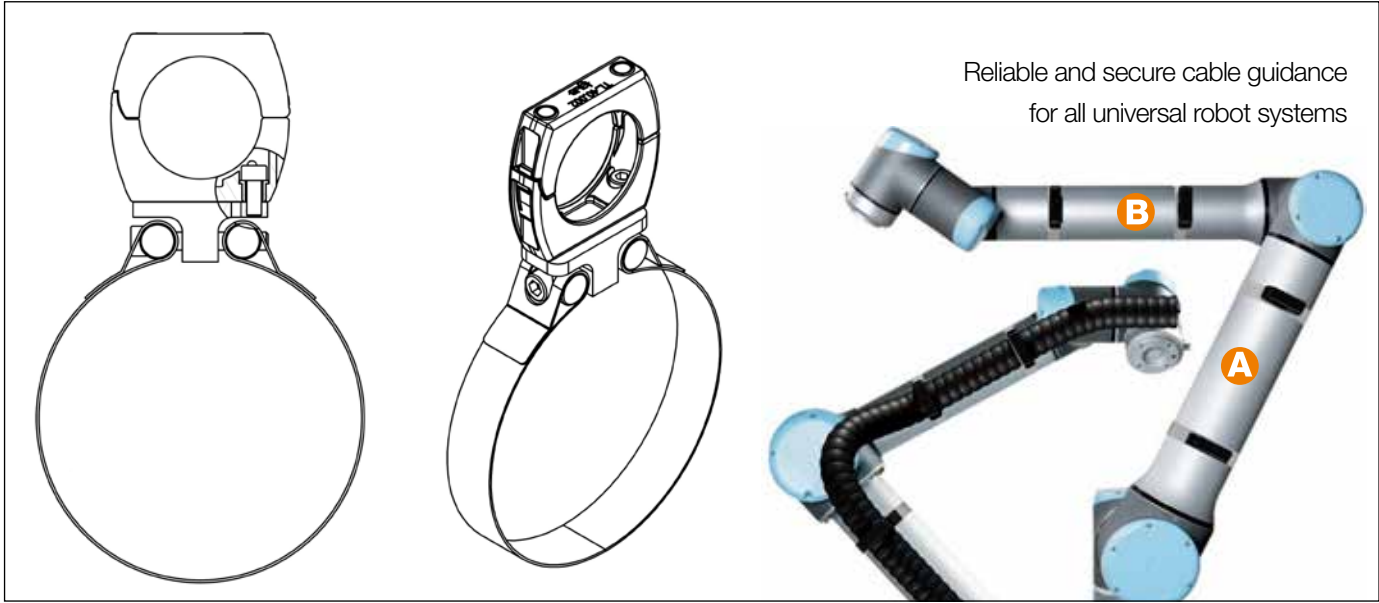
Overview PMA hose | For PMAFLEX corrugated tubes

Principle sketch	Part No. series	Corrugated tube nominal width	Metric size [mm]	Inner Ø d1 [mm]	Outer Ø d2 [mm]	Static R [mm]*	Dynamic R [mm]**	VE [mm]
	I-PIST-29B	29	32	29.0	34.3	45	110	50

*Static R = minimum recommended bend radius for static (fixed) installation **Dynamic R = minimum recommended bend radius for dynamic (flexible) laying

Product range

UR clips



Product range | Suitable for TRC.30 · TRE.30 · TRL.30 e-chains®

Part No. without strain relief	Part No. with strain relief	For UR-robot system	Ø [mm]	Position
TR.911.965.054.Z0	TR.911.965.054.Z1	UR3	054	B
TR.911.965.066.Z0	TR.911.965.066.Z1	UR3	066	A
TR.911.965.075.Z0	TR.911.965.075.Z1	UR5	075	B
TR.911.965.086.Z0	TR.911.965.086.Z1	UR5	086	A
TR.911.965.086.Z0	TR.911.965.086.Z1	UR10	086	B
TR.911.965.108.Z0	TR.911.965.108.Z1	UR10	108	A

Product range | Suitable for TRC.40 · TRE.40 · TRL.40 e-chains®

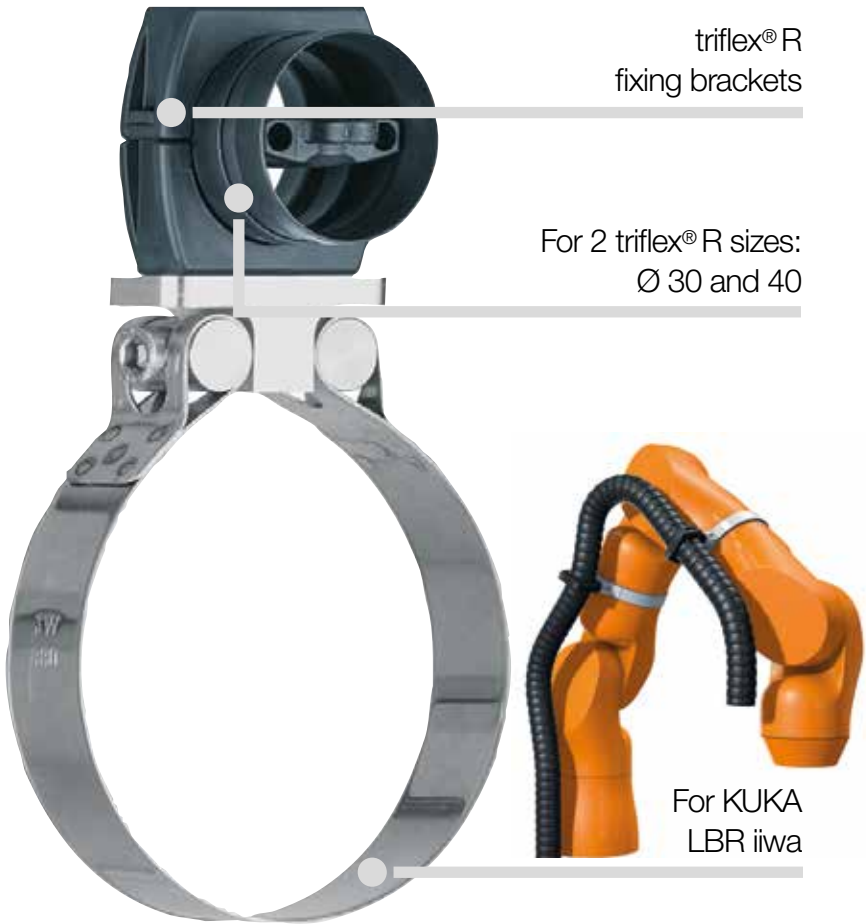
Part No. without strain relief	Part No. with strain relief	For UR-robot system	Ø [mm]	Position
TR.911.966.054.Z0	TR.911.966.054.Z1	UR3	054	B
TR.911.966.066.Z0	TR.911.966.066.Z1	UR3	066	A
TR.911.966.075.Z0	TR.911.966.075.Z1	UR5	075	B
TR.911.966.086.Z0	TR.911.966.086.Z1	UR5	086	A
TR.911.966.086.Z0	TR.911.966.086.Z1	UR10	086	B
TR.911.966.108.Z0	TR.911.966.108.Z1	UR10	108	A

Product range | Optional: suitable for PMA hose I-PIST-29B

For PMA hose I-PIST-29B	Part No. without strain relief	For UR-robot system	Ø [mm]	Position
	TR.914.836.054.Z0	UR3	054	B
	TR.914.836.066.Z0	UR3	066	A
	TR.914.836.075.Z0	UR5	075	B
	TR.914.836.086.Z0	UR5	086	A
	TR.914.836.086.Z0	UR10	086	B
	TR.914.836.108.Z0	UR10	108	A

triflex® R accessories

For KUKA LBR iiwa

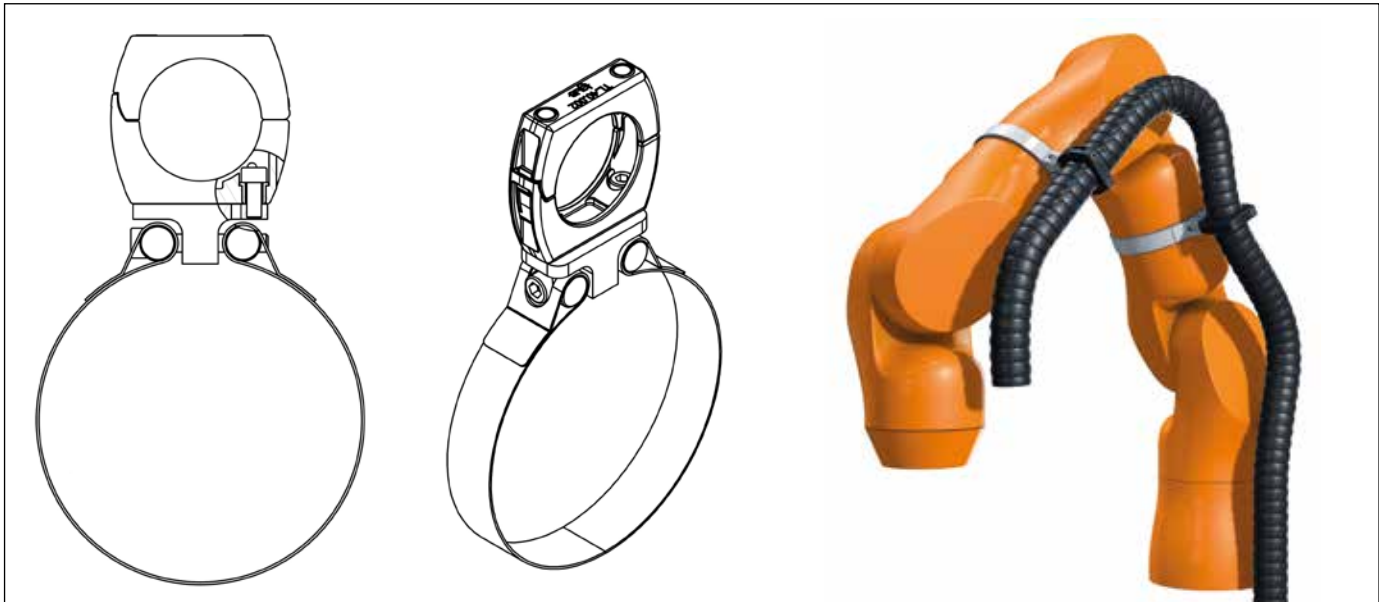


Connections for KUKA LBR iiwa

- Safe cable routing with triflex® R for KUKA LBR iiwa robots
- For KUKA LBR iiwa 14 R820 and KUKA LBR iiwa 7 R800
- For easy connection with screw clips
- For 2 triflex® R sizes: Ø 30 and 40
- For TRC, TRE and TRL e-chains®

Product range

For KUKA LBR iiwa



Product range | Suitable for TRC.30 · TRE.30 · TRL.30 e-chains®

Part No. without strain relief	Part No. with strain relief	For KUKA LBR iiwa	Ø [mm]
TR.914.951.Z0	TR.914.951.Z1	LBR iiwa 14 R820 LBR iiwa 7 R800	136

Overview triflex® R e-chains® | For TRC·TRE·TRL

Principle sketch	Part No. series	Bi1 [mm]	Bi2 [mm]	Ba [mm]	R [mm]	d1 [mm]	d2 [mm]	Pitch [mm]	Links per m
	Series TRC - enclosed design								
	TRC.30.050.0	12	10	34.5	050	10	8	11.3	89
	TRC.40.058.0	15	13	43	058	13	11	13.9	72
	Series TRE - "easy" design								
	TRE.30.050.0	12	10	34.5	050	10	8	11.3	89
	TRE.40.058.0.B	15	13	43	058	13	11	13.9	72
	Series TRL - light version of the "easy"-design								
	TRL.30.050.0	12.5	11	34.5	050	10	8	11.3	89
	TRL.40.058.0	15	–	45	058	13	–	13.9	72

Product range | Suitable for TRC.40 · TRE.40 · TRL.40 e-chains®

Part No. without strain relief	Part No. with strain relief	For KUKA LBR iiwa	Ø [mm]
TR.914.952.Z0	TR.914.952.Z1	LBR iiwa 14 R820 LBR iiwa 7 R800	136

triflex® R accessories

Protective jackets

Standard protective jacket



- Base support: fabric
- Plastic coated
- Easy to replace with Velcro fastenings
- Elastic sealing strips
- Standard lengths available from stock
- For paint or sealing applications
- PVC material
- Polyester coated fabrics

Ø	Part No.	Standard lengths ²⁾
Index	Jacket	XXXX [mm]
30.	▶	—
40.	▶	TR.40.14. 500 1000 1500 2000
50.	▶	TR.50.14. ¹⁾ 500 1000 1500 2000
60.	▶	TR.60.14. 500 1000 1500 2000
65.	▶	TR.65.14. ¹⁾ 500 1000 1500 2000
70.	▶	TR.70.14. 500 1000 1500 2000
85.	▶	TR.85.14. 500 1000 1500 2000
100.	▶	TR.100.14. 500 1000 1500 2000
125.	▶	TR.125.14. 500 1000 1500 2000

1) Available upon request 2) Special lengths upon request

Part No. with the desired standard value for the length **XXXX**

Example: **TR.60.14.500**

Heat shield protective jacket



- Made from heat-resistant, wear-resistant Kevlar weave
- Short-term protection against welding and metal spatter, temperatures up to +540°C
- High abrasion resistance
- Sealed design
- For tough environments
- Easy to replace or retrofit with zipper closure
- Velcro straps at beginning and end
- Tough design
- Silicone free
- Asbestos free
- Standard lengths from stock

Ø	Part No.	Standard lengths ²⁾
Index	Jacket	XXXX [mm]
30.	▶	—
40.	▶	TR.40.18. 500 1000 1500 2000
50.	▶	TR.50.18. ¹⁾ 500 1000 1500 2000
60.	▶	TR.60.18. 500 1000 1500 2000
65.	▶	TR.65.18. ¹⁾ 500 1000 1500 2000
70.	▶	TR.70.18. 500 1000 1500 2000
85.	▶	TR.85.18. 500 1000 1500 2000
100.	▶	TR.100.18. 500 1000 1500 2000
125.	▶	TR.125.18. 500 1000 1500 2000

1) Available upon request 2) Special lengths upon request

Part No. with the desired standard value for the length **XXXX**

Example: **TR.60.18.500**

Wear resistant protective jacket



- Extremely high abrasion resistance
- Black leather
- For use in temperatures from -40°C to +100°C
- Very flexible
- Easy to exchange or retrofit
- Silicone-free
- Asbestos-free
- Standard lengths from stock

Ø	Part No.	Standard lengths ²⁾
Index	Jacket	XXXX [mm]
30.	▶	—
40.	▶	TR.40.19. 500 1000 1500 2000
50.	▶	TR.50.19. ¹⁾ 500 1000 1500 2000
60.	▶	TR.60.19. 500 1000 1500 2000
65.	▶	TR.65.19. ¹⁾ 500 1000 1500 2000
70.	▶	TR.70.19. 500 1000 1500 2000
85.	▶	TR.85.19. 500 1000 1500 2000
100.	▶	TR.100.19. 500 1000 1500 2000
125.	▶	TR.125.19. 500 1000 1500 2000

1) Available upon request 2) Special lengths upon request

Part No. with the desired standard value for the length **XXXX**

Example: **TR.60.19.500**

triflex® R filling

e-chain® filling configurator

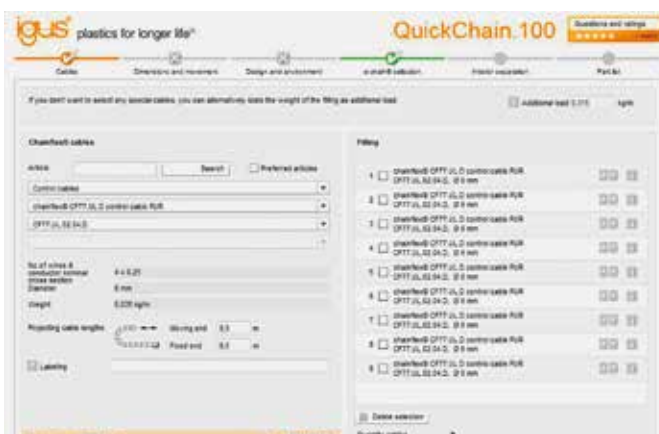
triflex® R interior separation - configure e-chains® easily

Quick and easy and creation of interior separations for triflex® R. After selecting the cables, they can be dragged & dropped into the e-chain® layout. The configurator creates a parts list of the echain® and the cables contained in the configuration. The configurations can be saved and reloaded. The entire configuration can be transferred to the shopping cart in a click.

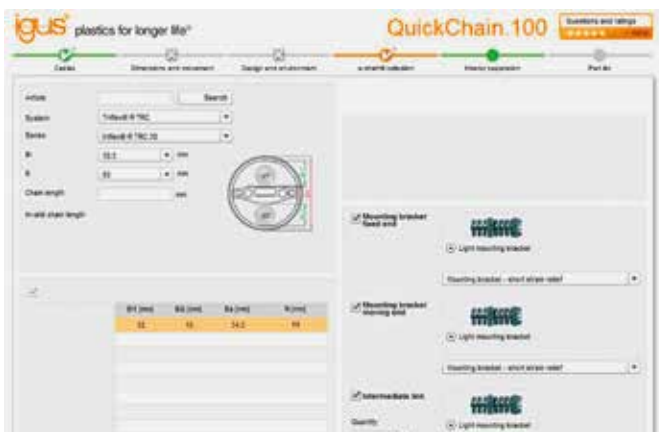
- Quick and easy shelving configuration
- Accounts for the max. filling cross sections and cable diameters
- Creation of parts lists
- Easy enquiry and ordering

More information, interior layout configurator

► www.igus.eu/triflexR-IA



1. Select cables, hoses and lengths



2. Select e-chain® and size



3. Filling of the e-chain® with cables and hoses



4. Result: parts list, price and drawings

triflex® R - readychain® dress-packs

Customised system consisting of the triflex® R, chainflex® and connectors

- Eliminate storage costs for cables, e-chains® and plugs
- Shorten turnaround times by half, minimise your machine downtime
- Reduce the number of suppliers and orders by 75%

More information ► www.readychain.eu



Retraction systems

For supplying energy to robots

triflex® R retraction systems - prevents loop formation on robots

The global growth in automation for industrial production is leading to more and more complex applications, particularly when using industrial robots. Despite greater integration and the use of new production processes, the target cycle times are getting shorter and shorter and downtime must also be reduced. To provide reliable protection against premature system failure and downtime, we recommend the use of a triflex® R e-chain®, especially to bridge the last three rotating axes on robots. The change in length that results from the robot's movement is compensated by our triflex® R retraction systems. This constantly guides the igus® e-chain® in a defined manner to prevent the formation of loops in the robot's working area.

4 triflex® R retraction system types available from stock:



RSP
pneumatic retraction system
► From page 66

- 
- Advantages of RSP:**

 - For series TRC·TRE·TRCF with a Ø-index of 60-125 mm
 - For robots with a load capacity from approx. 50 kg
 - Up to 780 mm retraction length possible
 - For applications with a high fill weight
 - For a sensor-based monitoring
 - Constant force path over the complete travel
 - Standard pneumatic components



RS
modular retraction system
► From page 72

- 
- Advantages of RS:**

 - For series TRC·TRE with Ø-index 40-100 mm
 - For robots with a load capacity from approx. 10 kg
 - Up to 670 mm retraction length possible
 - If no linear guide system is needed
 - For use with major environmental influences
 - Retraction force provided by integrated fibre-rods



RSE linear
cost-effective retraction system, linear
► From page 78

- 
- Advantages of RSE linear:**

 - For series TRC·TRE·TRCF* with Ø-index 40-125 mm
 - Special linear guide avoids small bend radii
 - Up to 490 mm retraction length possible
 - Simple, linear retraction without bends, fibre-rods or guide rollers
 - Cost-effective
 - Maintenance-free igus® drylin® W linear unit

*TRCF not available for each width, see product range



RSE
cost-effective retraction system with deflection
► From page 84

- 
- Advantages of RSE:**

 - For series TRC·TRE with Ø-index 40-50 mm
 - For small robots, very light
 - Up to 500 mm retraction length possible
 - For highly dynamic movements
 - Cost-effective
 - Maintenance-free igus® drylin® W linear unit

Retraction systems

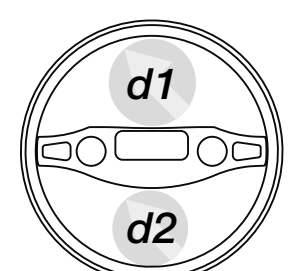
Selection tools

Choosing the right e-chain® size and retraction system

If you want to select a suitable retraction system yourself, please ensure that you observe the maximum cable diameter and usage data.

1

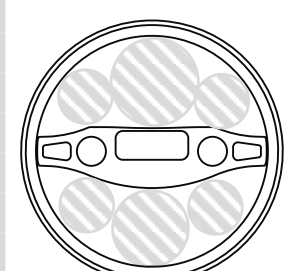
The largest cable diameter Ø ...



Max. cable Ø	
1. chamber d1 [mm]	2. chamber d2 [mm]
–	–
< 15	< 13
–	–
< 22.5	< 19.5
–	–
< 28	< 24
< 33	< 28
< 37.5	< 32.5
< 43	< 43

2

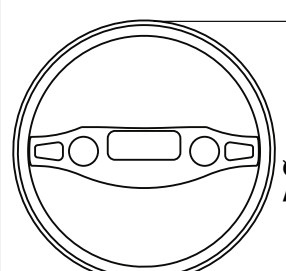
... and usable e-chain® cross section area ...



Coverage of the entire area [mm²]
–
< 500
–
< 1000
–
< 1750
< 2500
< 3000
< 4500

3

... determine the necessary Ø index of the triflex® R ...



Minimum Ø-index triflex® R
30.
40.
50.
60.
65.
70.
85.
100.
125.

4

... select from 4 retraction systems options:

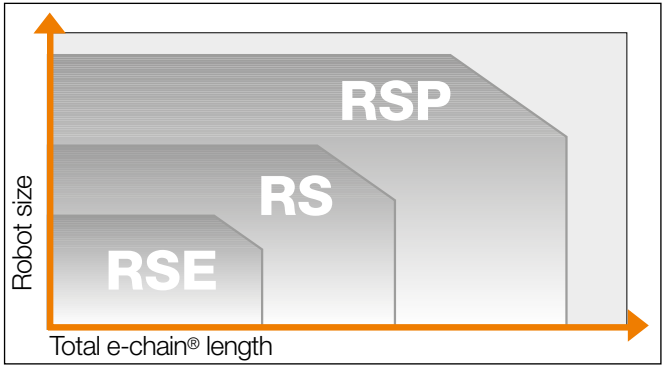


Retraction system			
RSP	RS	RSE linear	RSE
–	–	–	–
–	●	–	●
–	–	–	–
●	●	●	–
–	–	–	–
●	●	●	–
●	●	●	–
●	–	●	–

● = yes, it is possible – = it is not possible

 Interior layout configurator - quick and easy creation of interior layouts for triflex® R.
More information ► www.igus.eu/triflexR-IA

Selection tool for triflex® R retraction systems



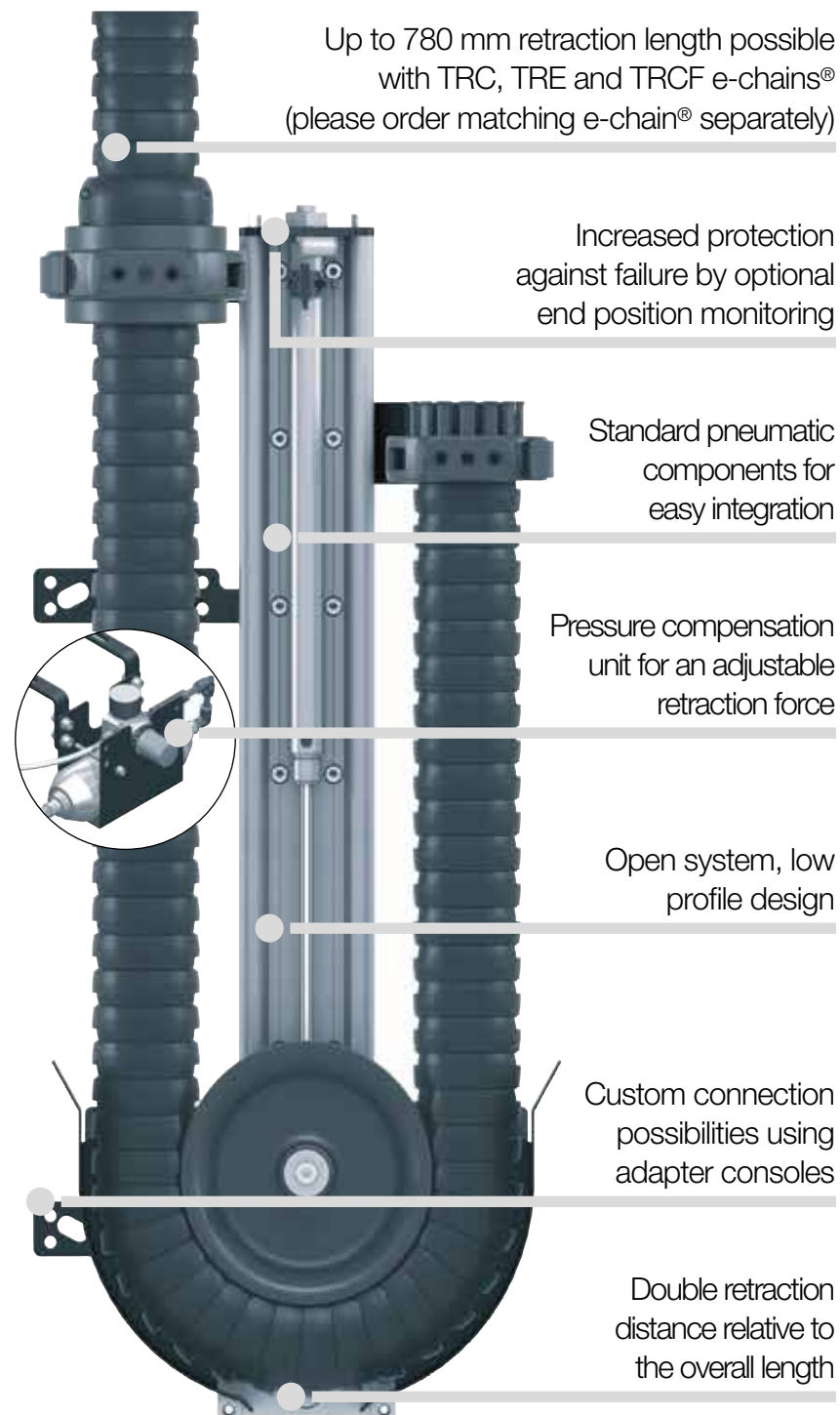
Possible Ø-index for triflex® R retraction systems

For series	RSP Ø Index	RS Ø Index	RSE linear Ø Index	RSE Ø Index
TRC	60 - 125	40 - 100	40 - 125	40 - 50
TRE	60 - 125	40 - 100	40 - 125	40 - 50
TRCF	85 - 100	–	85 - 100	–
TRL*	–	–	–	–
TRLF*	–	–	–	–

* Retraction systems not available for this series

RSP retraction system

Pneumatic retraction system



Pneumatic retraction system - triflex® RSP

triflex® RSP prevents creation of loops on the robot head, with a continuously adjustable retraction force. Extension lengths of up to 780 mm enable a secure guidance of the cables and hoses, even with large arm diameters and very complex movements. The retraction forces can be adjusted using a pneumatic cylinder. Whether light or heavy fill weights, long or short robot arms - with the igus® RSP retraction system the retraction force can always be adjusted to the individual application.

- Even larger e-chains® up to Ø 125 mm can be guided safely
- Almost constant force path over the complete travel, even with heavy fill weights
- The end position can be monitored and so damage can be prevented
- Larger retraction forces than RS system
- Mounting options for numerous robot models and manufacturers with adapter consoles
- For axis 3-6 on industrial robots
- Hardly any energy consumption due to integrated air reservoir

Optional accessories | RSP pneumatic retraction system



Adjustment unit - for accurate adjustment of the system position



Adapter consoles - for custom mounting options



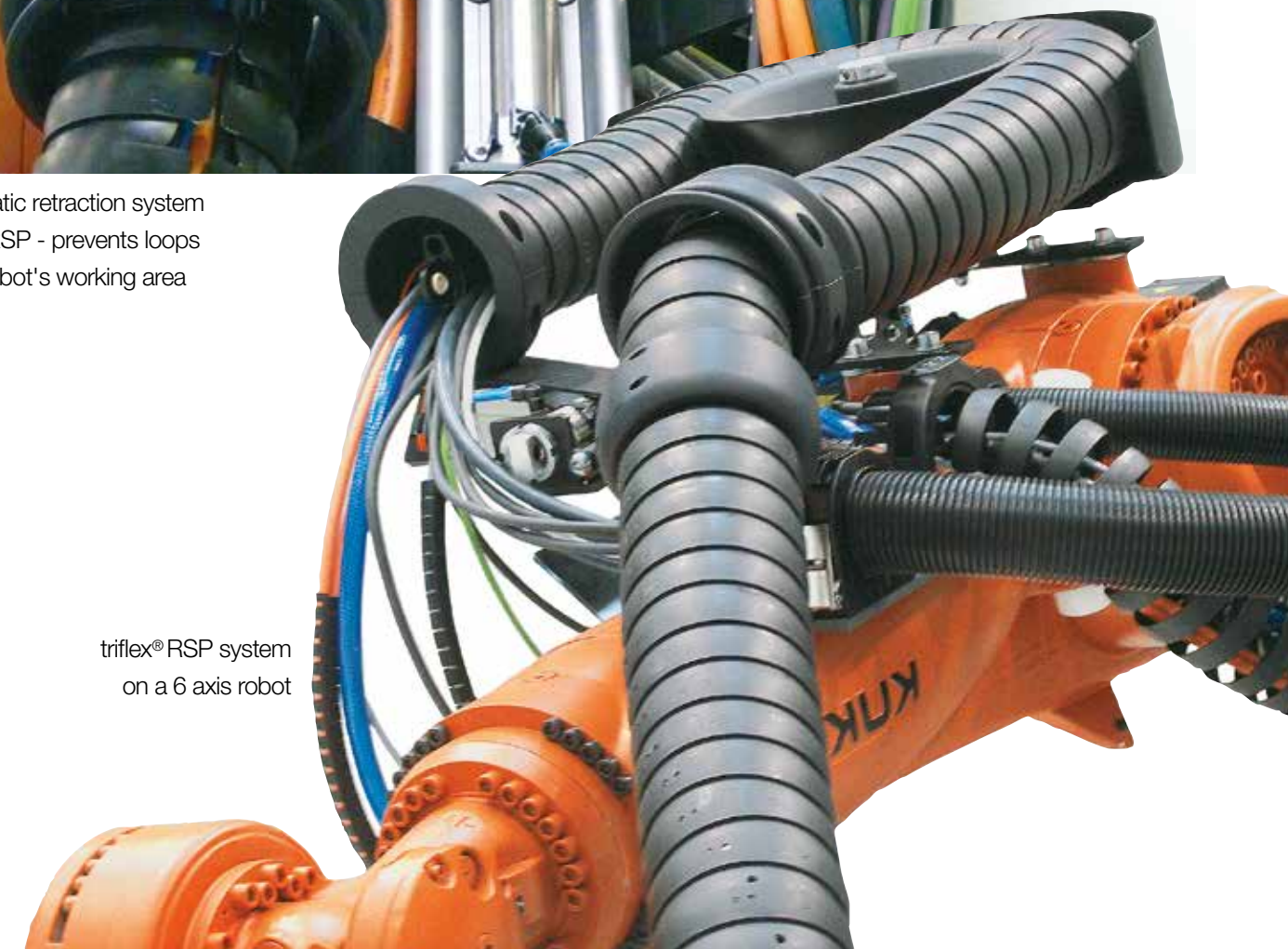
Axis 6 clamp - for triflex®R mounting bracket

Applications

RSP - R(etraction) S(ystem) P(neumatic)



Pneumatic retraction system triflex® RSP - prevents loops in the robot's working area

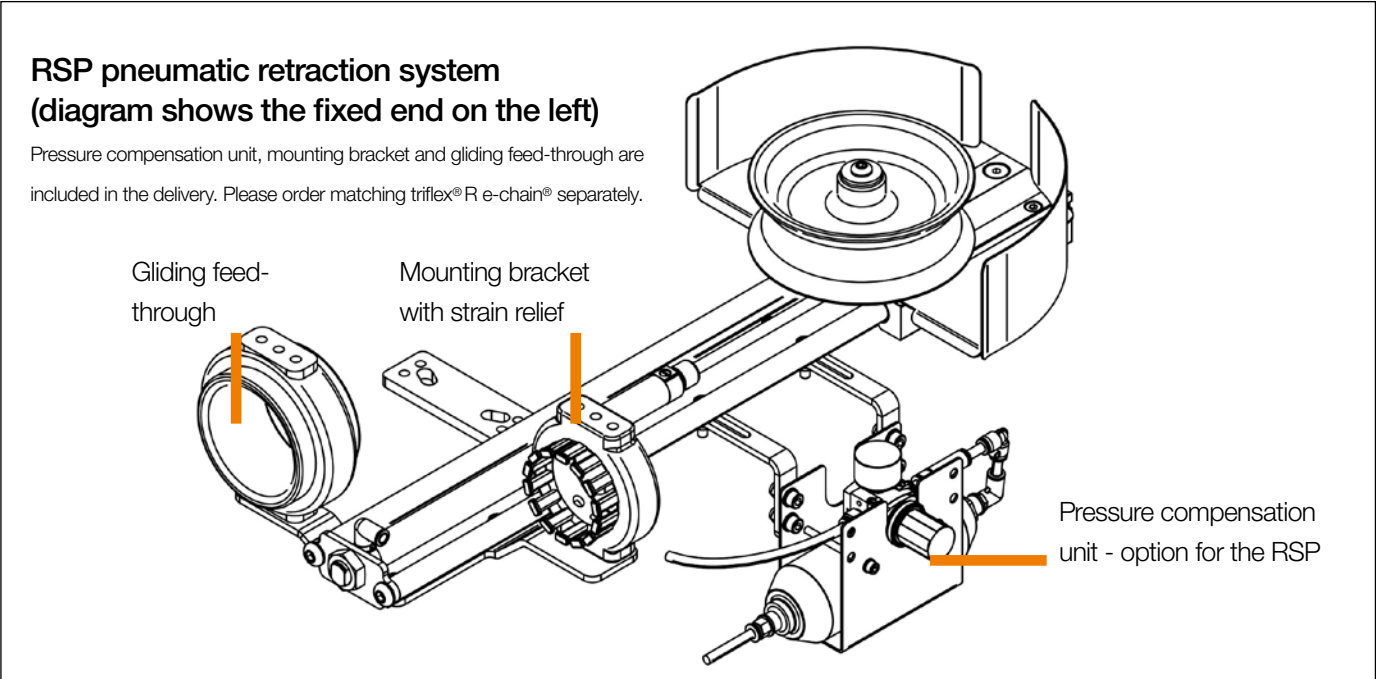
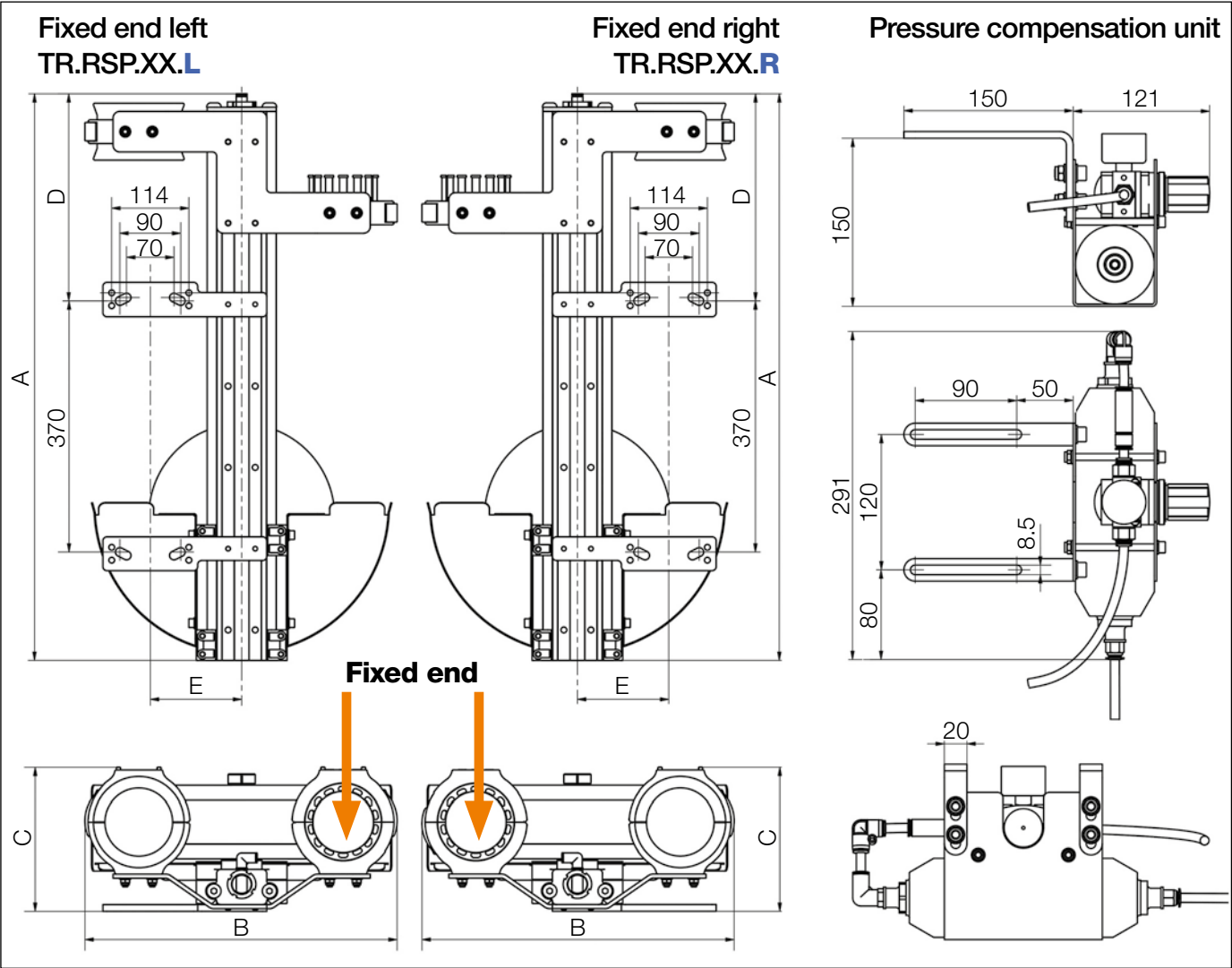


triflex® RSP system on a 6 axis robot

RSP accessories

Technical data

Dimensions | RSP pneumatic retraction system



Product range

triflex® R RSP for series TRC·TRE·TRCF

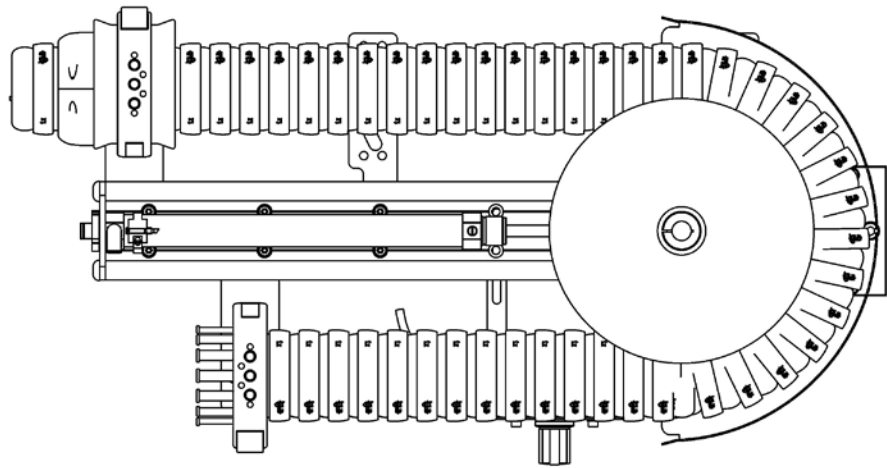
Product range | RSP pneumatic retraction system

Ø Index	Part No. fixed end left	Part No. fixed end right	Retraction length ¹⁾ ≤ [mm]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	Weight* [kg]
30.	▶ -	-	-	-	-	-	-	-	-
40.	▶ -	-	-	-	-	-	-	-	-
50.	▶ -	-	-	-	-	-	-	-	-
60.	▶ TR.RSP.60.L	TR.RSP.60.R	580	792	396	177	277	135	16.1
65.	▶ TR.RSP.65.L	TR.RSP.65.R	580	792	396	177	277	135	16.1
70.	▶ TR.RSP.70.L	TR.RSP.70.R	580	792	396	177	277	135	16.2
85.	▶ TR.RSP.85.L	TR.RSP.85.R	620	836	461	213	306	135	19.4
85. (R 240)	▶ -	-	-	-	-	-	-	-	-
100.	▶ TR.RSP.100.L	TR.RSP.100.R	620	845	467	213	306	135	19.5
125.	▶ TR.RSP.125.L	TR.RSP.125.R	780	1043	570	245	405	135	24.1

Pressure compensation unit, mounting bracket and gliding feed-through are included in the delivery. Please order matching triflex® R e-chain® separately.

1) These are the maximum values. In normal operation a filling of no more than 70% is advised.

*Plus 2.3 kg for pressure compensation unit



Order key

TR.RSP.XX.L / R

- R = Fixed end right
- L = Fixed end left
- Ø Index
- System
- e-chains® series

RSP accessories

RSP retraction system and matching e-chains®

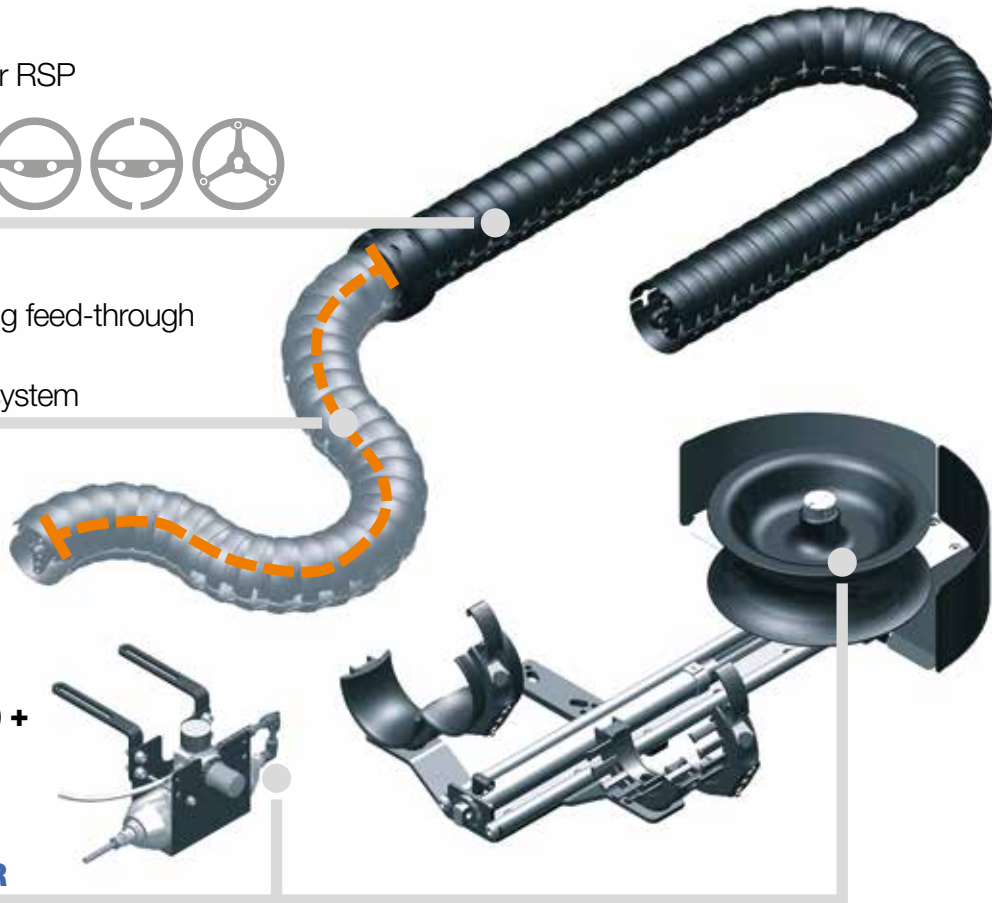
System design | RSP and matching e-chains®

Matching triflex®R e-chains® for RSP

TRC .RSP.XX.**R**.**LLLL**.0
TRE .RSP.XX.**R**.**LLLL**.0.B
TRCF.RSP.XX.**R**.**LLLL**.0



Overall length =
additional length from the gliding feed-through
LLLL +
the e-chain® length within the system



RSP-System (without e-chain®) +
Pressure compensation unit +
Mounting bracket +
Gliding feed-through =
TR.RSP.XX.**L** or TR.RSP.XX.**R**

 Sample order of a complete TR.RSP system, Ø-Index 60, fixed end on the left, and e-chain® (standard length: 500 mm)

System Insert Ø index **XX** / select fixed end **.L / .R** TR.RSP.XX.**L**

+ e-chain® Insert Ø-index **XX** / Insert bend radius **R** / Insert standard length **LLLL** TRC.RSP.60.**087**.**500**.0

Order text: TR.RSP.60.**L** + TRC.RSP.60.**087**.**500**.0



 Order key e-chains®

TRC .RSP.XX.**R**.**LLLL**.0
TRE .RSP.XX.**R**.**LLLL**.0.B
TRCF.RSP.XX.**R**.**LLLL**.0



Product range

e-chain® and cable length calculation

Product range | Matching e-chains® for RSP

Ø Index	Part No. TRC enclosed	Part No. TRE "easy" design	Part No. TRCF with snap lock mechanism
30.	–	–	–
40.	–	–	–
50.	–	–	–
60.	TRC.RSP.60. 087 . LLLL .0	TRE.RSP.60. 087 . LLLL .0.B	–
65.	–	–	TRCF.RSP.65. 100 . LLLL .0
70.	TRC.RSP.70. 110 . LLLL .0	TRE.RSP.70. 110 . LLLL .0.B	–
85.	TRC.RSP.85. 135 . LLLL .0	TRE.RSP.85. 135 . LLLL .0.B	TRCF.RSP.85. 135 . LLLL .0
85. (R 240)	–	–	–
100.	TRC.RSP.100. 145 . LLLL .0	TRE.RSP.100. 145 . LLLL .0.B/C 1)	TRCF.RSP.100. 145 . LLLL .0
125.	TRC.RSP.125. 182 . LLLL .0	TRE.RSP.125. 182 . LLLL .0.B	–

1) Available for B- and C-versions

*Standard lengths from the gliding feed-through outside the system - special lengths upon request.

e-chains® standard lengths*

LLLL [mm] | **500** | **1000** | **1500** | **2000** |

Part No. with **LLLL** standard length value (measured from the gliding feed-through) corresponds to the robot arm length from axis 3. For example: TRC.RSP.60.**087**.**500**.0

Calculating the overall e-chain® length | RSP e-chains®

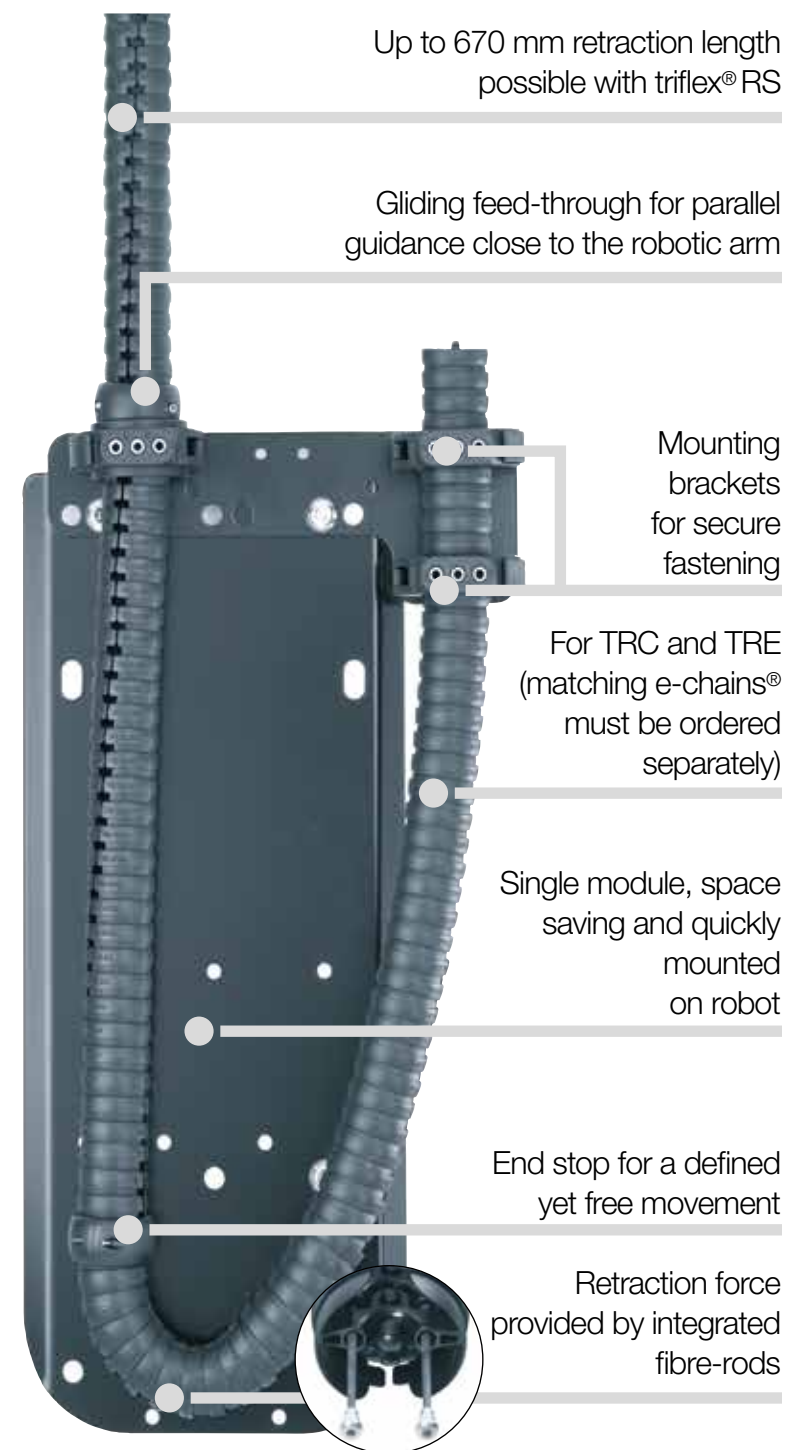
Ø Index	Bend radius R [mm]	e-chain® length* [mm]	Number of e-chain® links	Total e-chain® length [mm]
30.	–	–	–	–
40.	–	–	–	–
50.	–	–	–	–
60.	087	1489	73	LLLL + 1489
65.	100	1432	62	LLLL + 1432
70.	110	1484	58	LLLL + 1484
85.	135	1622	53	LLLL + 1622
85. (R 240)	–	–	–	–
100.	145	1656	48	LLLL + 1656
125.	182	1962	44	LLLL + 1962

*Values are related to the e-chain® length within the system

Please add the e-chain® length within the system to the standard length **LLLL** (measured from the gliding feed-through) to get the overall e-chain® length

RS Retraction system

Modular retraction system



Modular retraction system - triflex® RS

triflex® RS is a retraction system for robots with medium to high payloads. With triflex® RS, the multi-axis triflex® R e-chain® is routed parallel to the robot arm. Integrated spring rods produce a directed pretension, avoiding the formation of loops in the working area of the robot head. This also allows applications to be implemented in very limited space. triflex® RS offers the possibility to realise the energy supply for tools safely without stressing the cables, thus minimising downtimes.

