



robots

... Moving energy made easy ...

... for robots ... 2018 ...

industry

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, customized 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.com/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 inquiry.



David Sandiland

Automotive and Robotics

Sales Manager

Phone: 905.760.8448

Fax: 905.760.8688

Cell: 705.313.2574

dsandiland@igus.net

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.com/triflex-r



igus® solutions for the ro

Axis 3-6

triflex® R	From page 26
RS - Retraction systems	From page 64
easy triflex®	From page 108
triflex®	From page 110

Axis 2

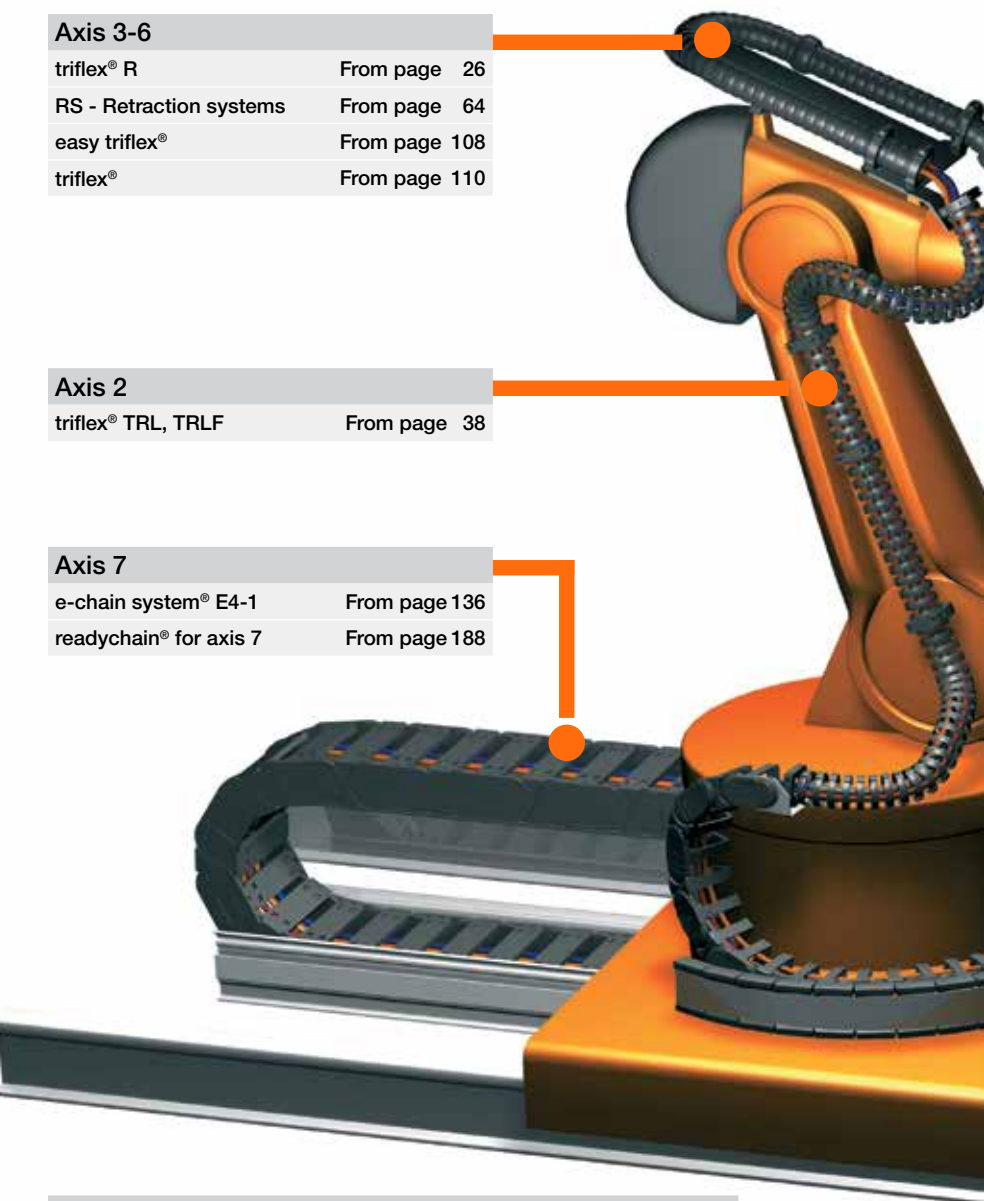
triflex® TRL, TRLF	From page 38
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Axis 7

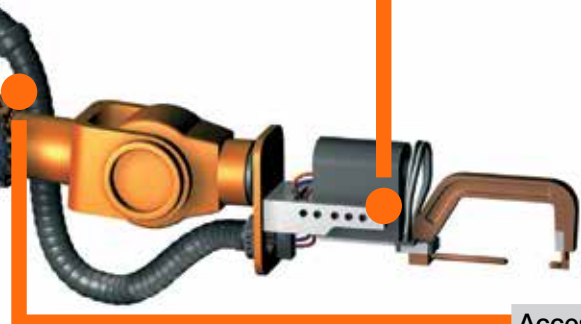
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robot industry



Self-lubricating guides

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Accessories

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Torsion cables

chainflex® CFROBOT From page 142



Available from stock.
Shipped in as little as 24 hours



No minimum order quantity!
No surcharges!

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



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



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



Order hotline
Phone 800-521-2747
Fax 401-438-7270



Onlineshop ► www.igus.com
Product finder, configurator, online catalogs, CAD modules and many more.
Order around-the-clock!

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

igus® motion plastics products are guaranteed to reduce maintenance, cut costs and extend service life. This catalog includes more than 100,000 products available from stock, starting from a batch size of one and shipped in as little as 24 hours.

Orders can be placed until 8:00 pm local time.
Phone 800-521-2747

"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 9001:2015 and ISO/TS 16949:2009 in the field of e-chains® with cables and harnessing, as well as plastic plain bearings.

24h/100,000
DIN EN ISO 9001:2015
ISO/TS 16949:2009

Quality from the igus[®] laboratory

Tested thousands of times, proven millions of times.

Applications dealing with extreme cycles, speeds or environmental conditions require durable components such as igus[®] e-chains[®], cables, polymer bearings and linear systems. Every year, thousands of tests are conducted under real-world conditions at the igus[®] test laboratory-more than 4,100 e-chain[®] and cable tests, and over 9,600 plain bearing tests. These assessments predominately measure push/pull forces, friction values and wear rates. Other factors like dirt and dust resistance, extreme temperature endurance and shock resistance are also tested. The lab is at the disposal of the customer; if data is not available for a particular application, tests can be conducted based on individual requirements.

► www.igus.com/test



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



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



Long-term wear and lifetime test





Noise level test inside an igus® acoustic cell



igus® dynamic bending test



Speed up to 10 ms and acceleration up to 656 ft/s² are tested by igus®



Long travel test field - 125 m travel length, speed 984 ft/min



Worldwide, quick and reliable.

The igus® service.

Delivery and consultation daily from 7 am to 8 pm

Innovation and service are the focal points of our corporate philosophy. Therefore, an extensive package of services is offered: no minimum order quantity, shipping within 24 hours and more than 100,000 products available from stock. Customers can order any product from an iglide® bearing to a pre-assembled standard portal, shipped from stock within 24 hours at no extra cost. Speedy delivery is guaranteed worldwide.

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.com/samples
- The **monthly newsletter keeps you regularly informed about new igus® solutions.** Register here
▶ www.igus.com/newsletter

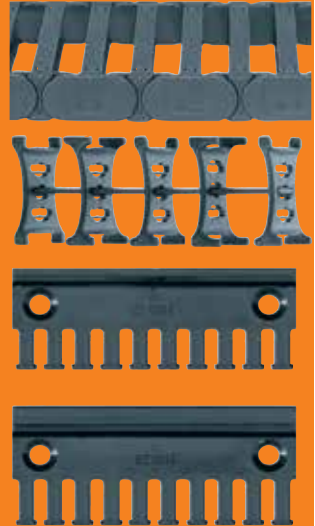
Order at igus®:
no minimum order quantities,
no surcharges.

24 hrs

Single components

For example:

One e-chain® link, 6 m
of e-chain®, 3 strain-
relief elements, etc.



24-48 hrs

Customized e-chain systems®

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

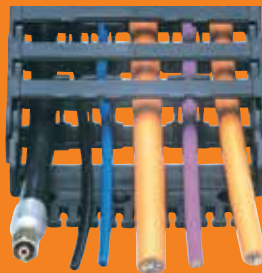


3-5 business days

Harnessed systems

For example:

readychain® "basic" Simple, harnessed e-chain systems® including installed cables without plug connections, labeled and tail lengths to your specifications

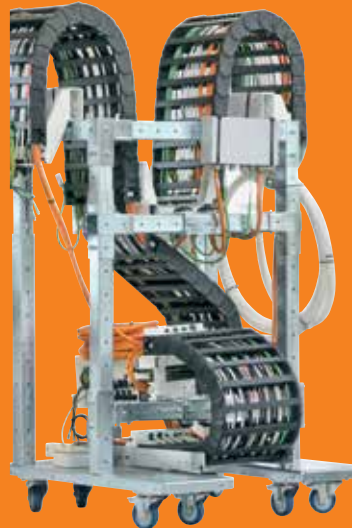


10 business days

Complex prefabricated systems

For example:

readychain® "premium" Complex customized e-chain system® including cables as well as plug connections, mounting brackets, tail-lengths and other components to your specifications



myigus space online



igus® Newsletter

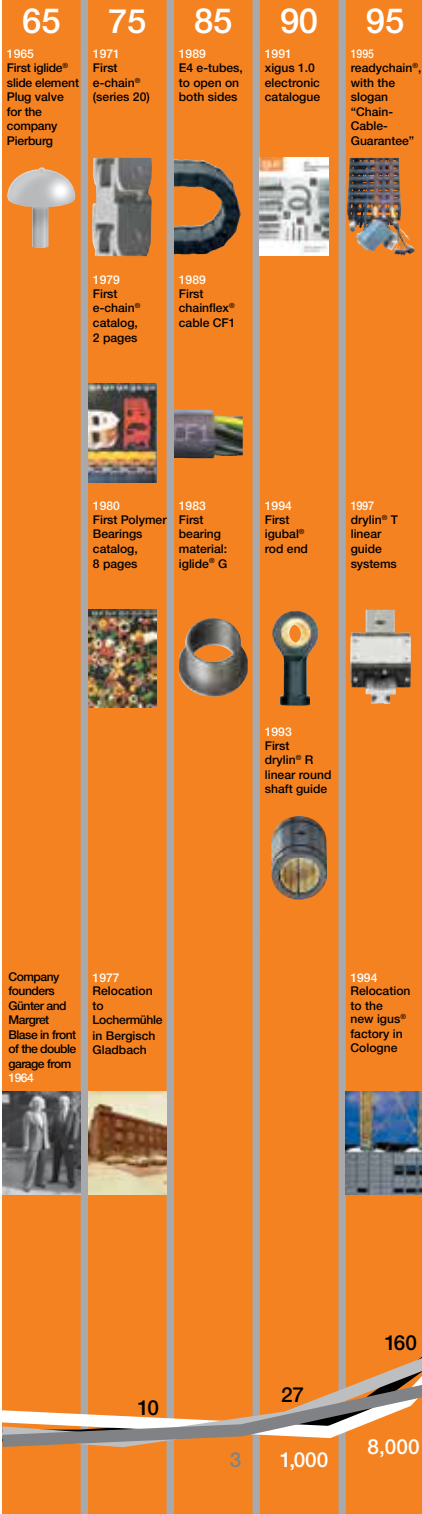


igus® - close to the customer since 1964

From a garage to the global market with tribopolymers

What began in 1964 with a single injection molding machine has since developed into a global enterprise. More than 50 years ago, Günter Blasé had an idea about the potential of polymer materials. A mere one year after he established igus®, the very first products were developed with an injection molding machine about the size of a sewing machine. Since then, the igus® design engineering team has been developing the wide range of plastic e-chains®. In accordance with our slogan "moving made easy," we configure, produce and develop energy chains designed specifically for the customer. In 1989, we developed the CF1, which was the first chainflex® cable specially designed to be used in e-chains®. Over time, igus® has become a global systems supplier.

Today, 3,180 igus® employees generate new ideas daily, make high-quality products, ensure streamlined processes and delivery times and, above all, remain close to the customer. On average, igus® distributes around 5,500 deliveries per day. In order to ensure quick delivery, 14 storage and assembly centers are positioned at various locations worldwide, which are readily available with single components and complete systems that can be installed or assembled onsite, if desired.



2000

2001 Low-vibration e-chains®: system E6



2003 triflex® R 3D e-chains®



2001 drylin® N miniature linear guide systems



2003 drylin® W modular linear guide systems



05

2006 rol e-chain®: System P4



2007 "One for all": system E4.1 e-chains®



2005 iglide® PRT slewing ring bearings



2007 drylin® ZLW Toothed belt axes



08

2009 Chip-proof: RX e-tube



2008 E4.350: largest plastic e-chain®



2008 xiros® plastic ball bearings



2009 robolink® joints



2010

2010 twisterband: turn 7000°



2010 For Pick & Place: pikchain®



2010 iglide® bar stocks for free design: Ø 10-100 mm



2011 drylin® E – linear axes with stepper motor



12

2012 The alternative to the cable drum: the modular e-spool system



2012 Flip open chain links on triflex® TRLF



2012 Individual design: igubal® coupling bars



2013 High efficiency: dryspin® high helix screw drives



14

2014 The first plug-in energy chain®: readychain® speed 2.0



2014 Cost-effective chainflex® M cables



2014 Versatile: iglide® Tribo-Tape



2014 iglide® Tribo-Filament for 3D printing



16

2016 100% stable, filled in seconds: easy chain® HD



2016 Predictive maintenance with smart plastics



2016 3D printing service for wear resistant components



2016 drylin® carriage for curved rail



2017

2017 Plastic energy chain® according to "Hygienic Design Guidelines"



2017 Angle adapter lbow for priceless flexibility



2017 "Eco series" linear modules – with 3D printed parts



2017 robolink® low-cost robot: modular ... built or buy



45,000

1,200

16

303 million

2009 60% factory extension in Cologne



80,000

1,800

2012 2nd factory extension in Cologne



95,000

552 million

2014 50s

2015 Guarantee plus chainflex 36

2,950

36

100,000

3,180



Change your bearing now: igus.com/iglide

The flexible igus[®] factory

Investments in better technology and faster delivery times

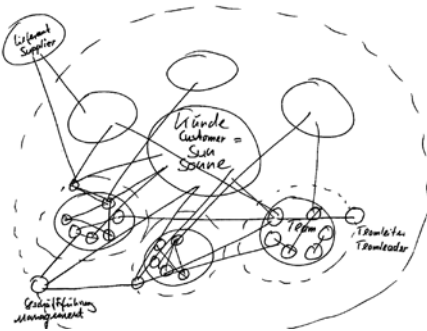
Nearly 200,000 customers worldwide believe in "plastics for longer life[®]." High-performance tribo-plastic technology from igus[®] is manufactured for quality and cost-effectiveness, and has been since the company's start. igus[®] is positioned as a global leader in the industry, as plastics are becoming increasingly affordable and the technical benefits are continuing to expand. Catalog items are available from stock, allowing customer requests to be resolved within hours and products to be shipped with a day. igus[®] is continuing to grow more than ever, but remains focused on high-tech yet cost-effective solutions for all applications.



Material preparation



Assembly factory



"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."





Injection molding



Warehouse



Toolmaking



Open offices



QuickRobot

Online tool - reduce process costs

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

igus® is expanding its range of online tools for energy systems. The online tool library allows users to select, configure and order products all in one place. Now, the QuickRobot tool makes it possible to configure 79 different types of robots in an instant. An ordering system is integrated with the configuration tool so that custom products can be created and shipped as quickly as possible. Users receive a parts list and other details as a PDF immediately after configuration, and order details are made easy to understand.



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



Type: **KUKA**
 Model: **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.

[Add to shopping basket](#)

Robotic equipment



Type: **COMAG**
 Model: **SMART II 110-5.5**
 Structure:
 E-Chain®: **TRC**
 Size: **85** mm
 Lateral connection:
 We will be glad to make you an offer for this axis. Please use the Help/Contact function for your enquiry.
 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 \(PDF\)](#) | Piece Price: 1.479,92 EUR | [Add to shopping basket](#)

Thanks to the selection tool for robotic equipment, the complete system, including cable guide systems, can be customized for the available robot types. One can either select full system or system for an individual axis.

Robots are available with various sizes of e-chains®, according to cable diameter. Additional parts can be added. Equipment for each axis can be ordered with one article number, and the entire robot can be equipped with just three article numbers.

Robotic equipment



Type: **FANUC**
 Model: **SL710C-85**
 Structure:
 E-Chain®: **TRC**
 Size: **75** mm
 Cover:
 Lateral connection:
 We will be glad to make you an offer for this axis. Please use the Help/Contact function for your enquiry.
 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 \(PDF\)](#) | Piece Price: 1.389,49 EUR | [Add to shopping basket](#)

[Home](#) | [Shopping cart](#) | [My account](#) | [Help/Contact](#) | [Log out](#)

Shopping Cart

You have 4 items in your shopping cart. Total price: 12.000,00 EUR (including VAT)

Item	Number	Part no.	Description	Price	Total
1	1	1000000000	Complete system (with e-chain® TRC 100)	12.000,00 EUR	12.000,00 EUR
2	1	1000000000	Complete system (with e-chain® TRC 100)		
3	1	1000000000	Complete system (with e-chain® TRC 100)		
4	1	1000000000	Complete system (with e-chain® TRC 100)		

Total: 12.000,00 EUR

[Back to shop](#) | [Shopping cart](#)

Shipping only within Germany
 VAT included | Cash payment

With a parts lists available as a PDF, options for each axis can be ordered conveniently with one article number.

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 fiber-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	Fiber rod module, complete set	1

Axis 2

with igus® e-chain® TRL.60

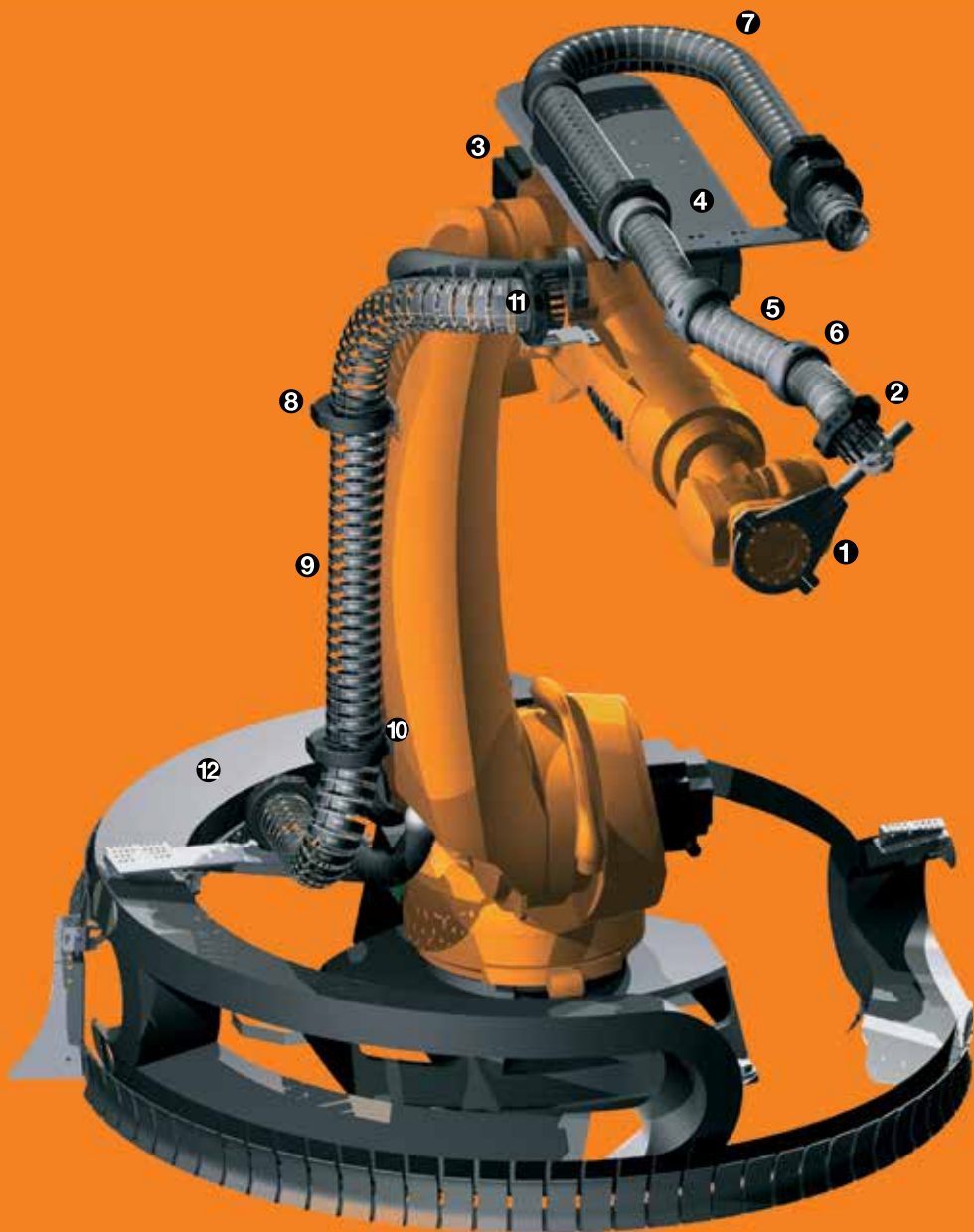
e-chain® pack for axis 2 - TRL.P23.1002.60