- Space-saving, closely routed on the robot arm
- A system solution proven and tested thousands of times
- Universal installation
- Integrated fibre-rods - no external mechanical components such as springs or steel cables required!

Optional accessories | RS modular retraction system



Cover - for additional mounting space and extreme movements



Adjustment unit - for accurate adjustment of the system position



Adapter consoles - for custom mounting options



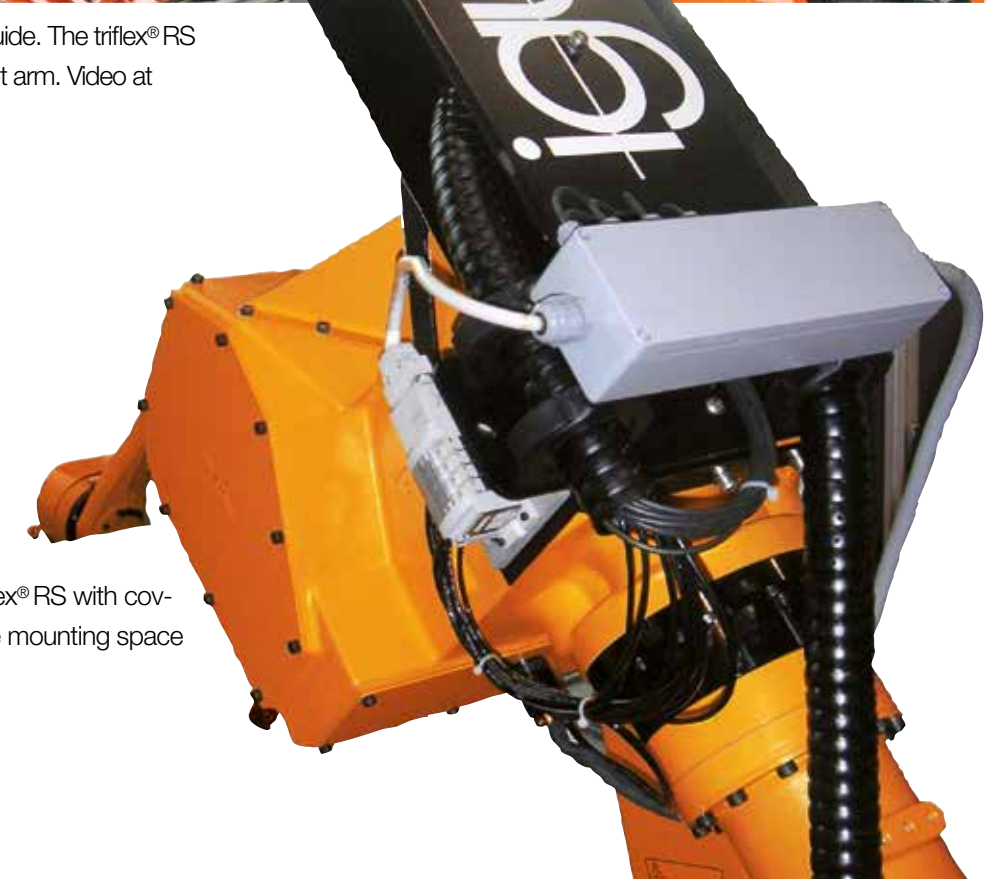
Axis 6 clamp - for triflex® R mounting bracket

Applications

RS - R(etraction) S(ystem)



triflex® RS for a low profile e-chain® guide. The triflex® RS retraction unit runs parallel to the robot arm. Video at www.igus.eu/RS_Film



Option: triflex® RS with cover for more mounting space

Modular retraction system

Technical drawings showing the fixed end connections for the TR.RS.40 and TR.RS.XX series. The drawings include side and end views with dimensions.

Fixed end left TR.RS.40.L and **Fixed end right TR.RS.40.R**: These drawings show the fixed end connections for the TR.RS.40 series. The side view dimensions are: total height 490, inner height 380, and a horizontal offset of 70 and 90. The end view shows a fixed end connection with a dimension C.

Fixed end left TR.RS.XX.L and **Fixed end right TR.RS.XX.R**: These drawings show the fixed end connections for the TR.RS.XX series. The side view dimensions are: total height 490, inner height 380, and a horizontal offset of 70 and 90. The end view shows a fixed end connection with a dimension C.

Illustration shows trifix® RS ø index: 40

Illustration shows trifix® RS ø index: 60 - 100

Mounting bracket

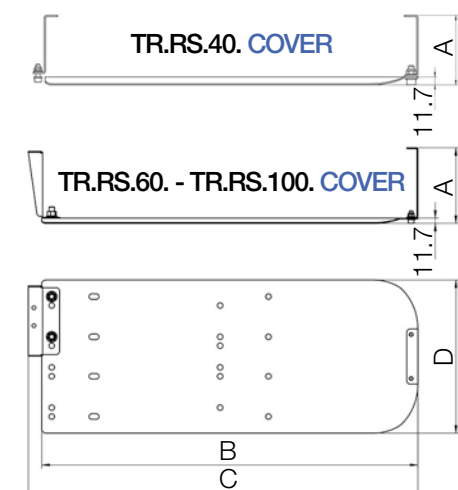
RS - R(etraction) S(ystem)

Ø		Part No.	Part No.	Retraction length ¹⁾	A	B	C	D	Weight
Index		fixed end left	fixed end right	≤ [mm]	[mm]	[mm]	[mm]	[mm]	[kg]
30.	▶	–	–	–	–	–	–	–	–
40.	▶	TR.RS.40.L	TR.RS.40.R	460	576	301	95	51	3.5
50.	▶	–	–	–	–	–	–	–	–
60.	▶	TR.RS.60.L	TR.RS.60.R	550	900	528	150	65	8.7
65.	▶	–	–	–	–	–	–	–	–
70.	▶	TR.RS.70.L	TR.RS.70.R	620	900	545	167	65	9.2
85.	▶	TR.RS.85.L	TR.RS.85.R	670	900	565	167	65	9.5
85. (R 240)	▶	–	–	–	–	–	–	–	–
100.	▶	TR.RS.100.L	TR.RS.100.R	580	938	614	167	108	11.5
125.	▶	–	–	–	–	–	–	–	–

Please order matching triflex® R e-chain® separately.

Ø		Optional cover	A	B	C	D	Load*	Weight
Index		retrofit kit	[mm]	[mm]	[mm]	[mm]	≤ [kg]	[kg]
30.	▶	–	–	–	–	–	–	–
40.	▶	TR.RS.40.COVER	101.7	550	567.5	244.6	1.5	2.3
50.	▶	–	–	–	–	–	–	–
60.	▶	TR.RS.60.COVER	170.7	850	880	344.6	3.5	5.2
65.	▶	–	–	–	–	–	–	–
70.	▶	TR.RS.70.COVER	170.7	850	880	344.6	3.5	5.2
85.	▶	TR.RS.85.COVER	170.7	850	880	344.6	3.5	5.2
85. (R 240)	▶	–	–	–	–	–	–	–
100.	▶	TR.RS.100.COVER	172	853	910.5	397.6	3.5	5.5
125.	▶	–	–	–	–	–	–	–

*Maximum fill weight to be used with the cover



TR.RS.XX.L / R

e-chains® series

RS retraction system and matching e-chain®

System design | RSP and matching e-chains®

Optional cover for additional installation space
on the robot: **TR.RS.XX.COVER**

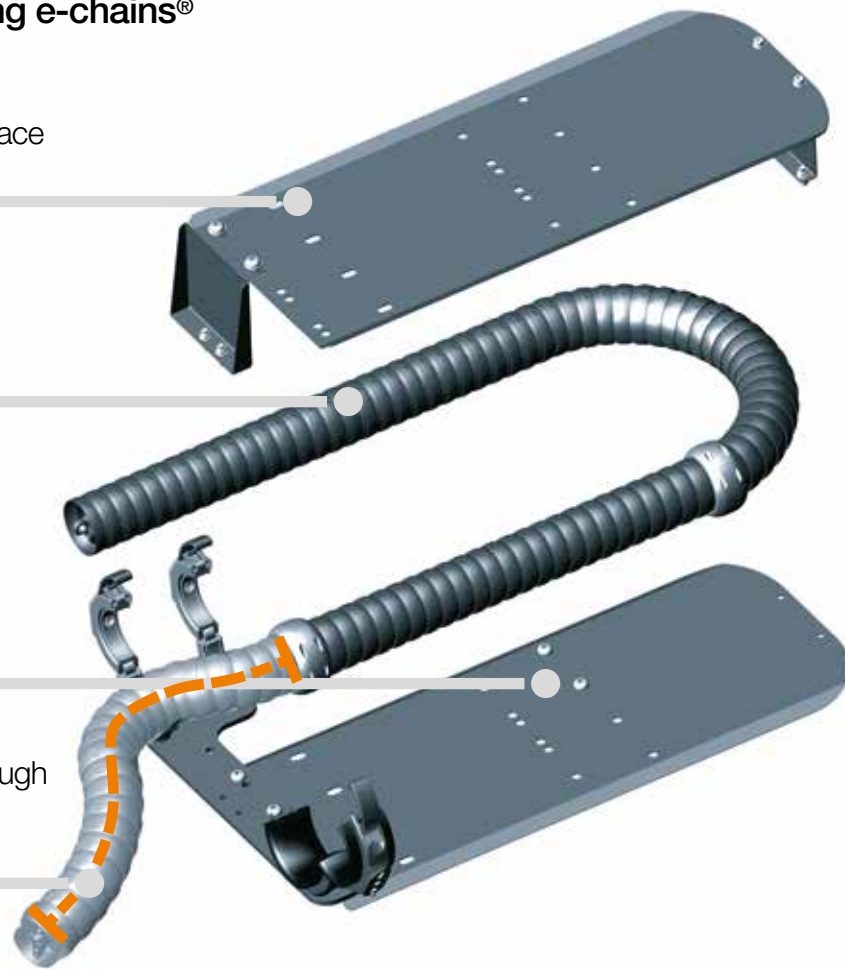
Matching triflex® R e-chains® for RS
with integrated fibre-rods

TRC.RS.XX.**R**.**LLLL**.0
TRE.RS.XX.**R**.**LLLL**.0.B



RS-system (without e-chain®) +
Support plate +
Mounting bracket +
Gliding feed-through =
TR.RS.XX.L or **TR.RS.XX.R**

Overall length =
additional length from the gliding feed-through
LLLL +
the e-chain® length within the system



Sample order of a complete TR.RS system, ø-Index 60, fixed end on the left, including cover and e-chain® (standard length: 500 mm)

System Insert Ø index **XX** / select fixed end **.L / .R** **TR.RS.60.L**

+ **Cover** Insert Ø index **XX** / Insert Ø index **XX** (cover optional) **TR.RS.60.CO**

+ e-chain® Insert ø-index **XX** / Insert bend radius **R** / Insert standard length **LLLL** **TRC.RS.60.087.500.0**

Order text: TR.RS.60.L + TR.RS.60.COVER + TRC.RS.60.087.500.0



Order key e-chains®

TRC.RS.XX.**R**.**LLLL**.0TRE.RS.XX.**R**.**LLLL**.0.B

■ Default colour black

Additional length

R Bend radius

Ø Index

System

e-chains® series

Product range

e-chain® and cable length calculation

Product range | Matching e-chains® for RS

Ø		Part No. TRC	Part No. TRE
Index		enclosed	"easy" design
30.	▶	–	–
40.	▶	TRC.RS.40.058. LLLL.0	TRE.RS.40.058. LLLL.0.B
50.	▶	–	–
60.	▶	TRC.RS.60.087. LLLL.0	TRE.RS.60.087. LLLL.0.B
65.	▶	–	–
70.	▶	TRC.RS.70.110. LLLL.0	TRE.RS.70.110. LLLL.0.B
85.	▶	TRC.RS.85.135. LLLL.0	TRE.RS.85.135. LLLL.0.B
85. (R 240)	▶	–	–
100.	▶	TRC.RS.100.145.LLLL.0	TRE.RS.100.145.LLLL.0.B/C
125.	▶	–	–

1) Available for B- and C-versions

*Standard lengths from the gliding feed-through outside the system - special lengths upon request.

e-chains® standard lengths*

LLL [mm] | **500** | **1000** | **1500** | **2000** |

Part No. with desired value for the standard length **LLLL** (measured from the gliding feed-through)

corresponds to the robot arm length from axis 3. Supplement to **TRC.RS.60.087.500.0**, for example

Calculating the overall e-chain® length | RS e-chains®

Ø		Bend radius	e-chain® length*	Number of	Total e-chain® length
Index		R [mm]	[mm]	e-chain® links	[mm]
30.	▶	—	—	—	—
40.	▶	058	1251	90	LLLL + 1251
50.	▶	—	—	—	—
60.	▶	087	1734	85	LLLL + 1734
65.	▶	—	—	—	—
70.	▶	110	1994	74	LLLL + 1994
85.	▶	135	2080	68	LLLL + 2080
85. (R 240)	▶	—	—	—	—
100.	▶	145	2105	61	LLLL + 2105
125.	▶	—	—	—	—

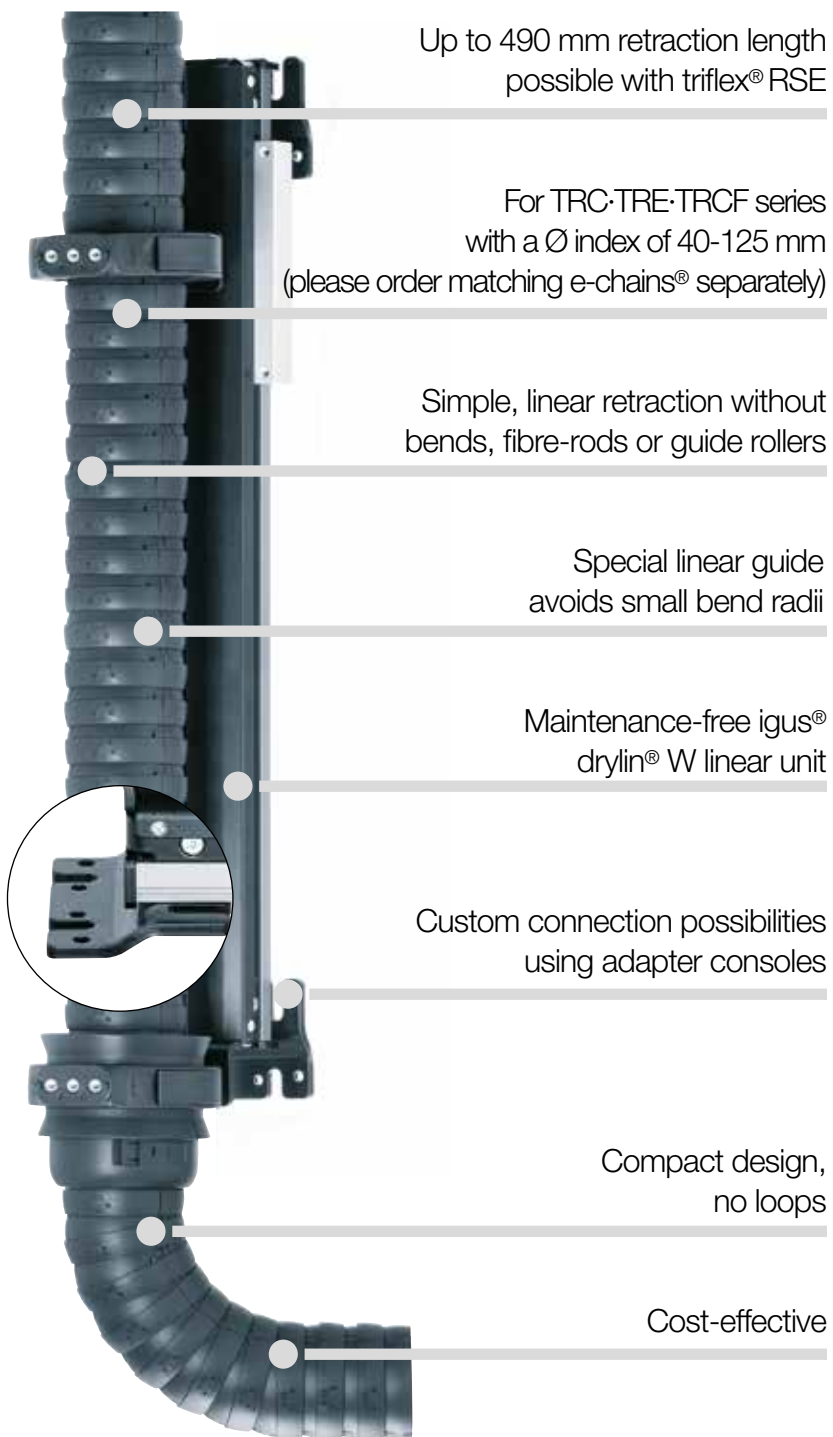
*Values are related to the e-chain® length within the system

Please add the e-chain® length within the system to the standard length **LLLL**

(measured from the gliding feed-through) to get the **overall e-chain®** length

RSE linear

Cost-effective retraction system, linear



Cost-effective, linear retraction system - triflex® RSE linear

The more complex the automated production technology, the greater are the requirements placed on energy supply systems. It is increasingly the case that not only electric power and fluids have to be supplied to production robots; but also laser cables and supply hoses for rivets, pins and screws. As these often cannot function with small bend radii, the new triflex® RSE relies on very easy linear retraction without curves and spring rods or deflection rollers. The purpose of the triflex® RSE retraction system is to hold the e-chain® as closely as possible to the robot arm in order to prevent the e-chain® from intruding upon or blocking the robot's movements.

- For series TRC·TRE·TRCF with a Ø-index of 40-125 mm
- Special linear guide avoids small bend radii
- Up to 490 mm retraction length possible
- Simple, linear retraction without bends, fibre-rods or guide rollers
- Cost-effective
- Maintenance-free igus® drylin® W linear unit

Optional accessories | RSE linear, cost-effective linear retraction system



Adapter consoles - for custom mounting options



Axis 6 clamp - for triflex® R mounting bracket

Applications

RSE linear - R(etraction) S(ystem) E(lastic) linear



igus® TR.RSE system on test robot



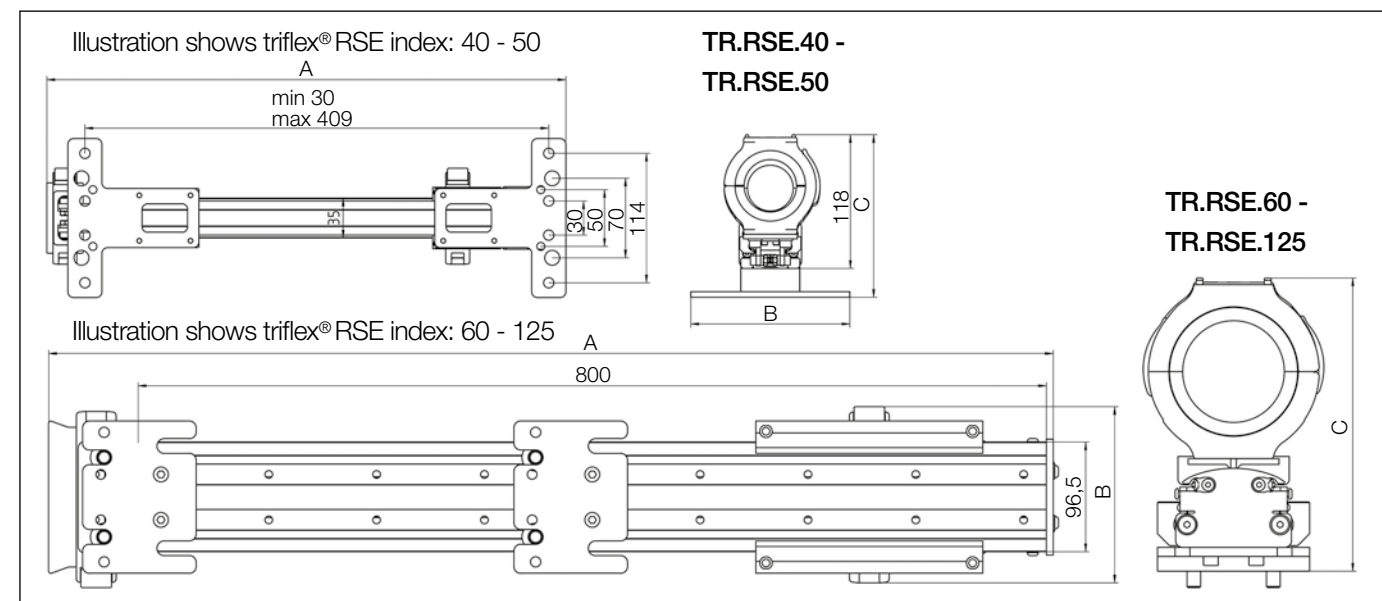
Lightweight, linear TR.RSE.40 retraction system for small robots



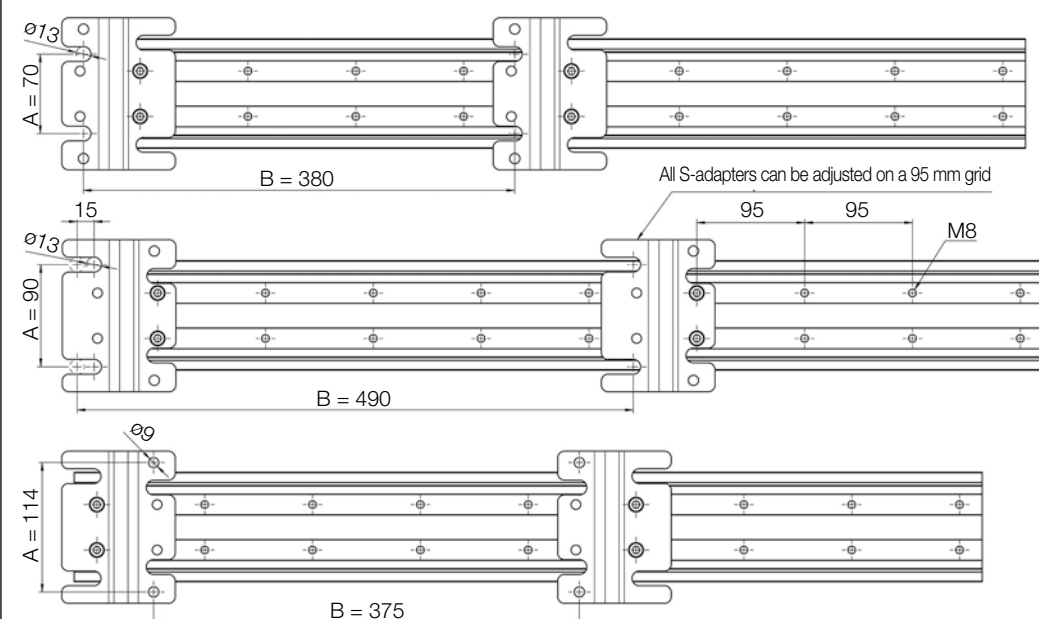
Linear TR.RSE retraction system for installation sizes 60-125 with attachment brackets for a wide variety of robot models

Technical data

Dimensions | RSE linear, cost-effective linear retraction system



Possible installation positions for TR.RS.60 - TR.RS.125 | RSE linear



Installation
position01

Installation position 02

Installation position03

Installation position01			Installation position 02			Installation position 03		
A	B	Thread size	A	B	Thread size	A	B	Thread size
[mm]	[mm]		[mm]	[mm]		[mm]	[mm]	
70	190	M12	90	175 - 205	M12	114	185	M8
70	285	M12	90	270 - 300	M12	114	280	M8
70	380	M12	90	365 - 395	M12	114	375	M8
70	475	M12	90	460 - 490	M12	114	470	M8
70	570	M12	90	555 - 585	M12	114	565	M8
70	665	M12	90	650 - 680	M12	114	660	M8
70	760	M12	90	745 - 775	M12			

Product range

RSE linear for series TRC·TRE·TRCF

Product range | RSE linear, cost-effective linear retraction system

Ø	Part No.	Retraction length ¹⁾	A	B	C	Weight	Part No.
Index	RSE linear	≤ [mm]	[mm]	[mm]	[mm]	[kg]	RSE support
30.	▶ –	–	–	–	–	–	–
40.	▶ TR.RSE.40	290	457	140	143	1.4	–
50.	▶ TR.RSE.50	290	475	140	151	1.7	–
60.	▶ TR.RSE.60	490	868	134	231	9.9	TR.914.973.60
65.	▶ TR.RSE.65	490	880	134	231	10.0	TR.914.973.65
70.	▶ TR.RSE.70	490	878	155	258	10.0	TR.914.973.70
85.	▶ TR.RSE.85	490	885	155	258	10.0	TR.914.973.85
85. (R 240)	▶ TR.RSE.85.240	490	885	155	258	10.0	–
100.	▶ TR.RSE.100	490	886	170	264	10.2	TR.914.973.100
125.	▶ TR.RSE.125	490	876	190	280	10.5	–

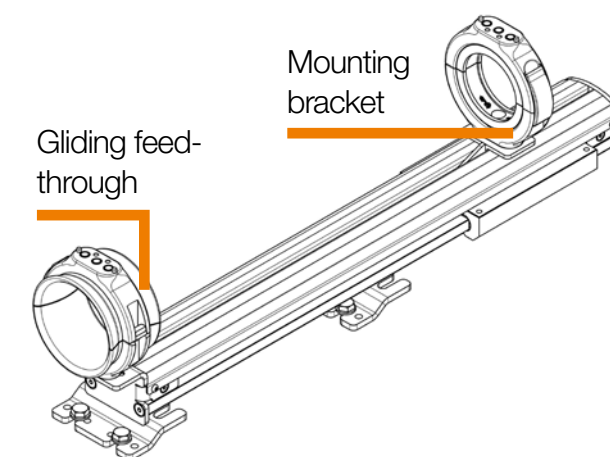
1) These are the maximum values. In normal operation a filling of no more than 70% is advised.

Please order matching triflex® R e-chain® separately. RSE support optional, please order separately.

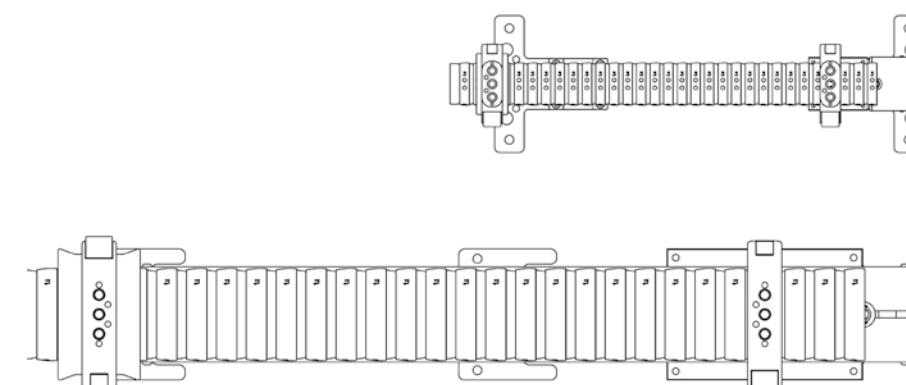
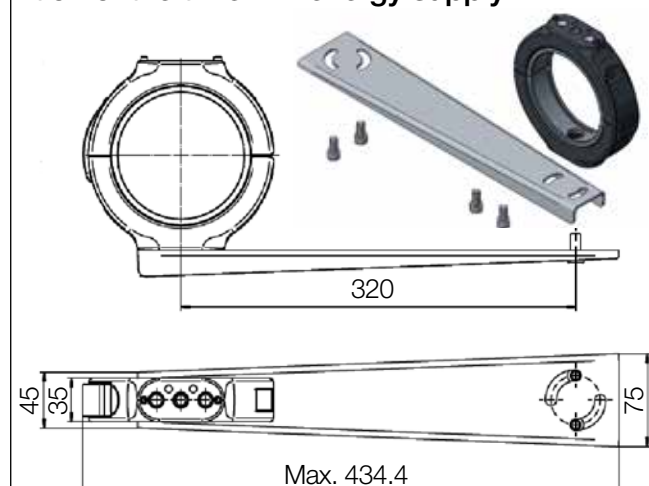
RSE linear retraction system

Mounting bracket and gliding feed-through are included.

Please order matching triflex®R e-chain® separately.



Optional - RSE support for the lateral deflection of the triflex® R energy supply

 **Order key**

TR.RSE.XXX

- Ø Index
- System
- e-chains® series

RSE linear accessories

RSE linear retraction system and matching e-chains®

System design | RSE linear and matching e-chain®

Matching triflex® R e-chain® for RSE linear

TRC .XX.**R**.0

TRE .XX.**R**.0.B

TRCF.XX.**R**.0



Excess length in direction **A1** +

Dimension **A** +

Excess length in direction **A6** =

Total e-chain® length

Limit protector

RSE linear system (without e-chain®) +

Mounting bracket +

Gliding feed-through =

TR.RSE.XX



Sample order of a complete TR.RSE linear system,
Ø index 40, and e-chain® (length: 2 m)

System	Insert Ø index XX	TR.RSE.40
+ e-chain®	Insert Ø index XX / Insert bend radius R / Insert standard length LLLL in metres	2 m TRC.40. 058 .0
+ Protector	Protector with quick-lock fastener	TR.40.30
Order text:	TR.RSE.40. + 2 m TRC.40. 058 .0 + TR.40.30	



Order key e-chains®

TRC .XX.**R**.0

TRE .XX.**R**.0.B

TRCF.XX.**R**.0

Default colour black

R Bend radius

Ø Index

e-chains® series

Product range

e-chain® and cable length calculation

Product range | Matching e-chains® and protectors for RSE linear

Ø Index	Part No. TRC enclosed	Part No. TRE "easy" design	Part No. TRCF with snap lock mechanism	Protector with screw fastener	Protector with quick-lock fastener
30.	▶ –	–	–	–	–
40.	▶ TRC.40. 058 .0	TRE.40. 058 .0.B	–	TR.40.10	TR.40.30
50.	▶ TRC.50. 080 .0	TRE.50. 080 .0.B	–	TR.50.10	–
60.	▶ TRC.60. 087 .0	TRE.60. 087 .0.B	–	TR.60.10	TR.60.30
65.	▶ –	–	TRCF.65. 100 .0	TR.65.10	–
70.	▶ TRC.70. 110 .0	TRE.70. 110 .0.B	–	TR.70.10	TR.70.30
85.	▶ TRC.85. 135 .0	TRE.85. 135 .0.B	TRCF.85. 135 .0	TR.85.10	TR.85.30
85. (R 240)	▶ –	–	TRCF.85. 240 .0	TR.85.240.10	–
100.	▶ TRC.100. 145 .0	TRE.100. 145 .0.B/C ¹⁾	TRCF.100. 145 .0	TR.100.10	TR.100.30
125.	▶ TRC.125. 182 .0	TRE.125. 182 .0.B	–	TR.125.10	–

1) Available for B- and C-versions

Please order e-chains® as piece parts and purchase a protector for each one.

Please order protectors with screw connections or quick release as limit protectors.

To calculate the total e-chain® length, add the desired excess length from axis 1 and axis 6 to dimension A (lower table). Additionally, at least 1 limit protector must be ordered.

Please note that all triflex® R e-chains® can be lengthened and shortened individually and can be customized to meet the needs of your application.

Calculating the overall e-chain® length | RSE linear e-chains®

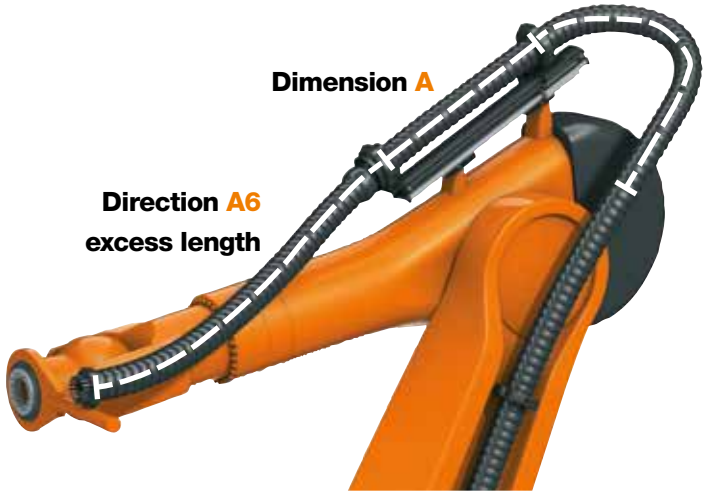
Ø Index	Bend radius R [mm]	A [mm]
30.	–	–
40.	058	390
50.	080	390
60.	087	750
65.	100	750
70.	110	750
85.	135	750
85. (R 240)	240	750
100.	145	750
125.	182	750

Excess length in direction **A6** + Dimension **A** + Excess length in direction **A1** = **Total e-chain® length**

Direction **A1**
excess length

Dimension **A**

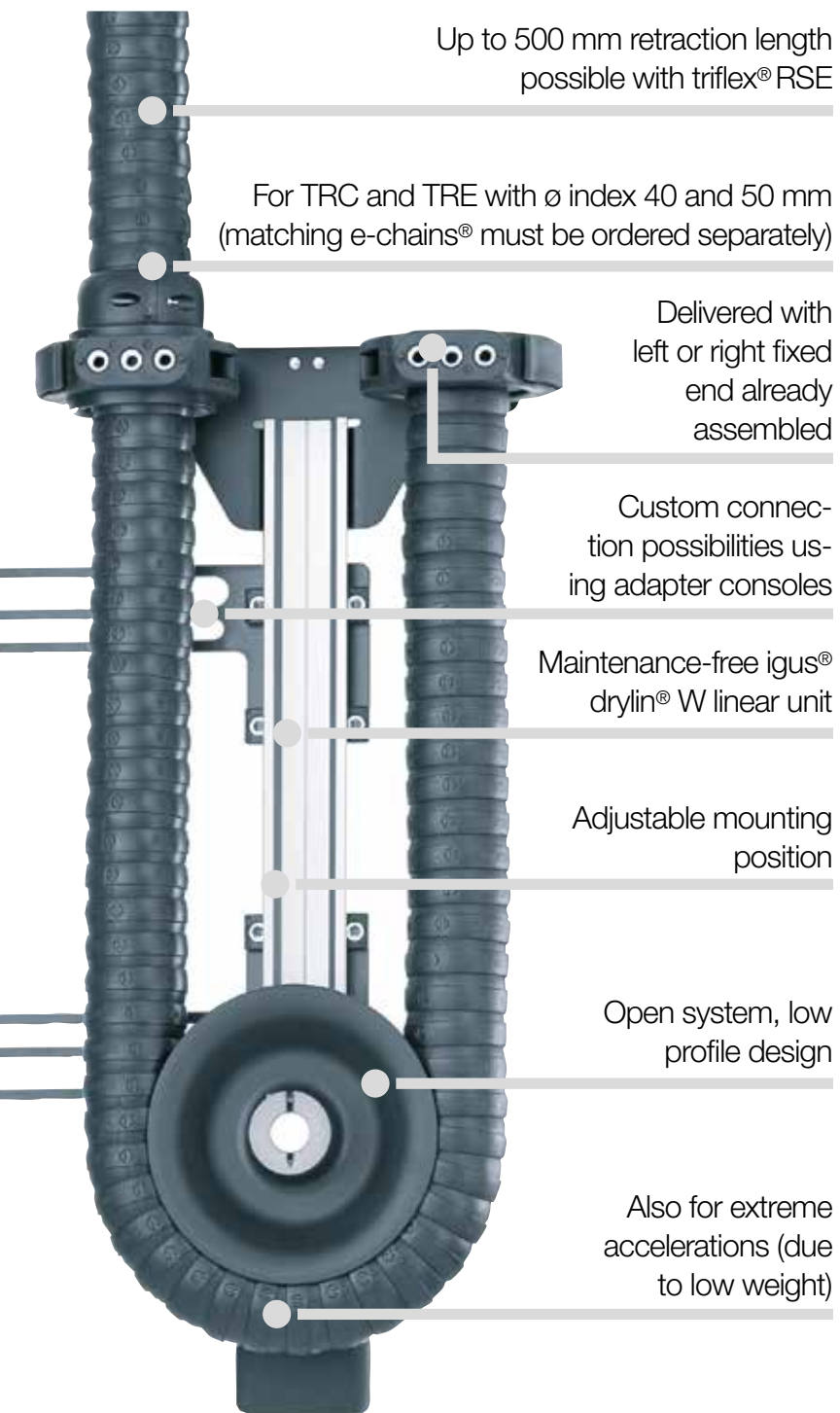
Direction **A6**
excess length



triflex® R length calculation for RSE linear

RSE Retraction system

Cost-effective retraction system with deflection



Cost-effective retraction system with deflection for small robots - triflex® RSE

Specially developed for robots with small to medium cable and dress-packs, the igus® triflex® RSE retraction system offers a way to prevent loop formation in the workspace of the robot, even in highly dynamic applications.

- For series TRC·TRE with $\varnothing$ -index 40/50 mm
- Extremely fast response, even in highly dynamic robot programs
- Low weight on the robot, very little reduction in robot handling capacity
- Universal adjustable installation brackets
- Maintenance and lubrication-free igus® drylin® W linear unit
- For maximum degrees of freedom
- More tolerance for the robot's programmer
- For cable diameters up to 18.8 mm

Optional accessories | RSE retraction system



Cover - for additional mounting space and extreme movements



Adapter consoles - for custom mounting options



Axis 6 clamp - for triflex®R mounting bracket

Applications

RSE - R(etraction) S(ystem) E(lastic)



Reliable and controlled energy supply, even in confined space

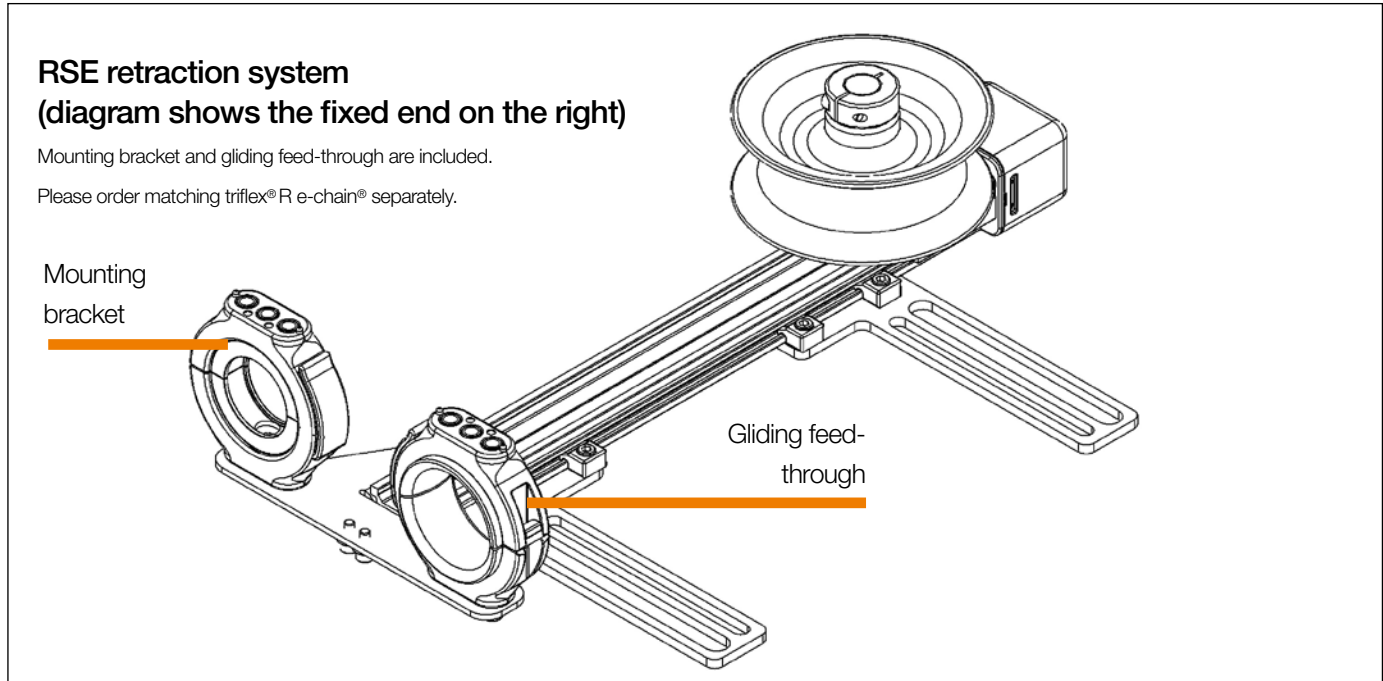
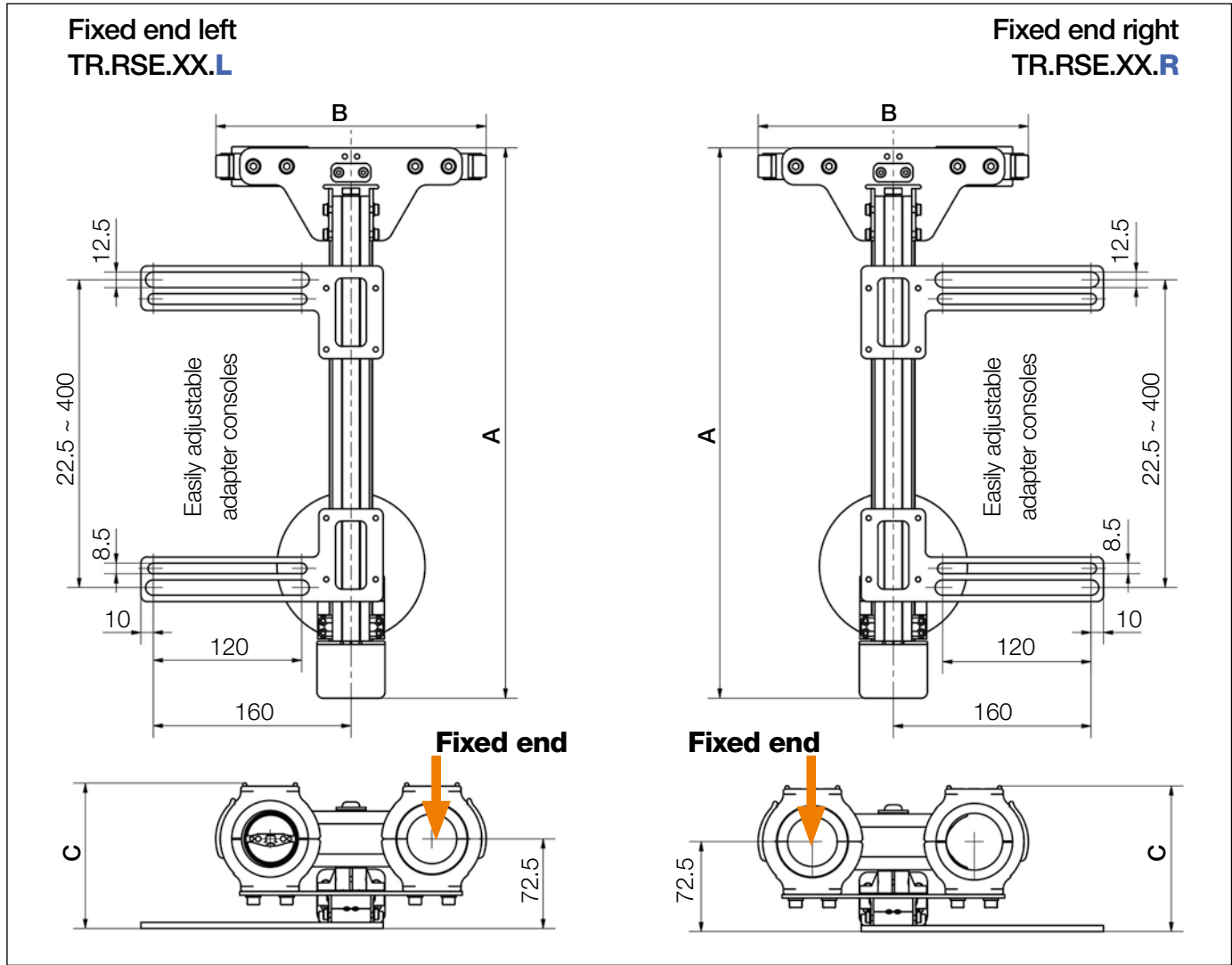


e-chain® is guided closely to the arm with a low profile

triflex® R accessories

Technical data

Dimensions | RSE cost-effective retraction system



Product range

triflex® R RSE for series TRC·TRE

Product range | RSE cost-effective retraction system with deflection

Ø	Part No.	Part No.	Retraction length ¹⁾	A	B	C	Weight
Index	fixed end left	fixed end right	≤ [mm]	[mm]	[mm]	[mm]	[kg]
40.	▶ TR.RSE.40.L	TR.RSE.40.R	500	440	220	110	1.6
50.	▶ TR.RSE.50.L	TR.RSE.50.R	500	497	275	132	2.1

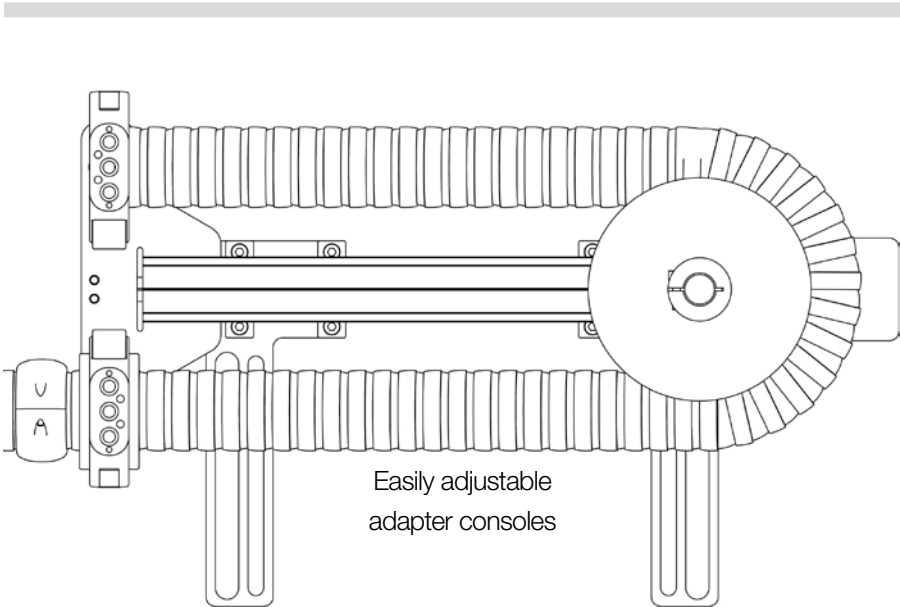
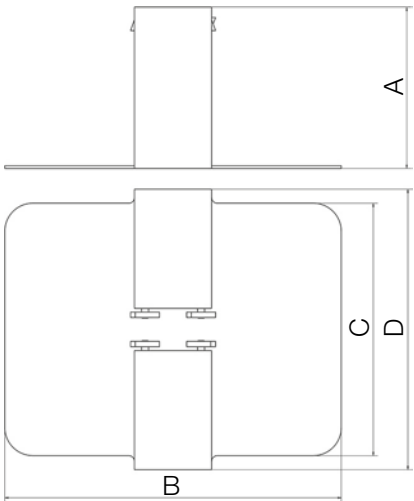
1) These are the maximum values. In normal operation a filling of no more than 70% is advised.

Please order matching triflex® R e-chain® separately.

Product range | Cover, optional

Ø	Optional cover	A	B	C	D	Load*	Weight
Index	retrofit kit	[mm]	[mm]	[mm]	[mm]	≤ [kg]	[kg]
40.	▶ TR.RSE.40.COVER	115	240	180	200	1.5	1.1
50.	▶	–	–	–	–	–	–

*Maximum fill weight to be used with the cover



Order key

TR.RSE.40.L / R

R

L

Ø

System

e-chains® series

= Fixed end right

= Fixed end left

= Index

= System

= e-chains® series

RSE Accessories

RSE and matching e-chains®

System design | RSE and matching e-chains®

Cover for additional installation space
on the robot, optional: **TR.RSE.40.COVER**

Matching triflex®R e-chains® for RSE

TRC.RSE.XX.R.LLLL.0

TRE.RSE.XX.R.LLLL.0.B



Overall length =
additional length from the gliding feed-through
LLLL +
the e-chain® length within the system

RSE system
(e-chain® not included) +
Mounting bracket +
Gliding feed-through =
TR.RSE.XX.L or **TR.RSE.XX.R**

 **Sample order of a complete TR.RSE system, Ø Index 40, fixed end on the left, including cover and e-chain® (standard length: 500 mm)**

System Insert Ø index **XX** / select fixed end **.L** / **.R** **TR.RS.40.L**

+ Cover Insert Ø index **XX** / Insert Ø index **XX** (cover optional) **TR.RSE.40.COVER**

+ e-chain® Insert ø-index **XX** / Insert bend radius **R** / Insert standard length **LLLL** **TRC.RSE.40.058.500.0**

Order text: **TR.RSE.40.L** + **TRE.RS.40.COVER** + **TRC.RSE.40.058.500.0**



Order key e-chains®

TRC.RSE.XX.R.LLLL.0

TRE.RSE.XX.R.LLLL.0.B



Default colour black

Additional length

R Bend radius

Ø Index

System

e-chains® series

Product range

e-chain® and cable length calculation

Product range | Matching e-chains® for RSE

Ø Index	Part No. TRC enclosed	Part No. TRE "easy" design
40.	TRC.RSE.50.058.LLLL.0	TRE.RSE.40.058.LLLL.0.B
50.	TRC.RSE.50.080.LLLL.0	TRE.RSE.50.080.LLLL.0.B

*Standard lengths from the gliding feed-through outside the system - special lengths upon request.

e-chains® standard lengths*

LLLL [mm] | **500** | **750** | **1000** | **1250** |

Part No. with desired value for the standard length **LLLL** (measured from the gliding feed-through) corresponds to the robot arm length from axis 3. Supplement to **TRC.RSE.50.058.500.0**, for example

Calculating the overall e-chain® length | RSE e-chains®

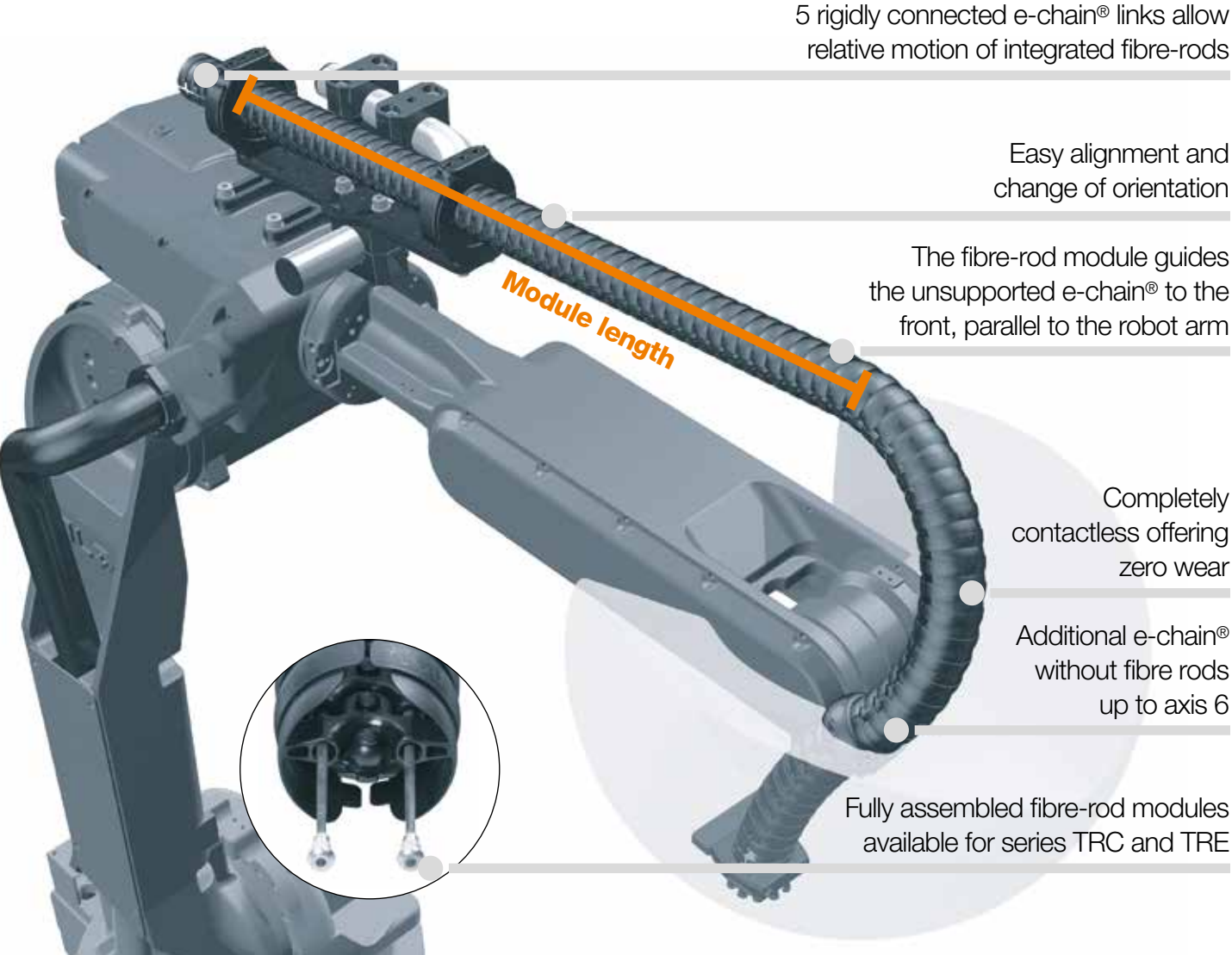
Ø Index	Bend radius R [mm]	e-chain® length* [mm]	Number of e-chain® links	Total e-chain® length [mm]
40.	058	904	65	LLLL + 904
50.	080	1044	60	LLLL + 1044

*Values are related to the e-chain® length within the system

Please add the e-chain® length within the system to the standard length **LLLL** (measured from the gliding feed-through) to get the **overall e-chain® length**

triflex® R accessories

Fibre rod modules and universal installation sets



Fibre-rod modules for a directional pretension of the e-chain®

We supply fully assembled fibre-rod modules for triflex® R e-chain® Series TRC and TRE. The integrated fibre-rods generate a directional pretension for the e-chain®. This system creates a unique choice of movements for the energy supply system to the final axis of industrial robots. The fibre-rod module guides the unsupported e-chain® to the front, parallel to the robot arm. The bending properties of the modules depends on the installation orientation: only the front end allows flexible movement. The five rear e-chain® links are rigidly connected to allow the relative movement of the integrated fibre-rods. This results in a fully contactless and therefore zero-wear energy supply system, designed for moderate movements with limited rotational motion of the axes. Additional e-chain® without fibre-rods for the final axis area needs to be ordered separately.



Product range

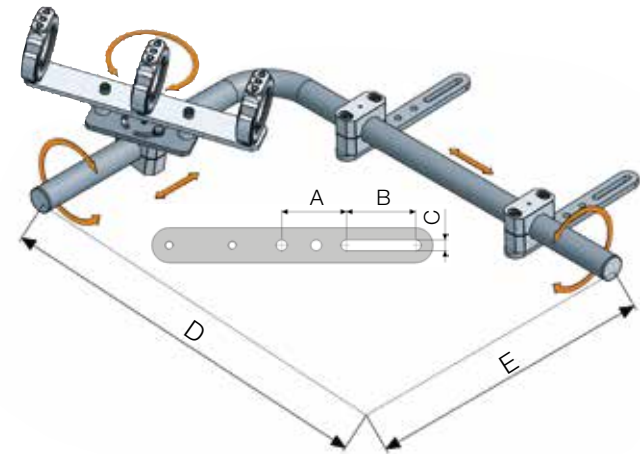
For series TRC·TRE

Part No. fibre-rod modules for TRC / TRE		Length [m]	Part No. fibre-rod modules for TRC / TRE		Length [m]
TRC.40			TRE.40		
TRC.F.40.1000.1.0	TRE.F.40.1000.1.0.B	≈ 1.0	TRC.F.85.2000.1.0	TRE.F.85.2000.1.0.B	≈ 2.0
TRC.F.40.0900.1.0	TRE.F.40.0900.1.0.B	≈ 0.9	TRC.F.85.1800.1.0	TRE.F.85.1800.1.0.B	≈ 1.8
TRC.F.40.0800.1.0*	TRE.F.40.0800.1.0.B*	≈ 0.8	TRC.F.85.1600.1.0	TRE.F.85.1600.1.0.B	≈ 1.6
TRC.F.40.0700.1.0	TRE.F.40.0700.1.0.B	≈ 0.7	TRC.F.85.1400.1.0*	TRE.F.85.1400.1.0.B*	≈ 1.4
TRC.F.40.0600.1.0	TRE.F.40.0600.1.0.B	≈ 0.6	TRC.F.85.1200.1.0	TRE.F.85.1200.1.0.B	≈ 1.2
TRC.F.40.0500.1.0	TRE.F.40.0500.1.0.B	≈ 0.5	TRC.F.85.1000.1.0	TRE.F.85.1000.1.0.B	≈ 1.0
TRC.F.40.0400.1.0	TRE.F.40.0400.1.0.B	≈ 0.4	TRC.F.85.0800.1.0	TRE.F.85.0800.1.0.B	≈ 0.8
TRC.60			TRE.60		
TRC.F.60.1400.1.0	TRE.F.60.1400.1.0.B	≈ 1.4	TRC.F.100.2000.1.0	TRE.F.100.2000.1.0.B/C ¹⁾	≈ 2.0
TRC.F.60.1200.1.0	TRE.F.60.1200.1.0.B	≈ 1.2	TRC.F.100.1800.1.0	TRE.F.100.1800.1.0.B/C ¹⁾	≈ 1.8
TRC.F.60.1000.1.0*	TRE.F.60.1000.1.0.B*	≈ 1.0	TRC.F.100.1600.1.0	TRE.F.100.1600.1.0.B/C ¹⁾	≈ 1.6
TRC.F.60.0800.1.0	TRE.F.60.0800.1.0.B	≈ 0.8	TRC.F.100.1400.1.0*	TRE.F.100.1400.1.0.B/C ¹⁾ *	≈ 1.4
TRC.F.60.0600.1.0	TRE.F.60.0600.1.0.B	≈ 0.6	TRC.F.100.1200.1.0	TRE.F.100.1200.1.0.B/C ¹⁾	≈ 1.2
TRC.F.60.0400.1.0	TRE.F.60.0400.1.0.B	≈ 0.4	TRC.F.100.1000.1.0	TRE.F.100.1000.1.0.B/C ¹⁾	≈ 1.0
TRC.70			TRE.70		
TRC.F.70.1800.1.0	TRE.F.70.1800.1.0.B	≈ 1.8	TRC.F.125.2000.1.0	TRE.F.125.2000.1.0	≈ 2.0
TRC.F.70.1600.1.0	TRE.F.70.1600.1.0.B	≈ 1.6	TRC.F.125.1800.1.0*	TRE.F.125.1800.1.0*	≈ 1.8
TRC.F.70.1400.1.0	TRE.F.70.1400.1.0.B	≈ 1.4	TRC.F.125.1600.1.0	TRE.F.125.1600.1.0	≈ 1.6
TRC.F.70.1200.1.0*	TRE.F.70.1200.1.0.B*	≈ 1.2	TRC.F.125.1400.1.0	TRE.F.125.1400.1.0	≈ 1.4
TRC.F.70.1000.1.0	TRE.F.70.1000.1.0.B	≈ 1.0	TRC.F.125.1200.1.0	TRE.F.125.1200.1.0	≈ 1.2
TRC.F.70.0800.1.0	TRE.F.70.0800.1.0.B	≈ 0.8	TRC.F.125.1000.1.0	TRE.F.125.1000.1.0	≈ 1.0
TRC.125			TRE.125		
TRC.F.125.2000.1.0	TRE.F.125.2000.1.0	≈ 2.0	TRC.F.125.1800.1.0*	TRE.F.125.1800.1.0*	≈ 1.8
TRC.F.125.1800.1.0*	TRE.F.125.1800.1.0*	≈ 1.8	TRC.F.125.1600.1.0	TRE.F.125.1600.1.0	≈ 1.6
TRC.F.125.1600.1.0	TRE.F.125.1600.1.0	≈ 1.6	TRC.F.125.1400.1.0	TRE.F.125.1400.1.0	≈ 1.4
TRC.F.125.1400.1.0	TRE.F.125.1400.1.0	≈ 1.4	TRC.F.125.1200.1.0	TRE.F.125.1200.1.0	≈ 1.2
TRC.F.125.1200.1.0	TRE.F.125.1200.1.0	≈ 1.2	TRC.F.125.1000.1.0	TRE.F.125.1000.1.0	≈ 1.0

*Maximum recommended length for fibre-rod modules 1) Please append index - C for C version

Universal installation sets | For TRC·TRE

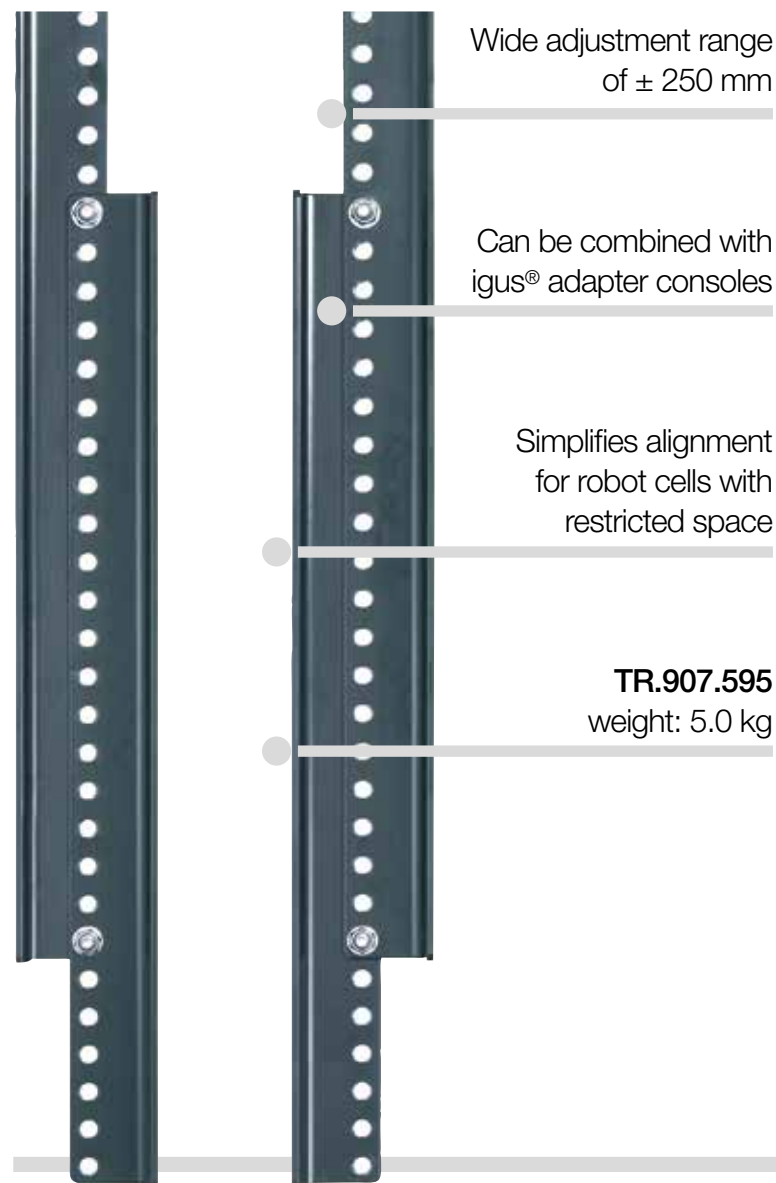
- Stainless steel angle tube with attachment brackets
- Freely positionable
- The energy supply system can be quickly and easily adapted to new programming sequences of the robot
- With 2 mounting brackets for sizes 40 and 60 - with 3 mounting brackets starting at size 70



Ø	Part No.	A	B	C	D	E	Weight
Index		[mm]	[mm]	[mm]	[mm]	[mm]	[kg]
40.	▶ TR.40.80	40	30	8.4	475	325	3.6
60.	▶ TR.60.80	40	30	8.4	475	325	4.3
70.	▶ TR.70.80	75	80	12.6	875	575	5.9
85.	▶ TR.85.80	75	80	12.6	875	575	6.3
100.	▶ TR.100.80	75	80	12.6	875	575	6.3
125.	▶ TR.125.80	75	80	12.6	875	575	8.5

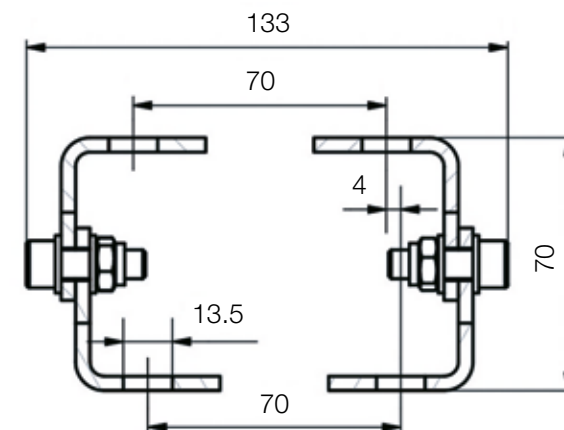
triflex® R accessories

Adjustment units for retraction systems

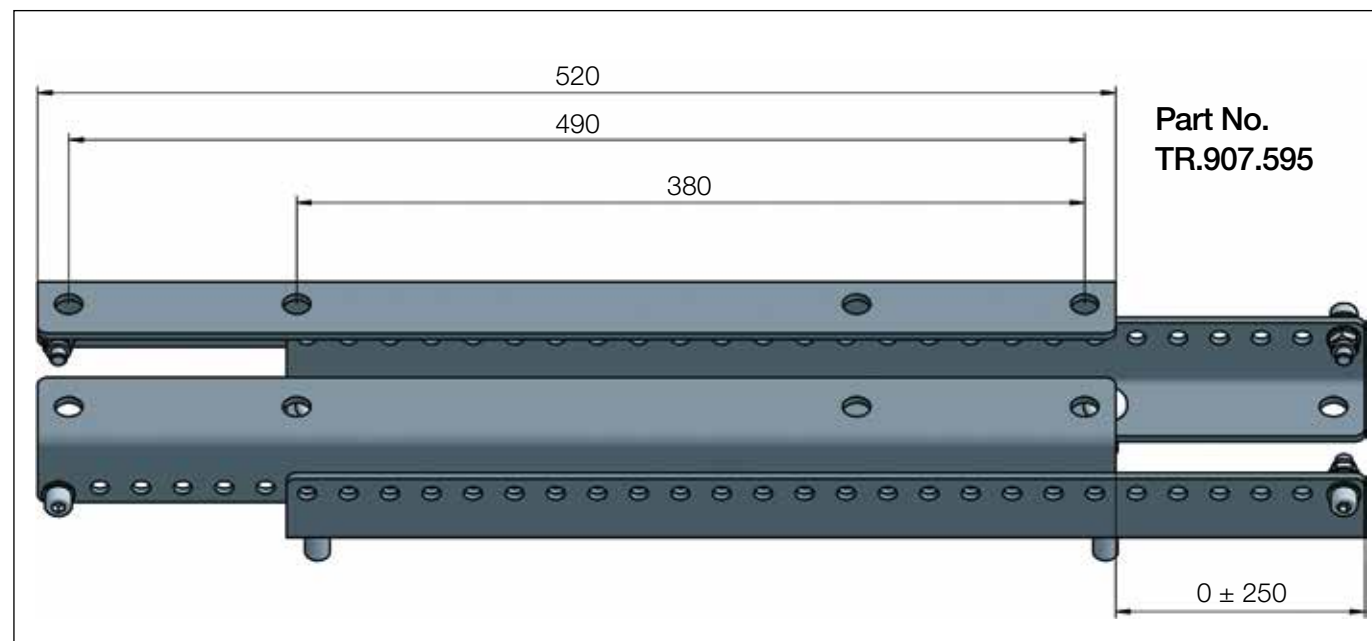


Adjustment unit for RSP and RS retraction systems

The optional adjustment unit is installed between the robot arm and the retraction system, and allows accurate adjustments of the position of the igus® retraction system on the robot arm. Particularly useful for multiple working programs using the same cable package.



TR.907.595
weight: 5.0 kg



Adjustment unit to easily change the position of the retraction system

triflex® R accessories

Adapter consoles for retraction systems



Adapter consoles for RSP, RS and RSE retraction systems

The RS and RSP retraction systems provide all widely used drill patterns for attachment: 380 x 70 mm and 490 x 90 mm (in Ø12.5 mm). We also supply a wide range of manufacturer and model-dependent adapter consoles from stock, in order to adapt to other robot variations. For example, many robot models are equipped from the factory with only side-mounted mounting options - in these cases, our adapter product range also supports reliable installation of the retraction systems without additional engineering. **Adapter consoles for many robot models, from stock. Product range ► next page**



Application example with RS system on ABB Series 6600

Product range

Adapter consoles for retraction systems from stock

Adapter console	Part No.	Manufacturer	Robot model				Weight [kg]
	TR.907.347	ABB	IRB 6600 IRB 6640 IRB 6650				4.0
	TR.907.468	ABB	IRB 6400				9.8
	TR.907.448	ABB	IRB 4400				5.0
	TR.907.381	ABB	IRB 2400/10 IRB 2400/16				5.2
	TR.907.905	ABB	IRB 6620				2.8
	TR.908.494	ABB	IRB 4600 IRB 2600				2.9
	TR.907.374	Comau	NH1 130-2.6 NH3 165-2.7 NH3 220-2.7		NJ 110-3.0 NJ 110-2.6 SMART5 NJ 165 3.0		4.7
	TR.907.447	Comau	NM 45-2.0 NM 16-3.1				3.4
	TR.908.493	Comau	Smart six				2.2
	TR.907.327	Motomann	UP 20 UP 50 UP 130	UP 165 ES 165 ES 200	ES 280 HP 20 HP 50	MH6 HP 165	3.6
	TR.909.641	Motomann	MH50				2.0

More adapter consoles upon request. CAD data online.

Product range

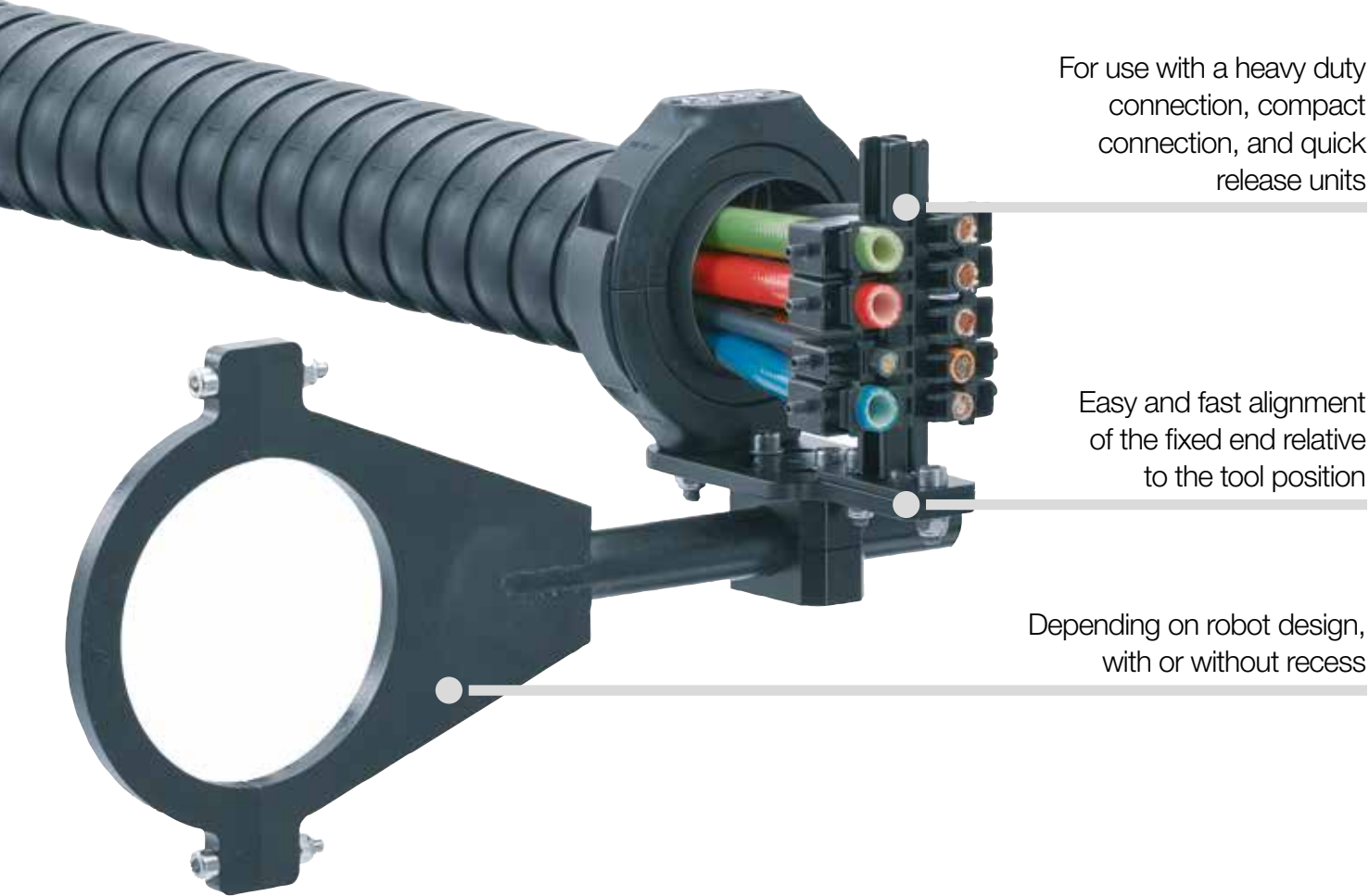
Adapter consoles for retraction systems from stock

Adapter console	Part No.	Manufacturer	Robot model		Weight [kg]
	TR.911.220	Fanuc	M-710iC 50 M-710iC 70		2.0
	TR.908.973	Fanuc	M-710iB 45		1.1
	TR.907.270	Fanuc	IR-2000iB R-2000iA R-1000iA	S 430 S 420	4.5
	TR.907.470.12	Fanuc	M-900iA 260L M-900iA 350		6.8
	TR.907.902.12	Fanuc	M-900iA 600		8.9
	TR.910.876	Fanuc	M900-IB700		4.6
	TR.907.599	Kuka	KR5 KR5arc	KR6 KR16	2.5
	TR.908.113	Kuka	KR-1000		5.2
	TR.908.014	Kuka	KR 60 (HA) KR 30 (HA)		4.3
	TR.907.706	Reis	RV30-26 RV10-16 RV20-16 RV60-16	RV60-26 RV60-40 RV60-60 RV130	4.3
	TR.911.223 Spacer bolt	Kuka	Series Quantec (4 piece kit)		0.6

More adapter consoles upon request. CAD data online.

triflex® R accessories

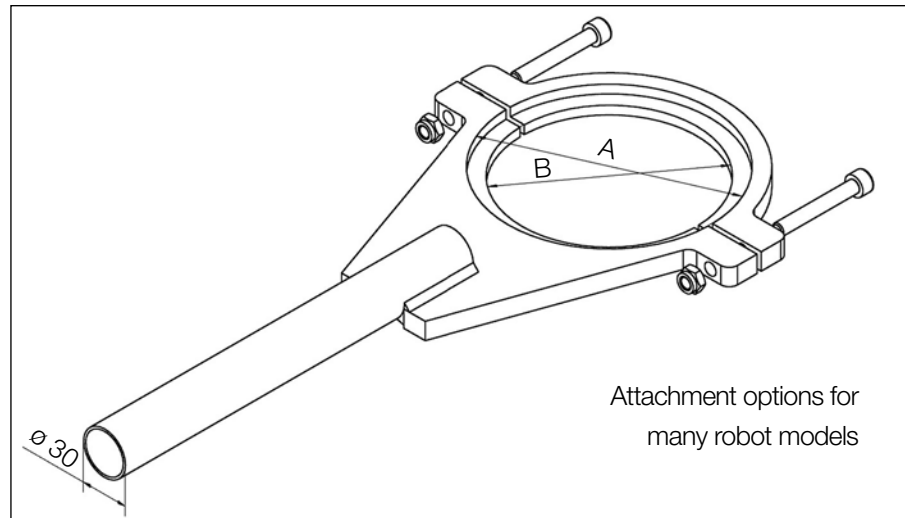
Clamps for attachment to axis 6



Clamps for attachment to axis 6

The clamp is used to attach a mounting bracket to axis 6, with a bar (Ø 30 mm) for all robots. They are easy and quick to assemble.

- For use with heavy duty connection **TR.XX.20** / **TR.XX.23**
- For use with compact connection **TR.XX.21.01** / **TR.XX.21.02**
- For use with quick exchange unit **TR.XX.22**

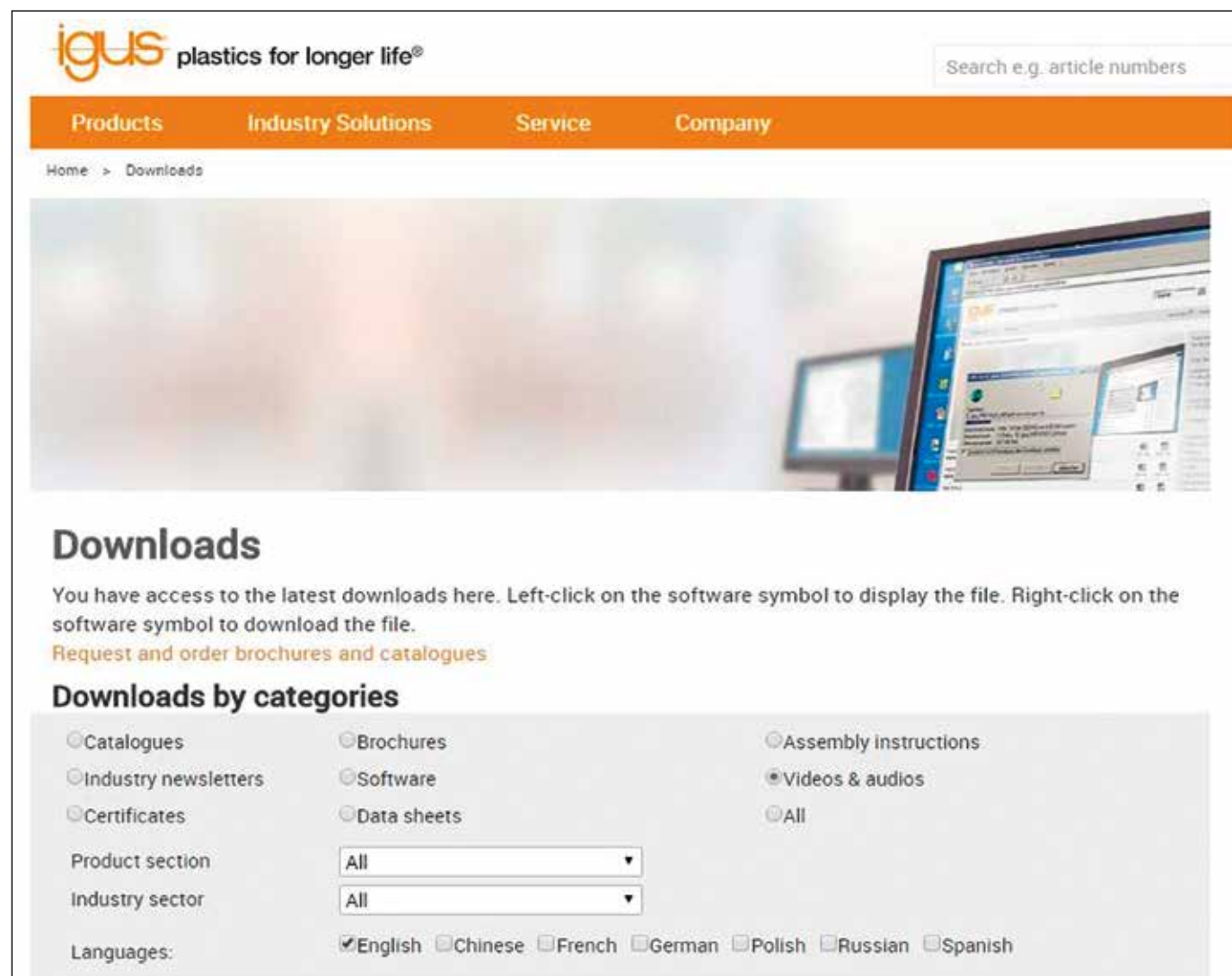


Product range

Clamps

Part No. Clamp	Robot model	With recess	A [mm]	B [mm]	Weight [kg]
TR.907.857	KUKA KR 30-3 (HA)	yes	130	115	1.9
	KUKA KR 60-3 (HA)	yes	130	115	1.9
	KUKA KR 60 L45-3 (HA)	yes	130	115	1.9
	KUKA KR 60 L30-3 (HA)	yes	130	115	1.9
TR.907.901	KUKA Quantec, large flange	yes	205	190	2.5
	KUKA KR 125/3	yes	205	190	2.5
	KUKA KR 150/3	yes	205	190	2.5
	KUKA KR 200/3	yes	205	190	2.5
	KUKA KR 360/1	yes	205	190	2.5
	KUKA KR 500/1	yes	205	190	2.5
	KUKA KR 150/2 Series 2000	yes	205	190	2.5
	KUKA KR 180/2 Series 2000	yes	205	190	2.5
	KUKA KR 210/2 Series 2000	yes	205	190	2.5
TR.908.115	KUKA KR 1000 Titan	yes	250	242	3.05
TR.907.992	Fanuc R-2000iB	yes	165	160	2.4
	Fanuc R-2000iA	yes	165	160	2.4
	Reis RV 130	yes	165	160	2.4
TR.908.065	Fanuc M-710iC 50	yes	130	124	2.2
	Fanuc M-710iC 70	yes	130	124	2.2
TR.909.387	Motoman UP 50	yes	125	100	1.9
	Motoman HP 50	yes	125	100	1.9
	Motoman MH 50	yes	125	100	1.9
TR.910.544	Reis RV60-60	yes	145	125	1.9
	Reis RV60-40	yes	145	125	1.9
	Fanuc R-1000	Yes	145	125	1.9
	Stäubli TX ₂ 00	yes	145	125	1.9
TR.908.347	for custom flange	no	125	= A	2.1
TR.907.667.125	KUKA Quantec small flange	no	140	= A	2.2
TR.907.667.140	Hyundai HX 165	no	142	= A	2.25
TR.907.667.150	Comau NJ 130	no	150	= A	2.4
TR.907.667.160	ABB IRB 6400	no	160	= A	2.45
	Fanuc S420	no	160	= A	2.45
TR.907.667.180	for custom flange	no	180	= A	2.55
TR.907.667.190	Comau NH3	no	190	= A	2.6
TR.907.667.200	KUKA KR 125/1	no	200	= A	2.7
	KUKA KR 150/1	no	200	= A	2.7
	KUKA KR 200/1	no	200	= A	2.7
	ABB IRB 6640	no	200	= A	2.7
	ABB IRB 6620	no	200	= A	2.7
	ABB IRB 6650	no	200	= A	2.7
	KUKA KR 360-2	no	220	= A	2.82
TR.907.667.220	KUKA KR 500-2	no	220	= A	2.82
	KUKA KR 360-3	no	220	= A	2.82
	KUKA KR 500-3	no	220	= A	2.82
TR.908.107.223	ABB IRB 7600-340	no	223	= A	3.5
	ABB IRB 7600-500	no	223	= A	3.5
TR.907.667.250	Fanuc M900iA 350	no	250	= A	3.2
	Fanuc M900iA 260L	no	250	= A	3.2
TR.907.667.275	Fanuc M900iA 200P	no	275	= A	3.4
TR.907.667.315	Fanuc M900iA 600	no	315	= A	3.6
	Fanuc M900iA 400L	no	315	= A	3.6

Other dimensions available upon request



Downloads

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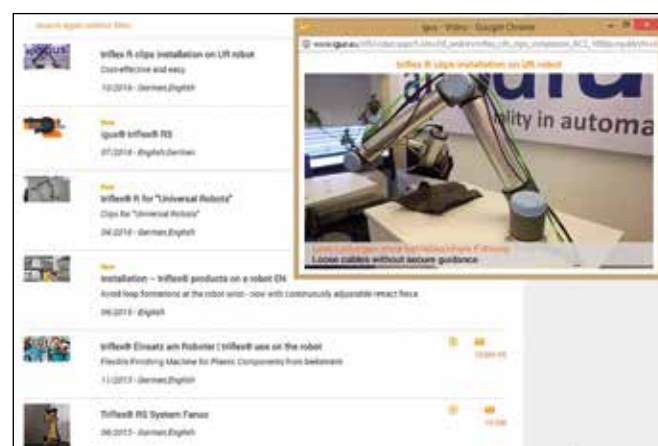
Downloads by categories

- ☐ Catalogues
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Product section:

Industry sector:

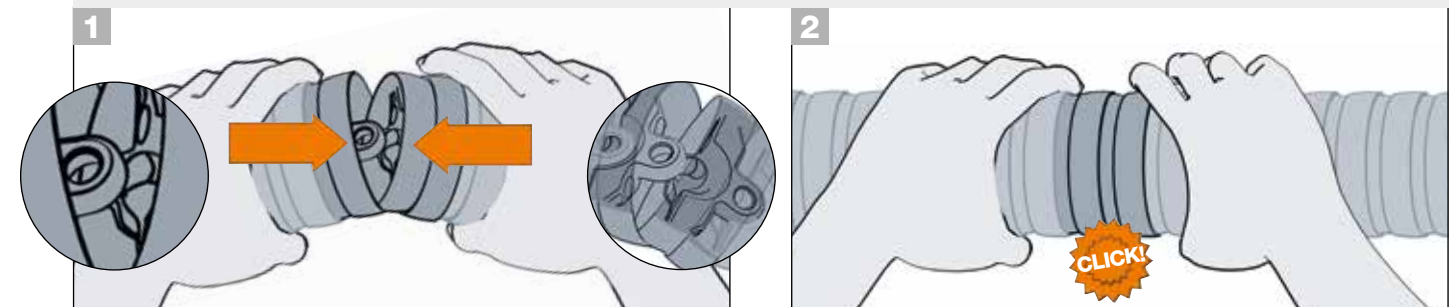
Languages: ☒ English ☐ Chinese ☐ French ☐ German ☐ Polish ☐ Russian ☐ Spanish



Assembly instruction videos - video clips and additional information are available online ► www.igus.eu/downloads

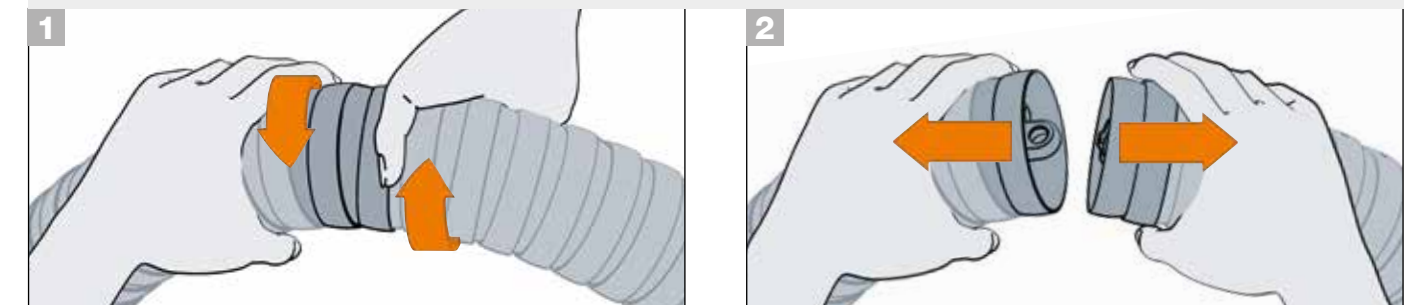


Assembly | TRC.30 · TRC.40 · TRC.60 · TRC.70 · TRC.85 · TRC.100



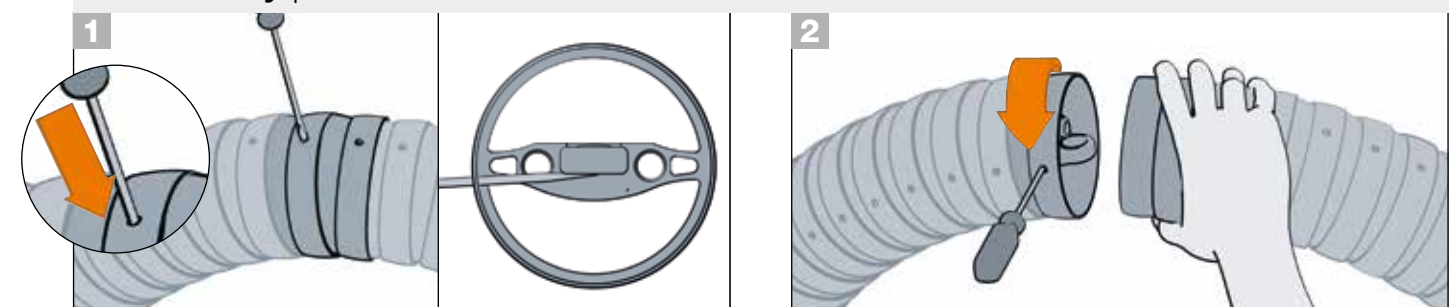
Engage the e-chain® links on the lower side. Use the chamfered side of the ball to open the socket and click together.

Disassembly | TRC.30 · TRC.40 · TRC.60



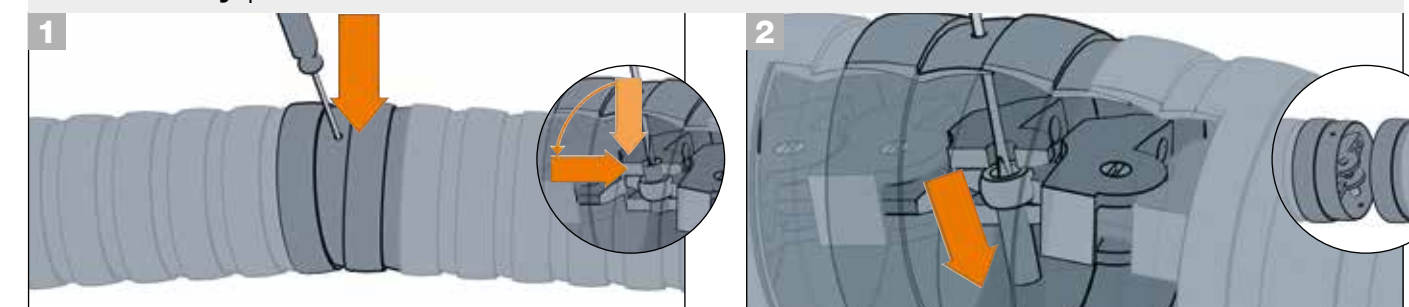
To disassemble, move triflex® R TRC.30, TRC.40 and TRC.60 to the bend radius stop then twist apart counterclockwise.

Disassembly | TRC.70 · TRC.85 · TRC.100



Bend e-chain® to the radius, press a screwdriver right through the opening marker, insert approx. 5 mm between the ball and socket and using it as a lever arm, twist apart counterclockwise.

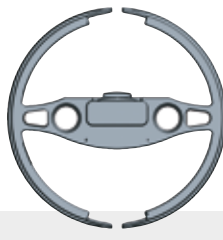
Disassembly | TRC.125



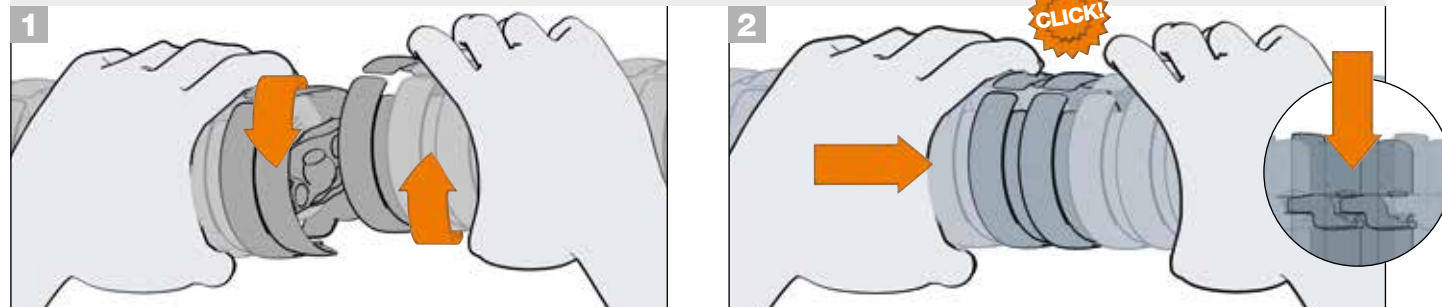
Place the e-chain® with the igus® logo facing down. Unlock the bolt by using a screwdriver to rotate it 90°. Push the bolt downwards to disconnect the e-chain® links for easy separation.

triflex® R TRE.B

Assembly instructions

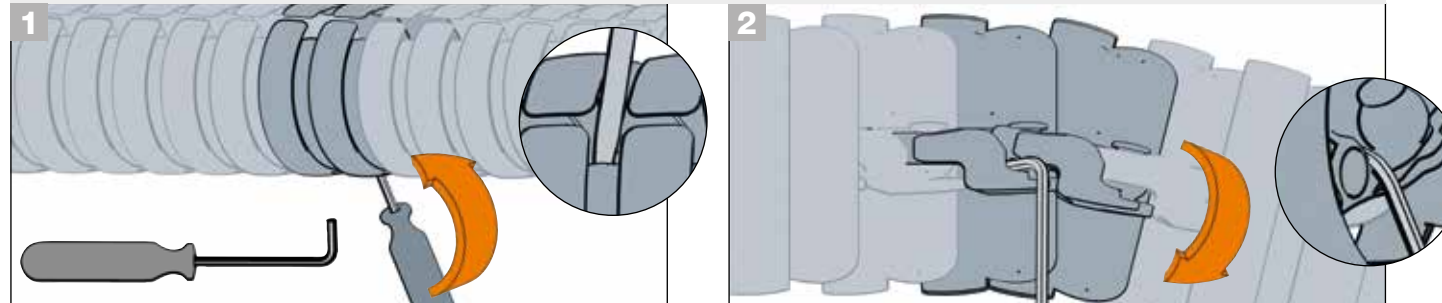


Assembly | TRE.B



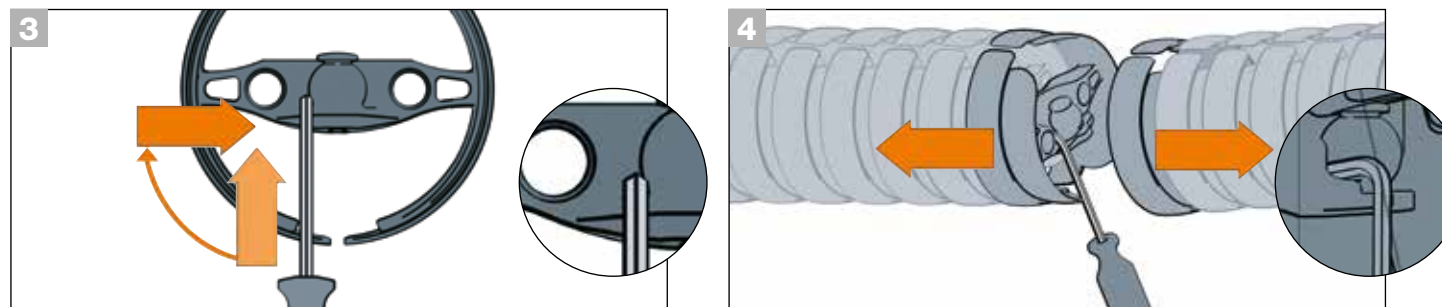
Engage the e-chain® links on the lower side. Use the chamfered side of the ball to open the socket and slightly rotate the e-chain® links to click together. Push the socket downward onto the ball in a straight motion. An audible "click" can be heard on successful connection.