Item	Part No.	Specification	Quantity
❽	TR.60.02	Mounting bracket without strain relief	2
❾	TRL.60.087.0	e-chain® TRL	123
❿	TR.909.011	Adapter console axis 2	2
⓫	TR.908.080	Adapter console axis 3	1
⓬	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/125L

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 tiewraps	1
❸	TR.907.270	Mounting bracket axis 3	1
❹	TR.RS.70.R	Retraction system, fixed end right, without e-chain® and fiber-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	Fiber 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
❽	TR.100.02	Mounting bracket without strain relief	2
❾	TRL.100.145.0	e-chain® TRL	81
❿	TR.907.260	Adapter console axis 2	2
⓫	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 fiber-rod module	1

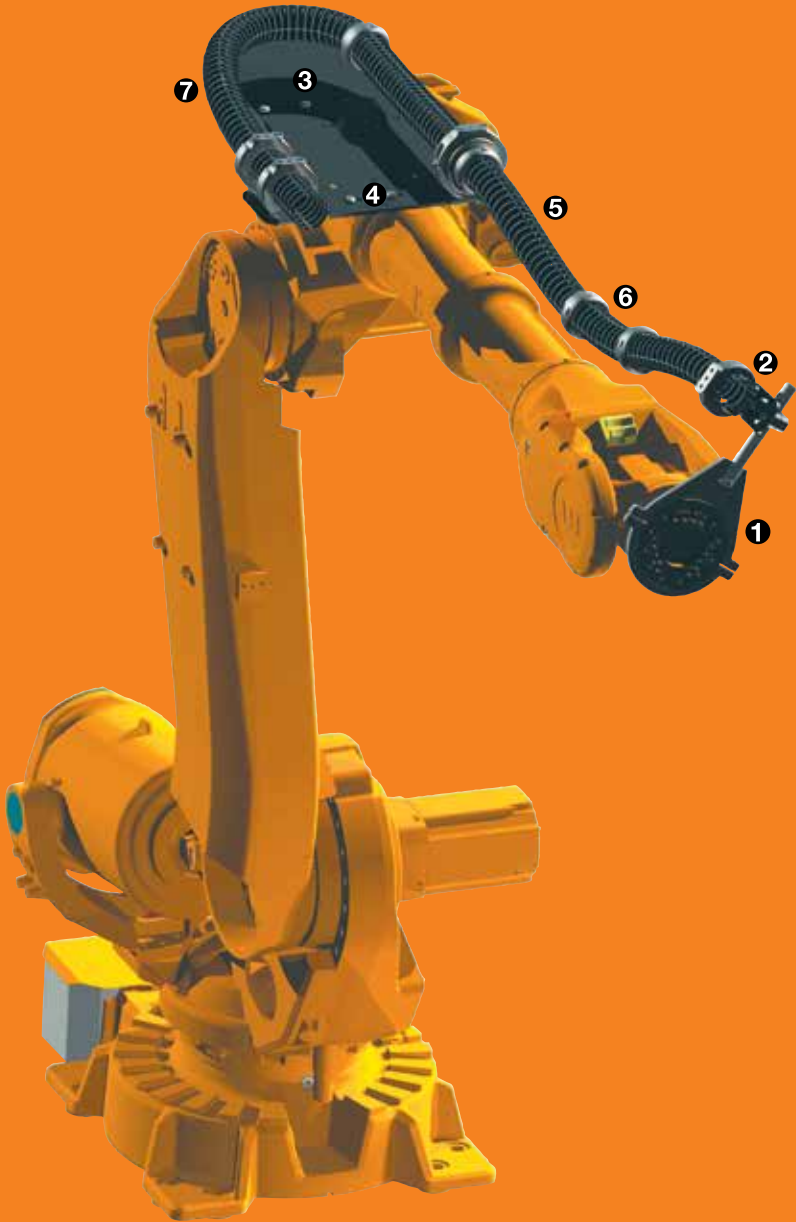
e-chains® pack for retraction system - TRC.RS.70.110.1250.09.0

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	Fiber rod module, complete set	1

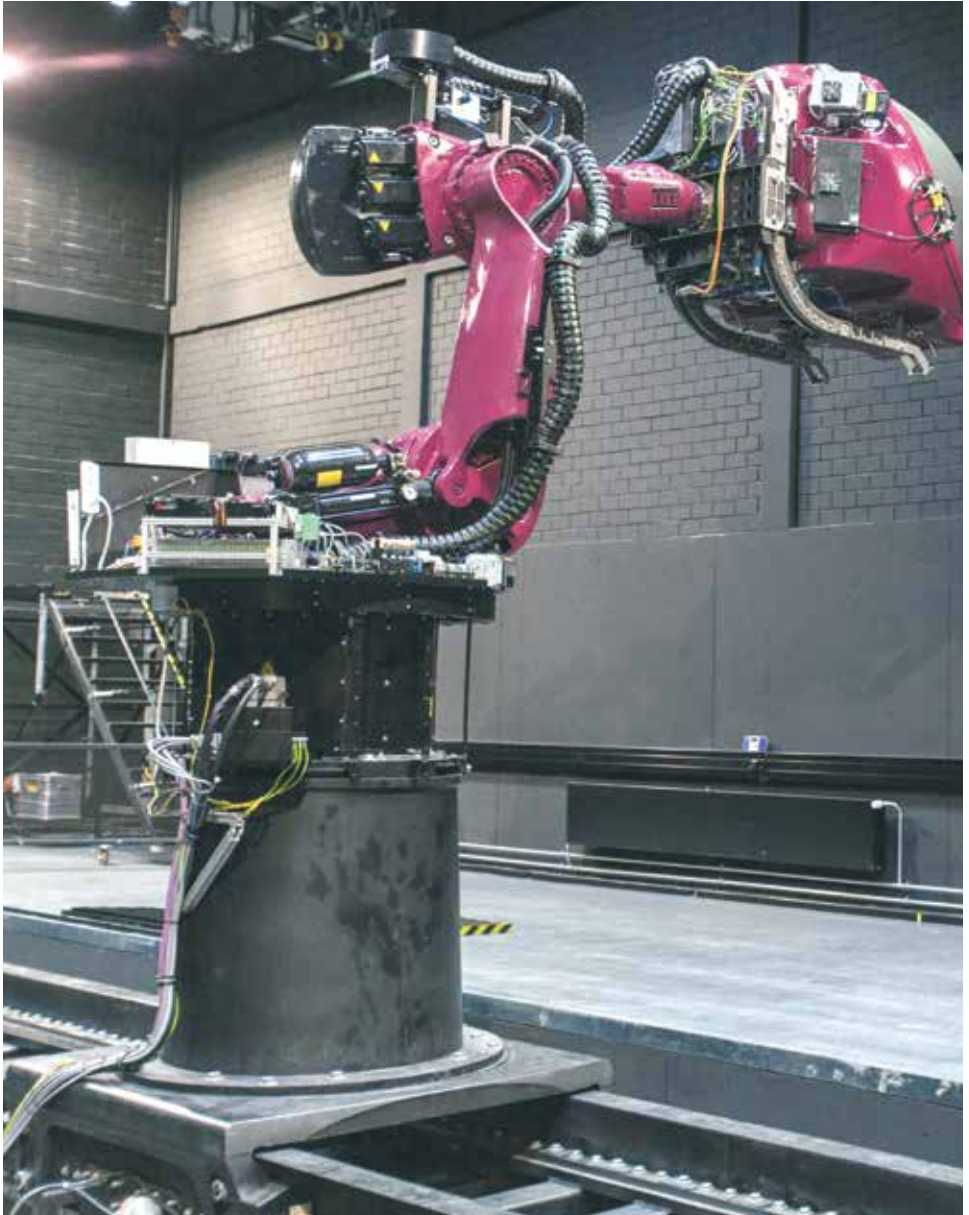
You can find the right parts here also for axes 1, 2 and 7 of your robot system.
Please contact us.

ABB

robot system - 3D-model



Moving energy made easy - for robots



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

Application examples

igus® 3D e-chains®



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.

the-chain

Moving energy made easy - for robots



Reliable energy supply even outdoors

Application examples

igus® 3D e-chains®



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

the-chain

Moving energy made easy - for robots



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

Application examples

igus® 3D e-chains®



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



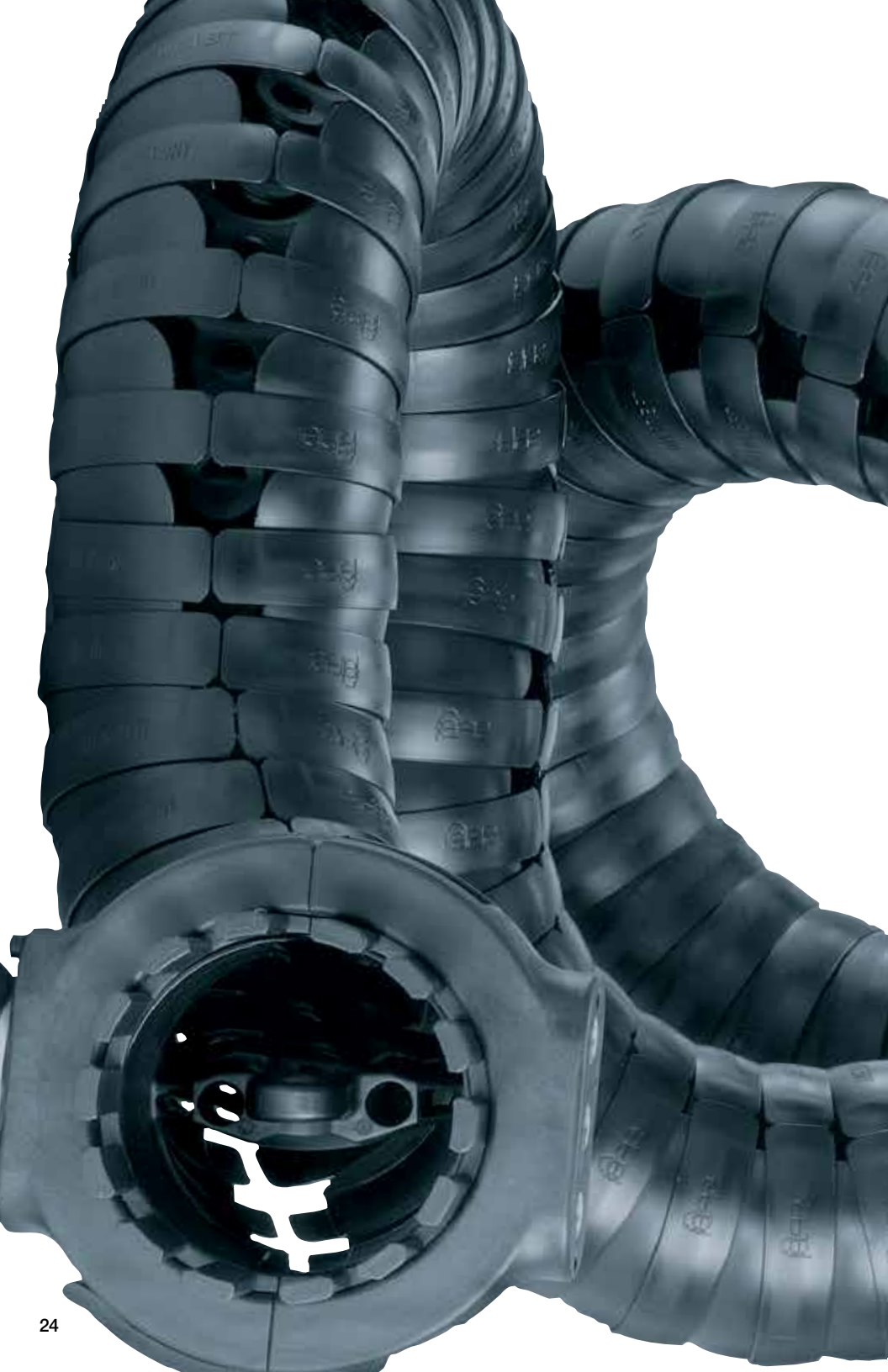
System E4 "RBR" supplies harbor crane with energy - rotary movements



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



E2 mini, Series B15 - The motor spindle has a swiveling range of approximately 210°



igus[®] 3D e-chains[®]

for robots and
3D movements



triflex® R robotics

Key benefits for the robotics industry

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 robotics 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
- Fiber-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.com/triflexR_assembly



Available from stock.
Shipped in as little as 24 hours

triflex® R features



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 a snap lock mechanism for quick filling



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



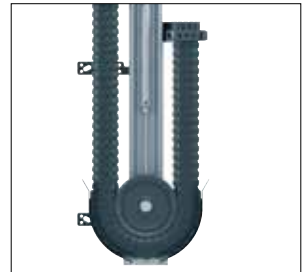
Standard and light mounting brackets available with or without integrated strain relief. Some versions available in ESD material, from stock



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

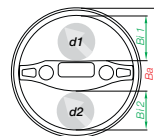
■ 2013 for igus® series TRLF

Selection table

Series	Inner height		≤ \varnothing cable		Outer width B_a [mm]	Bend radius R [mm]	Pitch [mm]	Links per m	Page
	B_{I1} [mm]	B_{I2} [mm]	$d1$ [mm]	$d2$ [mm]					



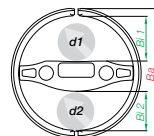
Series TRC - closed design
chip protection,
smooth exterior



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



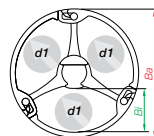
Series TRE - "easy" design
very easy to fill,
cables are simply pushed in



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 \varnothing 41 mm. Max. cable diameter changes to \varnothing 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

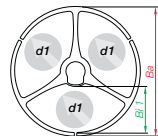
 Available from stock.
Shipped in as little as 24 hours

Selection table

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



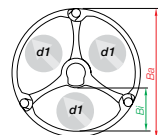
Series TRL -
the light version of
the “easy”-design
easy to fill and cost-effective



TRL.30 ⁹⁾	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 - 100	78
	RSE cost-effective retraction system, for small robots	TRC-TRE	40 - 50	84

Technical data

	Speed / acceleration	Upon request
	Material - permitted temperature °F, igumid G (TRLF/TRCF)	-40°F / +248°F
	Material - permitted temperature °F, igumid NB (TRC/TRE/TRL)	-40°F / +176°F
	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.com/triflex_B_disassemblytool



Assembly video available online at
► www.igus.com/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.
TRCF.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 40-100

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



Available from stock.

Shipped from stock in as little as 24 hours

More information ► www.igus.com/triflexR

Product range

Robotic applications, closed, chip-resistant



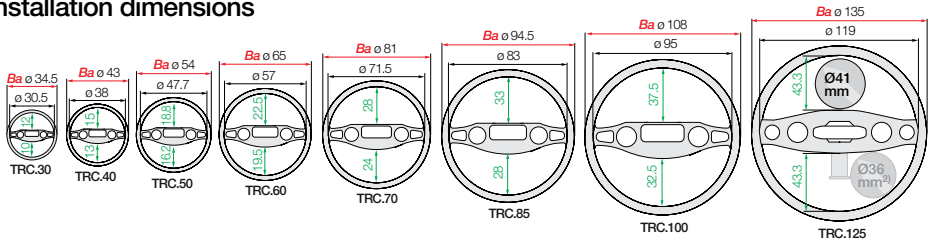
e-tubes | Series TRC | Totally enclosed, non-openable

Part No. e-tubes	Bi1 [mm]	Bi2 [mm]	Ba [mm]	R [mm]	d1 [mm]	d2 [mm]	Pitch [mm]	Links per m	TRC [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
- Standardized product - igumid ESD with PTB certificate
- Short delivery times including mounting brackets and interior separation; in as little as 24 hrs, from stock

More information ► www.igus.com/esd



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. Shipped from stock in as little as 24 hours

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

More information ► www.igus.com/triflexR

igus

Product range

Robotic applications, easy filling



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

Part No. e-chains®	B1 [mm]	B2 [mm]	Ba [mm]	R [mm]	d1 ²⁾ [mm]	d2 ²⁾ [mm]	Pitch [mm]	Links per m	TRE [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

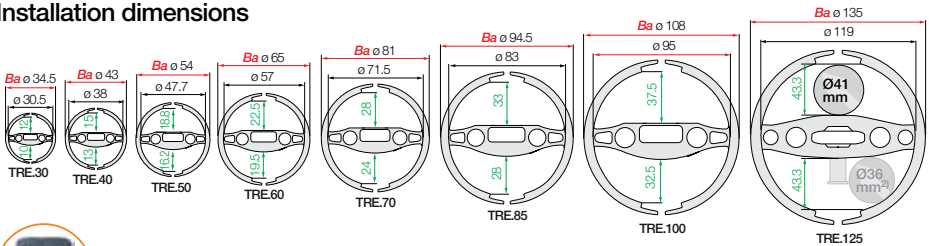
B-Series = 4-x higher torsion forces C-Series = quick assembly, 50% higher forces