Disassembly | TRE.B



Introduce disassembly tool into the e-chain®.

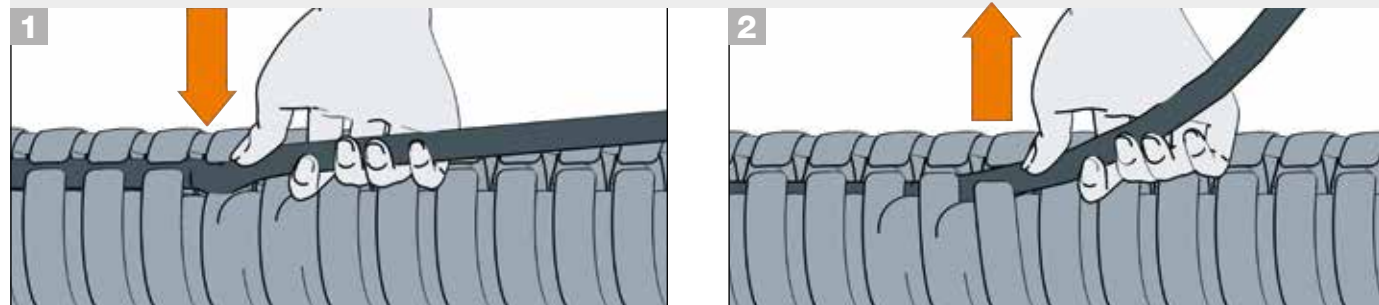
Hook the tool between ball and socket.



Once the tool is in place, turn e-chain® counterclockwise by 45°.

Once the socket has been lifted slightly over the ball head, the e-chain® links can be separated by twisting them.

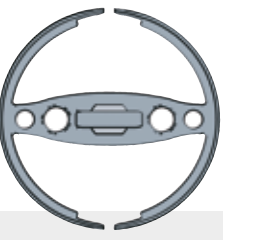
Filling | TRE.B



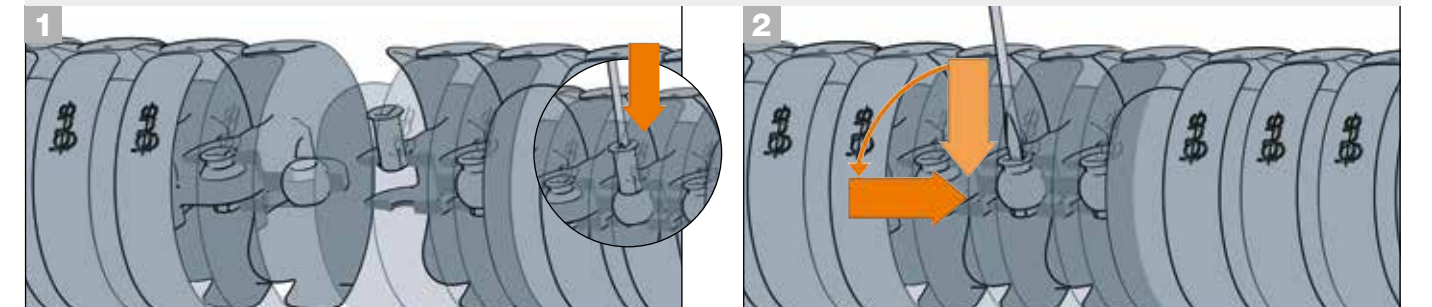
Very simple filling with "easy" design - simply push cables in ... and pull them out.

triflex® R TRE.C

Assembly instructions

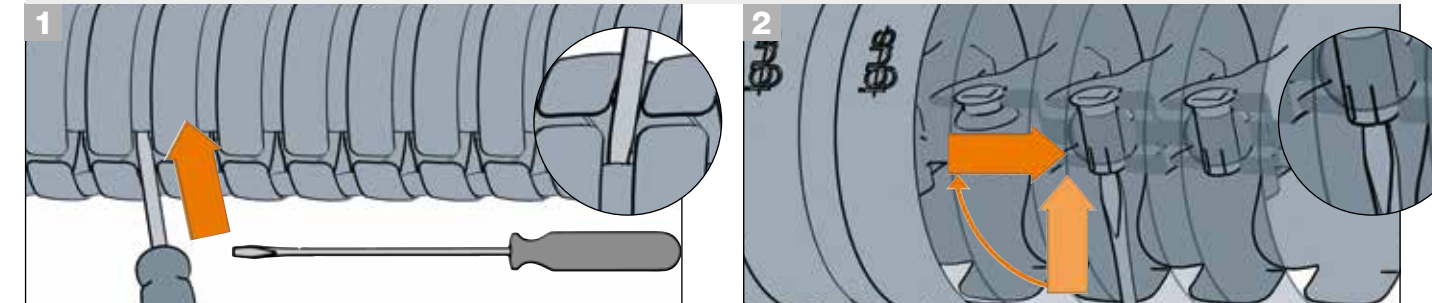


Assembly | TRE.100.C · TRE.125 · TRC.125



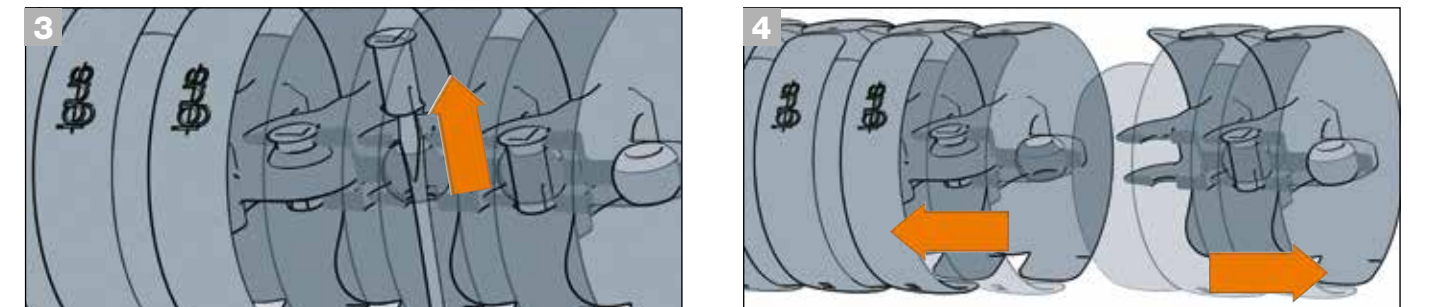
Align e-chain® links and use a screw driver to push the bolt down. Secure the connection bolt by rotating 90°.

Disassembly | TRE.C



Insert slotted screwdriver into the e-chain® centrally through "easy" slot.

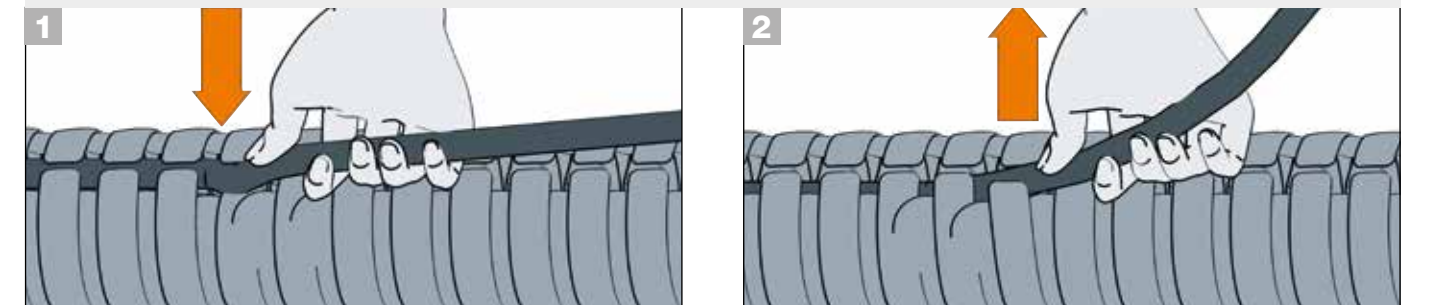
Unlatch bolt by rotating it 90°.



Push bolts through.

Simply slide the e-chain® links apart.

Filling | TRE.C



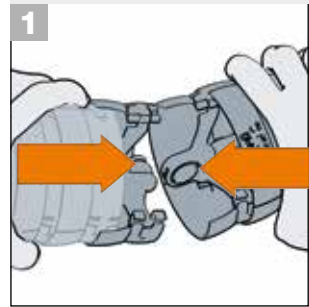
Very simple filling with "easy" design - simply push cables in ... and pull them out.

triflex® R TRCF

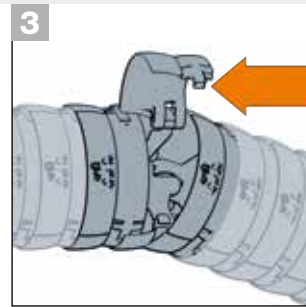
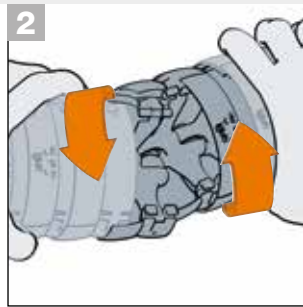
Assembly instructions



Assembly | TRCF



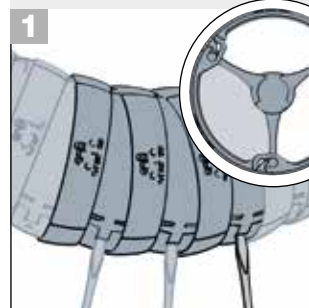
Attach e-chain® parts at an angle and push them together.



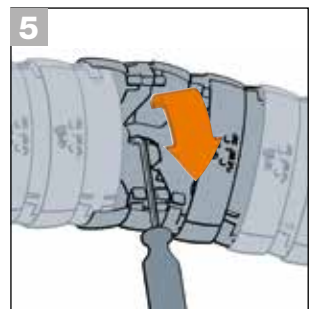
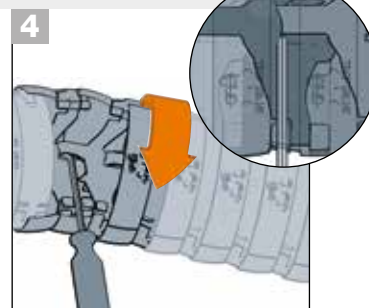
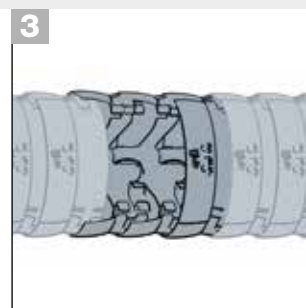
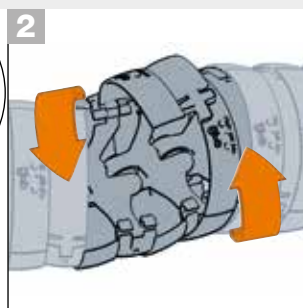
To close, simply snap the opened cover.



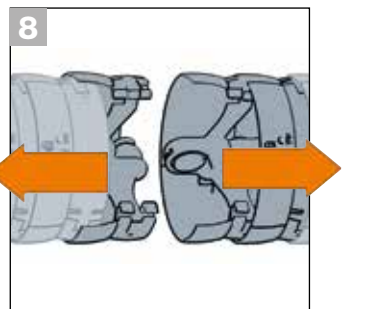
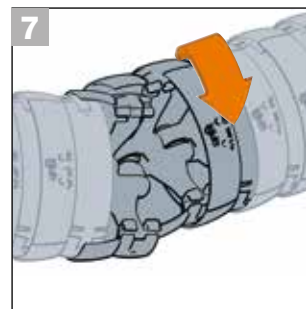
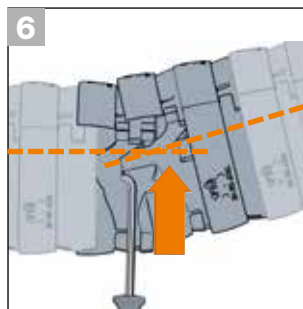
Disassembly | TRCF



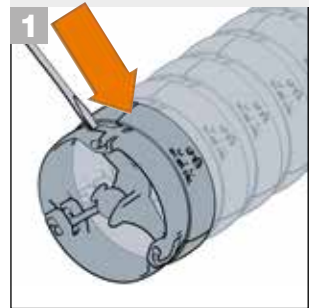
Using a screwdriver, unlatch the lid of three e-chain® links as marked. Open two lids by gently twisting the e-chain® links from each other. Introduce disassembly tool between ball and socket.



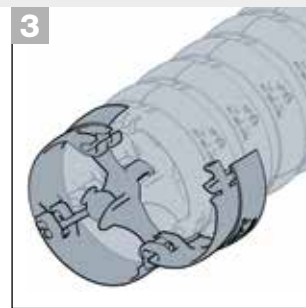
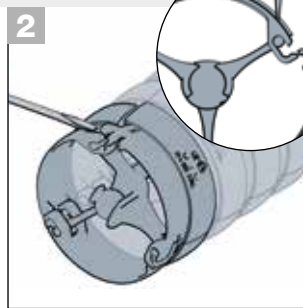
Then by turning the e-chain® links against the stop given by the disassembly tool - push the socket over the ball. Slightly bend the e-chain®, then turn and pull apart.



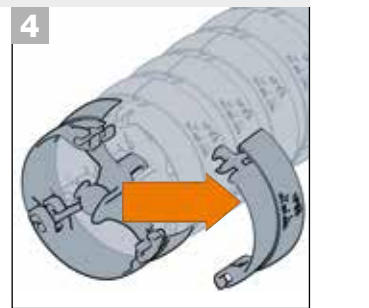
Opening | TRCF



Open the lid with a screwdriver.



The lid can be removed completely in the opened state if required.

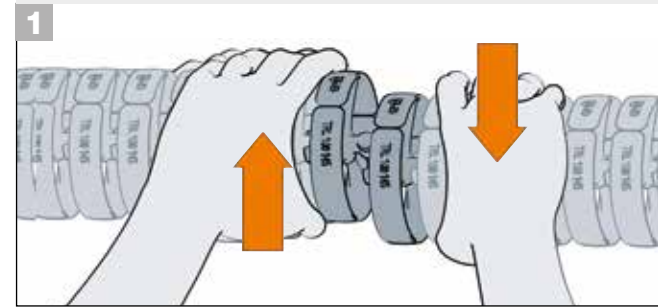


triflex® R TRL

Assembly instructions



Assembly | TRL

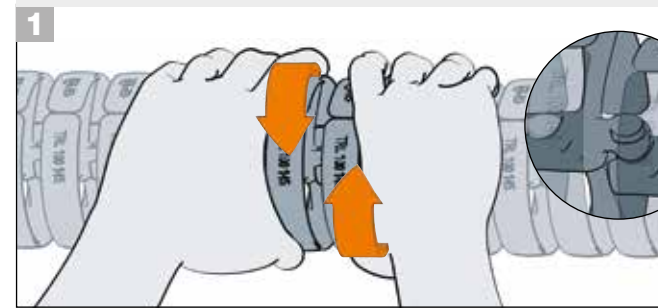


Attach ball with round side over socket.

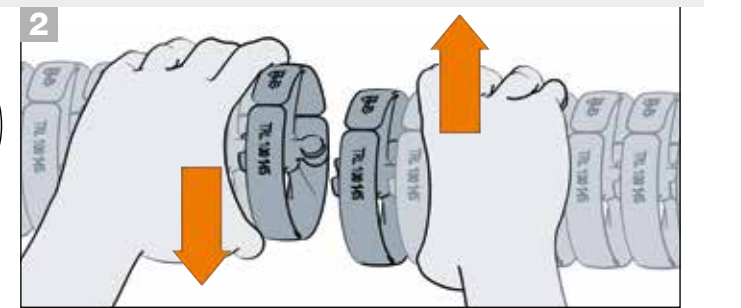


Press the ball into the socket ...

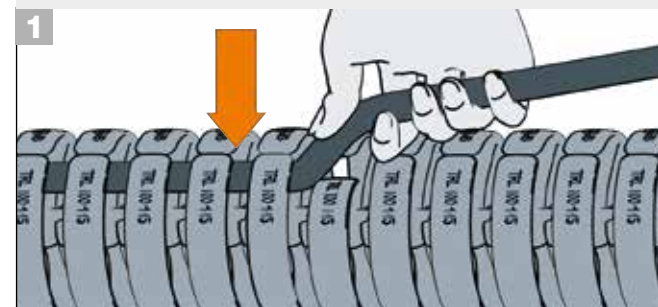
Disassembly | TRL



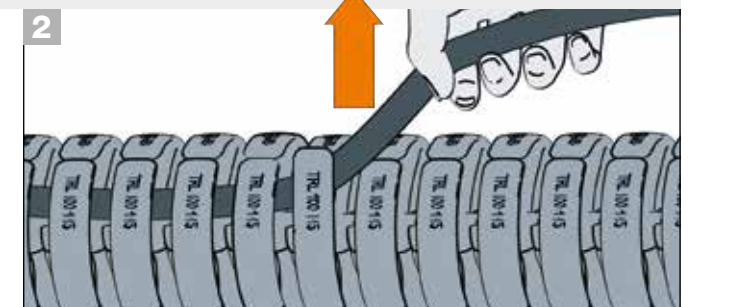
Rotate e-chain® links from one another slightly and push the ball sideways out of the socket.



Filling | TRL



Very simple filling with "easy" design - simply push cables in ... and pull them out.

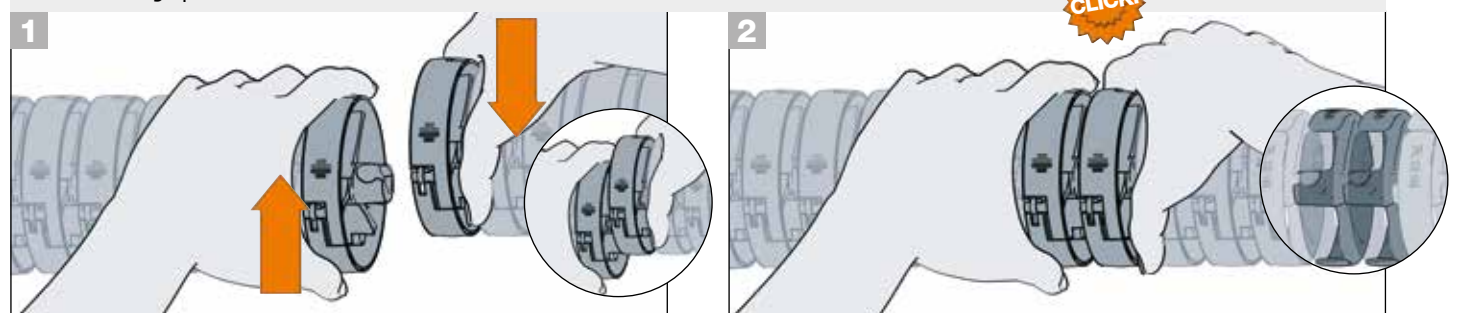


triflex® R TRLF

Assembly instructions



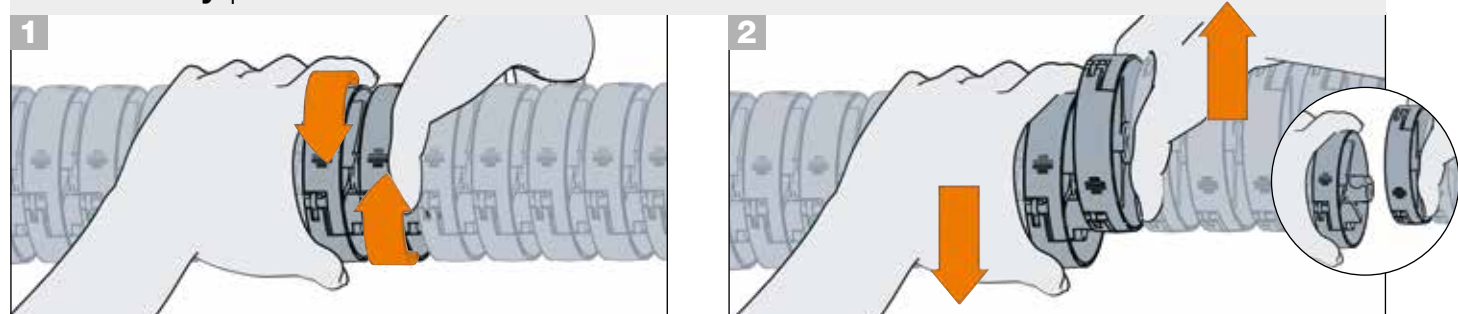
Assembly | TRLF



Attach ball with round side over socket.

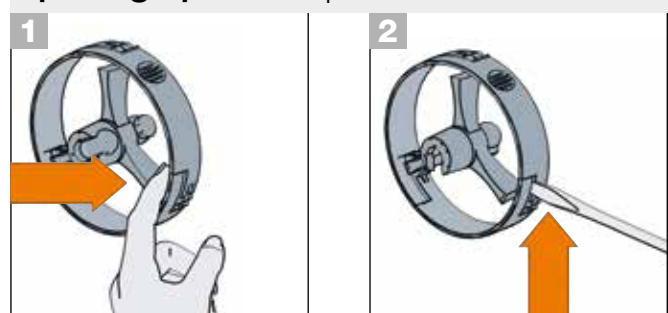
Press ball into the socket.

Disassembly | TRLF



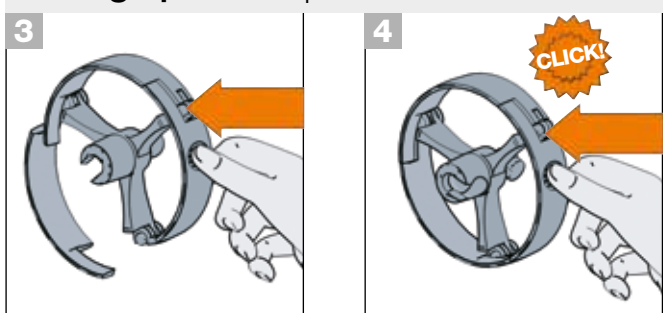
Rotate e-chain® links from one another slightly and push the ball sideways out of the socket.

Opening operation | TRLF



To open, raise the lug by hand or insert a screwdriver into the notch and open.

Closing operation | TRLF

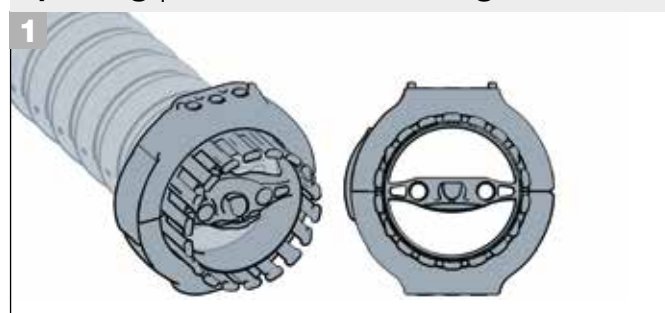


Push the lid until it locks.

triflex® R Assembly

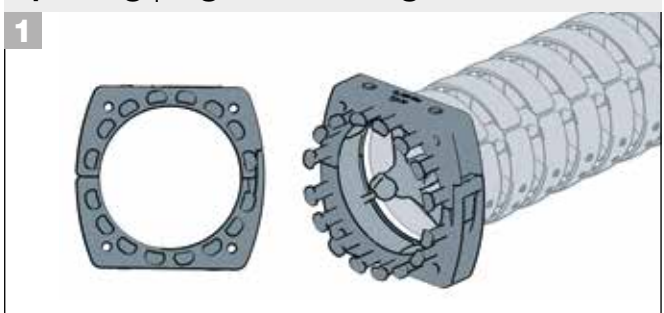
Assembly instructions mounting bracket & disassembly tool

Opening | Standard-mounting brackets

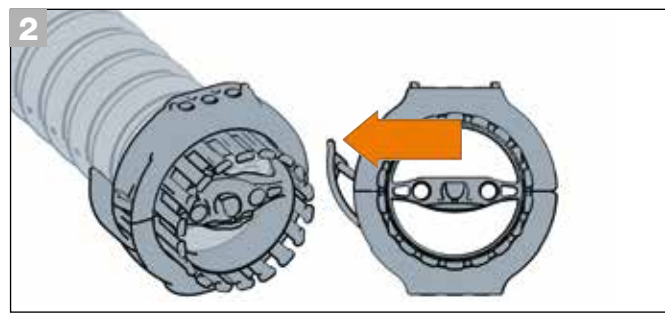


Standard mounting brackets can be opened without tools.

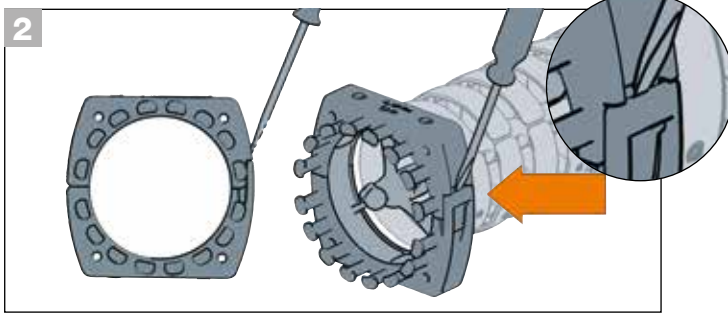
Opening | Light-mounting brackets



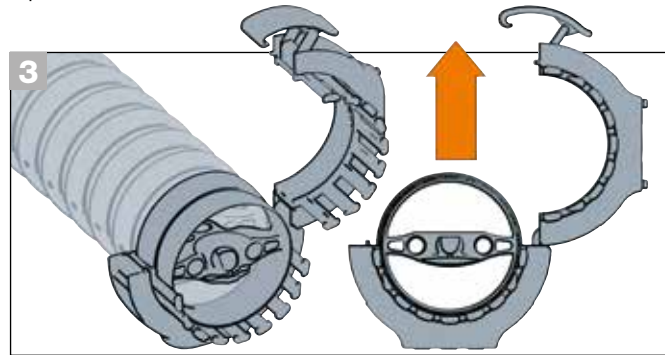
Light mounting brackets can be opened with a screwdriver.



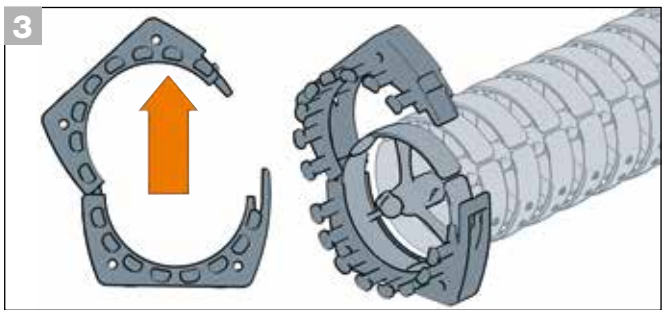
Open the side lever to unlock the bracket.



Push on the smaller inner latch to unlock the bigger outer latch.



Flip open the mounting bracket and remove the e-chain®.



Flip open the mounting bracket and remove the e-chain®.



Note: for triflex® R Series TRE, TRE.B - TRE.LOCK clips ensure a secure grip by the mounting bracket. Supplied automatically with every mounting bracket.

Disassembly tools

Easy-to-use disassembly tools for triflex® TRE (B version) and TRCF. Easy disassembling at any position of TRE B-series even when full.



For series	Part No.
TRE.B	Disassembly tool
TRE.40.B	MAT0050175
TRE.50.B	MAT0051190
TRE.60.B / TRE.70.B	MAT0051135
TRE.85.B	MAT0050170
TRE.100.B	MAT0050172

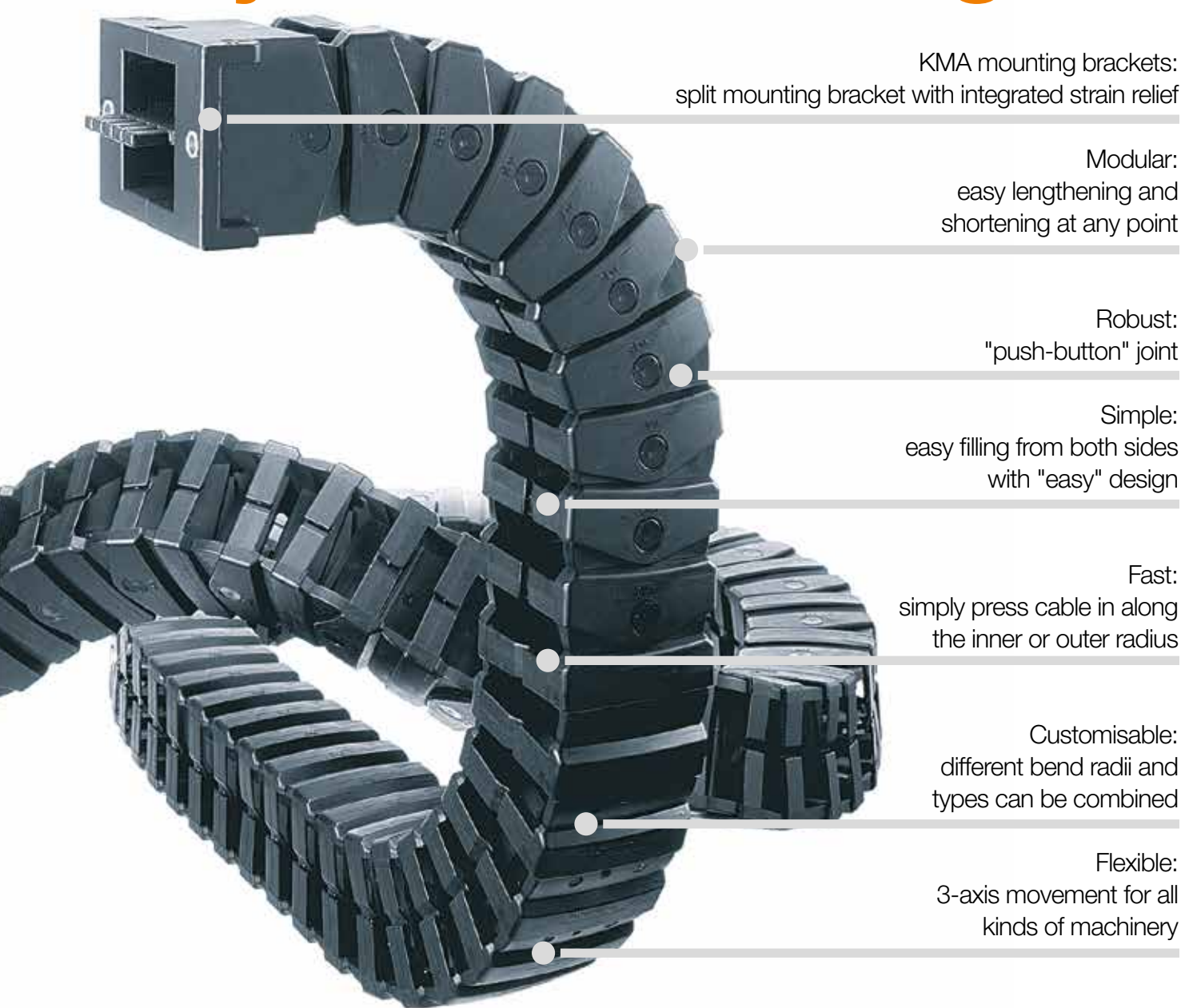
For series	Part No.
TRE.B	Disassembly tool
TRCF.65	MAT0051135
TRCF.85	MAT0050170
TRCF.100	MAT0050172



More 3D e-chains[®] for simple movements

easy triflex[®] & triflex[®]

easy triflex® advantages



KMA mounting brackets:
split mounting bracket with integrated strain relief

Modular:
easy lengthening and
shortening at any point

Robust:
"push-button" joint

Simple:
easy filling from both sides
with "easy" design

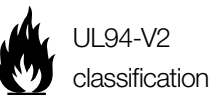
Fast:
simply press cable in along
the inner or outer radius

Customisable:
different bend radii and
types can be combined

Flexible:
3-axis movement for all
kinds of machinery

For simple 3D applications, easy filling from both sides - easy triflex®

The easy triflex® series was developed to offer safe energy supply for multi-axis movements. In doing so the flexibility of a hose was combined with the stability and defined bend radius of an e-chain®. With easy triflex® the installation of cables and hoses is simple. With flexible crossbars the cables are simply pushed into the e-chain® from either side. The unique modular range allows you to follow very complex movements. For example it is possible to combine 1- 2- and 3-axis links in one e-chain®.



iF product design award
2000 Series easy triflex®

Selection table

Series	Inner height <i>Bi1 / Bi1</i> [mm]	Inner width <i>Bi3</i> [mm]	Outer width <i>Ba</i> [mm]	Bend radius <i>R</i> [mm]	Pitch [mm]	igus® online
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Single-axis movement - "easy" design
easy filling from both sides

E332.25	13	25	34	048 - 200	14.5	► www.igus.eu/E332
E332.32	17	32	50	075 - 250	25	► www.igus.eu/E332
E332.50	26	50	68	100 - 250	30	► www.igus.eu/E332
E332.75	38.5	75	96	140 - 300	36	► www.igus.eu/E332



Double-axis movement - "easy" design
with *RBR* (Reverse Bend Radius)
easy filling from both sides

E332.25	13	25	34	048 - 200	14.5	► www.igus.eu/E332
E332.32	17	32	50	075 - 250	25	► www.igus.eu/E332
E332.50	26	50	68	100 - 250	30	► www.igus.eu/E332
E332.75	38.5	75	96	140 - 300	36	► www.igus.eu/E332



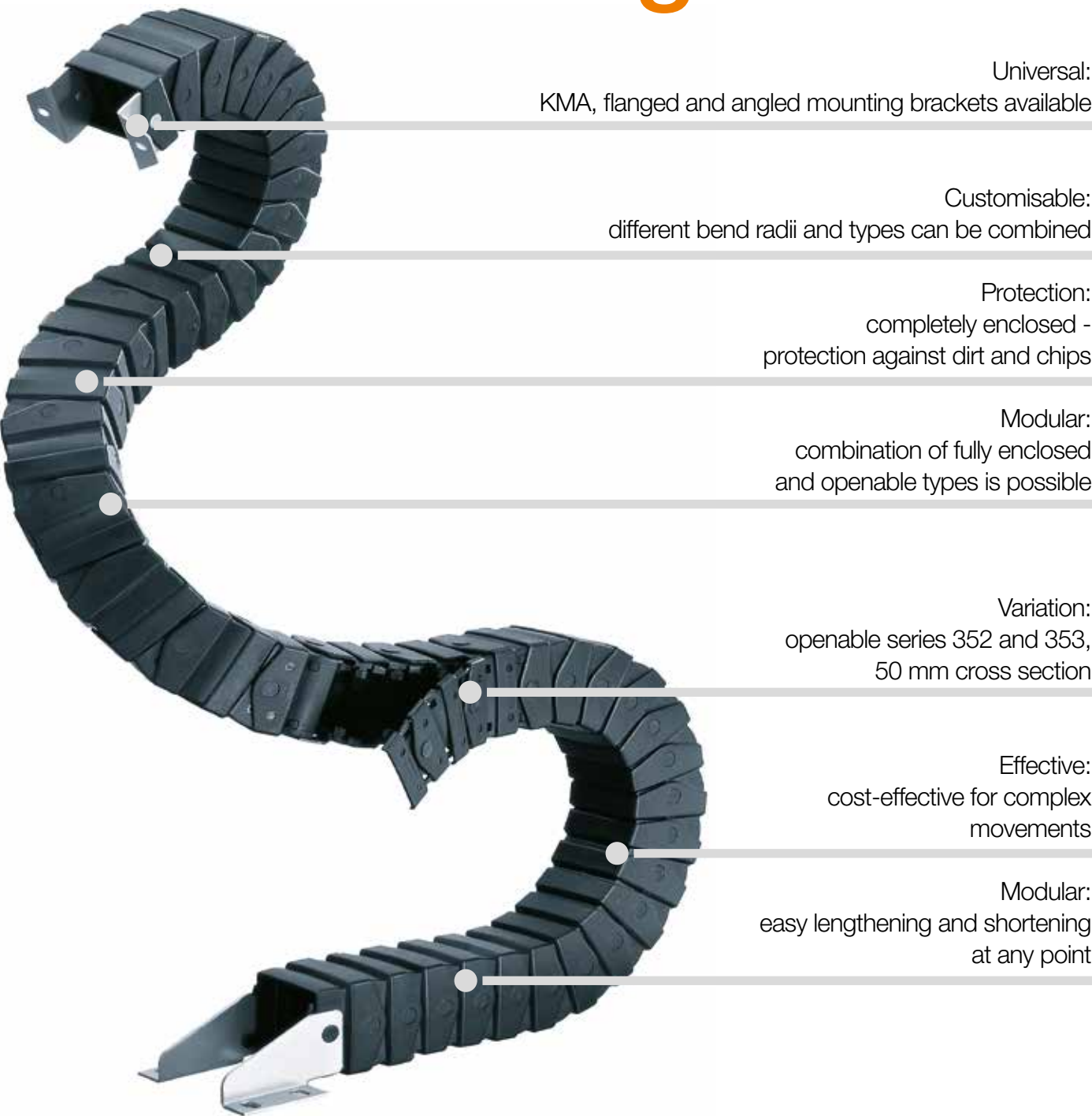
Triple-axis movement - "easy" design
with *RBR* (Reverse Bend Radius)
easy filling from both sides

E333.25	13	25	34	048 - 200	14.5	► www.igus.eu/E333
E333.32	17	32	50	075 - 250	25	► www.igus.eu/E333
E333.50	26	50	68	100 - 250	30	► www.igus.eu/E333
E333.75	38.5	75	96	140 - 300	36	► www.igus.eu/E333

 The complete range with ordering options,
3D-CAD, configurators, PDF, application examples ► www.igus.eu/easytriflex

 Available from stock. Ready for delivery in 24-48h*
*The delivery times indicated correspond to the average time until the ordered goods are dispatched.

triflex® advantages



Universal:
KMA, flanged and angled mounting brackets available

Customisable:
different bend radii and types can be combined

Protection:
completely enclosed -
protection against dirt and chips

Modular:
combination of fully enclosed
and openable types is possible

Variation:
openable series 352 and 353,
50 mm cross section

Effective:
cost-effective for complex
movements

Modular:
easy lengthening and shortening
at any point

Enclosed for simple, enclosed 3D applications - triflex®

The triflex® series was developed to allow safe energy supply for multi-axis movements. In doing so the flexibility of a hose was combined with the stability and defined bend radius of an e-chain®. The unique, modular product range allows very complex motions. For example it is possible to combine 1- 2- and 3-axis links in one e-chain®.



Selection table

Series	Inner width <i>Bi</i> [mm]	Outer width <i>Ba</i> [mm]	Bend radius <i>R</i> [mm]	Pitch [mm]	igus® online
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Single-axis movement - enclosed
protection against dirt and chips

332.16	16	26	038 - 100	13.3	► www.igus.eu/332
332.32	32	50	075 - 250	25	► www.igus.eu/332
332.50	50	68	100 - 250	30	► www.igus.eu/332
332.75	75	96	140 - 300	36	► www.igus.eu/332
352.50*	50	68	100 - 250	30	► www.igus.eu/352



Double-axis movement - enclosed,
with *RBR* (Reverse Bend Radius)
protection against dirt and chips

332.16	16	26	038 - 100	13.3	► www.igus.eu/332
332.32	32	50	075 - 250	25	► www.igus.eu/332
332.50	50	68	100 - 250	30	► www.igus.eu/332
332.75	75	96	140 - 300	36	► www.igus.eu/332
352.50*	50	68	100 - 250	30	► www.igus.eu/352



Triple-axis movement - enclosed,
with *RBR* (Reverse Bend Radius)
protection against dirt and chips

333.16	16	26	038 - 100	13.3	► www.igus.eu/333
333.32	32	50	075 - 250	25	► www.igus.eu/333
333.50	50	68	100 - 250	30	► www.igus.eu/333
333.75	75	96	140 - 300	36	► www.igus.eu/333
353.50*	50	68	100 - 250	30	► www.igus.eu/353

*Series 352/353 openable

 Complete product range with ordering options,
3D-CAD, configurators, PDF, applications ► www.igus.eu/triflex

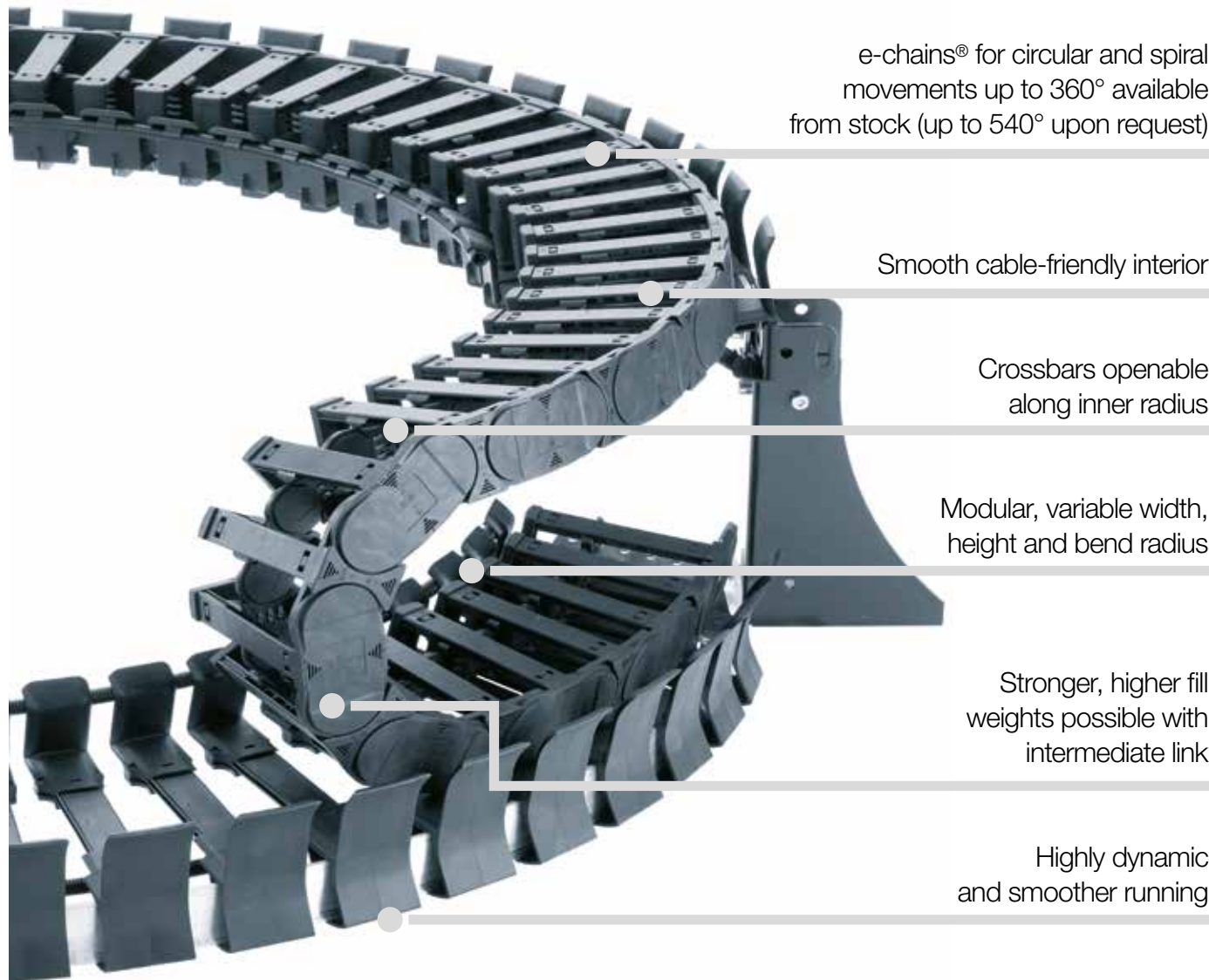
 Available from stock. Ready for delivery in 24-48h*
*The delivery times indicated correspond to the average time until the ordered goods are dispatched.



e-chains[®] for circular & rotary movements

twisterchain[®]
twisterband
Circular movement with
standard e-chains[®]
(RBR Reverse Bend Radius)

twisterchain® advantages



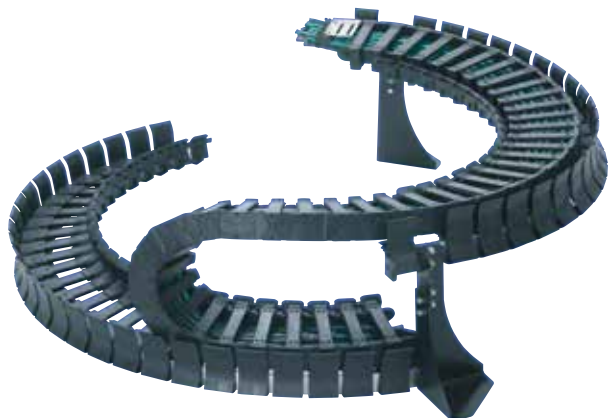
Strong, quiet, for higher loads and up to 540° - circular and spiral movements with twisterchain®

The igus® twisterchain® product line offers an extensive range of products for rotary movement and is available in four sizes. Its modular width and radius design ensures it can be used flexibly in applications with circular and spiral movements up to 360° and more, with high fill weights and where smooth operation is required. twisterchain® applications are available with modular guide troughs which offer: e-chain® guidance, reduced e-chain® wear, optimal levels of smooth operation, angle of rotations up to 360° from stock and up to 540° upon request.

- Stronger, higher fill weights, smoother running, weight-reduction
- Rotary speeds up to 1 m/s and more
- e-chains® for circular and spiral movements up to 360°available from stock (up to 540° upon request)
- Cable-friendly, smooth interior ● Crossbars openable along the inner radius
- Successfully tested for over 1 million cycles in the igus® laboratory

Selection table

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]	Bend radius <i>R</i> [mm]	Circular radii <i>AR</i> [mm]	Page
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twisterchain®
for rotary movements up to 360° available from stock; for angle of rotation >360° please contact us. Crossbars removable along the inner and outer radius

TC32	32	87.5 - 150	108.5 - 171	54	100 - 250	400 - 600	118
TC42	42	87.5 - 200	110.5 - 223	64	100 - 250	400 - 850	120
TC56	56	125 - 200	155 - 230	84	150 - 400	650 - 850	122

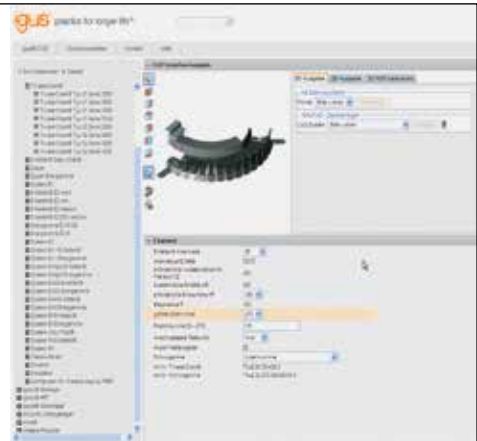
 The complete range with ordering options, 3D-CAD, configurators, PDF, application examples ► www.igus.eu/twisterchain

 Available from stock. Ready for delivery in 24-48h*
*The delivery times indicated correspond to the average time until the ordered goods are dispatched.