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

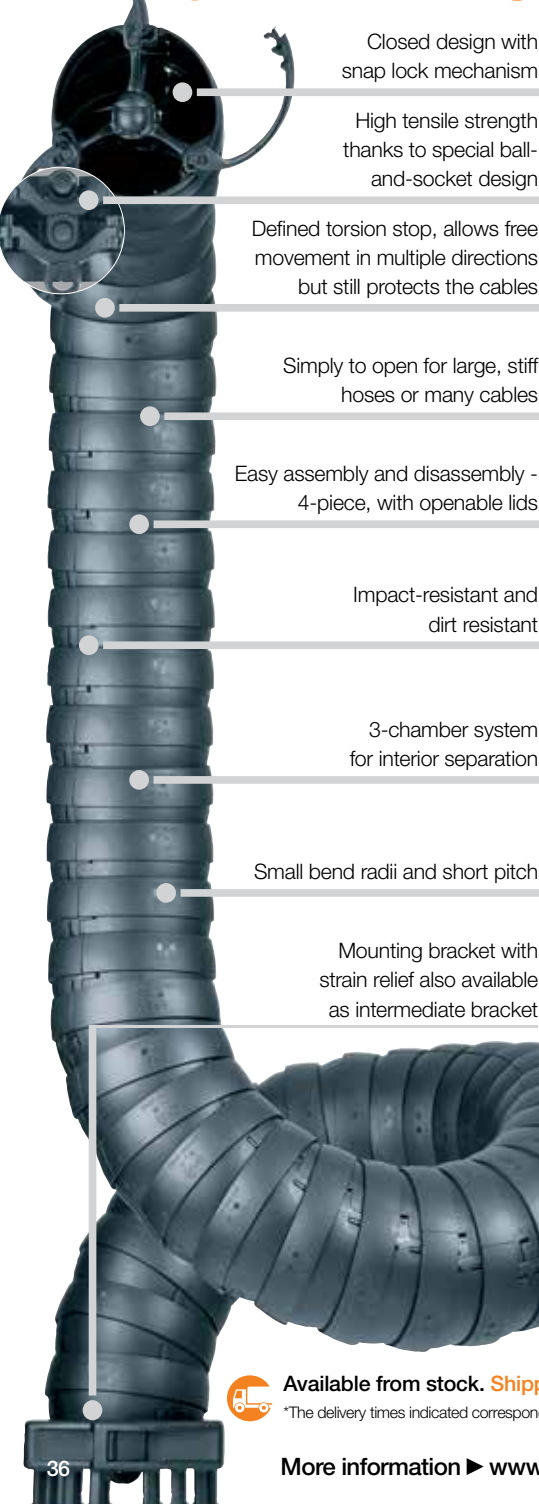


TRE.LOCK clips

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. as a single part	Size [mm]
TRE.30/40.LOCK	30/40
TRE.50.LOCK	50
TRE.60.LOCK	60
TRE.70.LOCK	70/85
TRE.100.LOCK	100
TRE.125.LOCK	125

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. Shipped from stock in as little as 24 hours

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

More information ► www.igus.com/TRCF

igus

Product range

Closed design, dirt resistant, quick filling

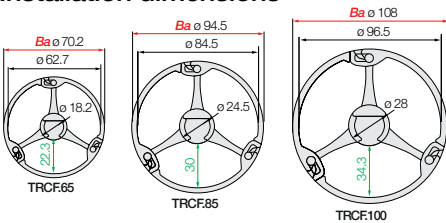


e-tubes | Series TRCF | Fully enclosed design, with snap lock mechanism

Part No. e-tubes	Bi1 [mm]	Ba [mm]	R [mm]	d1 [mm]	Pitch [mm]	Links per m	TRCF [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.com/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.com/TRCF



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

 iF product design award
2007 igus® Series TRL

product design award
2007

Product range

Robotic applications, light and cost-effective



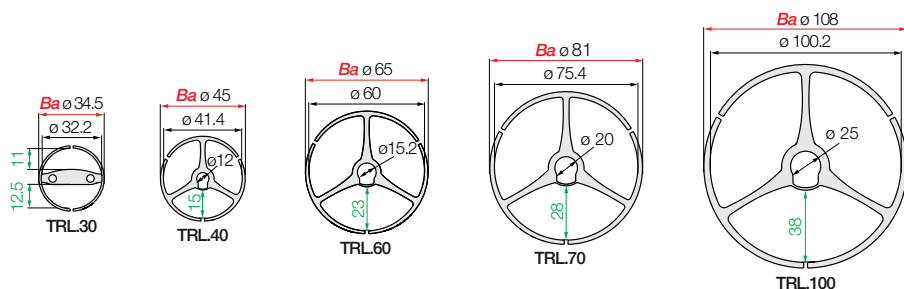
e-chains® | TRL series | Light version with "easy" design - simply press cables in

Part No. e-chains®	<i>Bi1</i> [mm]	<i>Bi2</i> [mm]	<i>Ba</i> [mm]	<i>R</i> [mm]	<i>d1</i> ²⁾ [mm]	<i>d2</i> ²⁾ [mm]	Pitch [mm]	Links per m	TRL [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!

Available from stock. Shipped from stock in as little as 24 hours

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

More information ► www.igus.com/TRLF



Product range

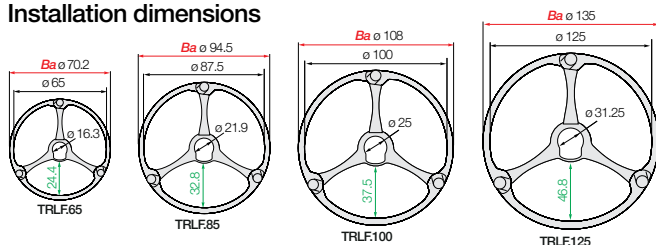
Quick filling with larger hoses and cables



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

Part No. e-chains®	Bi1 [mm]	Ba [mm]	R [mm]	d1 [mm]	Pitch [mm]	Links per m	TRLF [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

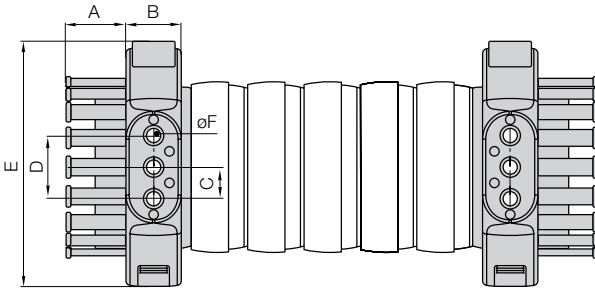
► www.igus.com/TRLF

triflex® R accessories

Standard mounting brackets with strain relief

With integrated strain relief tiwrap 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

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



TR.40.01 - TR.100.01

ø Index	Part No. with strain relief	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [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	-	-	-	-	-	-

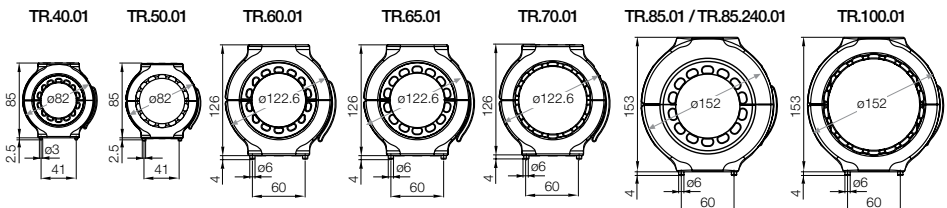
Strain reliefs are for use on the fixed end and/or moving end.

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.



triflex® R accessories

Standard mounting brackets without strain relief

<p>Without strain relief, only for TR.40.02 - TR.100.02</p>	<p>Without strain relief, only for TR.125.02</p>	
		<ul style="list-style-type: none"> ● 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 | Without strain relief | For TRC·TRE·TRCF·TRL·TRLF

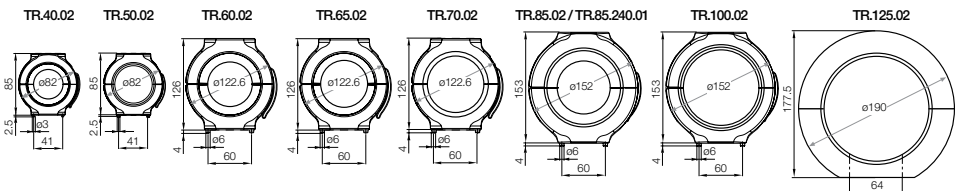


Ø Index	Part No. without strain relief or as intermediate bracket	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]
30.	▶ Alternative: light mounting bracket	-	-	-	-	-	-
40.	▶ TR.40.02.M6 ¹⁾	-	21	13.5	27	84.5	6.5
50.	▶ TR.50.02.M6 ¹⁾	-	21	13.5	27	84.5	6.5
60.	▶ TR.60.02.M8 ¹⁾	-	32	20	40	126	9
65.	▶ TR.65.02.M8 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

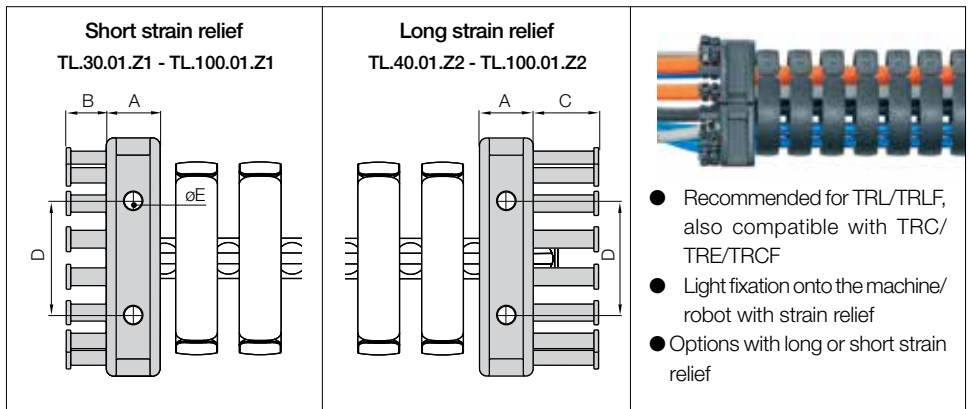
2) ▲ Available as ESD-Version from stock

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



triflex® R accessories

Light mounting brackets with strain relief



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

Standard 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

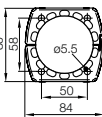
TL.30.01.Z1



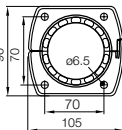
TL.40.01.Z1
TL.40.01.Z2



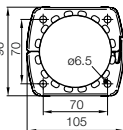
TL.60.01.Z1
TL.60.01.Z2



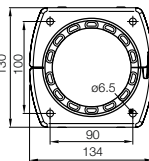
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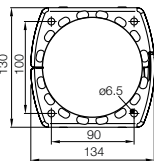
TL.70.01.Z1
TL.70.01.Z2



TL.85.01.Z1


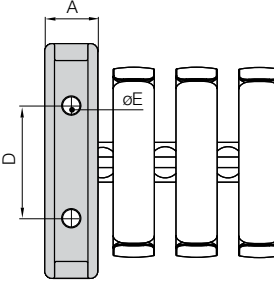
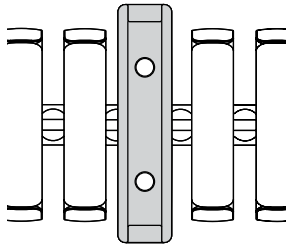


TL.100.01.Z1
TL.100.01.Z2



triflex® R accessories

Light mounting brackets without strain relief

Without strain relief TL.30.01.Z0 - TL.100.01.Z0	Intermediate bracket TL.30.01.Z0 - TL.100.01.Z0	
		<ul style="list-style-type: none"> ● Recommended for TRL/TRLF, also compatible with TRC/TRE/TRCF ● Light fixation onto the machine/robot without strain relief ● Can also serve as intermediate bracket

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	-	-	-	-	-

TL.30.01.Z0

TL.40.01.Z0

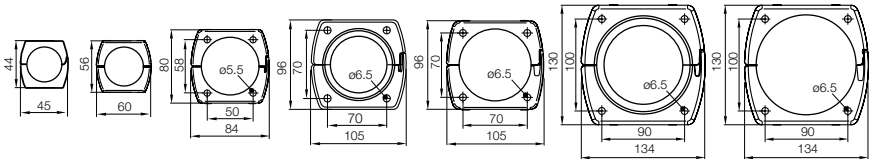
TL.60.01.Z0

TL.65.01.Z0

TL.70.01.Z0

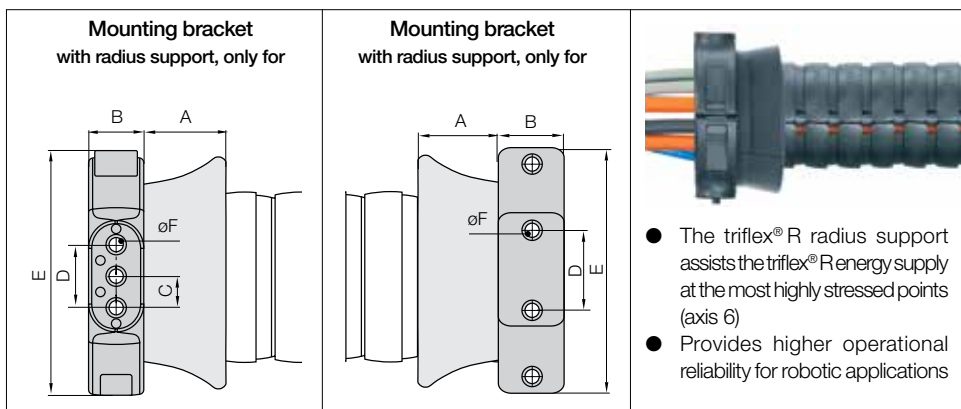
TL.85.01.Z0

TL.100.01.Z0



triflex® R accessories

Mounting brackets with radius support



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
<ul style="list-style-type: none"> ● 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



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

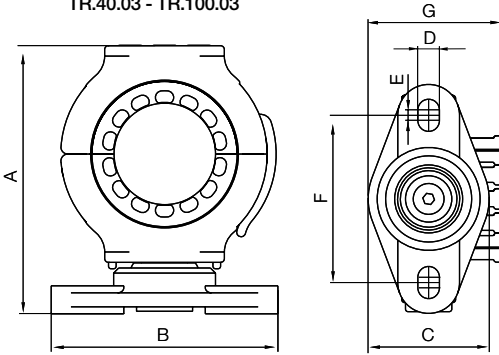
*TR.100.05 with 3 holes

Standard: through holes in Ø G 1) Option: with insert nuts, steel, M6/M8

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

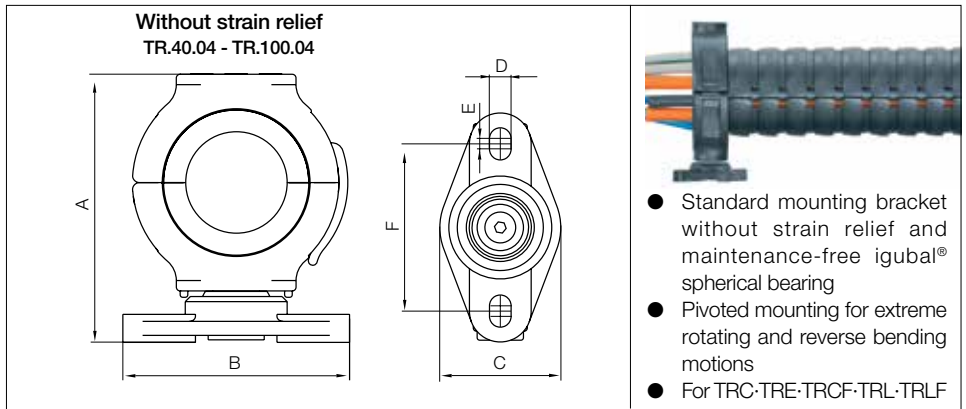
ø Index	Part No. with strain relief	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]
30.	▶ -	-	-	-	-	-	-	-
40.	▶ TR.40.03	105	89	47	8.4	4.1	65	51.8
50.	▶ TR.50.03	105	89	47	8.4	4.1	65	55
60.	▶ TR.60.03	152	118	65	10.5	5.5	87.5	73.5
65.	▶ TR.65.03 ⁵⁾	152	118	65	10.5	5.5	87.5	73.5
70.	▶ TR.70.03	152	118	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



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



TR.40.04 -
TR.100.04

Ø Index	Part No. without strain relief	A [mm]	B [mm]	C [mm]	C [mm]	E [mm]	F [mm]	G [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.	▶ -	-	-	-	-	-	-	-

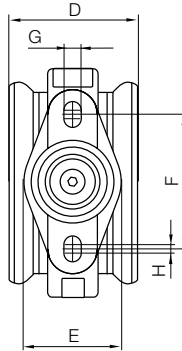
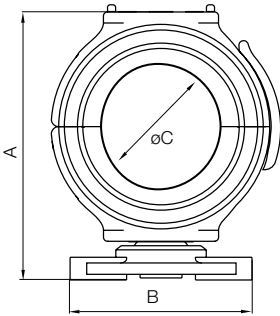
4) Only for special size TRCF.85.240.0 with 240 degree bend radius

triflex® R accessories

Swivel bearing gliding feed-throughs

Swivel bearing gliding feed-throughs

TR.40.07 - TR.85.07



- Gliding feed-through with swivel bearing
- For TRC·TRE·TRCF e-chains®
- Pivoted mounting with maintenance-free igubal® spherical bearings

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



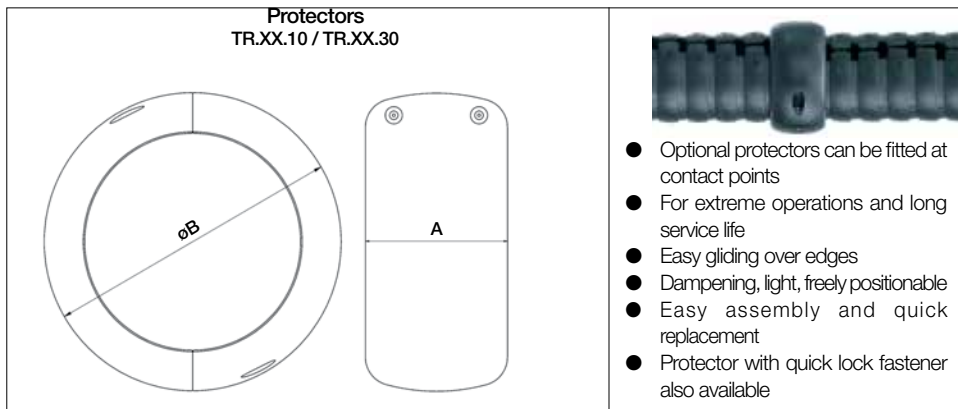
TR.40.07 -
TR.85.07

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**



**TR.40.30 -
TR.100.30**

\varnothing	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

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

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

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

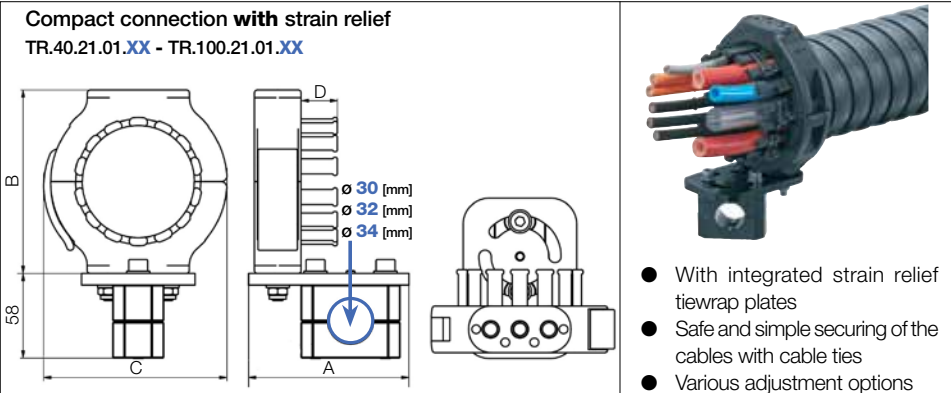
4) Only for special size TRCF.85.240.0 with 240 degree bend radius

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 tiewrap plates
- Safe and simple securing of the cables with cable ties
- Various adjustment options

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



**TR.40.21.01.XX -
 TR.100.21.01.XX**

Ø Index	Part No. with strain relief	Clamp ø [mm]	A [mm]	B [mm]	C [mm]	D [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