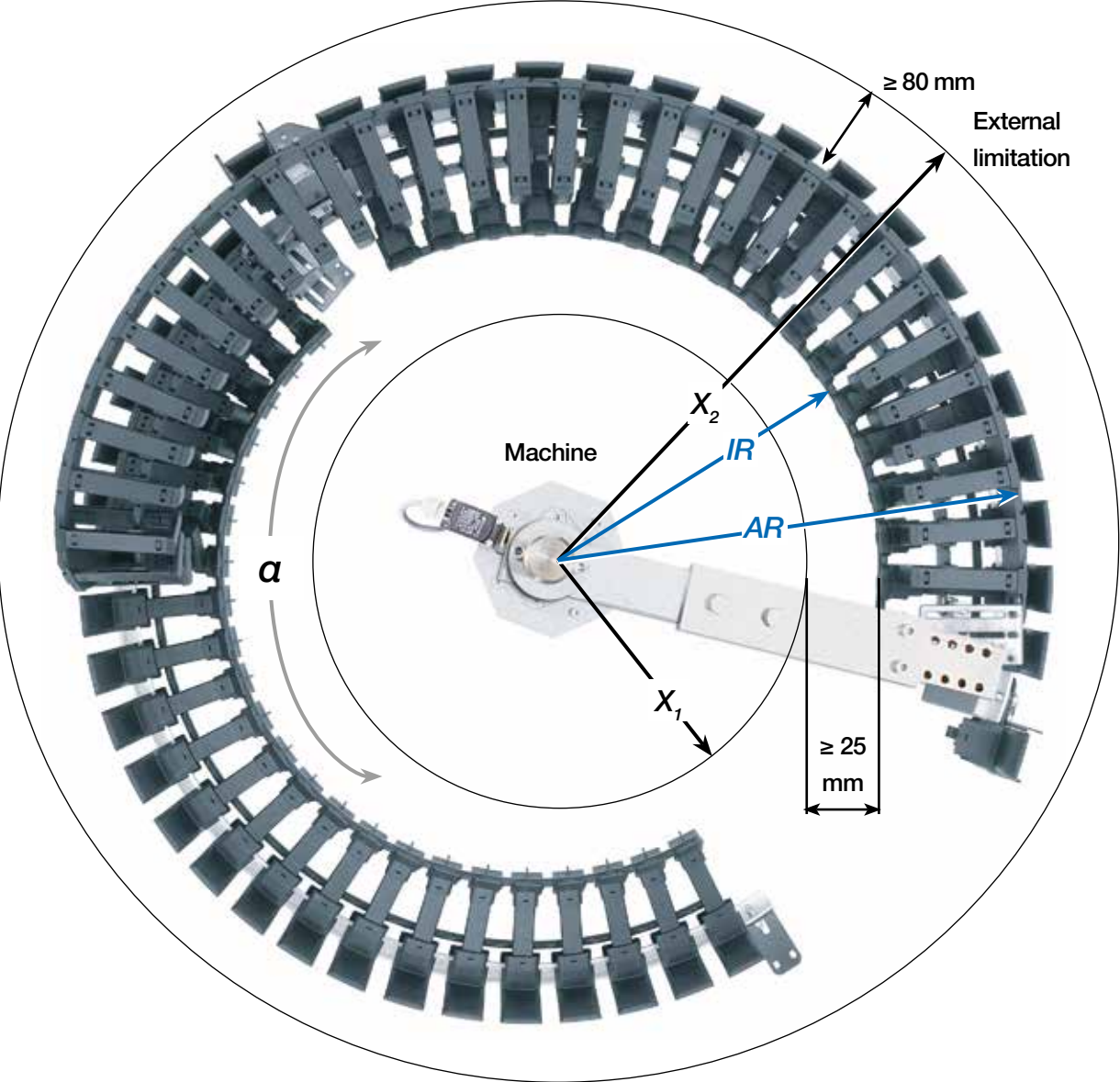
Quickly generate complete twisterchain® 3D CAD models

- Prepare 3D models just by inputting e-chain® radius and available area
- Free positioning of the e-chain® moving end along the travel length
- Optional generation of twisterchain® as a single part or complete with guide trough and base support
- Fast download of the CAD files without registration
- 11 different 3D formats available
- 8 different 2D formats available

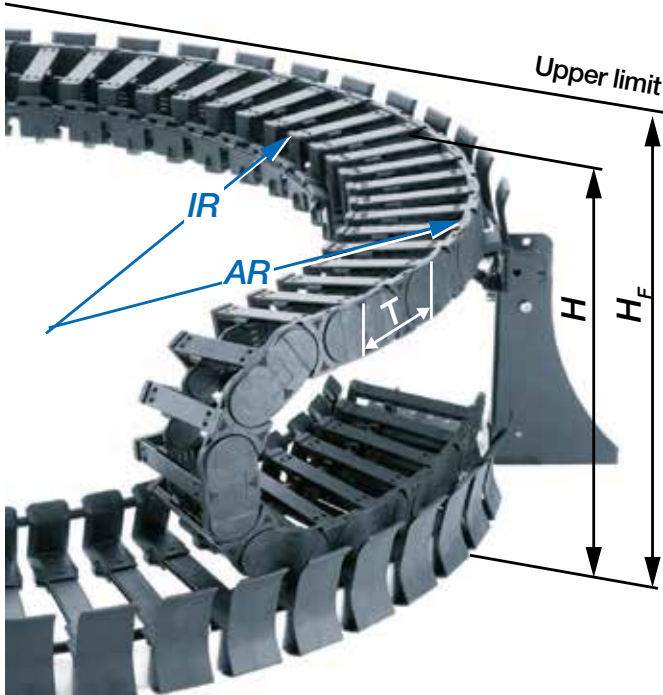
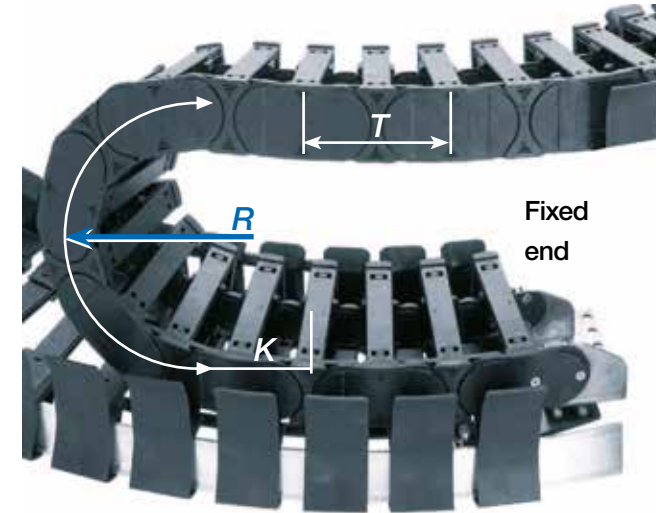
More information ► www.igus.eu/twister-configurator



Technical data



twisterchain® universal
In the case of machines which rotate in one direction than the other, the total rotation angle required is the sum of the two angles.



- AR = Outer radius of e-chain®

IR = Inner radius e-chain®

R = Bend radius e-chain®
- X_1 = Inner machine construction space

X_2 = Outer machine construction space

T = Pitch
- H_f = Height incl. 50 mm clearance

H = Nominal clearance height

K = Add-on for bend radius
- hi = Inner height e-chain®

ha = Outer height e-chain®

α = Rotation angle

Technical data

Technical data

	Speed / acceleration	Upon request
	Material - permitted temperature °C, igumid G	-40°C / +120°C
	Flammability class, igumid G	VDE 0304 IIC UL94-HB

Order example | Order key

Order example for complete e-chain® (1.0 m), colour black, with mounting brackets:

e-chain® (1.0 m)	Please indicate e-chain® length or number of links: 1.0 m or 11 links	TC56.12.250/650.0
+ Mounting brackets	1 set	TC5600.34.VS.E
Order text:	1 m TC56.12.250/650.0 + TC5600.34.VS.E	

Order key

TC56.12.250/650.0

Series

Inner height

Width index (depends on **Bi**)

Bend radius **R**

Outer radius **AR**

Standard colour black

TC56.12.250/650.0 = e-chain® openable along the inner radius, from both sides
Bi 125 mm inner width, **R** 250 mm bend radius / **AR** 650 mm outer radius, colour black

twisterchain[®] TC32
32 mm inner height - product range

AR	Bi	Ba	X ₂	X ₁	R 100 [mm]	R 125 [mm]	R 150 [mm]	R 175 [mm]	R 200 [mm]	R 250 [mm]	TC32
[mm]	[mm]	[mm]	[mm]	[mm]	TC32 ...	TC32 ...	TC32 ...	TC32 ...	TC32 ...	TC32 ...	[kg/m]
400	87.5	108.5	480	270	087.100/400	087.125/400	087.150/400	087.175/400	087.200/400	087.250/400	≈ 1.82
400	100	121	480	250	–	–	10.150/400	10.175/400	10.200/400	10.250/400	≈ 1.90
400	108	129	480	250	–	–	–	11.175/400	11.200/400	11.250/400	≈ 1.95
400	125	146	480	220	–	–	–	12.175/400	12.200/400	12.250/400	≈ 2.05
400	137.5	158.5	480	210	–	–	–	–	–	137.250/400	≈ 2.13
400	150	171	480	200	–	–	–	–	–	15.250/400	≈ 2.21
500	100	121	580	350	10.100/500	10.125/500	10.150/500	10.175/500	10.200/500	10.250/500	≈ 1.90
500	108	129	580	350	–	11.125/500	11.150/500	11.175/500	11.200/500	11.250/500	≈ 1.95
500	125	146	580	320	–	12.125/500	12.150/500	12.175/500	12.200/500	12.250/500	≈ 2.05
500	137.5	158.5	580	310	–	–	137.150/500	137.175/500	137.200/500	137.250/500	≈ 2.13
500	150	171	580	300	–	–	15.150/500	15.175/500	15.200/500	15.250/500	≈ 2.21
600	108	129	680	450	11.100/600	11.125/600	11.150/600	–	–	–	≈ 1.95
600	125	146	680	420	–	12.125/600	12.150/600	12.175/600	12.200/600	12.250/600	≈ 2.05
600	137.5	158.5	680	410	–	137.125/600	137.150/600	137.175/600	137.200/600	137.250/600	≈ 2.13
600	150	171	680	400	–	–	15.150/600	15.175/600	15.200/600	15.250/600	≈ 2.21

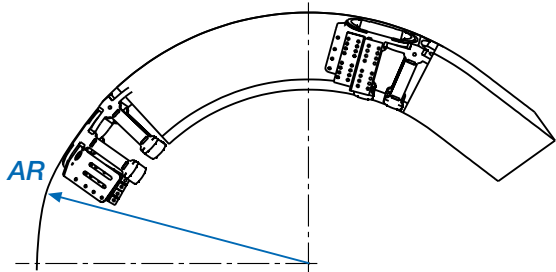
R	100	125	150	175	200	250	Pitch [mm/link]	56
H + ²⁰ ₀	254	304	354	404	454	554	Links/m	18
K	465	550	620	700	780	940	corresponds to [mm]	1,008

Installation dimensions

Dimension A1 depending on outer radius *AR*

AR	R 100	R 125	R 150	R 175	R 200	R 250
[mm]	A1 [mm]	A1 [mm]	A1 [mm]	A1 [mm]	A1 [mm]	A1 [mm]
400	51	51	52	53	53	58
500	65	65	66	67	69	71
600	79	80	81	81	82	85

Dimension A1 always with tolerance of ± 2.5 mm

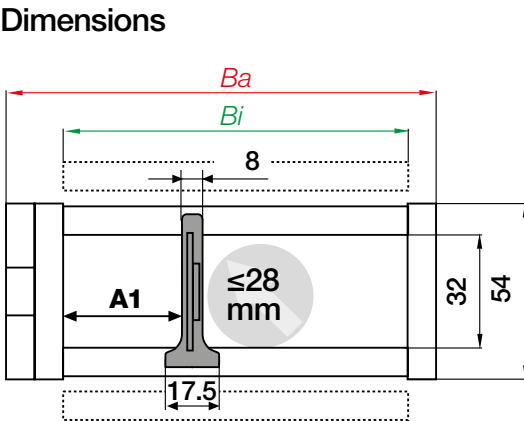


Note: outer radius *AR* (see drawing) determines dimension A1!



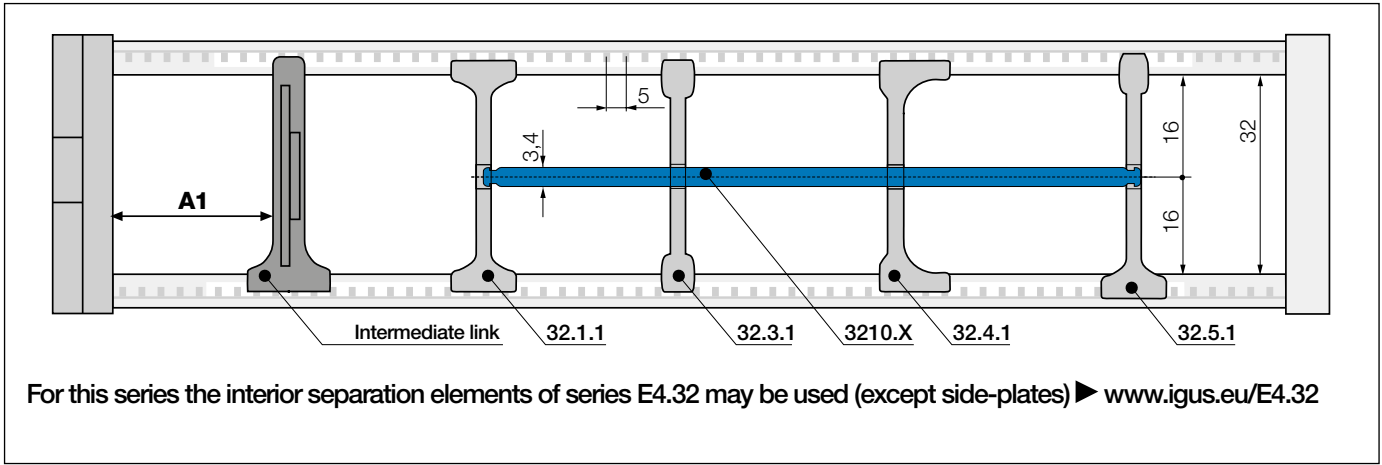
Intermediate link

The cable-friendly intermediate link increases the strength and stability of twisterchain[®] many times over. It also serves as interior separation, dividing the filling space into two chambers. **Outer radius *AR*** determines dimension A1.



twisterchain[®] 2nd generation from igus[®] - successfully tested for over 1 million cycles in the igus[®] laboratory

Series TC32 | interior separation



i

AR = Outer radius of e-chain[®]
IR = Inner radius e-chain[®]
R = Bend radius e-chain[®]

X₁ = Inner machine construction space
X₂ = Outer machine construction space
A1 = Intermediate link position

H = Nominal clearance height
K = Add-on for bend radius
T = Pitch

twisterchain® TC42

42 mm inner height - product range

AR	Bi	Ba	X ₂	X ₁	R 100 [mm]	R 125 [mm]	R 150 [mm]	R 175 [mm]	R 200 [mm]	R 250 [mm]	TC42
[mm]	[mm]	[mm]	[mm]	[mm]	TC42 ...	TC42 ...	TC42 ...	TC42 ...	TC42 ...	TC42 ...	[kg/m]
400	87.5	110.5	480	270	087.100/400	087.125/400	087.150/400	087.175/400	087.200/400	087.250/400	≈ 1.97
400	100	123	480	250	10.100/400	10.125/400	10.150/400	10.175/400	10.200/400	10.250/400	≈ 2.03
400	108	131	480	250	–	11.125/400	11.150/400	11.175/400	11.200/400	11.250/400	≈ 2.07
400	125	148	480	220	–	12.125/400	12.150/400	12.175/400	12.200/400	12.250/400	≈ 2.16
400	137.5	160.5	480	210	–	137.125/400	137.150/400	137.175/400	137.200/400	137.250/400	≈ 2.22
400	150	173	480	200	–	–	–	15.175/400	15.200/400	15.250/400	≈ 2.29
400	162.5	185.5	480	190	–	–	–	–	162.200/400	162.250/400	≈ 2.35
400	168	191	480	190	–	–	–	–	–	17.250/400	≈ 2.38
400	175	198	480	180	–	–	–	–	–	18.250/400	≈ 2.41
500	100	123	580	350	10.100/500	10.125/500	10.150/500	10.175/500	10.200/500	10.250/500	≈ 2.03
500	108	131	580	350	–	11.125/500	11.150/500	11.175/500	11.200/500	11.250/500	≈ 2.07
500	125	148	580	320	–	12.125/500	12.150/500	12.175/500	12.200/500	12.250/500	≈ 2.16
500	137.5	160.5	580	310	–	–	137.150/500	137.175/500	137.200/500	137.250/500	≈ 2.22
500	150	173	580	300	–	–	15.150/500	15.175/500	15.200/500	15.250/500	≈ 2.29
500	162.5	185.5	580	290	–	–	162.150/500	162.175/500	162.200/500	162.250/500	≈ 2.35
500	168	191	580	290	–	–	–	17.175/500	17.200/500	17.250/500	≈ 2.38
500	175	198	580	280	–	–	–	–	18.200/500	18.250/500	≈ 2.41
500	187.5	210.5	580	280	–	–	–	–	187.200/500	187.250/500	≈ 2.48
500	200	223	580	250	–	–	–	–	20.200/500	20.250/500	≈ 2.54
600	108	131	680	450	11.100/600	11.125/600	11.150/600	11.175/600	11.200/600	–	≈ 2.07
600	125	148	680	420	12.100/600	12.125/600	12.150/600	12.175/600	12.200/600	12.250/600	≈ 2.16
600	137.5	160.5	680	410	137.100/600	137.125/600	137.150/600	137.175/600	137.200/600	137.250/600	≈ 2.22
600	150	173	680	400	15.100/600	15.125/600	15.150/600	15.175/600	15.200/600	15.250/600	≈ 2.29
600	162.5	185.5	680	390	–	162.125/600	162.150/600	162.175/600	162.200/600	162.250/600	≈ 2.35
600	168	191	680	390	–	–	17.150/600	17.175/600	17.200/600	17.250/600	≈ 2.38
600	175	198	680	380	–	–	18.150/600	18.175/600	18.200/600	18.250/600	≈ 2.41
600	187.5	210.5	680	380	–	–	187.150/600	187.175/600	187.200/600	187.250/600	≈ 2.48
600	200	223	680	350	–	–	20.150/600	20.175/600	20.200/600	20.250/600	≈ 2.54
650	125	148	730	470	12.100/650	12.125/650	12.150/650	12.175/650	12.200/650	12.250/650	≈ 2.16
650	137.5	160.5	730	460	137.100/650	137.125/650	137.150/650	137.175/650	137.200/650	137.250/650	≈ 2.22
650	150	173	730	450	15.100/650	15.125/650	15.150/650	15.175/650	15.200/650	15.250/650	≈ 2.29
650	162.5	185.5	730	440	–	162.125/650	162.150/650	162.175/650	162.200/650	162.250/650	≈ 2.35
650	168	191	730	430	–	17.125/650	17.150/650	17.175/650	17.200/650	17.250/650	≈ 2.38
650	175	198	730	430	–	–	18.150/650	18.175/650	18.200/650	18.250/650	≈ 2.41
650	187.5	210.5	730	420	–	–	187.175/650	187.175/650	187.200/650	187.250/650	≈ 2.48
650	200	223	730	400	–	–	20.150/650	20.175/650	20.200/650	20.250/650	≈ 2.54
750	137.5	160.5	830	560	137.100/750	137.125/750	137.150/750	137.175/750	137.200/750	137.250/750	≈ 2.22
750	150	173	830	550	15.100/750	15.125/750	15.150/750	15.175/750	15.200/750	15.250/750	≈ 2.29
750	162.5	185.5	830	540	–	162.125/750	162.150/750	162.175/750	162.200/750	162.250/750	≈ 2.35
750	168	191	830	540	–	17.125/750	17.150/750	17.175/750	17.200/750	17.250/750	≈ 2.38
750	175	198	830	530	–	18.125/750	18.150/750	18.175/750	18.200/750	18.250/750	≈ 2.41
750	187.5	210.5	830	520	–	187.125/750	187.150/750	187.175/750	187.200/750	187.250/750	≈ 2.48
750	200	223	830	500	–	20.125/750	20.150/750	20.175/750	20.200/750	20.250/750	≈ 2.54
850	150	173	930	650	15.100/850	15.125/850	15.150/850	15.175/850	15.200/850	15.250/850	≈ 2.29
850	162.5	185.5	930	640	162.100/850	162.125/850	162.150/850	162.175/850	162.200/850	162.250/850	≈ 2.35
850	168	191	930	630	17.100/850	17.125/850	17.150/850	17.175/850	17.200/850	17.250/850	≈ 2.38
850	175	198	930	630	–	18.125/850	18.150/850	18.175/850	18.200/850	18.250/850	≈ 2.41
850	187.5	210.5	930	620	–	187.125/850	187.150/850	187.175/850	187.200/850	187.250/850	≈ 2.48
850	200	223	930	600	–	20.125/850	20.150/850	20.175/850	20.200/850	20.250/850	≈ 2.54

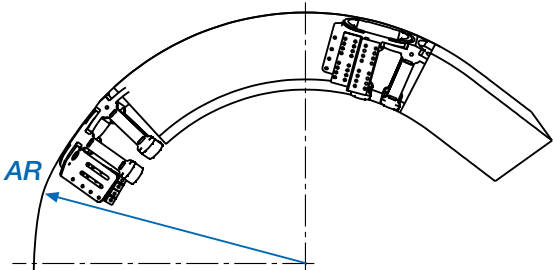
R	100	125	150	175	200	250	Pitch [mm/link]	67
H ₊₂₅	267	317	367	417	467	567	Links/m	15
K	500	650	725	800	875	1,050	corresponds to [mm]	1,005

Installation dimensions

Dimension A1 depending on outer radius **AR**

AR	R 100	R 125	R 150	R 175	R 200	R 250
[mm]	A1 [mm]	A1 [mm]	A1 [mm]	A1 [mm]	A1 [mm]	A1 [mm]
400	49	50	51	53	54	58
500	64	65	66	67	68	71
600	79	79	80	81	82	85
650	86	87	87	88	89	92
750	101	101	102	103	104	106
850	116	116	117	118	118	120

Dimension A1 always with tolerance of ± 2.5 mm



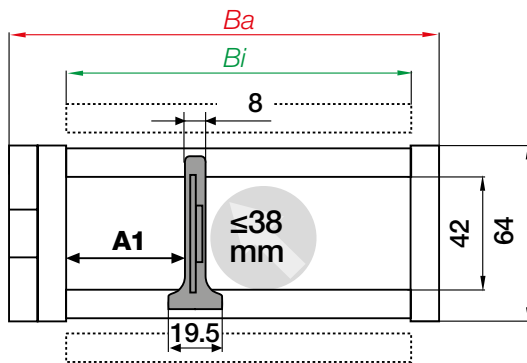
Note: outer radius **AR** (see drawing) determines dimension **A1**!



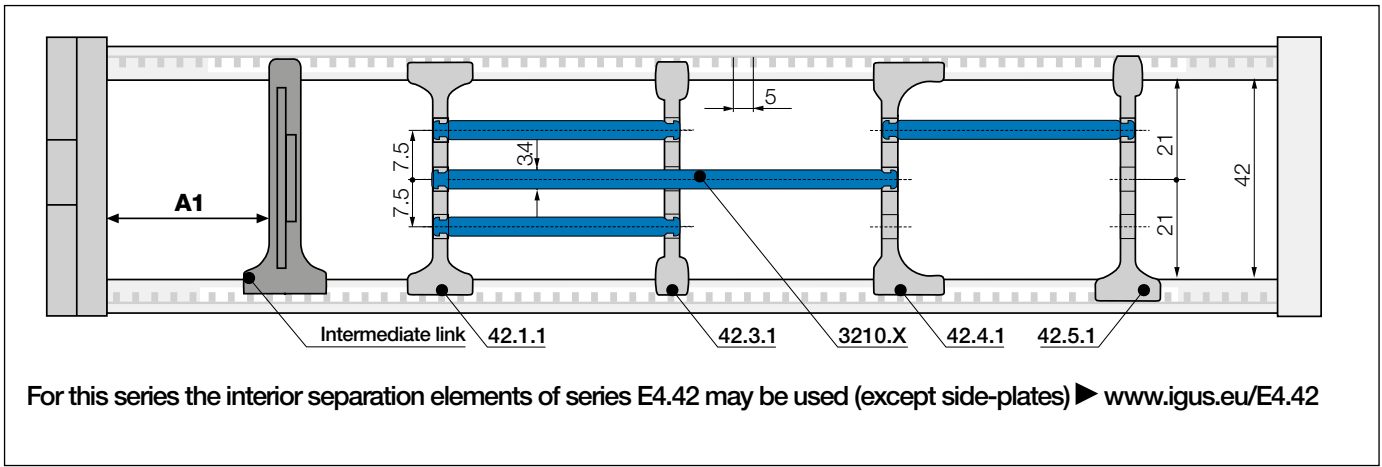
Intermediate link

The cable-friendly intermediate link increases the strength and stability of twisterchain® many times over. It also serves as interior separation, dividing the filling space into two chambers. Outer radius **AR** determines dimension **A1**.

Dimensions



Series TC42 | interior separation



AR = Outer radius of e-chain®
IR = Inner radius e-chain®
R = Bend radius e-chain®

X₁ = Inner machine construction space
X₂ = Outer machine construction space
A1 = Intermediate link position

H = Nominal clearance height
K = Add-on for bend radius
T = Pitch

twisterchain® TC56

56 mm inner height - product range

AR	Bi	Ba	X ₂	X ₁	R 150 [mm]	R 200 [mm]	R 250 [mm]	R 300 [mm]	R 400 [mm]	TC56
[mm]	[mm]	[mm]	[mm]	[mm]	TC56 ...	TC56 ...	TC56 ...	TC56 ...	TC56 ...	[kg/m]
650	125	155	730	470	12.150/650	12.200/650	12.250/650	12.300/650	–	≈ 3.45
650	137.5	168	730	460	–	13.200/650	13.250/650	13.300/650	13.400/650	≈ 3.54
650	150	180	730	450	–	–	15.250/650	15.300/650	15.400/650	≈ 3.62
650	162.5	193	730	440	–	–	16.250/650	16.300/650	16.400/650	≈ 3.70
650	175	205	730	430	–	–	–	17.300/650	17.400/650	≈ 3.78
650	187.5	218	730	420	–	–	–	18.300/650	18.400/650	≈ 3.87
650	200	230	730	400	–	–	–	–	20.400/650	≈ 3.95
750	137.5	168	830	560	13.150/750	13.200/750	13.250/750	13.300/750	–	≈ 3.54
750	150	180	830	550	–	15.200/750	15.250/750	15.300/750	15.400/750	≈ 3.62
750	162.5	193	830	540	–	16.200/750	16.250/750	16.300/750	16.400/750	≈ 3.70
750	175	205	830	530	–	–	17.250/750	17.300/750	17.400/750	≈ 3.78
750	187.5	218	830	520	–	–	18.250/750	18.300/750	18.400/750	≈ 3.87
750	200	230	830	500	–	–	20.250/750	20.300/750	20.400/750	≈ 3.95
850	150	180	930	650	15.150/850	15.200/850	15.250/850	15.300/850	15.400/850	≈ 3.62
850	162.5	193	930	640	16.150/850	16.200/850	16.250/850	16.300/850	16.400/850	≈ 3.70
850	175	205	930	630	17.150/850	17.200/850	17.250/850	17.300/850	17.400/850	≈ 3.78
850	187.5	218	930	620	–	18.200/850	18.250/850	18.300/850	18.400/850	≈ 3.87
850	200	230	930	600	–	–	20.250/850	20.300/850	20.400/850	≈ 3.95

R	150	200	250	300	400	Pitch [mm/link]	91
H ₊₂₅ ⁻⁰	384	484	584	684	884	Links/m	11
K	750	900	1,050	1,225	1,450	corresponds to [mm]	1,001

twisterchain® in a guide trough type 01 for rotary movement on an articulated robot - long service life and robust: tested successfully for more than 1,000,000 cycles

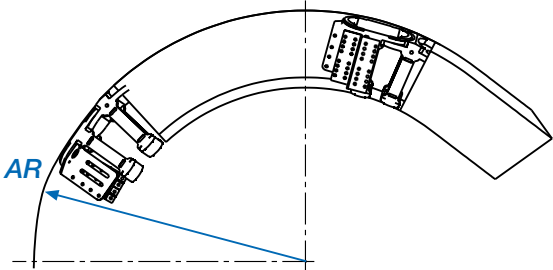


Installation dimensions

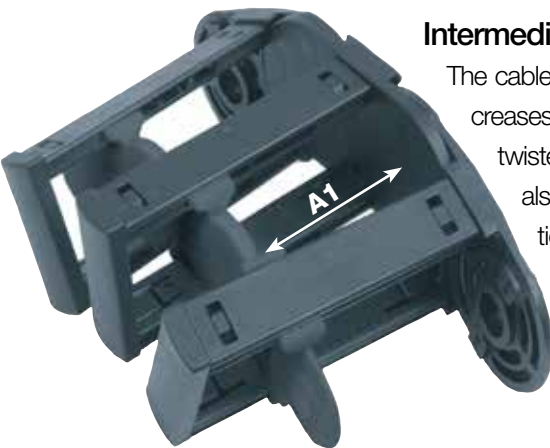
Dimension A1 depending on outer radius *AR*

AR	R 150	R 200	R 250	R 300	R 400
[mm]	A1 [mm]	A1 [mm]	A1 [mm]	A1 [mm]	A1 [mm]
650	83	85	88	90	97
750	98	101	102	103	110
850	113	116	117	118	124

Dimension A1 always with tolerance of ± 2.5 mm



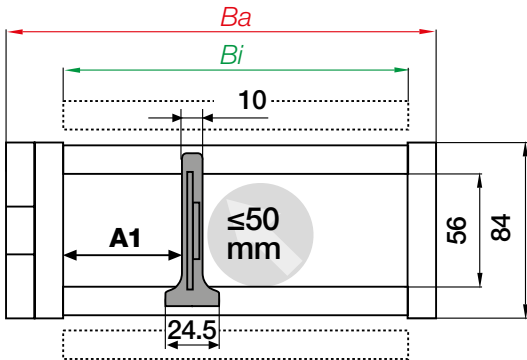
Note: outer radius *AR* (see drawing) determines dimension **A1**!



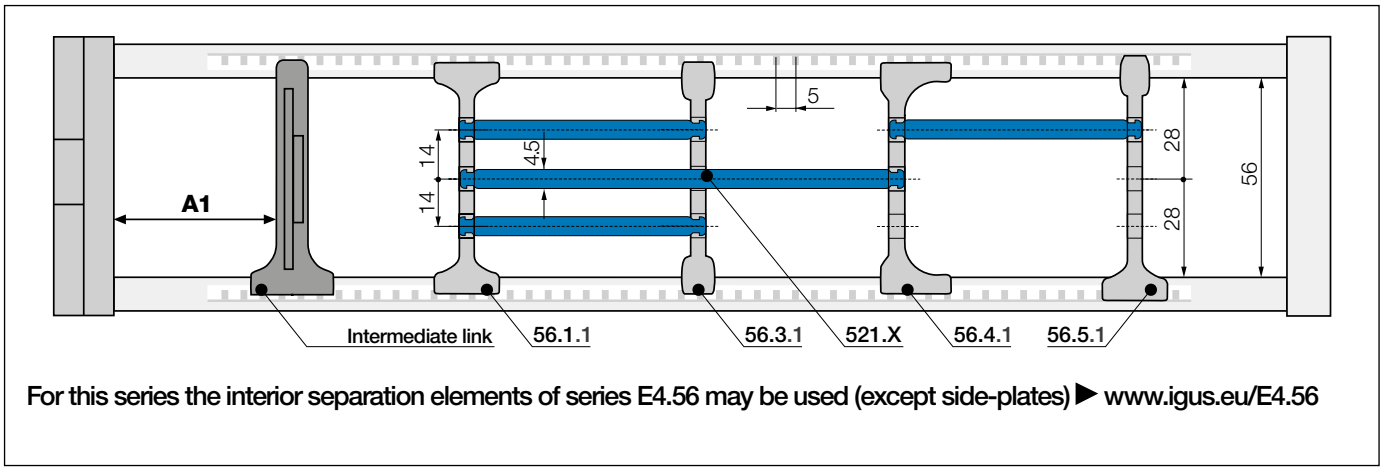
Intermediate link

The cable-friendly intermediate link increases the strength and stability of twisterchain® many times over. It also serves as interior separation, dividing the filling space into two chambers. **Outer radius *AR*** determines dimension **A1**.

Dimensions



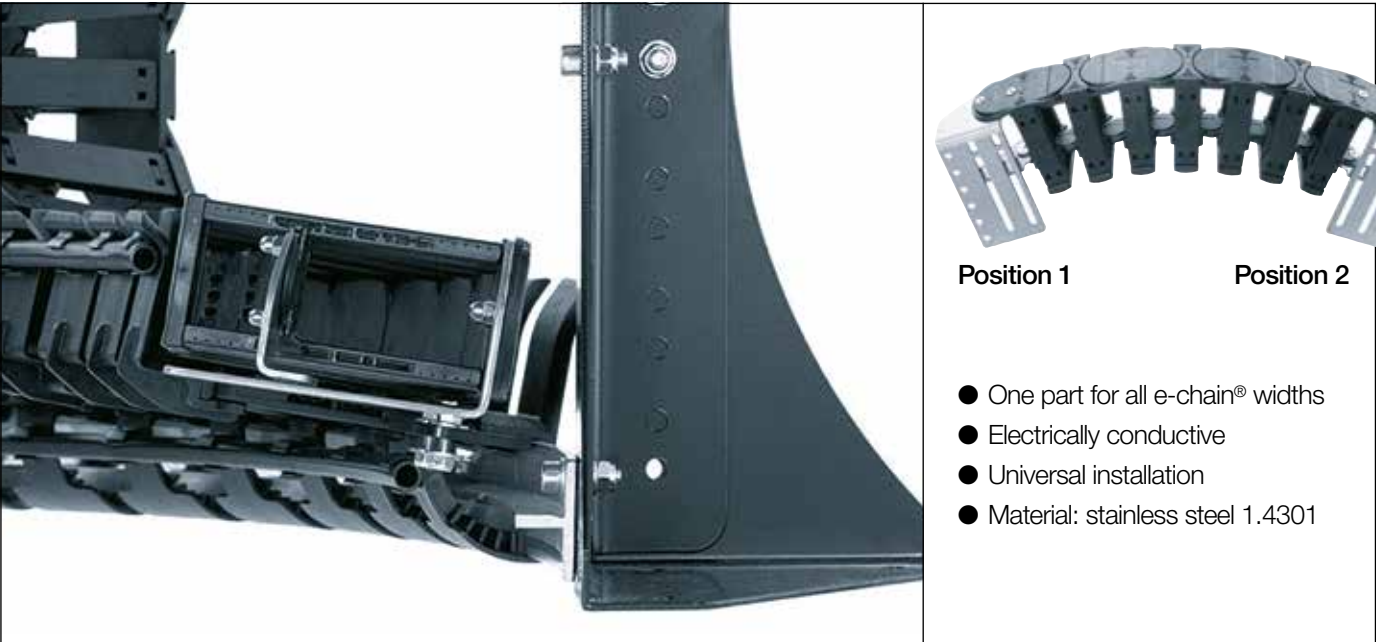
Series TC56 | interior separation



- i** *AR* = Outer radius of e-chain®
- IR* = Inner radius e-chain®
- R* = Bend radius e-chain®
- X*₁ = Inner machine construction space
- X*₂ = Outer machine construction space
- A1* = Intermediate link position
- H* = Nominal clearance height
- K* = Add-on for bend radius
- T* = Pitch

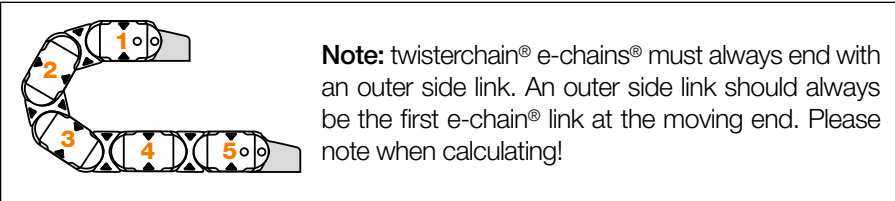
twisterchain® accessories

Steel mounting bracket



Steel, one-piece for twisterchain® (2nd generation) | Recommended for unsupported and rotary applications

For Series	Part No. full set	Part No. position 1	Part No. position 2
TC32 ▶	TC3200.34.VS.E	TC3200.30.VS.E	TC3200.40.VS.E
TC42 ▶	TC4200.34.VS.E	TC4200.30.VS.E	TC4200.40.VS.E
TC56 ▶	TC5600.34.VS.E	TC5600.30.VS.E	TC5600.40.VS.E



Applications



twisterchain® used on a cleaning robot

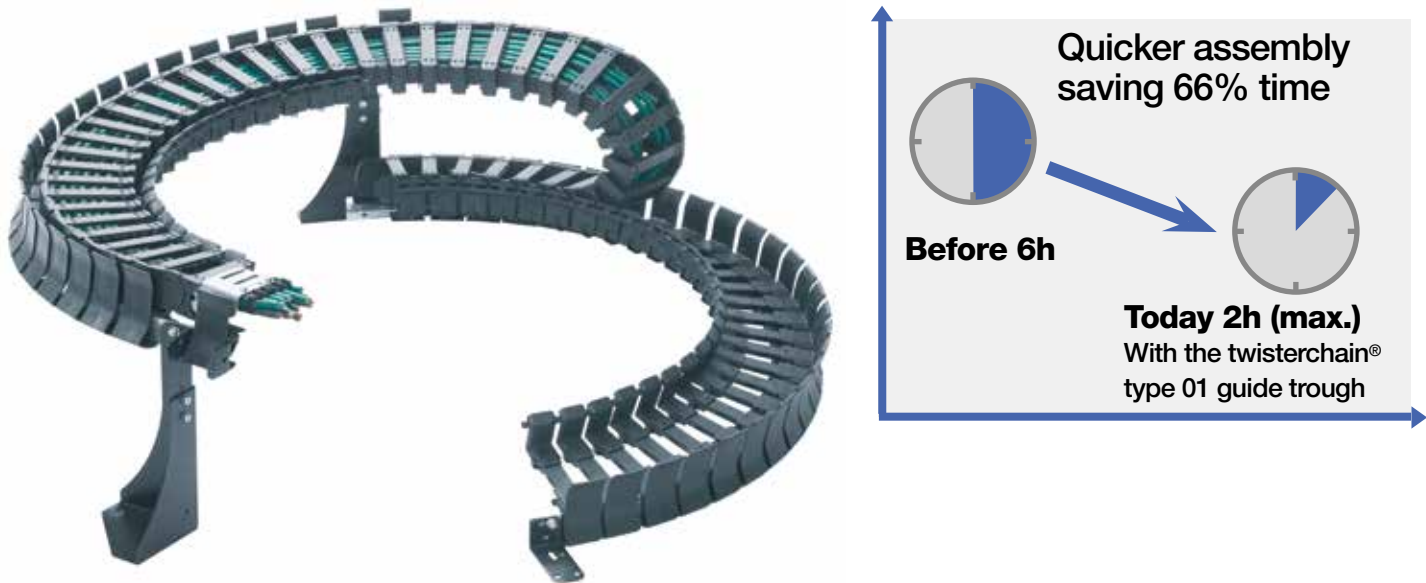


twisterchain® used on axis 1 of a robot

twisterchain® accessories

Guide troughs

Save installation time and cost -
better guidance for circular motion -
increase service life!



With the twisterchain® trough type 01, complex adjustment work is reduced. Assembly time is reduced from 6 hours to 2 hours. It also reduces noise levels, whilst travel speed and service life can be increased, thanks to its nearly all-plastic design. Available for all twisterchains® from the new and original product range.

- Suitable for high dynamics, because of the full guidance
- Much smoother and quieter motion in the trough due to continuous guidance of the upper run
- Upper run guided in the polymer trough over the full length
- Preassembled delivery possible
- Easy adjustment, alignment and handling
- Assembly time reduced from 6 hours to 2 hours

twisterchain® type 01 guide trough options



- 9XXX.31

Complete trough

(with base support, height adjustment and attachment angle brackets)
- 9XXX.32

Upper and lower run trough

(without floor support and height adjustment)

Special option: customer supplies base supports
- 9XXX.30

Lower run trough

(with mounting angle brackets)

Special option: customer builds upper run trough

Product range

Guide troughs

Product range | twisterchain® guide trough type 01

Part No. series	Exterior radius <i>AR</i> [mm]	Angle of rotation		Part No. complete trough	Part No. upper/lower run trough	Part No. lower run trough
		min.-max. α				
TC32 / TC42	400	0 - 90°		9XXX.31.90 .400/ <i>Bi</i> . <i>R</i>	9XXX.32.90 .400/ <i>Bi</i> . <i>R</i>	9XXX.30.90 .400/ <i>Bi</i> . <i>R</i>
		90° - 180°		9XXX.31.180.400/ <i>Bi</i> . <i>R</i>	9XXX.32.180.400/ <i>Bi</i> . <i>R</i>	9XXX.30.180.400/ <i>Bi</i> . <i>R</i>
		180° - 270°		9XXX.31.270.400/ <i>Bi</i> . <i>R</i>	9XXX.32.270.400/ <i>Bi</i> . <i>R</i>	9XXX.30.270.400/ <i>Bi</i> . <i>R</i>
		270° - 360°		9XXX.31.360.400/ <i>Bi</i> . <i>R</i>	9XXX.32.360.400/ <i>Bi</i> . <i>R</i>	9XXX.30.360.400/ <i>Bi</i> . <i>R</i>
	500	0 - 90°		9XXX.31.90 .500/ <i>Bi</i> . <i>R</i>	9XXX.32.90 .500/ <i>Bi</i> . <i>R</i>	9XXX.30.90 .500/ <i>Bi</i> . <i>R</i>
		90° - 180°		9XXX.31.180.500/ <i>Bi</i> . <i>R</i>	9XXX.32.180.500/ <i>Bi</i> . <i>R</i>	9XXX.30.180.500/ <i>Bi</i> . <i>R</i>
		180° - 270°		9XXX.31.270.500/ <i>Bi</i> . <i>R</i>	9XXX.32.270.500/ <i>Bi</i> . <i>R</i>	9XXX.30.270.500/ <i>Bi</i> . <i>R</i>
		270° - 360°		9XXX.31.360.500/ <i>Bi</i> . <i>R</i>	9XXX.32.360.500/ <i>Bi</i> . <i>R</i>	9XXX.30.360.500/ <i>Bi</i> . <i>R</i>
	600	0 - 90°		9XXX.31.90 .600/ <i>Bi</i> . <i>R</i>	9XXX.32.90 .600/ <i>Bi</i> . <i>R</i>	9XXX.30.90 .600/ <i>Bi</i> . <i>R</i>
		90° - 180°		9XXX.31.180.600/ <i>Bi</i> . <i>R</i>	9XXX.32.180.600/ <i>Bi</i> . <i>R</i>	9XXX.30.180.600/ <i>Bi</i> . <i>R</i>
		180° - 270°		9XXX.31.270.600/ <i>Bi</i> . <i>R</i>	9XXX.32.270.600/ <i>Bi</i> . <i>R</i>	9XXX.30.270.600/ <i>Bi</i> . <i>R</i>
		270° - 360°		9XXX.31.360.600/ <i>Bi</i> . <i>R</i>	9XXX.32.360.600/ <i>Bi</i> . <i>R</i>	9XXX.30.360.600/ <i>Bi</i> . <i>R</i>
TC42 / TC56	650	0 - 90°		9XXX.31.90 .650/ <i>Bi</i> . <i>R</i>	9XXX.32.90 .650/ <i>Bi</i> . <i>R</i>	9XXX.30.90 .650/ <i>Bi</i> . <i>R</i>
		90° - 180°		9XXX.31.180.650/ <i>Bi</i> . <i>R</i>	9XXX.32.180.650/ <i>Bi</i> . <i>R</i>	9XXX.30.180.650/ <i>Bi</i> . <i>R</i>
		180° - 270°		9XXX.31.270.650/ <i>Bi</i> . <i>R</i>	9XXX.32.270.650/ <i>Bi</i> . <i>R</i>	9XXX.30.270.650/ <i>Bi</i> . <i>R</i>
		270° - 360°		9XXX.31.360.650/ <i>Bi</i> . <i>R</i>	9XXX.32.360.650/ <i>Bi</i> . <i>R</i>	9XXX.30.360.650/ <i>Bi</i> . <i>R</i>
	750	0 - 90°		9XXX.31.90 .750/ <i>Bi</i> . <i>R</i>	9XXX.32.90 .750/ <i>Bi</i> . <i>R</i>	9XXX.30.90 .750/ <i>Bi</i> . <i>R</i>
		90° - 180°		9XXX.31.180.750/ <i>Bi</i> . <i>R</i>	9XXX.32.180.750/ <i>Bi</i> . <i>R</i>	9XXX.30.180.750/ <i>Bi</i> . <i>R</i>
		180° - 270°		9XXX.31.270.750/ <i>Bi</i> . <i>R</i>	9XXX.32.270.750/ <i>Bi</i> . <i>R</i>	9XXX.30.270.750/ <i>Bi</i> . <i>R</i>
		270° - 360°		9XXX.31.360.750/ <i>Bi</i> . <i>R</i>	9XXX.32.360.750/ <i>Bi</i> . <i>R</i>	9XXX.30.360.750/ <i>Bi</i> . <i>R</i>
	850	0 - 90°		9XXX.31.90 .850/ <i>Bi</i> . <i>R</i>	9XXX.32.90 .850/ <i>Bi</i> . <i>R</i>	9XXX.30.90 .850/ <i>Bi</i> . <i>R</i>
		90° - 180°		9XXX.31.180.850/ <i>Bi</i> . <i>R</i>	9XXX.32.180.850/ <i>Bi</i> . <i>R</i>	9XXX.30.180.850/ <i>Bi</i> . <i>R</i>
		180° - 270°		9XXX.31.270.850/ <i>Bi</i> . <i>R</i>	9XXX.32.270.850/ <i>Bi</i> . <i>R</i>	9XXX.30.270.850/ <i>Bi</i> . <i>R</i>
		270° - 360°		9XXX.31.360.850/ <i>Bi</i> . <i>R</i>	9XXX.32.360.850/ <i>Bi</i> . <i>R</i>	9XXX.30.360.850/ <i>Bi</i> . <i>R</i>

Complete Part No. 9XXX with required series (TC32, TC42, TC56),
value *Bi* and required bend radius *R* ▶ 9TC32.31.180.600/06.250

9TC32.31.180.600/12.250

9XXXX.31.180.600/*Bi*. *R*

Order key
Guide trough type 01

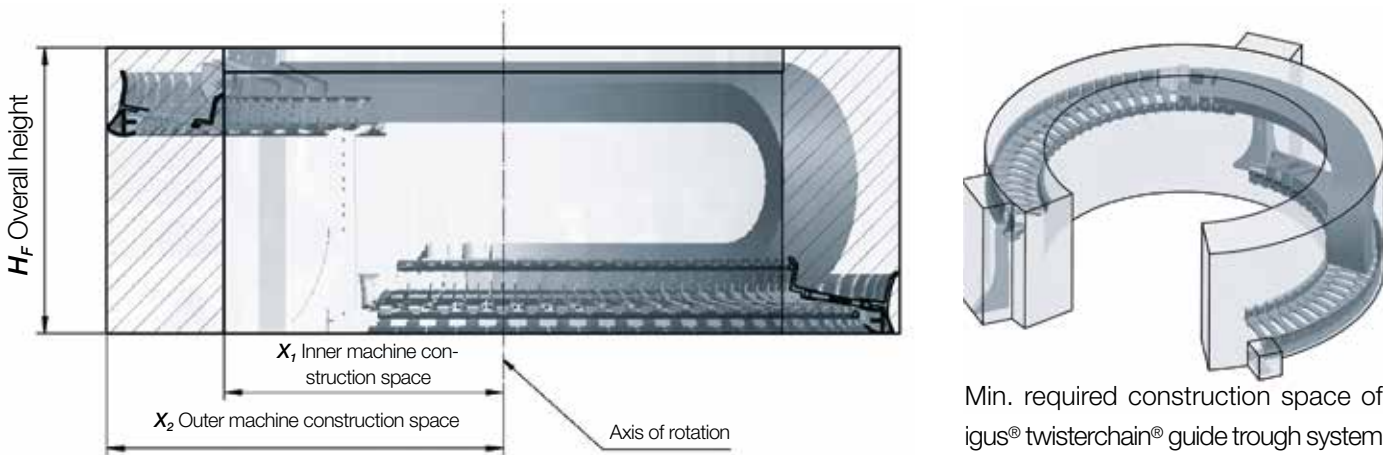
- R* - bend radius, please add required value
- Bi* - width index, please add required value
- Outer radius of e-chain®
- Angle of rotation of application (90°, 180°, 270°, 360°)
- Trough version
- Guide trough of selected series

More order examples

Complete trough	Part No. 9TC32.31.180.600/12.250
Lower run trough only	Part No. 9TC32.30.180.600/12.250
Upper and lower run trough without base support	Part No. 9TC32.32.180.600/12.250

twisterchain® accessories

Guide troughs - dimensions



Installation dimensions | X_1 inner machine construction space and X_2 outer machine construction space of guide trough

AR [mm]	X_2 [mm]	X_1 depending on Bi [mm]											
TC32		87.5	100	108	125	137.5	150						
400	480	270	250	250	220	210	200						
500	580	–	350	350	320	310	300						
600	680	–	–	450	420	410	400						
TC42		87.5	100	108	125	137.5	150	162.5	168	175	187.5	200	
400	480	270	250	250	220	210	200	190	190	180	–	–	
500	580	–	350	350	320	310	300	290	290	280	280	250	
600	680	–	–	450	420	410	400	390	390	380	380	350	
650	730	–	–	–	470	460	450	440	440	430	420	400	
750	830	–	–	–	–	560	550	540	540	530	520	500	
850	930	–	–	–	–	–	650	640	640	630	620	600	
TC56		–	–	–	125	137.5	150	162.5	–	175	187	200	
650	730	–	–	–	470	460	450	440	–	430	420	400	
750	830	–	–	–	–	560	550	540	–	530	520	500	
850	930	–	–	–	–	–	650	640	–	630	620	600	