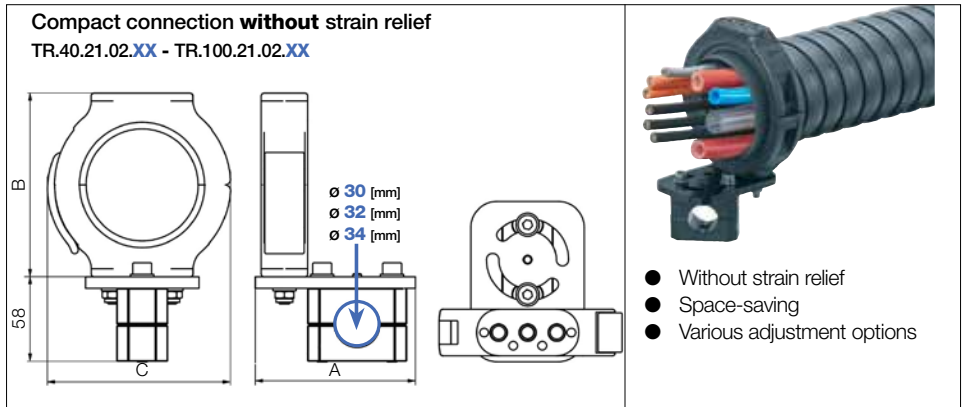
4) Only for special size TRCF.85.240.0 with 240 degree bend radius

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**

triflex® R accessories

Compact connections for clamp axis 6



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



TR.40.21.02.XX -
TR.100.21.02.XX

Ø Index	Part No. without strain relief	Clamp ø [mm]	A [mm]	B [mm]	C [mm]	D [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

\varnothing 30 [mm]
 \varnothing 32 [mm]
 \varnothing 34 [mm]

- 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



TR.60.22.XX -
TR.100.22.XX

Ø Index	Part No. quick-exchange 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: \varnothing 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

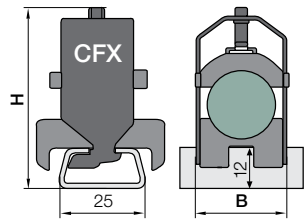
chainfix | Single clamp incl. bottom saddles

- 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 galvanized steel) or stainless steel (material 1.4301/ AISI 304) available



Part No.	Part No.	≤ Ø	B ⁺²	H	Part No.	Part No.	≤ Ø	B ⁺²	H
steel	stainless steel	[mm]	[mm]	[mm]	steel	stainless steel	[mm]	[mm]	[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					

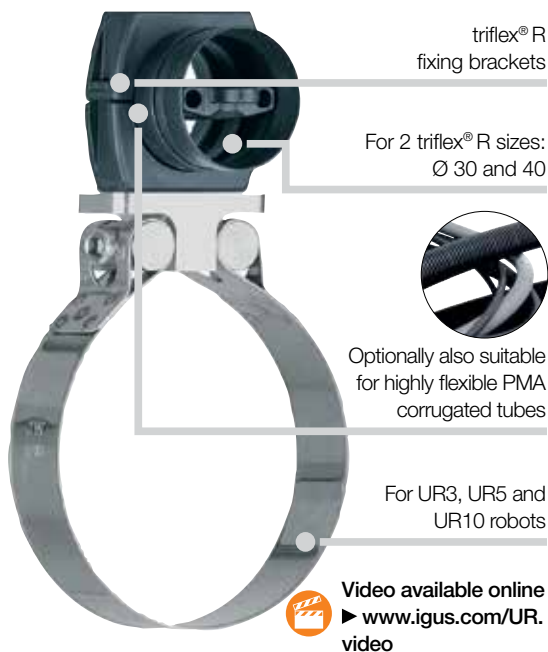
*Material stainless steel: 1.4301/AISI 304



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	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



Reliable and secure cable guidance
for all universal robot systems

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	∅ [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	∅ [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	Kit Part No.	Triflex series/size	For UR Robot System
	TR.UR3.TRC.30	TRC 30mm	UR3
	TR.UR3.TRE.30	TRE 30mm	UR3
	TR.UR5.TRC.40	TRC 40mm	UR5
	TR.UR5.TRE.40B	TRE 40mm	UR5
	TR.UR10.TRC.40	TRC 40mm	UR10
	TR.UR10.TRE.40B	TRE 40mm	UR10

triflex® R accessories

For KUKA LBR iiwa



Connections for KUKA LBR iiwa

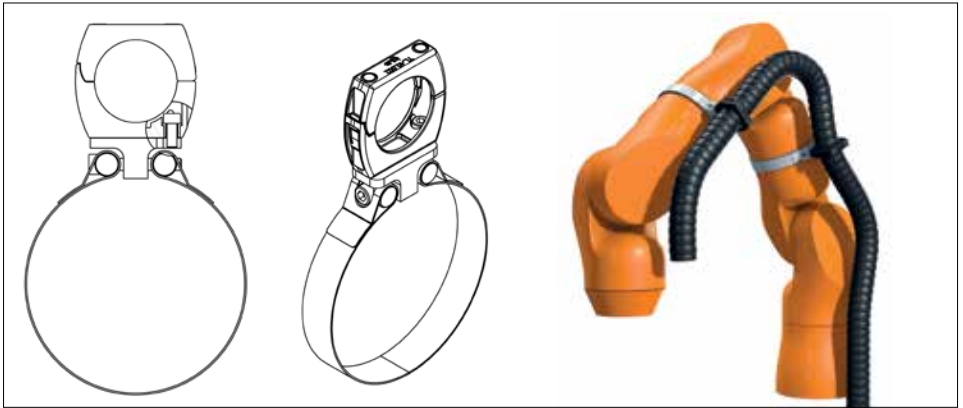
- Safe cable routing with triflex® R for KUKA LBR iiwa robots
- For KUKA LBR iiwa 14 R820 and KUKA LBR iiwa 7 R800
- For easy connection with screw clips
- For 2 triflex® R sizes: Ø 30 and 40
- For TRC, TRE and TRL e-chains®

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	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

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	∅ [mm]
TR.914.951.Z0	TR.914.951.Z1	LBR iiwa 14 R820 LBR iiwa 7 R800	136

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	∅ [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

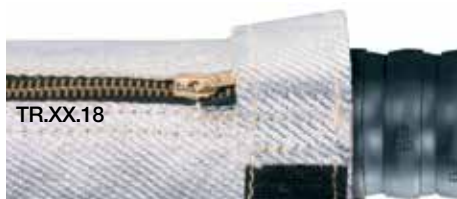
ø Index	Part No. Jacket	Standard lengths ²⁾ XXXX [mm]
30. ▶	–	–
40. ▶	TR.40.14.	500 1000 1500 2000
50. ▶	TR.50.14. ¹⁾	500 1000 1500 2000
60. ▶	TR.60.14.	500 1000 1500 2000
65. ▶	TR.65.14. ¹⁾	500 1000 1500 2000
70. ▶	TR.70.14.	500 1000 1500 2000
85. ▶	TR.85.14.	500 1000 1500 2000
100. ▶	TR.100.14.	500 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 Index	Part No. Jacket	Standard lengths ²⁾ 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°F to +212°F
- Very flexible
- Easy to exchange or retrofit
- Silicone-free
- Asbestos-free
- Standard lengths from stock

ø Index	Part No. Jacket	Standard lengths ²⁾ 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

Configure your own triflex® R interior separations quickly and easily with the QuickChain.100 online tool. After selecting cables, they can be dragged and dropped into the e-chain® layout. The configurator creates a parts list of the e-chain® 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 maximum filling cross sections and cable diameters
- Creation of parts lists
- Easy inquiry and ordering

More information, interior layout configurator

► www.igus.com/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

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

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

More information ► www.igus.com/readychain



Retraction systems

For supplying energy to robots

triflex® R retraction systems - prevents loop formation on robots

The global growth of automating industrial production processes is leading to more and more complex applications, particularly regarding industrial robots. Despite greater integration and new production processes, target cycle times are getting shorter and downtimes must be minimized. 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 ϕ -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 ϕ -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 fiber-rods



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



Advantages of RSE linear:

- For series TRC·TRE·TRCF* with ϕ -index 40-100 mm
- Special linear guide avoids small bend radii
- Up to 490 mm retraction length possible
- Simple, linear retraction without bends, fiber-rods or guide rollers
- Cost-effective
- Maintenance-free igus® drylin® W linear unit



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



Advantages of RSE:

- For series TRC·TRE with ϕ -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

*TRCF not available for each width, see product range

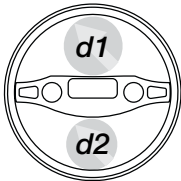
Retraction systems

Selection tools

Choosing the right e-chain® size and retraction system

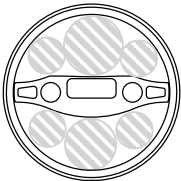
If you want to select a suitable retraction system yourself, please ensure that you observe the maximum cable diameter and usage data.

1
The largest cable diameter \varnothing ...

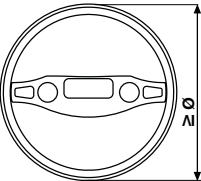


Max. cable \varnothing		Coverage of the entire area [mm ²]
1. chamber d1 [mm]	2. chamber d2 [mm]	
-	-	-
< 15	< 13	< 500
-	-	-
< 22.5	< 19.5	< 1000
-	-	-
< 28	< 24	< 1750
< 33	< 28	< 2500
< 37.5	< 32.5	< 3000
< 43	< 43	< 4500

2
... and usable e-chain® cross section area ...




3
... determine the necessary \varnothing index of the triflex® R ...