Construction height | H_F depending on bend radius of twisterchain® guide trough

Part No. series	R [mm]	100	125	150	175	200	250	300	400
H_F Installation height [mm]									
TC32		370	420	470	520	570	670	–	–
TC42		380	430	480	530	580	680	–	–
TC56		–	–	500	–	600	700	800	1,000

twisterchain® accessories

Guide troughs - rotation angle

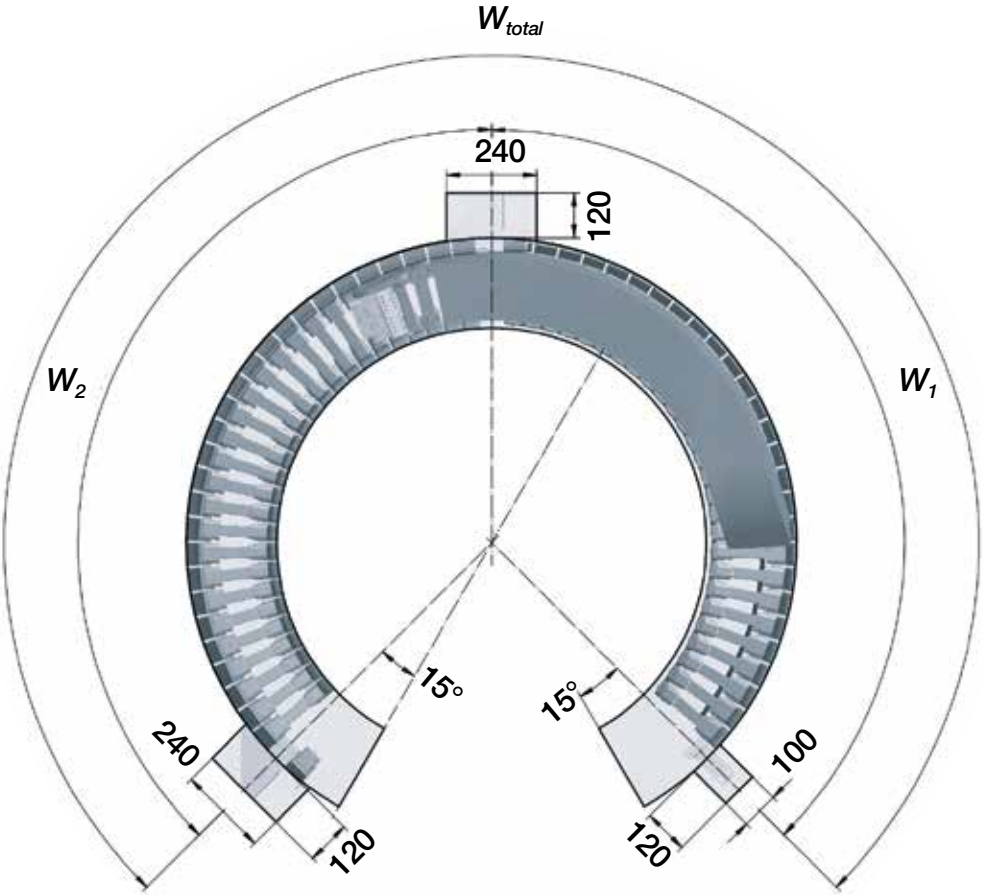
Angle of rotation for 360° | W_2 angle of upper run twisterchain® guide trough

Part No. series	AR [mm]	R [mm]	100	125	150	175	200	250	300	400
W_2 angle of rotation										
TC32/TC42	400		90°	90°	90°	90°	90°	90°	90°	90°
TC32/TC42	500		90°	90°	90°	90°	90°	90°	90°	90°
TC32/TC42	600		135°	135°	135°	135°	90°	90°	90°	90°
TC42/TC56	650		135°	135°	135°	135°	90°	90°	90°	90°
TC42/TC56	750		135°	135°	135°	135°	135°	135°	90°	90°
TC42/TC56	850		135°	135°	135°	135°	135°	135°	135°	135°

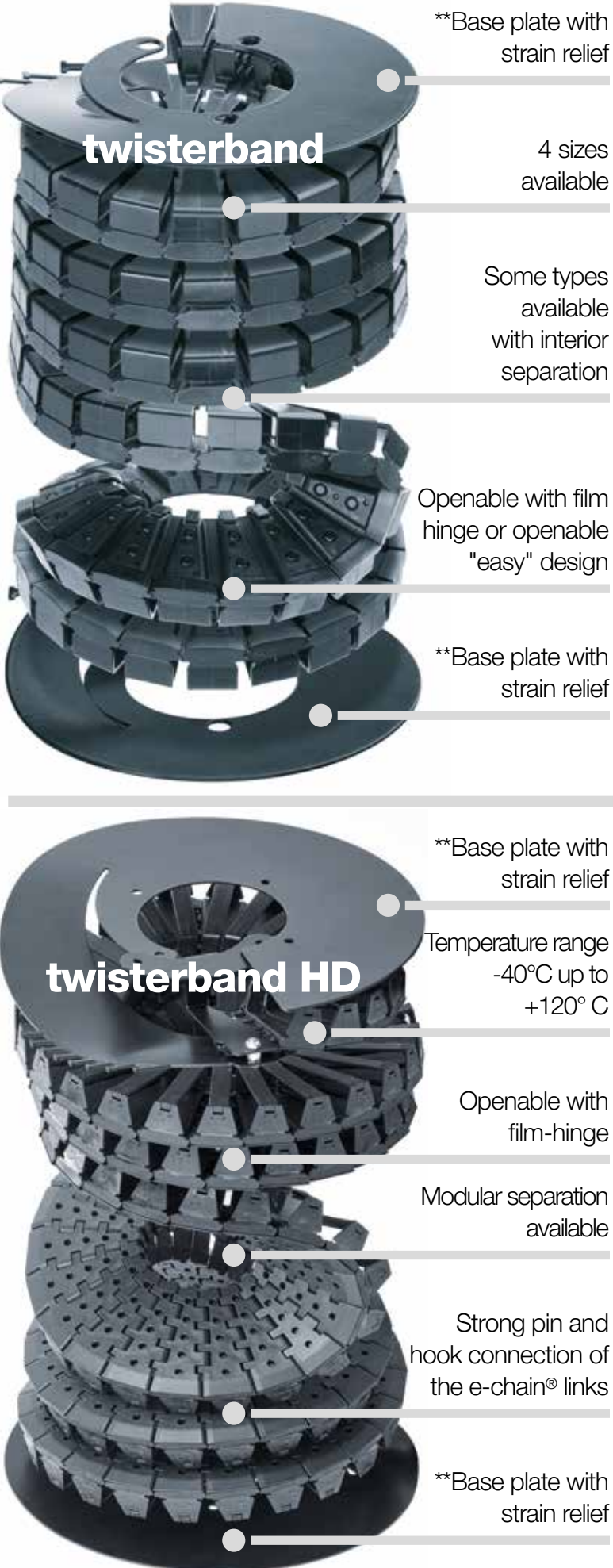
Support for the upper run as of 180° rotation angle

Angle of rotation | W_1 | W_{total}

Angle of rotation of system	Angle of lower run
W_{total}	W_1
90°	45°
180°	90°
270°	135°
360°	180°



i AR = Outer radius of e-chain®
 IR = Inner radius e-chain®
 R = Bend radius e-chain®
 X_1 = Inner machine construction space
 X_2 = Outer machine construction space
 H_F = Total trough height
 H_F = Height incl. 50 mm clearance
 H = Nominal clearance height
 K = Add-on for bend radius
 W_1 = Angle of upper run
 W_2 = Angle of lower run
 W_{total} = Angle of rotation of system

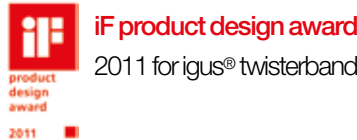


Up to 7,000°*
rotary
movements in
small spaces -
twisterband

With the very compact igus® twisterband, rotations of up to 7,000°* can be achieved cost-effectively, even in confined spaces. Energy, data and media are kept secure.

- Rotary movements up to 7000° (depending on installation orientation, vertical: up to 3,000°, horizontal: 7,000° and more possible)
- Rotary speeds up to 360°/s possible
- Available in 3 different versions: openable with film-hinge or openable "easy" design
- HD version with very strong pin and hook connection for an even longer service life as well as for temperatures below 0 °C
- Compact, modular and lightweight
- Bands can be lengthened and shortened as required
- Minimum installation space, fits very closely around the rotary axis
- Can be reliably used in various installation positions (horizontal or vertical)
- Cost-effective and easy to fill

**Base plates are delivered as standard, they are part of the twisterband module!



Series	Inner height <i>hi</i> [mm]	Inner width <i>Bi</i> [mm]	Ø <i>X</i> ₁ [mm]	Ø <i>X</i> ₂ [mm]	≥ <i>R</i> [mm]	≤ <i>R</i> [mm]	≤ <i>d1</i> [mm]	Interior seperation	igus® online
									
twisterband e-chain® links on a strip. Openable with film hinge or openable "easy" design									
TB12.23.9	9	23	40	140	024	035	7	–	► www.igus.eu/twisterband
TB20.44.12	12	44	50	220	034	057	9	–	► www.igus.eu/twisterband
TB20.44.18	18	44	50	220	034	057	14	Yes	► www.igus.eu/twisterband
TB29.27.22	22	27	200	320	069	082	17	Yes	► www.igus.eu/twisterband
TB30.75.22	22	75	90	330	044	077	17	Yes	► www.igus.eu/twisterband

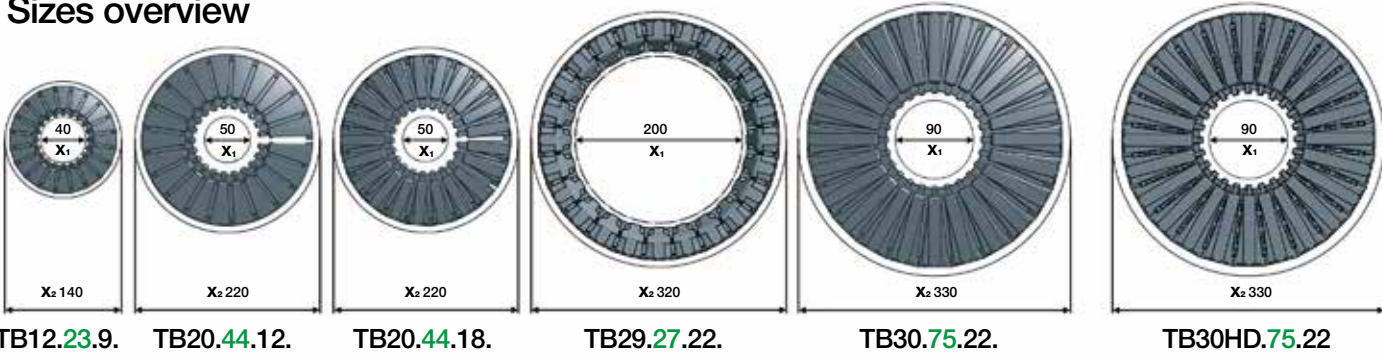
									
twisterband HD e-chain® links with very stable pin and hook connection. Openable with film-hinge									
TB30HD.75.22	22	75	90	330	044	077	17	Yes	► www.igus.eu/twisterbandHD

Other sizes available upon request. *X*₁ = inner machine construction space *X*₂ = outer machine construction space

 The complete range with ordering options,
3D-CAD, configurators, PDF, application examples ► www.igus.eu/twisterband

 Available from stock. Ready for delivery in 24-48h*
*The delivery times indicated correspond to the average time until the ordered goods are dispatched.

Sizes overview

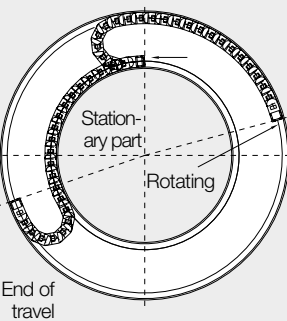


 *Bi* = Inner width e-chain® *hi* = Inner height e-chain® *X*₁ = Inner machine construction space *X*₂ = Outer machine construction space ≥ *R* = Min. bend radius e-chain® ≤ *R* = Max. bend radius e-chain® *d1* = Max. cable diameter *XX* = Number of ribbons

Rotary motion *RBR*



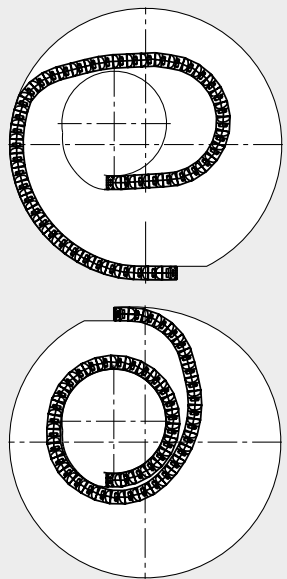
We recommend pivoting mounting brackets for most applications with rotary motion with *RBR*



RBR-rotary movement with igus® system E4, installed on a crane



Rotary motion with a standard igus® e-chain®



Standard E2/000 e-chain®, angle of rotation 225°



Rotary motion of 180° with a standard e-chain® on a crane turret drive

Technical data - rotary motion *RBR*

Max. angle of rotation	540°	More upon request
v max.	2 m/s	Depending on the application, please check with igus®
a max.	20 m/s²	Depending on the application, please check with igus®

Rotary motion with *RBR*

RBR (Reverse Bend Radius) means that the e-chain® can bend in two directions. Most igus® e-chains® can be used in *RBR* designs, with the exception of some bend radii, for the e-tubes R117 to R9850 and for the series 07, 09, 14, 15 and 17. The *RBR* does not necessarily need to be identical to the normal bend radius *R* of an e-chain®. For example, Part No. **E4.32.15.100/425.0**, describes series E4.32 e-chain® with an inner width of 150 mm, standard bend radius of *R* = 100 mm and *RBR* of 425 mm. Most rotary motion can be achieved with an *RBR* option. Angles of rotation up to 540° have been achieved. Please consult igus® for your particular application.

Rotary movements require less installation height. The e-chains® glide mostly on surfaces made of polymer, stainless steel (1.4301 material) or steel and are guided through channels in the rotary movement. See side mounted for further design tips. Bend radius, circular radius and e-chain® width are variable with this product line.

Rotary motion with standard e-chains®

The photo to the left shows an application which was achieved using standard e-chains®. Such solutions are possible if space is available and if the angles of rotation are limited to a maximum of 450°. All igus® e-chains®, e-tubes and chainflex® cables are appropriate for this situation.

Product range



System E2 medium with 360° *RBR* rotary motion on a robot

Product range for rotary motion with *RBR*

e-chains® with *RBR* are available as standard from stock for the complete triflex® range. In addition, we supply a number of e-chains® which have *RBR* as standard. For all other types, *RBR* is made to order, and we will be more than willing to offer you this option. igus® e-chains® with *RBR*, available as standard ▶triflex® R, easy triflex® and triflex®. The e-chain® series appearing in the table are *RBR* versions available from stock. Almost all igus® e-chains® can be delivered as an *RBR* version. Please contact us for any enquiry.

- chainflex® cables with TPE-outer jacket are especially suitable for e-chains® with *RBR* option
- Strain relief only for the moving end

Table of *RBR* e-chains® available from stock

Part No.	Series	Part No.	Series	Part No.	Series
03.05.10/70	E2 micro	10.2.048/048	E2 mini	1500.038.075/450.0	E2/000
03.10.010/070.0	E2 micro	10.2.075/220	E2 mini	2400.09.055/250	E2/000
05.16.018/018	E2 micro	10.3.028/028	E2 mini	250.05.060/060	E2 medium
06.20.018/018	E2 micro	10.3.038/600	E2 mini	250.07.060/060	E2 medium
06.20.038/350	E2 micro	10.3.048/048	E2 mini	2700.15.150/090	E2/000
06.30.018/018	E2 micro	10.3.075/220	E2 mini	B15i.050.100/460	E2 mini
06.64.018/018	E2 micro	10.4.028/028	E2 mini	E/Z14.1.038/038	easy chain®
10.1.028/028	E2 mini	10.4.038/600	E2 mini	E/Z14.2.038/038	easy chain®
10.1.038/600	E2 mini	10.4.048/048	E2 mini	E/Z14.3.038/038	easy chain®
10.1.048/048	E2 mini	10.4.048/400	E2 mini	E/Z14.3.075/075	easy chain®
10.1.075/220	E2 mini	10.4.075/220	E2 mini	E/Z14.4.038/038	easy chain®
10.2.028/028	E2 mini	1400.050.075/075.0	E2/000	TE14.50.028/028	snapchain
10.2.038/600	E2 mini	1400.068.038/038.0	E2/000	TE26.120.063/063	snapchain



The e-chain® series appearing in the table are *RBR* versions available from stock. Almost all igus® e-chains® can be delivered as an *RBR* version. Please contact us for any enquiry.



Available from stock. Ready for delivery in 24-48h*

*The delivery times indicated correspond to the average time until the ordered goods are dispatched.

igus 3D CAD, lifetime calculation, configurators and more ▶ www.igus.eu



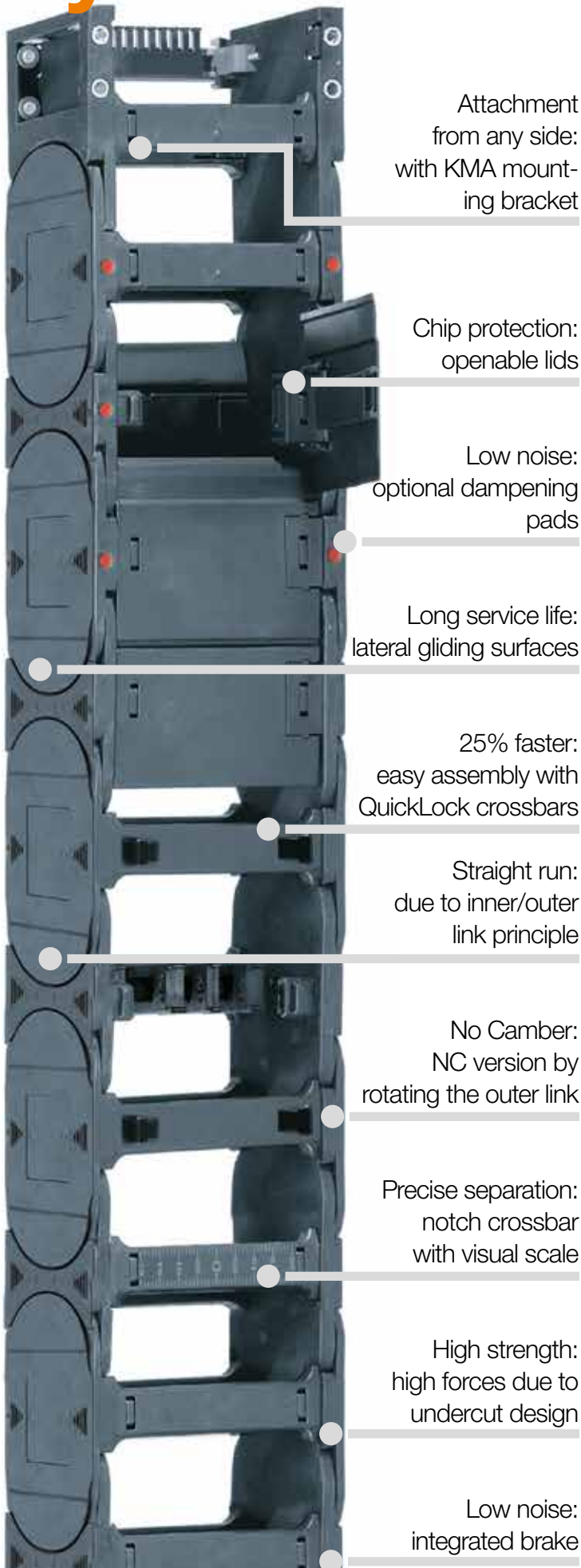


igus® E4.1

e-chains® and e-tubes
for secure energy
supply on robot axis 7

Ready-to-install assembled
e-chainsystems® e.g. for axis 7 -
readychain® ► From page 188

System E4.1 advantages



Reliable energy supply, for robot axis 7 - system E4.1

Secure energy supply to the 7th axis with igus® e-chains®. Even on long travels (when used with igus® guide troughs), high accelerations or in dirty environments, igus® e-chains® are the ideal partner for your robot application.

- Undercut design for high lateral stability, high forces on long travels and for large unsupported lengths
- Cable protection due to smooth, wide solid plastic load-bearing surfaces for cables
- Many quickly assembled interior separation options
- Noise-reducing brake and optional noise dampening pads
- Ideal for long travels in combination with igus® trough system
- Especially suited for side-mounted applications
- Inner and outer links for quick assembly, with or without pretension



IPA Qualification Certificate - Report IG 1303-640-1:
ISO Class 2, according to DIN EN ISO 14644-1 for System E4.1, Series E4.32.10.063.0.CR at v = 0.5 / 1.0 / 2.0



41 dB(A) - value determined at the igus® test-lab, v = 1.8 m/s unsupported, series E4.21.060.038.0



Electrically conductive ESD/ATEX versions with PTB certification - several series available from stock

Selection table

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]	Bend radius <i>R</i> [mm]	Unsupported length ≤ [m]	igus® online
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e-chains® with crossbars every link
e-chains® for particularly demanding applications

E4.21	21	30 - 140	44 - 154	28	038 - 200	2.50	► www.igus.eu/E4.21
E4.28	28	40 - 300	60 - 320	42	055 - 250	2.50	► www.igus.eu/E4.28
E4.32	32	50 - 400	73 - 423	54	063 - 300	3.30	► www.igus.eu/E4.32
E4.42	42	50 - 400	76 - 426	64	075 - 350	4.00	► www.igus.eu/E4.42
E4.56	56	50 - 600	84 - 634	84	135 - 500	5.00	► www.igus.eu/E4.56
E4.80	80	50 - 600	100 - 650	108	150 - 1.000	6.20	► www.igus.eu/E4.80
E4.112	112	50 - 600	102 - 652	140	200 - 1.000	6.50	► www.igus.eu/E4.112
E4.162	162	200 - 600	256 - 656	195	250 - 1.000	6.75	► www.igus.eu/E4.162



e-chains® with crossbars every other link
e-chains® for almost any application - standard

H4.32	32	50 - 400	73 - 423	54	063 - 300	3.30	► www.igus.eu/H4.32
H4.42	42	50 - 400	76 - 426	64	075 - 350	4.00	► www.igus.eu/H4.42
H4.56	56	50 - 600	84 - 634	84	135 - 500	5.00	► www.igus.eu/H4.56
H4.80	80	50 - 600	100 - 650	108	150 - 1.000	6.20	► www.igus.eu/H4.80



e-tubes
fully enclosed, excellent cable protection

R4.28	28	50 - 300	70 - 320	42	075 - 250	2.50	► www.igus.eu/E4.28
R4.32	32	50 - 300	73 - 323	54	125 - 300	3.30	► www.igus.eu/E4.32
R4.42	42	50 - 300	76 - 326	64	125 - 350	4.00	► www.igus.eu/E4.42
R4.56	56	75 - 462	109 - 497	84	135 - 500	5.00	► www.igus.eu/E4.56
R4.80	80	100 - 462	150 - 513	108	200 - 1.000	6.20	► www.igus.eu/E4.80
R4.112	108	200 - 400	252 - 452	140	250 - 1.000	6.50	► www.igus.eu/E4.112



The complete range with ordering options, 3D-CAD, configurators, PDF, application examples ► www.igus.eu/E4.1



Available from stock. Ready for delivery in 24-48h*

*The delivery times indicated correspond to the average time until the ordered goods are dispatched.

E4.1 advantages

High stability and strength and easy installation

Smooth, cable-friendly inner surfaces

Low noise operation through integrated brake on the radial stop-dogs

Smooth and wear-resistant gliding surface - no additional glide shoe required

Option with or without camber simply by reversing outer links

The undercut design principle, coupled with the inner/outer link design

ESD version ideal due to undercut contact area

Strong crossbars with double locking

Double vertical stop-dog system for larger unsupported lengths

Special e-chain® link contour provides low rolling noise

Optional noise dampening pads

Straight run and fast assembly due to inner/outer-link design

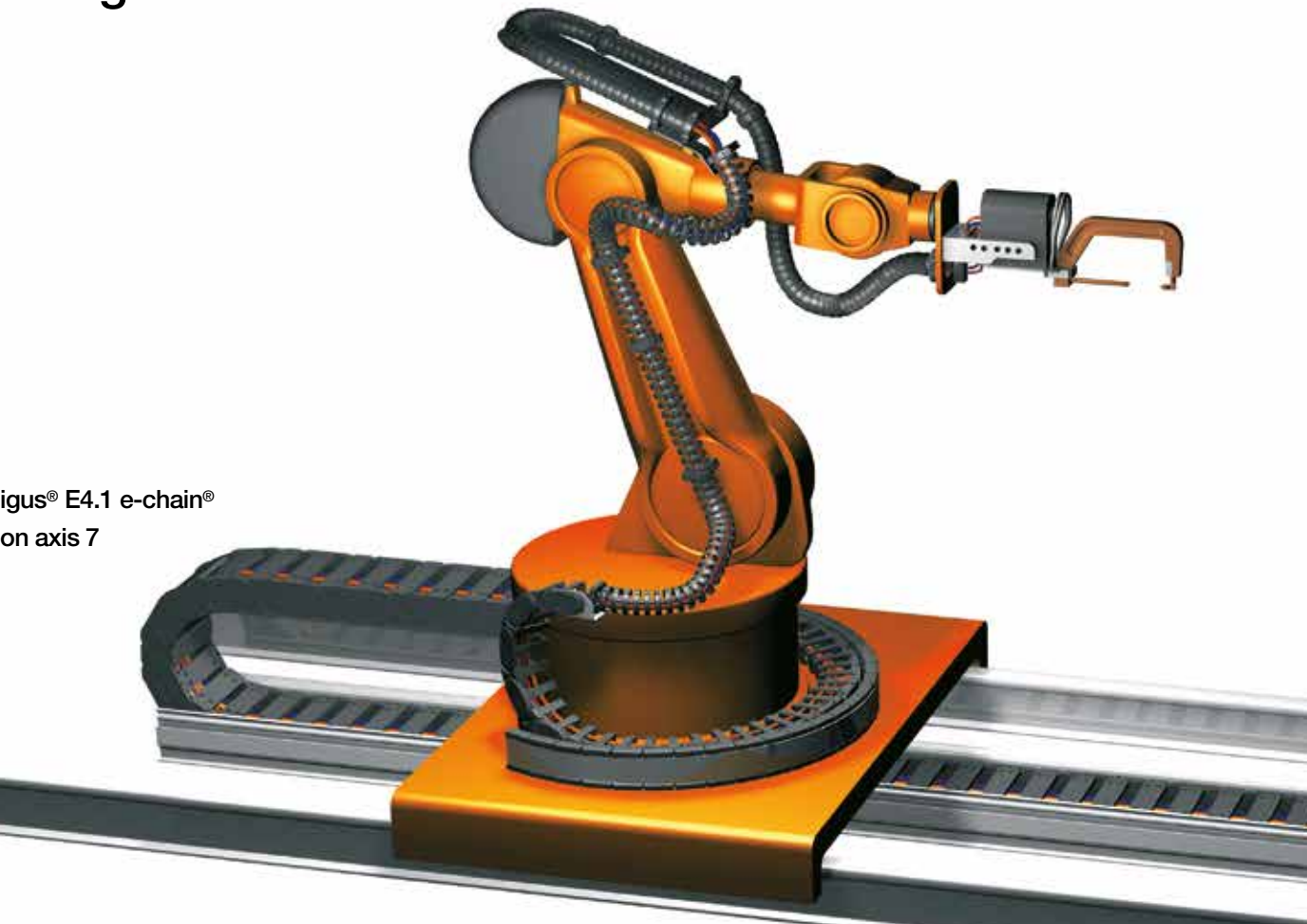
Very high stability due to the undercut design

Cable-friendly, rounded crossbar

Integrated lateral wear pads for a long service life (also for side-mounted applications)

E4.1 advantages

Design features



igus® E4.1 e-chain®
on axis 7

Application	Design features
Long unsupported length	Special stop-dogs, undercut design
Low noise, unsupported gliding	Integrated brake, smooth sliding surfaces - optional rubber dampers
Vertical hanging or standing	Undercut design increases torsional stability, "No Camber" version (by rotating the outer link)
Long travels	Undercut design and stop-dogs allows high push-pull forces and large smooth gliding surfaces
Unsupported, side-mounted	Undercut design extends the unsupported length when side-mounted
Fast assembly	Inner link/outer link design
Rotary motion	In part by simply rotating links, or fully with rework. Gliding surfaces on the sides
Increase service life	Smooth, wide, solid plastic support surface for cables, many quickly assembled inner separation options
Increase service life of e-chains®	Large pins, optimised material, high strength
ESD, ATEX	Undercut design for secure contact (especially for conductive material option)
Dirt, chips, moisture	Undercut design prevents e-chain® failures, dirt resistant design

Wear tests

Increase cable service life with igus® components



Cables last up to 4 times longer

Using optimised igus® separators, the service life of cables and hoses can be increased by a factor of 4. The rounded base, which produces an even transition to the crossbar has no interfering edges on which cables can abrade. The positive connection provides outstanding locking strength on e-chains® and e-tubes.

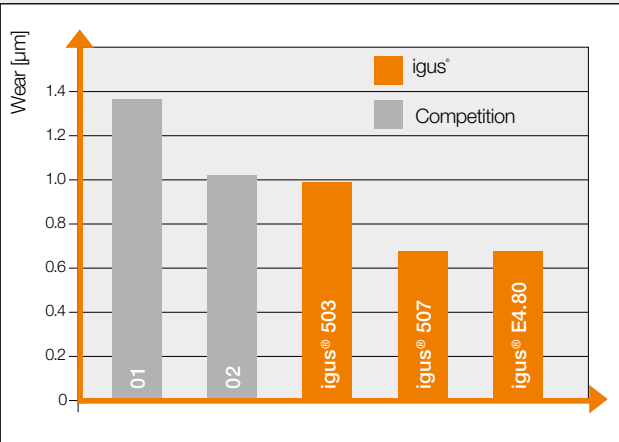


Plastic openable crossbars offer long service life

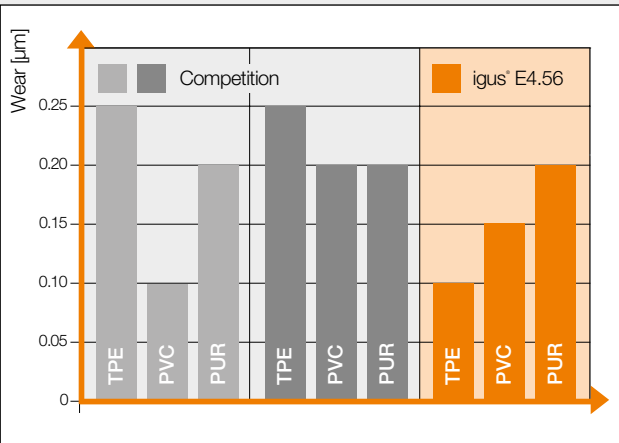
igus® laboratory tests have shown that the lowest cable abrasion occurs on e-chains® with plastic crossbars that also have a cable-friendly, rounded design. The holding force is equally impressive. The igus® test lab conducted tensile force tests on openable crossbars made from various materials. igus® plastic openable crossbars are elastic and very torsion resistant and do not deform.



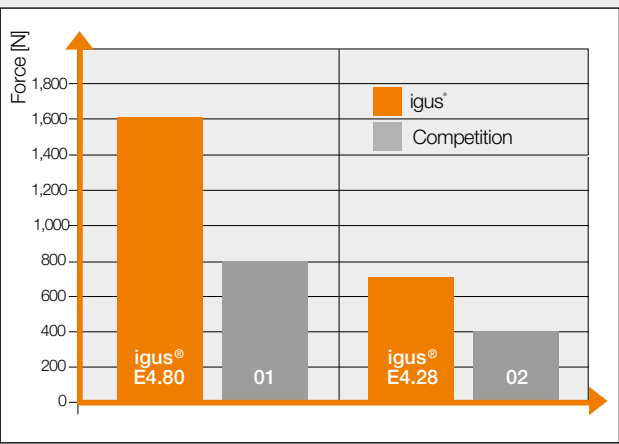
With optimised, rounded igus® separators and cable-friendly plastic crossbars, which increase service life of cables



Wear on plastic separators: wear can be reduced to nearly half with igus® separators



Wear on plastic crossbars: best service life with igus® polymer crossbars



Retention force comparison between polymer and aluminium crossbars - igus® crossbars offer longest service life and maximum holding strength

igus[®] chainflex[®] Robot

twistable cables
for robots and
3D applications

Selection table

Cables for robots

chainflex [®] cable	Jacket	Shield	Bend radius twisted, min. [factor x d]	Temperature twisted from/to [°C]	Approvals and standards	Oil-resistant	Torsion resistant	v max. twisted [°/s]	a max. twisted [°/s ²]	Page
Control cables, twistable										
CF77.UL.D	PUR		6.8	-25/ +80		✓	✓	180	60	150
CFROBOT2	PUR	✓	10	-25/ +80		✓	✓	180	60	154
Data cable, twistable										
CFROBOT3	PUR	✓	10	-25/ +80		✓	✓	180	60	156
Measuring system cable, twistable										
CFROBOT4	PUR	✓	10	-25/ +80		✓	✓	180	60	158
Fibre Optic Cable, twistable										
CFROBOT5	TPE		10	-35/ +80		✓	✓	180	60	162
Motor cables, twistable										
CFROBOT6	PUR		10	-25/ +80		✓	✓	180	60	164
CFROBOT7	PUR	✓	10	-25/ +80		✓	✓	180	60	166
CFROBOT	TPE	✓	10	-35/ +90		✓	✓	180	60	170
Bus cable, twistable										
CFROBOT8	PUR	✓	10	-25/ +70		✓	✓	180	60	172
Hybrid cable, twistable										
CFROBOT9	PUR	✓	10	-25/ +80		✓	✓	180	60	176



Available from stock. Ready for delivery in 24-48h*

*The delivery times indicated correspond to the average time until the ordered goods are dispatched.



36-month chainflex[®] guarantee

Guaranteed service life for predictable safety

For each of the chainflex[®] cable, you can calculate the service life expectancy of the selected cable for your application using the online service life calculator:



www.igus.eu/chainflexlife

igus 36 month guarantee up to 10 million double strokes ... 1,354 types from stock ... no cutting charges

chainflex®

lasts - or your money back!

Your production processes must remain trouble-free, and that means your energy supply systems too. This requires completely reliable operation by all sub-components, including moving cables. As the first company worldwide, igus® began to develop complete energy chain systems®, chainflex® cables and energy chains® are now being offered as a delivery from a single source and with a system guarantee depending on the application in each case. Based on the increasing know-how gained since 1989 and on the sophisticated testing that has been conducted since then, design principles were and are still being developed that help prevent machine downtimes in factories throughout the world today. 7 rules for a good cable:

1. Strain-relieving centre

Clear space is created in the centre of a cable depending on the number of cores and the cross section of each cable. This centre should be filled, as far as possible, with a genuine core element (and not, as frequently the case, with fillers or dummy cores made of waste materials). This braces the surrounding stranded structure and prevents it from sliding into the middle of the cable.

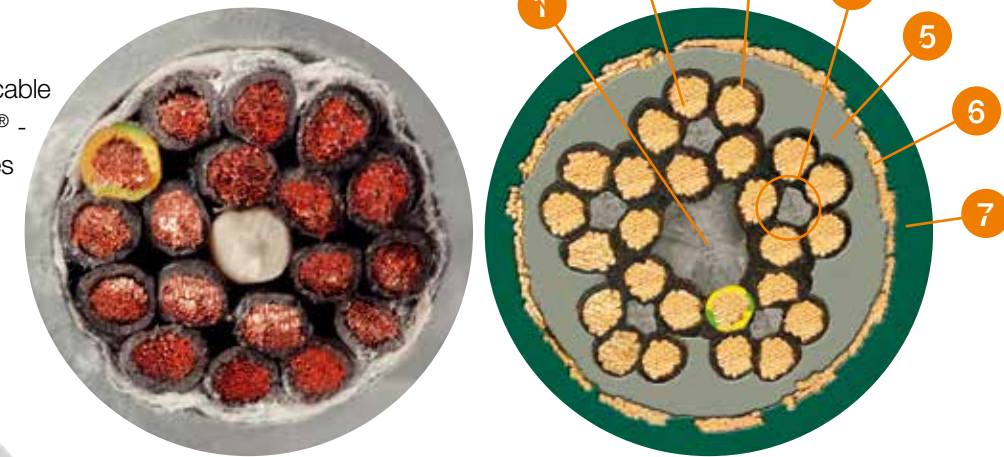
2. Core wire structure

For core strand wires, maximum flexibility has not proved to be the best solution. Although very thin individual strands result in very flexible conductors, these are highly susceptible to damage. Extensive test series have helped to determine which combination of single wire diameter, pitch of the strands and direction optimises the bending resistance.

3. Core insulation

The insulation materials must be made so that they do not stick to one another within the cable. Furthermore, the insulation is also required to support the individual strand wires of the conductor. To achieve this, we use only the best PVC and TPE extruded at high pressure and proven in millions of kilometres in e-chain® applications.

Conventional "flexible" cable (left) and igus® chainflex® - special cable with 7 rules for a moving cable (right)



4. Core structure

The braided or layered structure must be formed around a strong, tension-proof centre with an optimised short pitch length. To co-exist properly with the insulating materials, braids must allow a certain amount of movement. Starting from 12 cores, bundles should be used instead of layers.

5. Inner jacket

A gusset-filling extruded inner jacket must be used instead of inexpensive fleeces, fillers or fillers. This ensures that the structure is efficiently held in the longitudinal direction. Moreover, the structure cannot fall apart move around.

6. Shielding

The overall shield should be made tight using an optimised shield braiding angle over an extruded inner jacket. Loose open braids or wrapped stranding reduce the EMC protection considerably and can fail very quickly due to shield wire breakage. A tightly braided shield also has a torsion protection effect on the stranded structure.

7. Outer jacket

The optimised outer jacket can fulfil many different requirements: from UV-resistant to low-temperature-flexible, and from oil resistant to cost-optimised. But these outer jackets must have one thing in common: a jacket material must be highly abrasion-resistant but not stick to anything. It must be flexible but also provide a supporting function. The jacket should also be extruded under pressure (gusset-filling).

Order your chainflex® catalogue for free!
► www.igus.co.uk/chainflex



chainflex®

Cables for robots

The increasingly complex movements in industrial applications demand twistable cables with a long service life, similar to the classic chainflex® cables for use in linear e-chainsystems®.

Stranded cores, core structure, shields and jacket materials have to compensate for circumference changes due to torsional movements, as well as significant flexural stresses. For this purpose, various "soft" construction elements, e.g. Rayon filaments, PTFE elements, or torsional force absorbing fillers are used in the chainflex® CFROBOT cables. Special demands are made on the braided shielding in torsion cables. Torsion-optimised shield structures are chosen that can carry out the necessary compensatory movements thanks to special PTFE gliding films. With twistable bus cables in particular, the transmission characteristics such as attenuation, cable capacity and signal quality must remain within very tight tolerance ranges over the whole service life. This is achieved through the use of particularly torsion optimised insulating materials and mechanical attenuation elements with matching capacitance values.

The highly abrasion resistant, halogen free and flame-retardant PUR sheathing mixture in motor, hybrid/control cables and bus cables protects the torsion-optimised cores from possible damage.

The highly abrasion resistant, halogen free TPE-sheath mixture matches the special requirements of twistable FOC fibres and individual wires, and also protects these elements.

Unlike cables for linear e-chainsystems®, the mechanical stress for these cables is in the combination of bending, torsion and centrifugal forces that cannot usually be determined in advance or during use by measuring. For this reason, unlike linear e-chain® applications, a clear "yes" or "no" statement cannot be made about the suitability of a certain cable in torsion applications.

To enable evaluation to take place based on sensible comparative test results, the igus® "torsion test standard" was developed. According to this standard, all chainflex® CFROBOT cables are twisted within a triflex® R energy chain® over a distance of one metre with a torsion of $\pm 180^\circ$ at least 5 million times.



chainflex®

Torsion tested

In addition, a test is carried out on a test bench with a e-chain® length of approx. 2,500 mm with 270° torsion with an extreme load through centrifugal forces and heavy blows such as those that can occur on an industrial robot. All unshielded, gusset-filled extruded standard chainflex® control cables from the CF130.UL, CF5, CF9 and CF9.UL series comply with the above-named igus® standard and have been approved for use in torsion applications with $\pm 90^\circ$ and for a cable length of 1 m.

The following twistable CFROBOT cable types are currently available:

- Control cables (shielded and unshielded)
- Data and measuring system cables
- Fibre Optic Cables
- Motor and Servo cables
- Bus cables
- Hybrid cables

We can also offer chainflex® CFROBOT cables pre-fitted with the plug-in connectors of your choice as a readycable® or as a ready-to-install readychain® cable assembly.



	chainflex® cable	Temperature, from/to [°C]	v max. [°/s] Twisted		a max. [°/s²] Twisted		Bend radius min. [factor x d]		Bend radius min. [factor x d]		Bend radius min. [factor x d]	Page
Twistable cables												
Control cables, twistable												
	CF77.UL.D	-25 / -15 -15 / +70 +70 / +80	180		60		±150 ±180 ±150		±90 ±120 ±90		±30 ±60 ±30	150
	CFROBOT2	-25 / -15 -15 / +70 +70 / +80	180		60		±150 ±180 ±150		±90 ±120 ±90		±30 ±60 ±30	154
Data cable, twistable												
	CFROBOT3	-25 / -15 -15 / +70 +70 / +80	180		60		±150 ±180 ±150		±90 ±120 ±90		±30 ±60 ±30	156
Measuring system cable, twistable												
	CFROBOT4	-25 / -15 -15 / +70 +70 / +80	180		60		±150 ±180 ±150		±90 ±120 ±90		±30 ±60 ±30	158
Fibre Optic Cable, twistable												
	CFROBOT5	-25 / -15 -15 / +70 +70 / +80	180		60		±150 ±180 ±150		±90 ±120 ±90		±30 ±60 ±30	162
Motor cables, twistable												
	CFROBOT6	-25 / -15 -15 / +70 +70 / +80	180		60		±150 ±180 ±150		±90 ±120 ±90		±30 ±60 ±30	164
	CFROBOT7	-25 / -15 -15 / +70 +70 / +80	180		60		±150 ±180 ±150		±90 ±120 ±90		±30 ±60 ±30	166
	CFROBOT	-35 / -25 -15 / +80 +80 / +90	180		60		±150 ±180 ±150		±90 ±120 ±90		±30 ±60 ±30	172
Bus cable, twistable												
	CFROBOT8	-25 / -15 -15 / +60 +60 / +70	180		60		±150 ±180 ±150		±90 ±120 ±90		±30 ±60 ±30	176
Hybrid cable, twistable												
	CFROBOT9	-25 / -15 -15 / +70 +70 / +80	180		60		±150 ±180 ±150		±90 ±120 ±90		±30 ±60 ±30	176

* Higher number of cycles? Calculate service life online: ► www.igus.eu/chainflexlife

chainflex® CF77.UL.D

PUR control cable, twistable



- For heavy duty applications with torsion movements
- PUR outer jacket
- Oil resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

Dynamic information

	Bend radius	e-chain® twisted	min. 6.8 x d
		flexible	min. 5 x d
		fixed	min. 4 x d
	Temperature	e-chain® twisted	-25 °C to +80 °C
		flexible	-40 °C to +80 °C (following DIN EN 60811-504)
		fixed	-50 °C to +80 °C (following DIN EN 50305)
	v max.	twisted	180 °/s
	a max.	twisted	60 °/s²
	Travel distance	Unsupported travel distances and up to 100 m for gliding applications, Class 5	
	Torsion	± 180°, with 1 m cable length, Class 3 (Except for 5-core types ≥ 4.0 mm² ► Product range table)	

Cable structure

	Conductor	Fine-wired stranded conductor consisting of bare copper wires (following DIN EN 60228).	
	Core insulation	Mechanically high-quality TPE mixture.	
	Core structure	Number of cores < 12: Cores wound in a layer with short pitch length. Number of cores ≥ 12: Cores in bundles and wound together around a centre for high tensile stresses with optimised short pitch length and directions, especially low-torsion structure.	
	Core identification	Cores < 0.5 mm²: Colour code in accordance with DIN 47100 Cores ≥ 0.5 mm²: Black cores with white numerals, one green-yellow core. CF77.UL.03.04.INI: brown, blue, black, white	
	Outer jacket	Low-adhesion, halogen free, highly abrasion resistant mixture on the basis of PUR, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2). Colour: Window grey (similar to RAL 7040) CF77.UL.03.04.INI: Colour: Colza yellow (similar to RAL 1021)	

Electrical information

	Nominal voltage	300/500 V (following DIN VDE 0298-3)
	Testing voltage	2000 V (following DIN EN 50395)

Product range

Properties and approvals

	UV resistance	Medium
	Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3
	Offshore	MUD-resistant following NEK 606 - status 2009
	Flame-retardant	According to IEC 60332-1-2, CEI 20-35, FT1, VW-1
	Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 - status 1992)
	Halogen-free	Following DIN EN 60754
	UL/CSA	Cores ≤ 0.5 mm²: Style 10493 and 20233, 300 V, 80 °C Cores ≤ 0.5 mm²: Style 11323 and 21223, 1000 V, 80 °C
	NFPA	Following NFPA 79-2012, chapter 12.9
	DNV-GL	Type approval certificate No. 61 935-14 HH
	EAC	Certificate No. RU C-DE.ME77.B.01254 (TR ZU)
	CTP	Certificate No. C-DE.PB49.B.00416 (fire protection)
	CEI	Following CEI 20-35
	Lead free	Following 2011/65/EC (RoHS-II)
	Clean room	According to ISO Class 1, material/cable tested by IPA according to DIN EN ISO standard 14644-1
	DESINA	According to VDW, DESINA standardisation
	CE	Following 2014/35/EU

Guaranteed as the service life

Cycles *	5 million	7.5 million	10 million
Temperature, from/to [°C]	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]
-25/-15	±150	±90	±30
-15/+70	±180	±120	±60
+70/+80	±150	±90	±30

* Higher number of cycles? Calculate service life online: www.igus.eu/chainflexlife

Typical mechanical application areas

- For heavy duty applications with torsion movements, Class 5
- Almost unlimited resistance to oil, Class 3
- Indoor and outdoor applications with average sun radiation
- Unsupported travels and up to 100 m for gliding applications, Class 5
- Robots, handling, lead screw drives



chainflex® CF77.UL.D
PUR control cable, twistable

Product range



Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index Weight		Price [€/m]
			[kg/km]	[kg/km]	
CF77.UL.02.04.D	4x0.25	5.5	11	35	1.51
CF77.UL.03.04.INI	4x0.34	6.0	17	40	1.65
CF77.UL.05.04.D	4G0.5	6.0	22	44	1.47
CF77.UL.05.05.D	5G0.5	6.5	28	52	1.72
CF77.UL.05.07.D	7G0.5	7.5	41	80	2.19
CF77.UL.05.12.D	12G0.5	10.0	66	132	4.19
CF77.UL.05.18.D	18G0.5	12.0	99	184	6.20
CF77.UL.05.25.D	25G0.5	14.0	138	247	7.58
CF77.UL.05.30.D	30G0.5	15.0	165	325	9.14
CF77.UL.07.03.D	3G0.75	6.5	24	55	1.51
CF77.UL.07.04.D	4G0.75	7.0	32	64	1.68
CF77.UL.07.05.D	5G0.75	7.5	40	75	1.93
CF77.UL.07.07.D	7G0.75	8.5	56	106	2.48
CF77.UL.07.12.D	12G0.75	12.0	96	192	5.55
CF77.UL.07.18.D	18G0.75	13.5	143	260	7.35
CF77.UL.07.20.D	20G0.75	14.5	159	292	7.54
CF77.UL.07.25.D	25G0.75	16.0	198	368	10.32
CF77.UL.07.36.D	36G0.75	19.0	297	524	10.56
CF77.UL.07.42.D	42G0.75	21.0	365	604	12.05
CF77.UL.10.02.D	2x1.0	6.5	22	54	1.51
CF77.UL.10.03.D	3G1.0	6.5	32	65	1.66
CF77.UL.10.04.D	4G1.0	7.0	43	79	1.87
CF77.UL.10.05.D	5G1.0	8.0	53	97	2.21
CF77.UL.10.07.D	7G1.0	9.0	74	119	2.81
CF77.UL.10.12.D	12G1.0	12.5	127	234	5.55
CF77.UL.10.18.D	18G1.0	15.0	191	339	8.10
CF77.UL.10.25.D	25G1.0	17.5	264	452	9.04
CF77.UL.10.42.D	42G1.0	22.5	462	708	15.96
CF77.UL.15.03.D	3G1.5	7.5	48	86	2.01
CF77.UL.15.04.D	4G1.5	8.0	64	105	2.36
CF77.UL.15.05.D	5G1.5	8.5	80	125	2.76
CF77.UL.15.07.D ¹⁷⁾	7G1.5	10.5	111	174	3.89
CF77.UL.15.12.D	12G1.5	14.0	191	308	7.61
CF77.UL.15.18.D	18G1.5	17.0	286	477	9.23
CF77.UL.15.25.D	25G1.5	19.5	396	630	12.78
CF77.UL.15.36.D	36G1.5	23.5	594	891	15.92
CF77.UL.15.42.D	42G1.5	26.5	729	1040	18.32

¹⁷⁾ Using the cables with "7 G 1.5 mm² and "7 G 2.5 mm² it is essential: Bend radius ≥ 17.5 x d with travel distance ≥ 5 m.
When the travel distance is not less than 5 m, a bend radius not less than 17.5 x d has to be used.
Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core x= without earth core

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index Weight		Price [€/m]
			[kg/km]	[kg/km]	
CF77.UL.25.03.D	3G2.5	8.5	80	124	2.89
CF77.UL.25.04.D	4G2.5	9.5	106	155	3.48
CF77.UL.25.05.D	5G2.5	10.5	132	192	3.99
CF77.UL.25.07.D ¹⁷⁾	7G2.5	12.5	185	270	5.53
CF77.UL.25.12.D	12G2.5	17.5	317	530	10.45
CF77.UL.40.04.D	4G4.0	11.5	176	256	5.15
CF77.UL.40.05.D	5G4.0	12.0	212	302	6.58
CF77.UL.60.05.D	5G6.0	14.0	317	428	10.27
CF77.UL.160.05.D	5G16.0	22.5	845	1098	25.71

¹⁷⁾ Using the cables with "7 G 1.5 mm² and "7 G 2.5 mm² it is essential: Bend radius ≥ 17.5 x d with travel distance ≥ 5 m.
When the travel distance is not less than 5 m, a bend radius not less than 17.5 x d has to be used.
Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core x= without earth core

-  Order example: CF77.UL.02.04.D - in your desired length (0.5 m steps)
CF77.UL.D chainflex® series .02 Code nominal cross section .04 Code Number of cores
-  Online order ► www.chainflex.eu/CF77.UL.D
-  Available from stock. Ready for delivery in 24-48h*
*The delivery times indicated correspond to the average time until the ordered goods are dispatched.



chainflex® CFROBOT2

PUR control cable, twistable



- For very heavy duty applications with torsion movements
- PUR outer jacket
- Shielded
- Oil resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

Dynamic information

	Bend radius	e-chain® twisted	min. 10 x d
		flexible	min. 8 x d
		fixed	min. 5 x d
	Temperature	e-chain® twisted	-25 °C to +80 °C
		flexible	-40 °C to +80 °C (following DIN EN 60811-504)
		fixed	-50 °C to +80 °C (following DIN EN 50305)
	v max.	twisted	180 °/s
	a max.	twisted	60 °/s²
	Travel distance	Robots and 3D movements, Class 1	
	Torsion	± 180°, with 1 m cable length, Class 3	

Cable structure

	Conductor	Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228).	
	Core insulation	Mechanically high-quality TPE mixture.	
	Core identification	Black cores with white numerals, one green-yellow core.	
	Element shield	Extremely torsion-resistant tinned braided copper shield. Cover approx. 85% visual.	
	Outer jacket	Low-adhesion, halogen free, highly abrasion resistant mixture on the basis of PUR, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2). Colour: Steel blue (similar to RAL 5011)	

Electrical information

	Nominal voltage	300/500 V (following DIN VDE 0298-3)
	Testing voltage	2000 V (following DIN EN 50395)

Properties and approvals

	UV resistance	High
	Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3
	Flame-retardant	According to IEC 60332-1-2, CEI 20-35, FT1, VW-1

Product range

	Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 - status 1992)
	Halogen-free	Following DIN EN 60754
	UL/CSA	Style 10493 and 20317, 300 V, 80 °C
	NFPA	Following NFPA 79-2012, chapter 12.9
	EAC	Certificate No. RU C-DE.ME77.B.01254 (TR ZU)
	CTP	Certificate No. C-DE.PB49.B.00416 (fire protection)
	CEI	Following CEI 20-35
	Lead free	Following 2011/65/EC (RoHS-II)
	Clean room	According to ISO Class 1. The outer jacket material of this series complies with CF27.07.05.02.01.D - tested by IPA according to standard DIN EN ISO 14644-1
	CE	Following 2014/35/EU

Guaranteed as the service life

Cycles *	5 million	7.5 million	10 million
Temperature, from/to [°C]	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]
-25/-15	±150	±90	±30
-15/+70	±180	±120	±60
+70/+80	±150	±90	±30

* Higher number of cycles? Calculate service life online: www.igus.eu/chainflexlife

Typical mechanical application areas

- For very heavy duty applications with torsion movements, Class 6
- Almost unlimited resistance to oil, Class 3
- Indoor and outdoor applications, UV resistant
- Robots and 3D movements, Class 1
- Robots, handling, lead screw drives

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Price [€/m]
CFROBOT2.07.04.C	(4G0.75)C	8.5	45	84	7.48
CFROBOT2.07.05.C	(5G0.75)C	8.5	54	94	8.02
CFROBOT2.07.07.C	(7G0.75)C	10.0	75	130	8.86
CFROBOT2.07.12.C	(12G0.75)C	14.0	131	219	16.67
CFROBOT2.07.18.C	(18G0.75)C	16.5	197	321	19.40

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core x= without earth core



chainflex® CFROBOT3

PUR data cable, twistable

- For very heavy duty applications with torsion movements
- PUR outer jacket
- Shielded
- Oil resistant and coolant-resistant
- Flame-retardant
- Notch-resistant
- Hydrolysis and microbe-resistant

Dynamic information

	Bend radius	e-chain® twisted	min. 10 x d
		flexible	min. 8 x d
		fixed	min. 5 x d
	Temperature	e-chain® twisted	-25 °C to +80 °C
		flexible	-40 °C to +80 °C (following DIN EN 60811-504)
		fixed	-50 °C to +80 °C (following DIN EN 50305)
	v max.	twisted	180 °/s
	a max.	twisted	60 °/s²
	Travel distance	Robots and 3D movements, Class 1	
	Torsion	± 180°, with 1 m cable length, Class 3	

Cable structure

	Conductor	Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228).	
	Core insulation	Mechanically high-quality TPE mixture.	
	Core identification	Colour code in accordance with DIN 47100.	
	Overall shield	Extremely torsion-resistant tinned braided copper shield. Cover approx. 85% visual.	
	Outer jacket	Low-adhesion, halogen free, highly abrasion resistant mixture on the basis of PUR, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2). Colour: Steel blue (similar to RAL 5011)	

Electrical information

	Nominal voltage	300/500 V (following DIN VDE 0298-3)	
	Testing voltage	2000 V (following DIN EN 50395)	

Properties and approvals

	UV resistance	High	
	Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3	

Product range

	Flame-retardant	According to IEC 60332-1-2, CEI 20-35, FT1, VW-1
	Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 - status 1992)
	UL/CSA	Style 10497 and 20911, 300 V, 80 °C
	NFPA	Following NFPA 79-2012, chapter 12.9
	EAC	Certificate No. RU C-DE.ME77.B.01254 (TR ZU)
	CTP	Certificate No. C-DE.PB49.B.00416 (fire protection)
	CEI	Following CEI 20-35
	Lead free	Following 2011/65/EC (RoHS-II)
	Clean room	According to ISO Class 1. The outer jacket material of this series complies with CF27.07.05.02.01.D - tested by IPA according to standard DIN EN ISO 14644-1
	CE	Following 2014/35/EU

Guaranteed as the service life

Cycles *	5 million	7.5 million	10 million
Temperature, from/to [°C]	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]
-25/-15	±150	±90	±30
-15/+70	±180	±120	±60
+70/+80	±150	±90	±30

* Higher number of cycles? Calculate service life online: www.igus.eu/chainflexlife

Typical mechanical application areas

- For very heavy duty applications with torsion movements, Class 6
- Almost unlimited resistance to oil, Class 3
- Indoor and outdoor applications, UV resistant
- Robots and 3D movements, Class 1
- Robots, handling, lead screw drives

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Price [€/m]
CFROBOT3.02.04.02	(4x(2x0.25))C	10.5	40	102	11.67
CFROBOT3.02.06.02	(6x(2x0.25))C	11.5	55	139	12.08
CFROBOT3.02.08.02	(8x(2x0.25))C	14.0	70	157	17.64
CFROBOT3.05.05.02	(5x(2x0.5))C	12.5	80	164	13.76

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core x= without earth core



chainflex® CFROBOT4

PUR measuring system cable, twistable



- For very heavy duty applications with torsion movements
- PUR outer jacket
- Shielded
- Oil resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

Dynamic information

	Bend radius	e-chain® twisted	min. 10 x d
		flexible	min. 8 x d
		fixed	min. 5 x d
	Temperature	e-chain® twisted	-25 °C to +80 °C
		flexible	-40 °C to +80 °C (following DIN EN 60811-504)
		fixed	-50 °C to +80 °C (following DIN EN 50305)
	v max.	twisted	180 °/s
	a max.	twisted	60 °/s²
	Travel distance	Robots and 3D movements, Class 1	
	Torsion	± 180°, with 1 m cable length, Class 3	

Cable structure

	Conductor	Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228).
	Core insulation	Mechanically high-quality TPE mixture.
	Core identification	According to measuring system specification. ► Product range table
	Element shield	Extremely torsion-resistant tinned braided copper shield.
	Overall shield	Torsion resistant tinned braided copper shield. Cover approx. 80% visual.
	Outer jacket	Low-adhesion, halogen free, highly abrasion resistant mixture on the basis of PUR, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2). Colour: Steel blue (similar to RAL 5011)

Electrical information

	Nominal voltage	50 V
	Testing voltage	500 V

Product range

Properties and approvals

	UV resistance	High
	Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3
	Flame-retardant	According to IEC 60332-1-2, CEI 20-35, FT1, VW-1
	Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 - status 1992)
	Halogen-free	Following DIN EN 60754
	UL/CSA	Style 1589 and 20236, 30 V, 80 °C
	NFPA	Following NFPA 79-2012, chapter 12.9
	EAC	Certificate No. RU C-DE.ME77.B.01218 (TR ZU)
	CTP	Certificate No. C-DE.PB49.B.00416 (fire protection)
	CEI	Following CEI 20-35
	Lead free	Following 2011/65/EC (RoHS-II)
	Clean room	According to ISO Class 1. The outer jacket material of this series complies with CF27.07.05.02.01.D - tested by IPA according to standard DIN EN ISO 14644-1
	CE	Following 2014/35/EU

Guaranteed as the service life

Cycles *	5 million	7.5 million	10 million
Temperature, from/to [°C]	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]
-25/-15	±150	±90	±30
-15/+70	±180	±120	±60
+70/+80	±150	±90	±30

* Higher number of cycles? Calculate service life online: www.igus.eu/chainflexlife

Typical mechanical application areas

- For very heavy duty applications with torsion movements, Class 6
- Almost unlimited resistance to oil, Class 3
- Indoor and outdoor applications, UV resistant
- Robots and 3D movements, Class 1
- Robots, handling, lead screw drives



chainflex® CFROBOT4

PUR measuring system cable, twistable

Product range



Image exemplary

Part No.	Number of cores and conductor nominal cross section	Outer diameter (d) max.	Copper index	Weight	Price	Part No.	Core group	Colour code
	[mm²]	[mm]	[kg/km]	[kg/km]	[€/m]			
CFROBOT4.001	(3x(2x0.14)C+(4x0.14)+(2x0.5))C	10.5	65	119	20.84	CFROBOT4.001	3x(2x0.14)C 4x0.14 2x0.5	green/yellow, black/brown, red/orange grey/blue/white-yellow/white-black brown-red/brown-blue
CFROBOT4.006	(3x(2x0.14)C+(4x0.14)+(4x0.22)+(2x0.5))C	11.5	78	143	20.29	CFROBOT4.006	3x(2x0.14)C (4x0.14) (4x0.22) (2x0.5)	green/yellow, black/brown, red/orange grey/blue/white-yellow/white-black brown-yellow/brown-grey/green-black/green-red brown-red/brown-blue
CFROBOT4.009	(4x(2x0.25)+(2x0.5))C	9.5	51	93	13.59	CFROBOT4.009	4x(2x0.25) 2x0.5	brown/green, blue/violet, grey/pink, red/black white, brown
CFROBOT4.015	(4x(2x0.14)+4x0.5)C	9.0	52	96	13.73	CFROBOT4.015	4x(2x0.14) 4x0.5	brown/green, blue/violet, grey/pink, red/black blue, white, brown-green, white-green
CFROBOT4.028 ⁶⁾	(2x(2x0.20)+(2x0.38))C	7.5	47	75	18.91	CFROBOT4.028 ⁶⁾	2x(2x0.20) (2x0.38)	green/yellow, pink/blue red/black

⁶⁾ Colour outer jacket: Yellow-green (RAL 6018)
Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x**= without earth core

-  **Order example: CFROBOT4.009 - in your desired length (0.5 m steps)**
CFROBOT4 chainflex® Series .009 Code measuring system type
-  **Online order ► www.chainflex.eu/CFROBOT4**
-  **Available from stock. Ready for delivery in 24-48h***
*The delivery times indicated correspond to the average time until the ordered goods are dispatched.



chainflex® CFROBOT5

TPE Fibre Optic Cable, twistable

- For very heavy duty applications with torsion movements
- TPE outer jacket
- Oil and bio-oil resistant
- UV-resistant
- Low-temperature-flexible
- Hydrolysis and microbe-resistant
- PVC and halogen-free

Dynamic information

	Bend radius	e-chain® twisted	min. 10 x d
		flexible	min. 8 x d
		fixed	min. 5 x d
	Temperature	e-chain® twisted	-35 °C to +80 °C
		flexible	-50 °C to +80 °C (following DIN EN 60811-504)
		fixed	-55 °C to +80 °C (following DIN EN 50305)
	v max.	twisted	180 °/s
	a max.	twisted	60 °/s²
	Travel distance	Robots and 3D movements, Class 1	
	Torsion	± 180°, with 1 m cable length, Class 3	

Cable structure

	Conductor	50/125 µm, 62.5/125 µm special fixed wire elements with aramid strain relief.	
	Core stranding	FOC cores wound with high-tensile aramid dampers around a GRP central element.	
	Core identification	► Product range table	
	Outer jacket	Low-adhesion mixture on the basis of TPE, especially abrasion resistant and highly flexible, adapted to suit the requirements in e-chains®. Colour: Jet black (similar to RAL 9005)	

Properties and approvals

	UV resistance	High	
	Oil resistance	Oil resistant (following DIN EN 60811-404), bio-oil resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4	
	Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 - status 1992)	
	Halogen-free	Following DIN EN 60754	

Product range

**Lead free**

**Clean room**

**CE**

Following 2011/65/EC (RoHS-II)

According to ISO Class 1. The outer jacket material of this series complies with CF9.15.07 - tested by IPA according to standard DIN EN ISO 14644-1

Following 2014/35/EU

Guaranteed as the service life

Cycles *	5 million	7.5 million	10 million
Temperature, from/to [°C]	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]
-35/-25	±150	±90	±30
-25/+70	±180	±120	±60
+70/+80	±150	±90	±30

* Higher number of cycles? Calculate service life online: www.igus.eu/chainflexlife

Typical mechanical application areas

- For very heavy duty applications with torsion movements, Class 6
- Almost unlimited resistance to oil, also to bio-oils, Class 4
- Indoor and outdoor applications, UV resistant
- Robots and 3D movements, Class 1
- Robots, handling

Part No.	Number of fibres	Fibre diameter [µm]	Outer diameter (d) max. [mm]	Weight [kg/km]	Price [€/m]
CFROBOT5.500	2	62.5/125	8.5	53	19.36
CFROBOT5.501	2	50/125	8.5	53	18.23

Part No.	Bandwidth [MHz x km] @ 850 nm	Bandwidth [MHz x km] @ 1300 nm	Attenuation [dB/km] @ 850 nm	Attenuation [dB/km] @ 1300 nm	Fibre identification
CFROBOT5.500	≥ 200	≥ 500	≤ 3.0	≤ 0.7	orange with white numerals
CFROBOT5.501	≥ 500	≥ 500	≤ 2.5	≤ 0.7	blue with white numerals

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core x= without earth core

**Order example: CFROBOT5.501 - in your desired length (0.5 m steps)**
CFROBOT5 chainflex® series .501 Code Type of fibres

**Online order ► www.chainflex.eu/CFROBOT5**

**Available from stock. Ready for delivery in 24-48h***
*The delivery times indicated correspond to the average time until the ordered goods are dispatched.



igus® chainflex® CFROBOT5

Image exemplary



chainflex® CFROBOT6

PUR motor cable, twistable

- For very heavy duty applications with torsion movements
- PUR outer jacket
- Oil resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

Dynamic information

	Bend radius	e-chain® twisted	min. 10 x d
		flexible	min. 8 x d
		fixed	min. 5 x d
	Temperature	e-chain® twisted	-25 °C to +80 °C
		flexible	-40 °C to +80 °C (following DIN EN 60811-504)
		fixed	-50 °C to +80 °C (following DIN EN 50305)
	v max.	twisted	180 °/s
	a max.	twisted	60 °/s²
	Travel distance	Robots and 3D movements, Class 1	
	Torsion	± 180°, with 1 m cable length, Class 3	

Cable structure

	Conductor	Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228).	
	Core insulation	Mechanically high-quality TPE mixture.	
	Core identification	Black cores with white numerals 1-2, one green-yellow core	
	Outer jacket	Low-adhesion, halogen free, highly abrasion resistant mixture on the basis of PUR, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2). Colour: Steel blue (similar to RAL 5011)	

Electrical information

	Nominal voltage	600/1000 V (following DIN VDE 0298-3)	
	Testing voltage	4000 V (following DIN EN 50395)	

Properties and approvals

	UV resistance	High	
	Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3	
	Flame-retardant	According to IEC 60332-1-2, CEI 20-35, FT1, VW-1	

Product range

	Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 - status 1992)
	Halogen-free	Following DIN EN 60754
	UL/CSA	Style 10492 and 21223, 1000 V, 80 °C
	NFPA	Following NFPA 79-2012, chapter 12.9
	EAC	Certificate No. RU C-DE.ME77.B.02324 (TR ZU)
	CTP	Certificate No. C-DE.PB49.B.00420 (fire protection)
	CEI	Following CEI 20-35
	Lead free	Following 2011/65/EC (RoHS-II)
	Clean room	According to ISO Class 1. The outer jacket material of this series complies with CF27.07.05.02.01.D - tested by IPA according to standard DIN EN ISO 14644-1
	CE	Following 2014/35/EU

Guaranteed as the service life

Cycles *	5 million	7.5 million	10 million
Temperature, from/to [°C]	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]
-25/-15	±150	±90	±30
-15/+70	±180	±120	±60
+70/+80	±150	±90	±30

* Higher number of cycles? Calculate service life online: www.igus.eu/chainflexlife

Typical mechanical application areas

- For very heavy duty applications with torsion movements, Class 6
- Almost unlimited resistance to oil, Class 3
- Indoor and outdoor applications, UV resistant
- Robots and 3D movements, Class 1
- Robots, handling, lead screw drives

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Price [€/m]
CFROBOT6.100.03	3G10.0	16.0	317	414	19.46
CFROBOT6.160.03	3G16.0	18.5	508	618	24.93
CFROBOT6.250.03	3G25.0	23.0	795	962	34.81
CFROBOT6.350.03 ¹¹⁾	3G35.0	25.5	1122	1298	42.24

¹¹⁾ Phase-out model
Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core x= without earth core



chainflex® CFROBOT7

PUR motor cable, twistable



- For very heavy duty applications with torsion movements
- PUR outer jacket
- Shielded
- Oil resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

Dynamic information

	Bend radius	e-chain® twisted	min. 10 x d
		flexible	min. 8 x d
		fixed	min. 5 x d
	Temperature	e-chain® twisted	-25 °C to +80 °C
		flexible	-40 °C to +80 °C (following DIN EN 60811-504)
		fixed	-50 °C to +80 °C (following DIN EN 50305)
	v max.	twisted	180 °/s
	a max.	twisted	60 °/s²
	Travel distance	Robots and 3D movements, Class 1	
	Torsion	± 180°, with 1 m cable length, Class 3	

Cable structure

	Conductor	Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228).	
	Core insulation	Mechanically high-quality TPE mixture.	
	Core identification	Power cores: Cores black with white numerals, one core green-yellow 2 Control pairs: Core black with white numerals. 1. Control core: 5 2. Control core: 6 3. Control core: 7 4. Control core: 8 4 Control pairs: Colour code in accordance with DIN 47100	
	Overall shield	Extremely torsion-resistant tinned braided copper shield. Cover approx. 85% visual.	
	Outer jacket	Low-adhesion, halogen free, highly abrasion resistant mixture on the basis of PUR, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2). Colour: Steel blue (similar to RAL 5011)	

Electrical information

	Nominal voltage	600/1000 V (following DIN VDE 0298-3)
	Testing voltage	4000 V (following DIN EN 50395)

Product range

Properties and approvals

	UV resistance	High
	Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3
	Flame-retardant	According to IEC 60332-1-2, CEI 20-35, FT1, VW-1
	Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 - status 1992)
	Halogen-free	Following DIN EN 60754
	UL/CSA	Style 10492 and 21223, 1000 V, 80 °C
	NFPA	Following NFPA 79-2012, chapter 12.9
	EAC	Certificate No. RU C-DE.ME77.B.02324 (TR ZU)
	CTP	Certificate No. C-DE.PB49.B.00420 (fire protection)
	CEI	Following CEI 20-35
	Lead free	Following 2011/65/EC (RoHS-II)
	Clean room	According to ISO Class 1. The outer jacket material of this series complies with CF27.07.05.02.01.D - tested by IPA according to standard DIN EN ISO 14644-1
	CE	Following 2014/35/EU

Guaranteed as the service life

Cycles *	5 million	7.5 million	10 million
Temperature, from/to [°C]	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]
-25/-15	±150	±90	±30
-15/+70	±180	±120	±60
+70/+80	±150	±90	±30

* Higher number of cycles? Calculate service life online: www.igus.eu/chainflexlife

Typical mechanical application areas

- For very heavy duty applications with torsion movements, Class 6
- Almost unlimited resistance to oil, Class 3
- Indoor and outdoor applications, UV resistant
- Robots and 3D movements, Class 1
- Robots, handling, lead screw drives



chainflex® CFROBOT7

PUR motor cable, twistable

Product range



Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Price [€/m]
without control pair					
CFROBOT7.15.03.C	(3G1.5)C	8.5	64	103	7.94
CFROBOT7.15.04.C	(4G1.5)C	9.5	82	127	9.76
CFROBOT7.25.03.C	(3G2.5)C	10.0	98	147	9.02
CFROBOT7.25.04.C	(4G2.5)C	10.5	127	182	10.90
CFROBOT7.60.04.C	(4G6.0)C	15.0	296	403	16.84
2 Control pairs					
CFROBOT7.15.15.02.02.C	(4G1.5+2x(2x1.5)C)C	16.5	211	325	24.53
CFROBOT7.25.15.02.02.C	(4G2.5+2x(2x1.5)C)C	17.0	259	381	28.49
4 Control pairs					
CFROBOT7.40.02.02.04.C	(4G4.0+4x(2x0.25)C)C	17.0	270	384	43.37

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core x= without earth core

-  **Order example:** CFROBOT7.15.03.C - in your desired length (0.5 m steps)
CFROBOT7 chainflex® series .15 Code nominal cross section .03 Code Number of cores
-  Online order ► www.chainflex.eu/CFROBOT7
-  **Available from stock. Ready for delivery in 24-48h***
*The delivery times indicated correspond to the average time until the ordered goods are dispatched.



chainflex® CFROBOT

TPE spindle cable/single core, twistable

- For very heavy duty applications with torsion movements
- TPE outer jacket
- Shielded
- Oil and bio-oil resistant
- PVC-free
- UV resistant
- Flame-retardant
- Hydrolysis and microbe-resistant

Dynamic information

	Bend radius	e-chain® twisted	min. 10 x d
		flexible	min. 8 x d
		fixed	min. 5 x d
	Temperature	e-chain® twisted	-35 °C to +90 °C
		flexible	-45 °C to +100 °C (following DIN EN 60811-504)
		fixed	-50 °C to +100 °C (following DIN EN 50305)
	v max.	twisted	180 °/s
	a max.	twisted	60 °/s²
	Travel distance	Robots and 3D movements, Class 1	
	Torsion	± 180°, with 1 m cable length, Class 3	

Cable structure

	Conductor	Extremely bend-resistant cable.	
	Core insulation	Mechanically high-quality TPE mixture.	
	Overall shield	Extremely torsion-resistant tinned braided copper shield. Cover approx. 90% visual.	
	Outer jacket	Low-adhesion mixture on the basis of TPE, especially abrasion resistant and highly flexible, adapted to suit the requirements in e-chains®. Colour: Jet black (similar to RAL 9005)	

Electrical information

	Nominal voltage	600/1000 V (following DIN VDE 0298-3)	
	Testing voltage	4000 V (following DIN EN 50395)	

Properties and approvals

	UV resistance	High	
	Oil resistance	Oil resistant (following DIN EN 60811-404), bio-oil resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4	
	Flame-retardant	According to IEC 60332-1-2, CEI 20-35, FT1, VW-1	

Product range

	Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 - status 1992)
	UL/CSA	Style 10258 and 21387, 1000 V, 90 °C
	NFPA	Following NFPA 79-2012, chapter 12.9
	EAC	Certificate No. RU C-DE.ME77.B.02324 (TR ZU)
	CTP	Certificate No. C-DE.PB49.B.00420 (fire protection)
	CEI	Following CEI 20-35
	Lead free	Following 2011/65/EC (RoHS-II)
	Clean room	According to ISO Class 1. The outer jacket material of this series complies with CF34.UL.25.04.D - tested by IPA according to standard DIN EN ISO 14644-1
	CE	Following 2014/35/EU

Guaranteed as the service life

Cycles *	5 million	7.5 million	10 million
Temperature, from/to [°C]	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]
-35/-25	±150	±90	±30
-25/+70	±180	±120	±60
+70/+80	±150	±90	±30

* Higher number of cycles? Calculate service life online: www.igus.eu/chainflexlife

Typical mechanical application areas

- For very heavy duty applications with torsion movements, Class 6
- Almost unlimited resistance to oil, also to bio-oils, Class 4
- Indoor and outdoor applications, UV resistant
- Robots and 3D movements, Class 1
- Robots, handling, lead screw drives

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Price [€/m]
CFROBOT.035	(1x10.0)C	10.5	134	209	9.40
CFROBOT.036	(1x16.0)C	12.0	202	293	11.71
CFROBOT.037	(1x25.0)C	14.5	318	454	16.70
CFROBOT.038	(1x35.0)C	15.5	431	574	19.92
CFROBOT.039 ¹¹⁾	(1x50.0)C	18.0	601	781	24.91

¹¹⁾ Phase-out model

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core x= without earth core



chainflex® CFROBOT8

PUR bus cable, twistable

- For very heavy duty applications with torsion movements
- PUR outer jacket
- Shielded
- Oil resistant and coolant-resistant
- Flame-retardant
- Notch-resistant
- Hydrolysis and microbe-resistant

CAT5e to CAT7
for torsion

Dynamic information

	Bend radius	e-chain® twisted	min. 10 x d
		flexible	min. 8 x d
		fixed	min. 5 x d
	Temperature	e-chain® twisted	-25 °C to +70 °C
		flexible	-40 °C to +70 °C (following DIN EN 60811-504)
		fixed	-50 °C to +70 °C (following DIN EN 50305)
	v max.	twisted	180 °/s
	a max.	twisted	60 °/s²
	Travel distance	Robots and 3D movements, Class 1	
	Torsion	± 180°, with 1 m cable length, Class 3	

Cable structure

	Conductor	Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228).	
	Core insulation	According to bus specification.	
	Core structure	According to bus specification.	
	Core identification	According to bus specification. ► Product range table	
	Intermediate layer	Foil taping over the external layer.	
	Overall shield	Torsion resistant tinned braided copper shield. Cover approx. 80% visual.	
	Outer jacket	Low-adhesion, halogen free, highly abrasion resistant mixture on the basis of PUR, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2). Colour: Steel blue (similar to RAL 5011)	

Electrical information

	Nominal voltage	50 V
	Testing voltage	500 V

Product range

Properties and approvals

	UV resistance	High
	Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3
	Flame-retardant	According to IEC 60332-1-2, CEI 20-35, FT1
	Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 - status 1992)
	UL/CSA	Style 1589 and 20236, 30 V, 80 °C
	EAC	Certificate No. RU C-DE.ME77.B.01218 (TR ZU)
	CTP	Certificate No. C-DE.PB49.B.00416 (fire protection)
	CEI	Following CEI 20-35
	Lead free	Following 2011/65/EC (RoHS-II)
	Clean room	According to ISO Class 1. The outer jacket material of this series complies with CF27.07.05.02.01.D - tested by IPA according to standard DIN EN ISO 14644-1
	CE	Following 2014/35/EU

Guaranteed as the service life

Cycles *	5 million	7.5 million	10 million
Temperature, from/to [°C]	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]
-25/-15	±150	±90	±30
-15/+60	±180	±120	±60
+60/+70	±150	±90	±30

* Higher number of cycles? Calculate service life online: www.igus.eu/chainflexlife

Typical mechanical application areas

- For very heavy duty applications with torsion movements, Class 6
- Almost unlimited resistance to oil, Class 3
- Indoor and outdoor applications, UV resistant
- Robots and 3D movements, Class 1
- Robots, handling, lead screw drives



chainflex® CFROBOT8
PUR bus cable, twistable

Product range



Image exemplary

Part No.	Number of cores and conductor nominal cross section	Outer diameter (d) max.	Copper index	Weight	Price	Part No.	Characteristic wave impedance approx.	Core group	Colour code
	[mm²]	[mm]	[kg/km]	[kg/km]	[€/m]		[Ω]		
Profibus									
CFROBOT8.001	(2x0.35)C	8.0	29	62	17.28	CFROBOT8.001	150	(2x0.35)C	red, green
CAN-Bus									
CFROBOT8.022	(4x0.5)C	7.5	43	72	14.60	CFROBOT8.022	120	(4x0.5)C	white, green, brown, yellow (star-quad stranding)
DeviceNet									
CFROBOT8.030	(2xAWG24)C+(2xAWG22)C	9.5	31	75	14.90	CFROBOT8.030	120	(2xAWG24)C (2xAWG22)C	white/blue red, black
Ethernet/CAT5e									
CFROBOT8.045	4x(2x0.14)C	8.5	39	69	20.34	CFROBOT8.045	100	4x(2x0.14)C	white-green/green, white-orange/orange, white-blue/blue, white-brown/brown
Ethernet/CAT6									
CFROBOT8.049	4x(2x0.14)C	8.5	38	68	25.36	CFROBOT8.049	100	4x(2x0.14)C	white-green/green, white-orange/orange, white-blue/blue, white-brown/brown
Ethernet/CAT6A									
CFROBOT8.050	4x(2x0.15)C	10.5	54	127	42.23	CFROBOT8.050	100	4x(2x0.15)C	white-green/green, white-orange/orange, white-blue/blue, white-brown/brown
Ethernet/CAT7									
CFROBOT8.052	4x(2x0.15)C	10.5	55	129	47.99	CFROBOT8.052	100	4x(2x0.15)C	white-green/green, white-orange/orange, white-blue/blue, white-brown/brown
Profinet									
CFROBOT8.060	(2x(2x0.34))C	8.5	36	70	18.80	CFROBOT8.060	100	(2x(2x0.34))C	white/blue, yellow/orange

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core x= without earth core

Technical note bus cables

chainflex® bus cables are specially developed and tested for continuous use in e-chains® applications. Depending on the used outer jacket material and the design principle, the bus cables are designed for different mechanical requirements and media resistances.

The electrical design is selected in such a way that, on the one hand, the electrical properties of the respective bus specification are reliably fulfilled, and the greatest importance is also placed on high EMC safety. A permanent stability of the electrical values despite permanent movement is also ensured.

However, the entire transmission property in a complete bus communication system is not exclusively dependent on the cable used. Rather, it requires an exact coordination of all components (electronic components, connection technology and cable) as well as the consideration of the maximum transmission rates which are dependent on the respective systems in relation to the required data transmission rates. A cable alone is thus not responsible for the secure transmission of the signals.

igus® advises you in the design of the appropriate bus system, taking into account all these factors and carrying out extensive tests to ensure the process reliability of your system from the start.

-  **Order example:** CFROBOT8.052 - in your desired length (0.5 m steps)
CFROBOT8 chainflex® series .052 Code bus type
-  **Online order** ► www.chainflex.eu/CFROBOT8
-  **Available from stock. Ready for delivery in 24-48h***
*The delivery times indicated correspond to the average time until the ordered goods are dispatched.



chainflex® CFROBOT9

PUR hybrid cable, twistable



- For very heavy duty applications with torsion movements
- PUR outer jacket
- Unshielded/shielded
- Oil resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

Dynamic information

	Bend radius	e-chain® twisted	min. 10 x d
		flexible	min. 8 x d
		fixed	min. 5 x d
	Temperature	e-chain® twisted	-25 °C to +80 °C
		flexible	-40 °C to +80 °C (following DIN EN 60811-504)
		fixed	-50 °C to +80 °C (following DIN EN 50305)
	v max.	twisted	180 °/s
	a max.	twisted	60 °/s²
	Travel distance	Robots and 3D movements, Class 1	
	Torsion	± 180°, with 1 m cable length, Class 3	

Cable structure

	Conductor	Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228).	
	Core insulation	Mechanically high-quality TPE mixture.	
	Core identification	► Product range table	
	Element shield	Extremely torsion-resistant tinned braided copper shield. Cover approx. 85% visual.	
	Outer jacket	Low-adhesion, halogen free, highly abrasion resistant mixture on the basis of PUR, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2). Colour: Steel blue (similar to RAL 5011)	

Electrical information

	Nominal voltage	300/500 V (following DIN VDE 0298-3)
	Testing voltage	2000 V (following DIN EN 50395)

Properties and approvals

	UV resistance	High
	Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3
	Flame-retardant	According to IEC 60332-1-2, CEI 20-35, FT1, VW-1

Product range

	Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 - status 1992)
	Halogen-free	Following DIN EN 60754
	UL/CSA	Cores ≤ 0.5 mm²: Style 10467 and 20317, 300 V, 80 °C Cores ≤ 0.5 mm²: Style 10493 and 20317, 300 V, 80 °C
	NFPA	Following NFPA 79-2012, chapter 12.9
	EAC	Certificate No. RU C-DE.ME77.B.01254 (TR ZU)
	CTP	Certificate No. C-DE.PB49.B.00416 (fire protection)
	CEI	Following CEI 20-35
	Lead free	Following 2011/65/EC (RoHS-II)
	Clean room	According to ISO Class 1. The outer jacket material of this series complies with CF27.07.05.02.01.D - tested by IPA according to standard DIN EN ISO 14644-1
	CE	Following 2014/35/EU

Guaranteed as the service life

Cycles *	5 million	7.5 million	10 million
Temperature, from/to [°C]	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]
-25/-15	±150	±90	±30
-15/+70	±180	±120	±60
+70/+80	±150	±90	±30

* Higher number of cycles? Calculate service life online: www.igus.eu/chainflexlife

Typical mechanical application areas

- For very heavy duty applications with torsion movements, Class 6
- Almost unlimited resistance to oil, Class 3
- Indoor and outdoor applications, UV resistant
- Robots and 3D movements, Class 1
- Robots, handling, lead screw drives



igus® chainflex® cables in application of a multi-dimensional moving e-chain® trifix R for 6-axis robots.



chainflex® CFROBOT9

PUR hybrid cable, twistable

Product range



Image exemplary

Part No.	Number of cores and conductor nominal cross section	Outer diameter (d) max.	Copper index	Weight	Price	Part No.	Core group	Colour code
	[mm²]	[mm]	[kg/km]	[kg/km]	[€/m]			
CFROBOT9.001	5G1.0+(2x1.0)C	10.5	86	142	9.91	CFROBOT9.001	5G1.0 (2x1.0)C	white with black numerals 1-4, one green-yellow core white with black numerals 5-6
CFROBOT9.002 ¹¹⁾	2x3x0.75+(3x0.75)C	11.5	82	145	12.58	CFROBOT9.002 ¹¹⁾	2x3x0.75 (3x0.75)C	white with black numerals 4-9 white with black numerals 1-3
CFROBOT9.003 ¹¹⁾	2x0.5+(2x0.5)C	10.0	29	80	9.18	CFROBOT9.003 ¹¹⁾	2x0.5 (2x0.5)C	blue/black white/brown
CFROBOT9.004	16G1.0+(2x1.0)C	16.0	207	324	22.69	CFROBOT9.004	16G1.0 (2x1.0)C	white with black numerals 1-4, 7-17, one green-yellow core white with black numerals 5-6
CFROBOT9.005	23G1.0+(2x1.0)C	19.5	286	462	31.67	CFROBOT9.005	23G1.0 (2x1.0)C	white with black numerals 1-4, 7-24 one green-yellow core white with black numerals 5-6
CFROBOT9.006	24G1.0+(2x1.0)C	20.0	299	476	31.82	CFROBOT9.006	24G1.0 (2x1.0)C	white with white numerals 1-4, 7-25, one green-yellow core white with black numerals 5-6
CFROBOT9.007	(15x(2x0.25)C+(4x0.25)C)C	18.5	245	384	56.45	CFROBOT9.007	15x(2x0.25)C (4x0.25)C)C	Colour code in accordance with DIN 47100. white/green/brown/yellow (CAN-Bus)
CFROBOT9.010	(4x(2x0.25)C)C	10.5	66	120	31.15	CFROBOT9.010	4x(2x0.25)C)C	white/brown, green/yellow, grey/pink, blue/red

¹¹⁾ Phase-out model
Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x**= without earth core





Selection table

chainflex[®] readychain[®] and readycable[®]

Cable type			Page
Harnessed dress-packs for robots			
	readychain [®] robot	Harnessed dress-packs for welding robots	182
Harnessed cables for robots			
	readycable [®] robot	Harnessed cables for KUKA robots	184



Available from stock. Ready for delivery in 24-48h*

*The delivery times indicated correspond to the average time until the ordered goods are dispatched.

readychain[®] robot

Ready to install harnessed e-chainsystems[®] for robots

Assembled energy supply systems, connectors and cables from igus[®]. Everything from a single source. Direct from the manufacturer. Quick delivery to your robot, in 1-10 days.

readychain[®] for axis 7

- e-chain[®] + cable + connector harnessed according to manufacturer standard
- Including igus[®] guide trough and other accessories

readychain[®] for axis 2-6

- Cable packages pre-harnessed including twistable cables and connectors according to your requirements
- Only one part number for complete system

readychain[®] for axis 1

- Ready to fit twisterchain[®] or *RBR* e-chains[®]
- Including igus[®] standard- or special trough

Additional services for you

- Survey of existing systems on your robot by our sales engineers
- Optional system guarantee
- Worldwide readychain[®] specialists and 11 production sites for fast maintenance and spare part support

Moving energy made easy - for robot applications

The modular igus[®] robot construction kit comprises over 5,000 different items. We can offer you the optimum, customised solution for almost any robot application. Our "Quick Robot" online tool can be used to create the ideal configuration in seconds - try it for yourself ► www.igus.eu/quickrobot

All igus[®] robotic components are tested in our laboratory and have already been used reliably in many applications for years. Our primary aim is to design a reliable overall energy supply system for your robot. We do not simply focus on mechanical protection but instead look at the entire application including the cables that have been specially developed for use on the robot. We will gladly find a solution for your application too - and look forward to receiving your enquiry.

Jörg Ottersbach
Head of industry management
Automotive & Robotics
Phone: +49-2203 9649-688
jottersbach@igus.de

Product range

triflex[®] readychain[®] dress-packs

Hose packages for welding robots			
Product range	Dress pack	Base price €: 1 m e-chain [®] incl. harnessing and cables	€/m Extension of e-chain [®] incl. piece goods
Part No.			
Welding axis 1-3 (1 m projection/each end + 1 m e-chain [®] for each)			
RRC.S.001	Consisting of: - 1 m TRCF.85.135.0, including mounting brackets - Welding cable (2x35 mm² + 1x25 mm²) including multi-contact TSB and TSS welding connector - Control cable (18x0.75 mm² + 5x0.75 mm²) including rectangular connector on both ends - Welding control cable (5x2x0.5 mm²) including rectangular connector on both ends - 3x hoses - DN12 red, green, blue - including fixture on both ends	1,375.69	111.15
Welding axis 3-6 (1 m projection/each end + 1 m e-chain [®] for each)			
RRC.S.002	Consisting of: - 1 m TRC.85.135.0 including protectors and mounting brackets - Welding cable (2x35 mm² + 1x25 mm²) including multi-contact TSB and TSS welding connector - Control cable (18x0.75 mm² + 5x0.75 mm²) including round connector and rectangular connector - Welding control cable (5x2x0.5 mm²) including rectangular connector on both ends - 3x hoses - DN12 red, green, blue - including fixture on both ends	1,432.95	147.12

readychain[®] robot

Harnessed cables for robots - Kuka Quantec

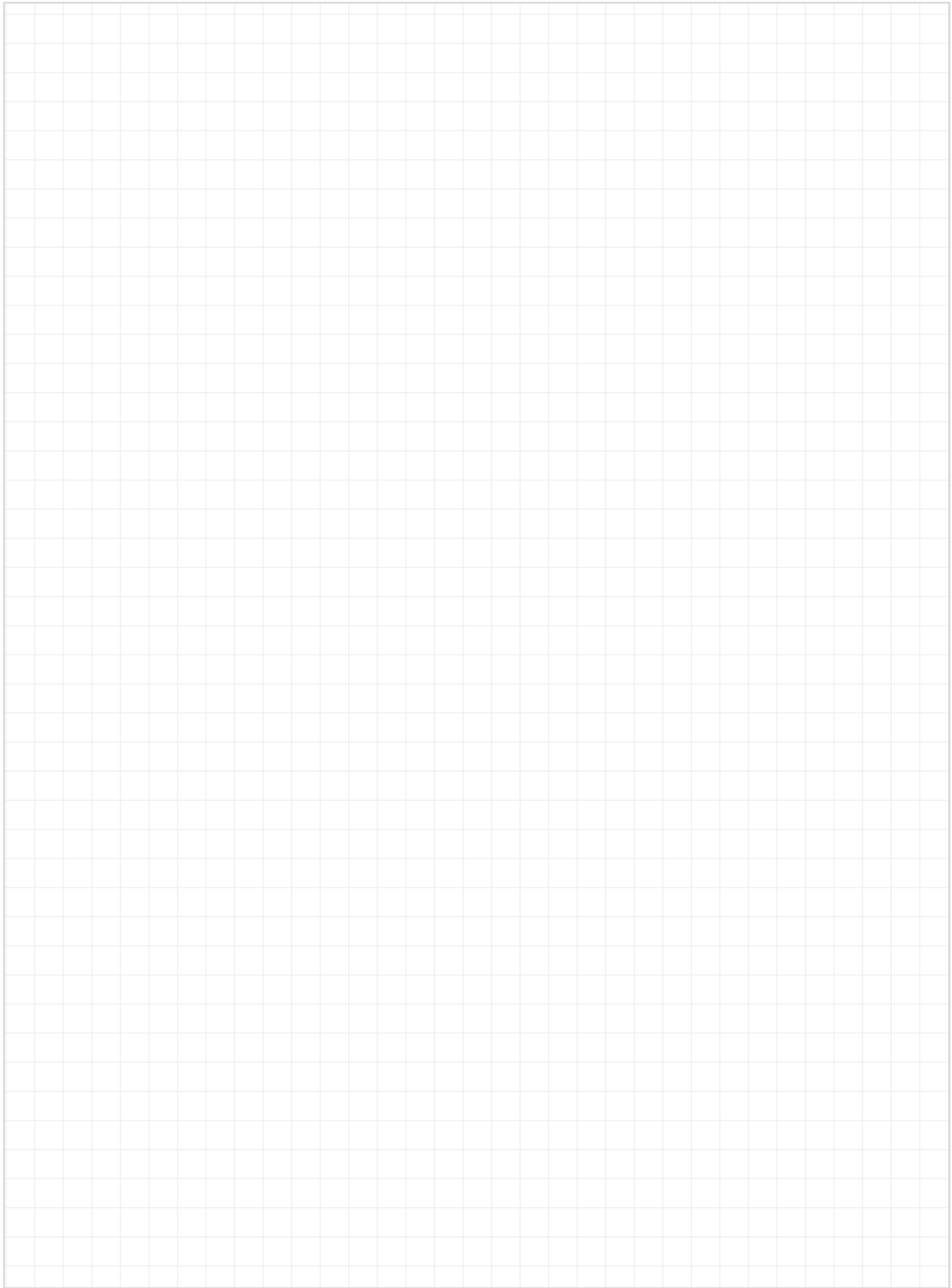
Cable type Part No.	Base article	Number of cores and conduc- tor nominal cross section [mm²]	ø [mm]	By	According to	Base price €: harnessing incl. connectors	Cable price [€/m]
Product range - Kuka Quantec							
Motor cable (Straight on socket)							
MAT904105003	CFSPECIAL.792.011	(5x(2x6.0+2x2.5)+(2x(6x1.0)C)C	35.5	X30	X30.1	327.24	35.92
Motor cable (Angled on socket)							
MAT904105004	CFSPECIAL.792.011	(5x(2x6.0+2x2.5)+(2x(6x1.0)C)C	35.5	X30	X30.1	328.31	35.92
Data cable							
MAT904105005	CFBUS.PUR.H01.060	(4x0.38)C+4x1.5	11.5	X31	X31.1	69.54	10.30
Motor cable Single axis (7th axis)							
MAT904105006	CF270.UL.25.15.02.01.D	(4G2.5+(2x1.5)C)C	14.0	XM...	X...	76.18	4.38
MAT904105007	CF270.UL.40.15.02.01.D	(4G4.0+(2x1.5)C)C	15.0	XM...	X...	76.18	5.22
Motor cable Single axis (7th axis)							
MAT904105008	CF270.UL.60.15.02.01.D	(4G6.0+(2x1.5)C)C	16.5	XM...	X...	135.06	6.52
Control cable (7. axis)							
MAT904105009	CF112.02.04.02	(4x(2x0.25)C)C	11.0	Control cable single axis		74.47	3.84
Earth-core							
MAT904105010	CFPE.160.01	1G16.0	9.5	Connec- tor plate	Robot	21.20	2.46

readychain[®] robot

Harnessed cables for robots - Kuka Fortec

Cable type Part No.	Base article	Number of cores and conduc- tor nominal cross section [mm²]	ø [mm]	By	According to	Base price €: harnessing incl. connectors	Cable price [€/m]
Product range - Kuka Fortec							
Motor cable (Angled on socket)							
MAT904105011	CFSPECIAL.792.014	((6x1.5)C+3x(3x4)+1G6)C	28.0	X30.1	X30.1.1	329.35	42.64
MAT904105012	CFSPECIAL.792.013	(2x(3x1.5)C+3x(3x10)+1G10)C	29.5	X30.4	X30.4.1	311.94	28.34
Data cable							
MAT904105005	CFBUS.PUR.H01.060	(4x0.38)C+4x1.5	11.5	X31	X31.1	69.54	10.30
Motor cable Single axis (7th axis)							
MAT904105006	CF270.UL.25.15.02.01.D	(4G2.5+(2x1.5)C)C	14.0	XM...	X...	76.18	4.38
MAT904105007	CF270.UL.40.15.02.01.D	(4G4.0+(2x1.5)C)C	15.0	XM...	X...	76.18	5.22
Motor cable Single axis (7th axis)							
MAT904105008	CF270.UL.60.15.02.01.D	(4G6.0+(2x1.5)C)C	16.5	XM...	X...	135.06	6.52
Control cable (7th axis)							
MAT904105013	CF112.02.04.02	(4x(2x0.25)C)C	11.0	Control cable single axis		74.08	3.84
Earth-core							
MAT904105010	CFPE.160.01	1G16.0	9.5	Connec- tor plate	Robot	21.20	2.46

Cable type Part No.	Base article	Number of cores and conduc- tor nominal cross section [mm²]	ø [mm]	By	According to	Base price €: harnessing incl. connectors	Cable price [€/m]
Product range - Kuka Titan							
Motor cable (Angled on socket)							
MAT904105011	CFSPECIAL.792.014	((6x1.5)C+3x(3x4)+1G6)C	28.0	X30.1	X30.1.1	329.35	42.64
MAT904105014	CFSPECIAL.792.014	((6x1.5)C+3x(3x4)+1G6)C	28.0	X30.2	X30.2.1	329.35	42.64
MAT904105015	CFSPECIAL.792.014	(2x(3x1.5)C+3x(3x10)+1G10)C	29.5	X30.3	X30.3.1	329.35	42.64
Data cable							
MAT904105005	CFBUS.PUR.H01.060	(4x0.38)C+4x1.5	11.5	X31	X31.1	69.54	10.30
Motor cable Single axis (7th axis)							
MAT904105006	CF270.UL.25.15.02.01.D	(4G2.5+(2x1.5)C)C	14.0	XM...	X...	76.18	4.38
MAT904105007	CF270.UL.40.15.02.01.D	(4G4.0+(2x1.5)C)C	15.0	XM...	X...	76.18	5.22
Motor cable Single axis (7th axis)							
MAT904105008	CF270.UL.60.15.02.01.D	(4G6.0+(2x1.5)C)C	16.5	XM...	X...	135.06	6.52
Control cable (7th axis)							
MAT904105013	CF112.02.04.02	(4x(2x0.25)C)C	11.0	Control cable single axis		74.08	3.84
Earth-core							
MAT904105010	CFPE.160.01	1G16.0	9.5	Connec- tor plate	Robot	21.20	2.46



igus® readychain®

Ready to install harnessed e-chainsystems® for robots

Assembled energy supply systems, connectors and cables from igus®. Everything from one source, directly from the manufacturer, delivered quickly to your machine



Ready to install systems, from connectors through assembled cables up to complex energy supply modules, delivered in 1-10 days



Customer-specific production



From one off to mass production

readychains® - increase your capacity and cash flow quickly with igus®

- Reduce overhead costs
- Reduce your throughput times from days to hours
- Respond flexibly to order variations
- Utilise igus® manufacturing capacities and our know-how in cable assembly

Reduce the number of suppliers and orders by 75% with igus®

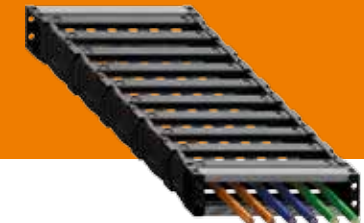
- One order, one invoice, one delivery
- A partner for minimal machine downtimes
- All readychain® components are subject to an extensive quality control and function testing

readychain®

You decide, igus® delivers

Industrially harnessed e-chain® modules direct from the manufacturer ... You decide the quantity, the travel and the degree of harnessing.

3 Benefits: readychain® basic



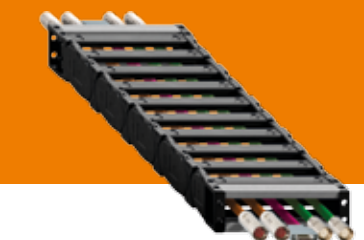
- 1 ONE supplier - combine suppliers
- 2 Reduce assembly time
- 3 Reduce failures

Reduction of installation time
Reduction of logistics cost
Procurement optimisation



Further information, videos, configurators and product finders
► www.igus.eu/RCbasic

6 Advantages: readychain® standard



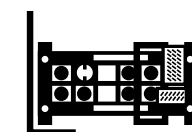
- 4 No electrical termination needed
- 5 100% digitally tested
- 6 No cable surplus

Reduction of installation time
Reduction of logistics cost
Procurement optimisation



Further information, videos, configurators and product finders
► www.igus.eu/RCstandard

9 Vorteile: readychain® standard+



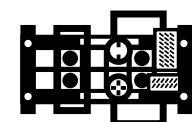
- 7 Reduce interfaces
- 8 Optimise points of connection / interfaces
- 9 Ready to install multi-axis system

Reduction of installation time
Reduction of logistics cost
Procurement optimisation



Further information, videos, configurators and product finders
► www.igus.eu/RCstandard+

13 Benefits: readychain® premium



- 10 Perfect your transport / assembly
- 11 One single assembly
- 12 One Part No. / Product group
- 13 Plug & Play

Reduction of installation time
Reduction of logistics cost
Procurement optimisation



Further information, videos, configurators and product finders
► www.igus.eu/RCpremium

igus® readychain®

The igus® readychain® factory

Up to 1,600 orders/week, over 3,000 m² floor space, "chain-cable-guarantee" since 1989.
3 shifts, 24 project engineers, 306 employees just for assembly



In the igus® readychain® factory, we assemble customised e-chainsystems®. All under one roof.



Up-to-date production processes, custom-build or serial production



Full Service from system acceptance to installation



12 readychain® factories worldwide



Customised cable assembling

readychain® rack

Modular, quick and ready-to-install

Everything from one source

The readychain® system includes pre-assembled, customised e-chainsystems®. The "Plug & Play" solutions are configured, manufactured and delivered according to individual customer specifications. The use of the mounting rack can yield benefits even at low quantities.



Flexible components

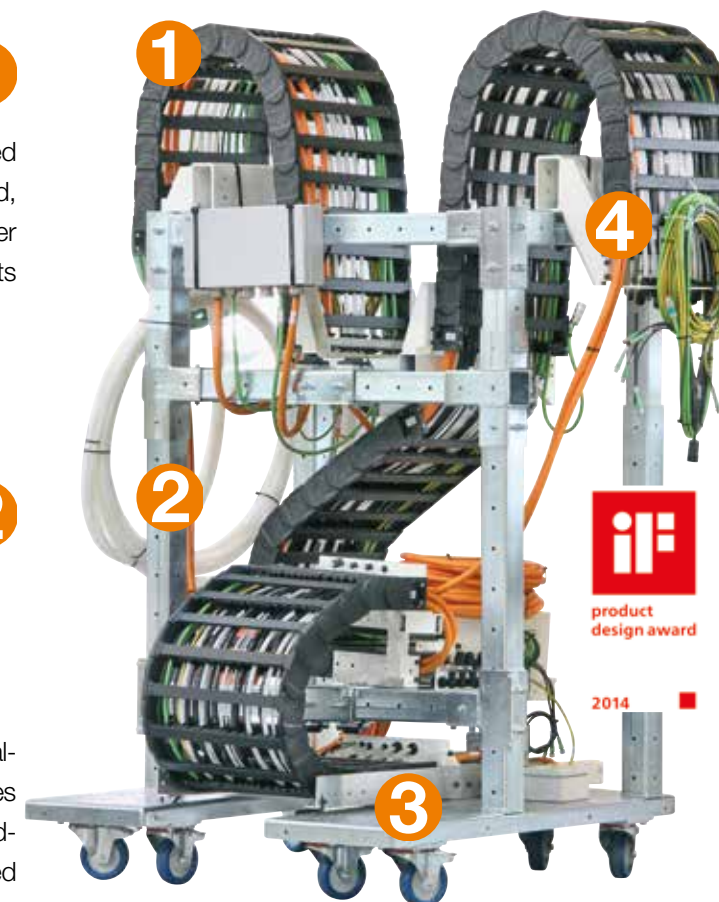
The telescopic supports and braces of the readychain® rack allow flexible adaptation to the installation needs on site. Changes in serial production can be undertaken easily. By using modular parts, additional components can also be easily attached to the rack.

Sustainable use

The components of the readychain® rack are galvanised and thus designed for a long life. Each rack can be constructed within a few hours. The individual elements can be reused at any time removing the need to dispose of custom made parts, such as conventional welded transport racks.

Precise fitting "Plug & Play"

All interfaces and attachments are designed in such a way that the installation of the e-chain® can be managed quickly and easily. The complete package includes the matching plugs and connectors, plates, sensor actuator boxes, linear bearings, links to the central lubrication, etc., all reducing the installation time considerably.



80% saving during prototyping. Assembly transport rack for ready-to-install energy supply systems.



igus® readychain®

Connectors, cables and accessories

igus® connectors



Round plug connector kit



Square plug connector kit



Tools and accessories

igus® readycable®



4,400 drive cables in accordance with 24 manufacturer standards, from stock



Catalogue standards: Video/vision/bus technology



Catalogue standards: network/ethernet/FOC/Field bus



Catalogue standards: CF.INI initiator cables up to 4 x d

igus® hoses and attachments



Configured online with hose cable configurator



readychain®

Configured, fitted, with system guarantee



readychain® service

- We visit you
- Define interfaces
- Logistics planning
- Cycle integration
- Time schedule



System acceptance on your machine



readychain® service

- Component selection
- Interface optimisations
- Documentation
- Integrated project management
- Cost optimisation



Project planning



readychain® Skype service*

- Initial acceptance from your work place
- Build your prototype with an igus® project engineer, live in your meeting
- Your requests for changes explained with a model or visit us for production acceptance

*Only available in Germany



Prototype including transport rack



readychain® installation

- System installation by igus® specialists
- igus® supervision service for your own installation
- Transparent, fixed price



Installation on site

Capacity for 600,000 assembled cables a year, more than 18,000 test programmes, 1,800 test adapters



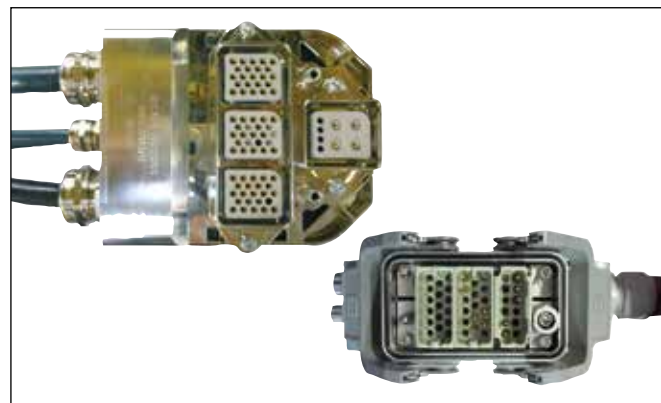
Process reliability, crimp force monitored, automated, time-optimised



Computer-based high-voltage testing and inspection of all assembled cables



Modern machinery - automatic stripper-crimper



Special cable assemblies to your specifications



Worldwide system guarantee



In our warehouse the material waits for your order and not your order for the materials!

e-chains® ...



90,000 e-chain® components

... chainflex® cables ...



3 million meter of cables on stock

... harnessing



3,500 connector components



Hundreds of meters of guide troughs



2,750 m² test lab - more than 15,000 tests every year



Quickly within reach



Numerous strain relief solutions



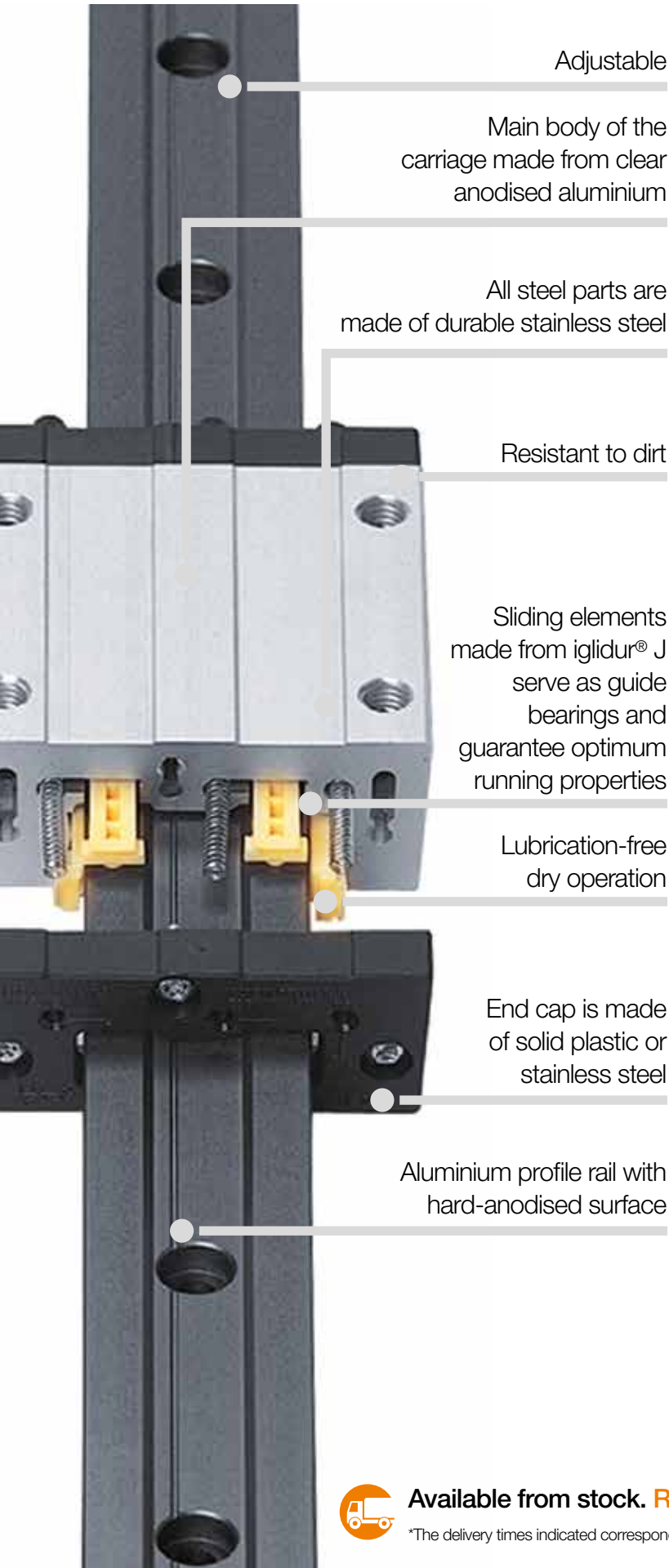
More than 8,000 cables per week



Just In Time supply

drylin® T advantages

Sliding instead of rolling



For applications in automation and handling systems - drylin® T

igus® drylin® T rail guide systems were originally developed for applications in both automation and materials handling. The goal was to create a high performance, maintenance-free linear guide for use in the most diverse, even extreme environments. Their dimensions are identical to most recirculating ball guides.

- Lubrication-free
- Adjustable bearing clearance
- Automatic clearance adjustment
- High static load capacity
- Service life up to 50,000 km without lubrication
- Resistant to dirt
- Low vibration and quiet



Welding tongs on the robot head with igus® drylin® T



Available from stock. Ready for delivery in 24-48h*

*The delivery times indicated correspond to the average time until the ordered goods are dispatched.

More information ► www.igus.eu/drylinT



Selection table

Product	Specification
	Standard ● Supplied pre-set and can be put into operation at once ● Manual clearance adjustment or fine tuning ● Maintenance-free without lubrication ● Corrosion-free
	Automatic ● With a mechanism that automatically adjusts the bearing clearance after removal of the pre-load key and adjusts during operation ● Maintenance-free without lubrication ● Corrosion-free
	With manual clamp ● Carriage with adjustable clearance (manual clearance adjustment) ● Maintenance-free dry running ● Corrosion-free
	Heavy Duty ● Used for the most extreme conditions (dirt, adhesive residues, chips, mud, etc.) ● Plastic sliding elements are fixed in the cover plate and are therefore permanent
	Compact ● Narrow linear guide carriage for small installation spaces ● Plastic sliding elements are fixed in the cover plate and are therefore permanent
	Low-profile guide ● Small, compact, lubrication-free ● Easy to install ● Rugged and cost effective
	Clamps ● Compact and strong clamps for all sizes ● Holding force up to 500 N



The complete range with ordering options,

3D-CAD, configurators, PDF, application examples ► www.igus.eu/drylinT



3D CAD, configurators, lifetime calculation and more ► www.igus.eu/drylinT

robolink® advantages

Multiple-axis joint - building blocks

Built or Buy ... cost-effective automation with igus® robolink®

Our basic idea is to give developers, labs, and automation integrators access to a joint modular system to construct customised robots which can be used in the most different applications. Always at the lowest possible costs, with the appropriate technology. The required number of joint axes in the appropriate geometric constellation is often decisive for the correct solution.

- Modular approach
- Low cost
- High flexibility: freely-selectable end effectors
- Lightweight construction
- Precision ≤ 1 mm
- 2-5 degrees of freedom (DOF)
- Return on Investment (ROI) after 4 to 7 months (depending on control system)
- Lubrication-free
- Free CAD downloads
- Design and simulate robolink® online



Overview

Electro mechanical robot arms (*DOF = degree of freedom)

robolink® DC (4 DOF*)

		Small versions		Large versions	
		With motor encoder and INI	With output encoder	With motor encoder and INI	With output encoder
Weight	[kg]	12.1	10.9	21.4	20.2
Reach	[mm]	510		620	
Payload	[g]	1,000		3,000	
Precision	[mm]	1		1	
Part No.		RL-D-RBT-3322-BC	...-AE	RL-D-RBT-5532-BC	...-AE

robolink® DC (5 DOF*)

		Small versions		Large versions	
		With motor encoder and INI	With output encoder	With motor encoder and INI	With output encoder
Weight	[kg]	13.2	11.7	22.4	21.0
Reach	[mm]	680		790	
Payload	[g]	500		2,500	
Precision	[mm]	1		1	
Part No.		RL-D-RBT-3322S-BC	...-AE	RL-D-RBT-5532S-BC	...-AE

robolink® DQ (4 DOF*)

		Small versions		Large versions	
		With motor encoder and INI	With output encoder	With motor encoder and INI	With output encoder
Weight	[kg]	12.3	11.0	20.4	19.3
Reach	[mm]	510		620	
Payload	[g]	1,500		4,000	
Precision	[mm]	1		1	
Part No.		RL-DQ-RBT-3322-BC	...-AE	RL-DQ-RBT-5532-BC	...-AE

robolink® DQ (5 DOF*)

		Small versions		Large versions	
		With motor encoder and INI	With output encoder	With motor encoder and INI	With output encoder
Weight	[kg]	13.5	12.0	21.7	20.2
Reach	[mm]	680		780	
Payload	[g]	1,000		3,500	
Precision	[mm]	1		1	
Part No.		RL-DQ-RBT-3322S-BC	...-AE	RL-DQ-RBT-5532S-BC	...-AE



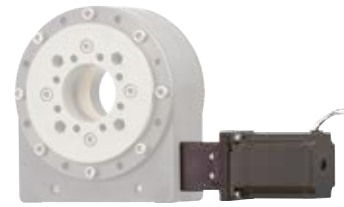
Available from stock. Ready for delivery in 24-48h*

*The delivery times indicated correspond to the average time until the ordered goods are dispatched.

robolink® D components



Joint with plastic worm gear



Motor kits



Accessories



Joint with Plastic strain wave gear



Motor kits



Accessories

Electro-mechanical robot arms



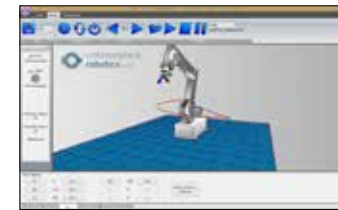
robolink® C arms



robolink® Q arms



robolink® online designer



CPR control

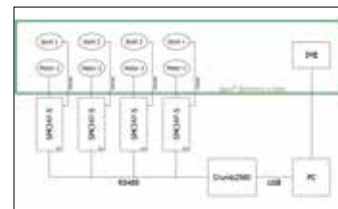
robolink® W draw-wire technology



Rope drive for rotating joint



Complete 6 DOF unit

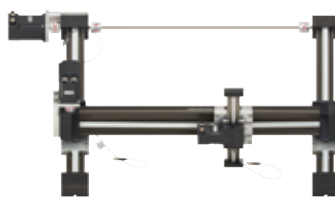


Open source



Software for programming articulated joints

Linear robots for predefined surfaces and spaces



Multi-axis modular drylin® linear robots

► www.igus.eu/gantry



The complete range with ordering options, 3D-CAD, configurators, PDF, application examples ► www.igus.eu/robolink

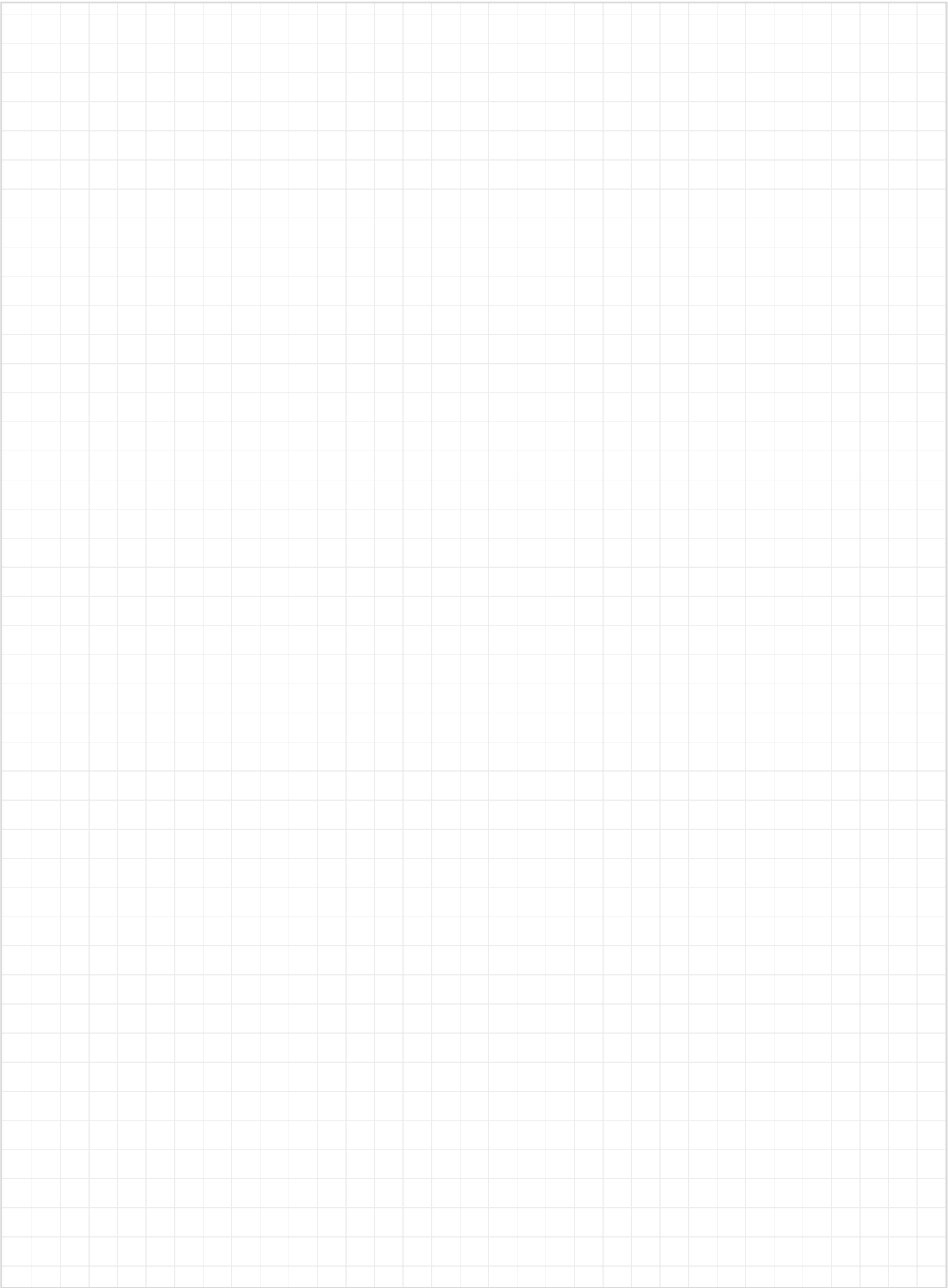


Available from stock. Ready for delivery in 24-48h*

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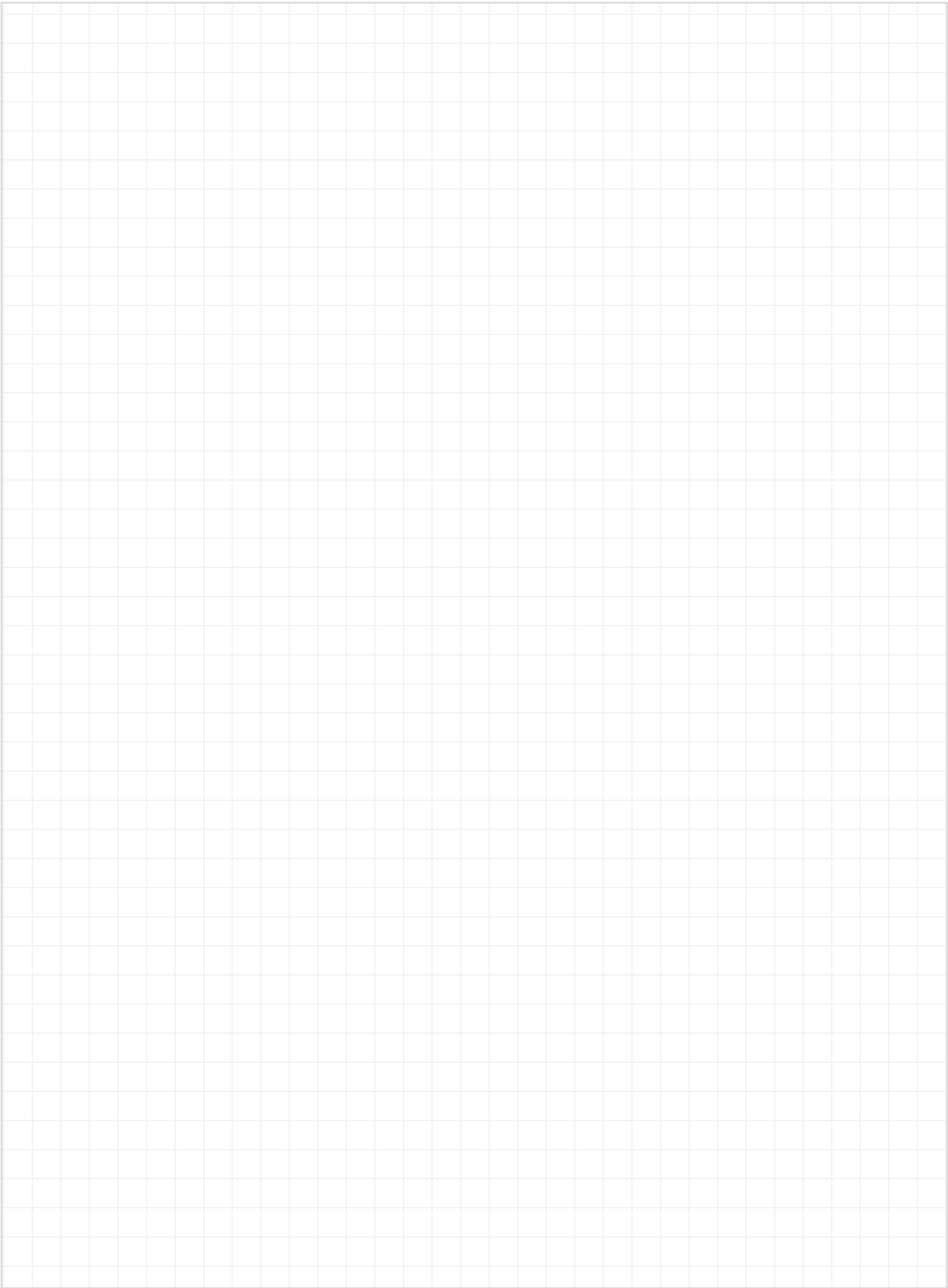
Robotics industry

My sketches



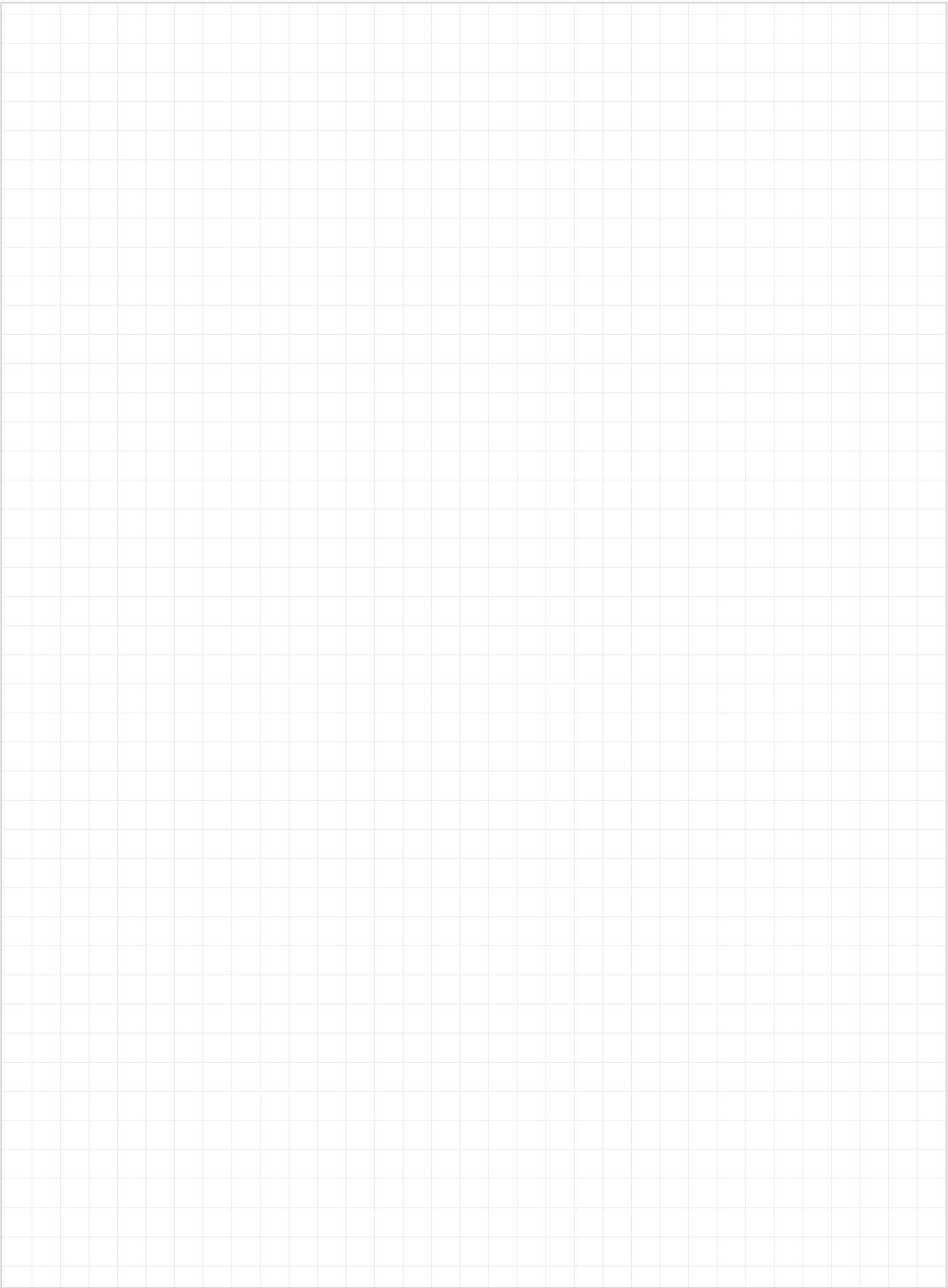
Robotics industry

My sketches



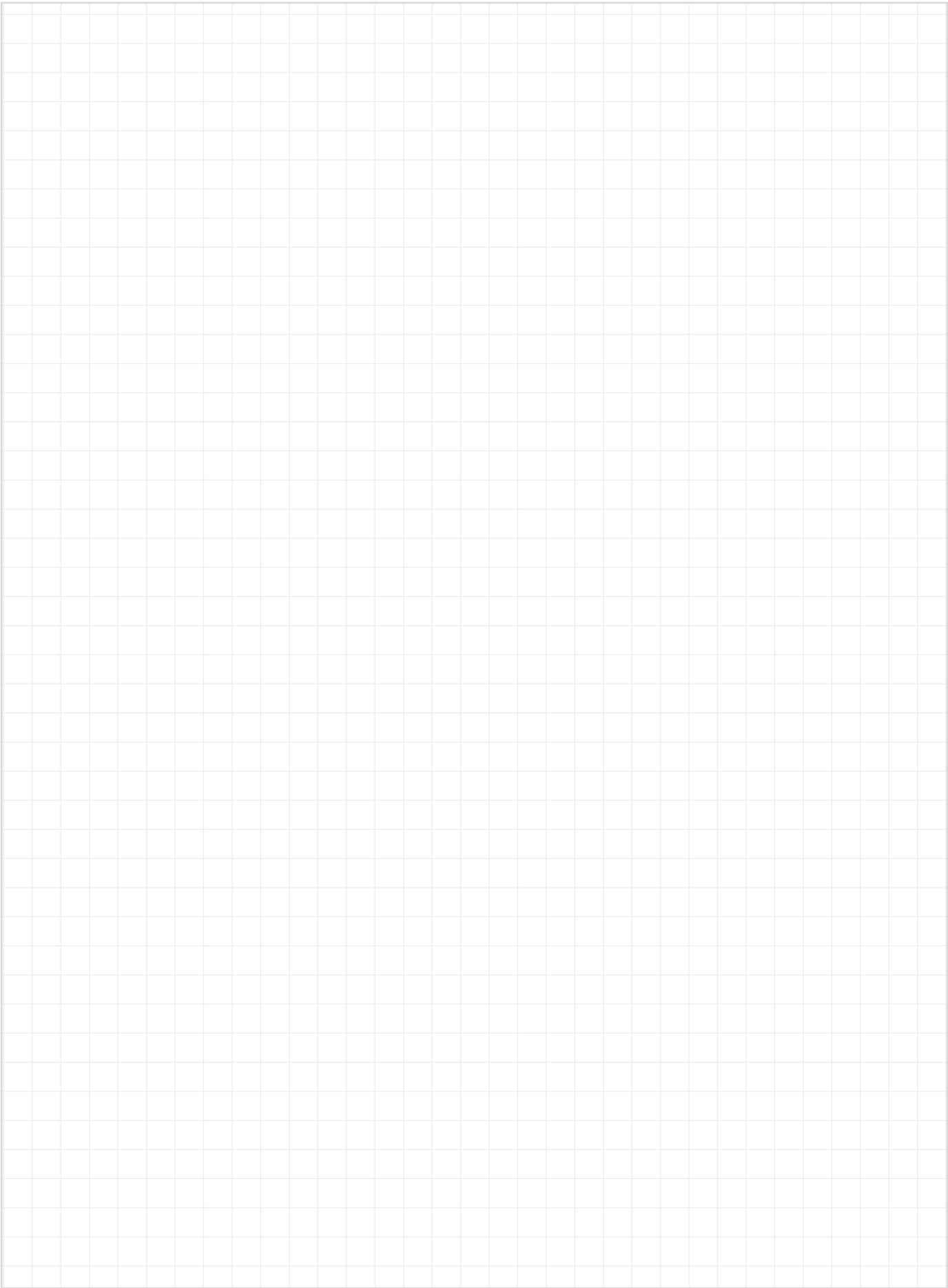
Robotics industry

My sketches



Robotics industry

My sketches



igus® locations

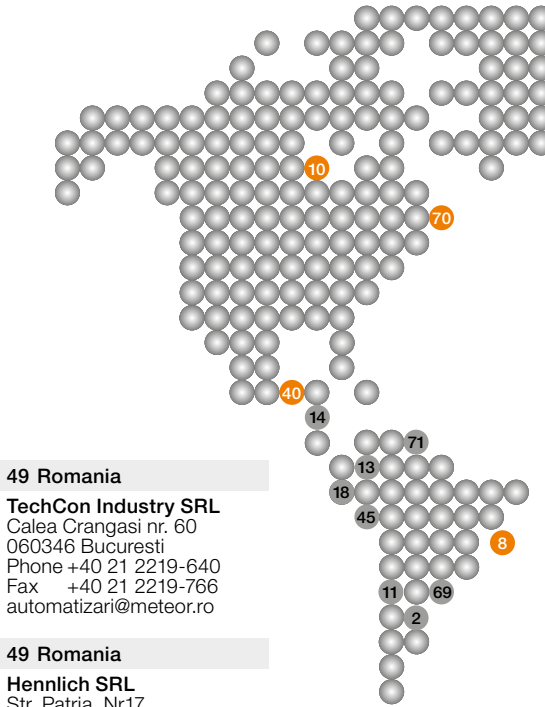


igus® worldwide

igus® Offices	10 Canada
igus® Distributors	igus® Office Canada Suite 100-180 Bass Pro Mills Dr Vaughan, ON L4K 5W4 Phone +1 905 7608448 Fax +1 905 7608688 webmaster@igus.com
1 Germany	igus® GmbH Spicher Str. 1a 51147 Köln P.O. Box 90 61 23 51127 Köln Phone 02203 9649-0 Fax 02203 9649-222 info@igus.de, www.igus.de
2 Argentina	Borintech SRL Av. Elcano 4971 C1427CIH Buenos Aires Phone +5411 4556 1000 Fax +5411 4556 1000 igus@borintech.com
3 Australia	Treotham Automation Pty. Ltd. 14 Sydenham Road Brookvale NSW 2100 Phone +61 2 9907-1788 Fax +61 2 9907-1778 info@treotham.com.au
4 Austria	igus® polymer Innovationen GmbH Ort 55 4843 Ampflwang Phone +43 7675 4005-0 Fax +43 7675 3203 igus-austria@igus.at
5 Belarus	SOOO Hennlich Puschkin ave. 39 amt 5 BY 220092 Minsk Republik Belarus Phone +375 17 207-1828 Fax +375 17 207-3921 info@hennlich.by
6 Belgium/Luxembourg	igus® B.V.B.A. Jagersdreef 4A 2900 Schoten Phone +32 3 330 13 60 Fax +32 3 313 79 91 info@igus.be
7 Bosnia + Herzegovina	Hennlich d.o.o. Dzemala Bijedica 185 Avaz Business Centar 71000 Sarajevo Phone +387 33 45 14 39 Fax +387 33 45 14 39 info@hennlich.ba
8 Brazil	igus® do Brasil Ltda. Avenida Marginal Norte da via Anhanguera 53.780 Vila Rami – Jundiaí CEP 13206-245 – SP Phone +55 11 3531-4487 Fax +55 11 3531-4488 vendas@igus.com.br
9 Bulgaria	igus® EOOD 2, Lui Ayer str., fl.4, off. 4 1404 Sofia, Bulgaria Phone +359 2 850 8409 Fax +359 2 850 8409 info@igus.bg
9 Bulgaria	Hennlich OOD, BG 4003 Plovdiv, Bulgaria 147A, Brezovsko shose Str., Rota center, fl. 3 Phone +359 32 511 326 Fax +359 32 621 929 office@hennlich.bg

19 Egypt	20 Estonia
IEE International Company for Electrical Engineering 2nd floor, 25 Orabi St Down Town, Cairo Phone +202 25767370 Fax +202 25767375 kamel@iee-egypt.com	igus® OÜ Lõotsa 4A Tallinn 11415 Phone +372 667 5600 Fax +372 667 5601 info@igus.ee
21 Finland	SKS Mekaniikka Oy Martinkyläntie 50 01720 Vantaa Phone +358 20 7646522 Fax +358 20 7646824 mekaniikka@sks.fi
22 France	igus® SARL 49, avenue des Pépinières Parc Médicis 94260 Fresnes Phone +33 1 49840404 Fax +33 1 49840394 info@igus.fr
23 Greece	Chrimotor s.a. 71, Sp. Patsi str. 118 55 Athens Phone +30 210 34 25574 Fax +30 210 3425595 info@chrimotor.gr
23 Greece	J. & E. Papadopoulos S.A. 12 Polidefous str Piraeus, 185 40 Phone +30 210 4113133 Fax +30 210 4116781 sales@papadopoulos-sa.com
24 Hong Kong	Sky Top Enterprises Ltd. Room 1806 ; Block C; Wah Tat Industrial Center; Wah Sing Street; Kwai Chung Hong Kong Phone +852 23318928 Fax +852 24269738 info@skytop.com.cn
25 Hungary	igus® Hungária Kft. Ipari Park u.10. 1044 Budapest Phone +36 1 3066486 Fax +36 1 4310374 info@igus.hu
25 Hungary	Tech-Con Kft. Véső utca 9-11 1133 Budapest Phone +36 1 4124161 Fax +36 1 4124171 tech-con@tech-con.hu
26 India	igus® (India) Pvt. Ltd. 36/1, Sy No. 17/3 Euro School Road, Dodda Nekkundi Industrial Area, - 2nd Stage Mahadevapura Post Bangalore 560048 Phone +91 80 45127800 Fax +91 80 45127802 info@igus.in
27 Indonesia	PT igus® Indonesia German Centre Suite 6040-6050 Jalan Kapten Subijanto Dj. BSD City Tangerang 15321 Phone +62 21 537 6184 Fax +62 21 537 6183 info@igus.co.id
28 Iran	Tamin Ehtiajat Fanni Tehran (TAF CO.) No. 36, West 4th St. , Et-tehad Ave. Damavand Rd. Tehran - 1658674583, Iran Phone +98-21-7712 0809 Fax +98-21-7679 0430 info@taf-co.com
28 Iran	igus® Ireland Caswell Rd Northampton NN4 7PW Phone +44-1604 677240 Fax +44-1604 677242 sales@igus.ie
30 Israel	Conlog LTD P.O. Box 3265 17 Hamefalssim Str. Industrial Zone Kiryat Arie Petach-Tikva 49130 Phone +972 3 9269595 Fax +972 3 9233367 conlog@conlog.co.il
31 Italy	igus® S.r.l. Via delle Rovedine, 4 23899 Robbiate (LC) Phone +39 039 5906.1 Fax +39 039 5906.222 igusitalia@igus.it
32 Japan	igus® k.k. Arcacental 15F, 1-2-1 Kinshi, Sumida-ku Tokyo JAPAN Zip 130-0013 Phone +81 358 192030 Fax +81 358 192055 info@igus.co.jp
33 Jordan	Al Hezam Adtech Abu Alanda Street ,Building No. 1 Amman Phone +962 64 170100 Fax +962 64 169993 info.jod@adtech-trading.com
34 Latvia	igus® OÜ Lõotsa 4A Tallinn 11415 Phone +372 667 5600 Fax +372 667 5601 info@igus.ee
35 Lebanon	Mecanix Shops Gebran Safi Charles Helou Avenue Beirut Phone +961 1 486701 Fax +961 1 490929 mecanix@dm.net.lb
36 Lithuania	Hitech UAB Terminalo g. 3 54469 Biruliskiu k. (Kauno LEZ) Kauno raj. Phone +370 37 323271 Fax +370 37 203273 info@hitech.lt
37 Macedonia, Albania, Kosovo	Hennlich DOOEL Boris Kidric 88 1200, Tetovo MK Phone +389 44614411 Mob. +389 76 200 770 dritan.qamili@hennlich.mk
38 Malaysia	igus® Malaysia Sdn Bhd Suite 1601-1, Level 16, Tower 2, Wisma AmFirst, Jalan SS 7/15 (Jalan Stadium), 47301 Kelana Jaya, Selangor Phone +603 7803 0618 Fax +603 7886 1328 info@igus.my

39 Morocco	40 Mexico
AFIT 5, Rue Amir Abdelkader 20300 Casablanca Phone +212 522 633769 Fax +212 522 618351 souria.vu@premium.net.ma	igus® México S. de R.L. de C.V. Boulevad Aeropuerto Miguel Alemán 160 Int. 135 Col. Corredor Industrial Toluca Lerma Lerma, Estado de México C.P. 52004 Phone +52 728284 3185 Fax +52 728284 3187 fmarquez@igus.com
41 Myanmar	Sea Lion Co. Ltd. 181 Bo Myat Tun St Botataung Yangon 11161 Myanmar Phone +95 1 29 97 97 Fax +95 1 20 27 51 zaw.m.thant@sealionmyanmar.com
42 Netherlands	igus® B.V. Sterrenbergweg 9 3769 BS Soesterberg Phone +31 346 353932 Fax +31 346 353849 igus.nl@igus.de
42 Netherlands - Plain bearing	Elcee Holland BV Kamerlingh Onnesweg 28 NL-3316 GL Dordrecht Phone +31 78 6544777 Fax +31 78 6544733 info@elcee.nl
43 New Zealand	Automation Equipment Ltd. 26 Tawn Place PO Box 5656 Hamilton Phone +64 7 8490281 Fax +64 7 8492422 sales@autoequip.co.nz
44 Norway	ASI Automatikk AS Ingv. Ludvigsensgate 23 3007 Drammen Phone +47 9006 1100 info@asiflex.no
45 Peru	PROIGUS S.A.C. Calle Bolivar 388/of. 203 Miraflores Lima 18 – Perú Phone +51 1 2414370 Fax +51 1 2428608 profacoventas@profaco.com
46 Philippines	Silicon Exponents Corp. Unit 1-B, 8414 LMN Bldg. Dr. A. Santos Avenue Brgy.BF Homes Sucat Parañaque City 1700 Philipines Phone +63 2 8250 126/135 Fax +63 2 8250 141 ryemrigror@sieplus.ph
47 Poland	igus® Sp. z o.o. ul. Działkowa 121C 02-234 Warszawa Phone +48 22 8635770 Fax +48-22 8636169 info@igus.pl
48 Portugal	igus® Lda. R. Eng. Ezequiel Campos, 239 4100-203 Porto Phone +351 22 6109000 Fax +351 22 8328321 info@igus.pt



49 Romania
TechCon Industry SRL Calea Crangasi nr. 60 060346 Bucuresti Phone +40 21 2219-640 Fax +40 21 2219-766 automatizari@meteoro.ro
49 Romania
Hennlich SRL Str. Patria, Nr17 310106 Arad Phone +40 257 211119 Fax +40 257 211021 igus@hennlich.ro
50 Russia
OOO Hennlich Room 14 Naberezhnaya reki Lazuri, 15A 170028 Tver Russian Federation Phone +7 4822 787 180 Fax +7 4822 787 180, add. 380 hennlich@hennlich.ru

51 Saudi Arabia
AFI Khalaf Bin Hesham Street Box 9998 31423 Dammam Phone +966 38740033 Fax +966 38470077 marketing@afi.com.sa

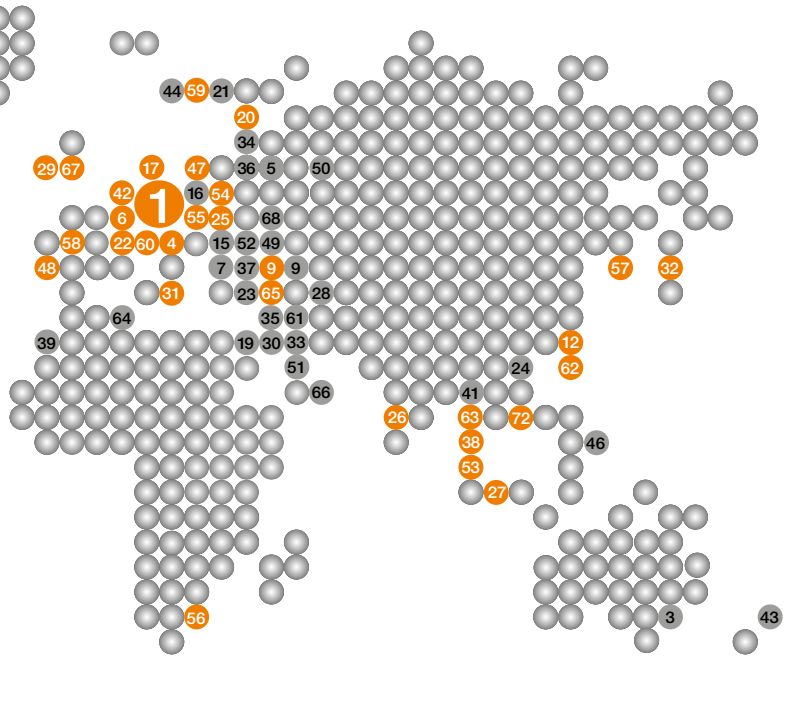
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igus® Singapore Pte Ltd 84 Gentling Lane #06-03 Cityneon Design Centre Singapore 349584 Phone +65 6487 1411 Fax +65 6487 1511 info@igus.com.sg

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igus® Slovakia s.r.o. Fatranská 3 949 01 Nitra Slovakia Mob. +421 949 459 409 info@igus.sk

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Hennlich s.r.o. Na Bystricku 16 SK-036 01 Martin Phone +421 43 421 2352 lntech@hennlich.sk www.hennlich.sk

55 Slovenia
igus® d.o.o. Tržaška c. 134 1000 Ljubljana Slovenija Mob. +386 (0)30 601 610 info@igus.si



60 Switzerland
igus® Schweiz GmbH Winkelstr. 5 4622 Egerkingen Phone +41 62 3889797 Fax +41 62 3889799 info@igus.ch

61 Syria
ETTA Systems Al-Hamra St. Shalan Building 12850 Damascus Phone +96 311 332 5519 Fax +96 311 334 2639 info@ettasystems.com

62 Taiwan
igus® Taiwan Company Ltd. 5F, No. 35, 24th Road Taichung Industrial Park Taichung 40850 Phone +886 4 2358-1000 Fax +886 4 2358-1100 info@igus.tw

63 Thailand
igus® Thailand Co., Ltd 10 Floor, Unit C1 Thanapoom Tower 1550 New Petchaburi Road Makkasan Raththawi Bangkok 10400 Thailand Phone +66 (0)2 207 0541 Fax +66 (0)2 652 7326 info@igus.co.th

64 Tunisia
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65 Turkey
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66 United Arab Emirates
Unigroup FZE Plot of Land M6-01 Sharjah Airport Free Zone P.O. Box 120300 Sharjah - U.A.E. Phone +971 6 5578386 Fax +971 6 5578387 automation@unigroup.ae

67 United Kingdom
igus® Caswell Rd Northampton NN4 7PW Phone +44 1604 677240 Fax +44 1604 677242 sales@igus.co.uk

68 Ukraine
Cominpro Ltd. Romena Rollana 12, Office 220 61058 Kharkov Phone +38 0577174914 Fax +38 0577174914 cominpro@gmail.com

68 Ukraine
Hennlich Ukraine LLC (HQ) Kramatorska Street 15 84100 Slovnyansk City, Donetsky Region Phone +38 06262 33540 hennlich@hennlich.com.ua

69 Uruguay
Larrique Rulemanes SA Galicia 1204 Montevideo-Uruguay Phone +598 29021773 Fax +598-29084824 larrique@larrique.com.uy

70 USA
igus® inc. 257 Ferris Avenue P.O. Box 14349 East Providence RI 02914 Phone +1 401 4382200 Fax +1 401 4387270 webmaster@igus.com

71 Venezuela
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