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

4
... select from 4 retraction systems options:


RSP




RS



RSE linear




RSE

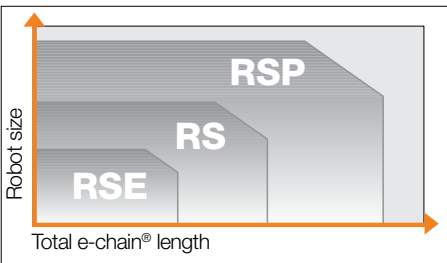


Retraction system			
RSP	RS	RSE linear	RSE
-	-	-	-
-	●	-	●
-	-	-	-
●	●	●	-
-	-	-	-
●	●	●	-
●	●	●	-
●	●	●	-
●	-	●	-

● = 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.com/triflexR-IA

Selection tool for triflex® R retraction systems



Possible \varnothing -index for triflex® R retraction systems

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

* Retraction systems not available for this series

RSP retraction system

Pneumatic retraction system

Up to 780 mm retraction length possible with TRC, TRE and TRCF e-chains® (please order matching e-chain® separately)

Increased protection against failure by optional end position monitoring

Standard pneumatic components for easy integration

Pressure compensation unit for an adjustable retraction force

Open system, low profile design

Custom connection possibilities using adapter consoles

Double retraction distance relative to the overall length

Pneumatic retraction system - triflex® RSP

triflex® RSP prevents the creation of loops on the robot head by means of 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 there are light or heavy fill weights, or long or short robot arms - the igus® RSP retraction system always allows the retraction force to 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

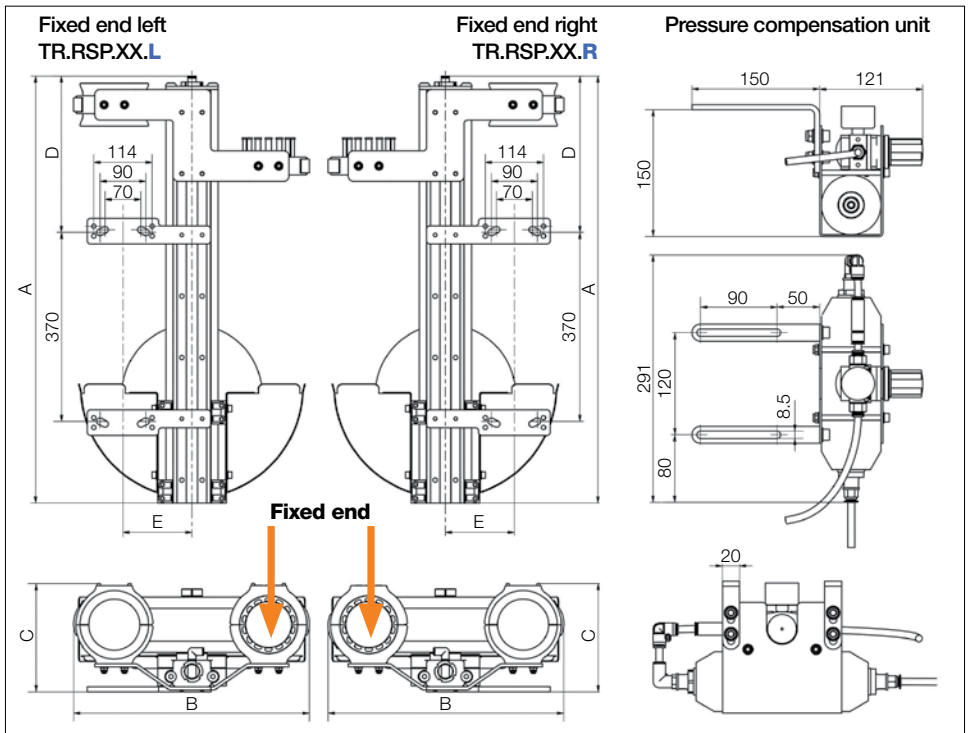


triflex® RSP system
on a 6 axis robot

RSP accessories

Technical data

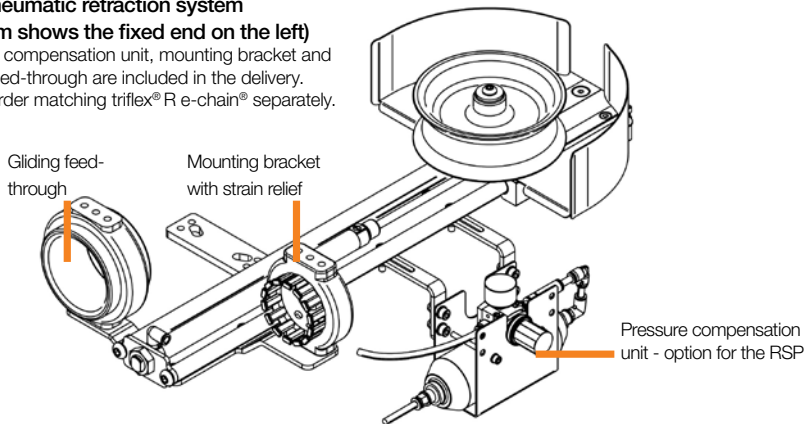
Dimensions | RSP pneumatic retraction system



RSP pneumatic retraction system

(diagram shows the fixed end on the left)

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



Product range

triflex® R RSP for series TRC·TRE·TRCF

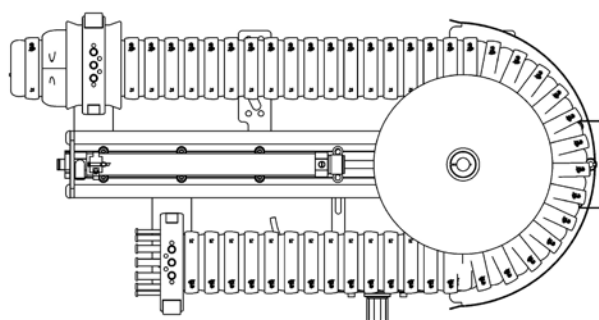
Product range | RSP pneumatic retraction system

∅ 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.

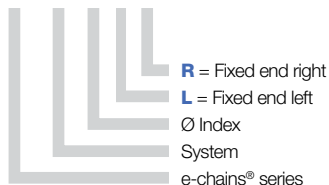
1) These are the maximum values. In normal operation a filling of no more than 70% is advised

*Plus 2.3 kg for pressure compensation unit



 Order key

TR.RSP.XX.L / R



RSP accessories

RSP retraction system and matching e-chains®

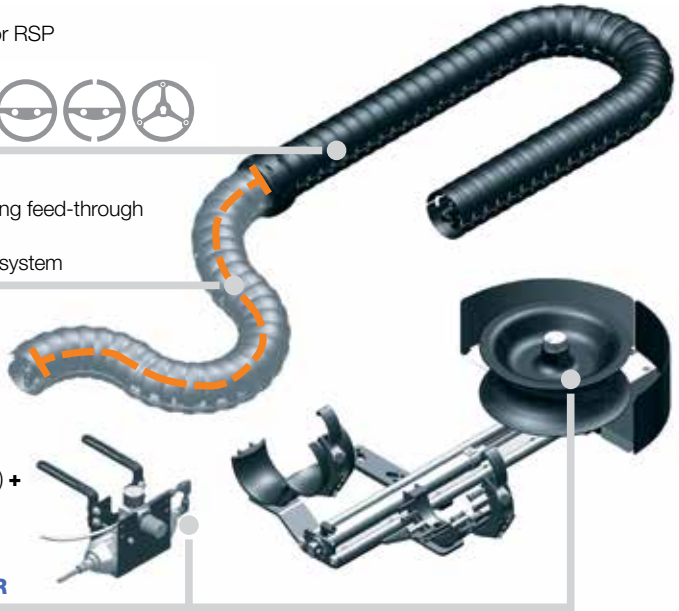
System design | RSP and matching e-chains®

Matching triflex®R e-chains® for RSP


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



Overall length =
 additional length from the gliding feed-through
LLLLL +
 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 **LLLLL**

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**.LLLLL.0
 TRE .RSP.XX.**R**.LLLLL.0.B
 TRCF.RSP.XX.**R**.LLLLL.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.LLLLL.0	TRE.RSP.60.087.LLLLL.0.B	–
65.	▶ –	–	TRCF.RSP.65.100.LLLLL.0
70.	▶ TRC.RSP.70.110.LLLLL.0	TRE.RSP.70.110.LLLLL.0.B	–
85.	▶ TRC.RSP.85.135.LLLLL.0	TRE.RSP.85.135.LLLLL.0.B	TRCF.RSP.85.135.LLLLL.0
85. (<i>R 240</i>)	▶ –	–	–
100.	▶ TRC.RSP.100.145.LLLLL.0	TRE.RSP.100.145.LLLLL.0.B/C ¹⁾	TRCF.RSP.100.145.LLLLL.0
125.	▶ TRC.RSP.125.182.LLLLL.0	TRE.RSP.125.182.LLLLL.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 <i>R</i> [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. (<i>R 240</i>)	▶ –	–	–	–
100.	▶ 145	1656	48	LLLL + 1656
125.	▶ 182	1962	44	LLLL + 1962

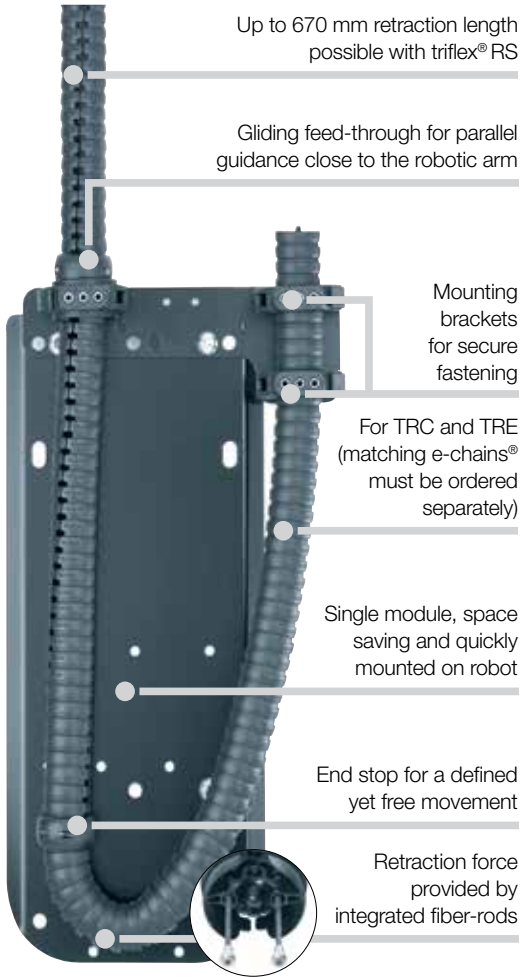
*Values are related to the e-chain® length within the system

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 safely utilize energy supply for tools without stressing the cables, thus minimizing downtimes.

- Space-saving, closely routed on the robot arm
- A system solution proven and tested thousands of times
- Universal installation
- Integrated fiber-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.

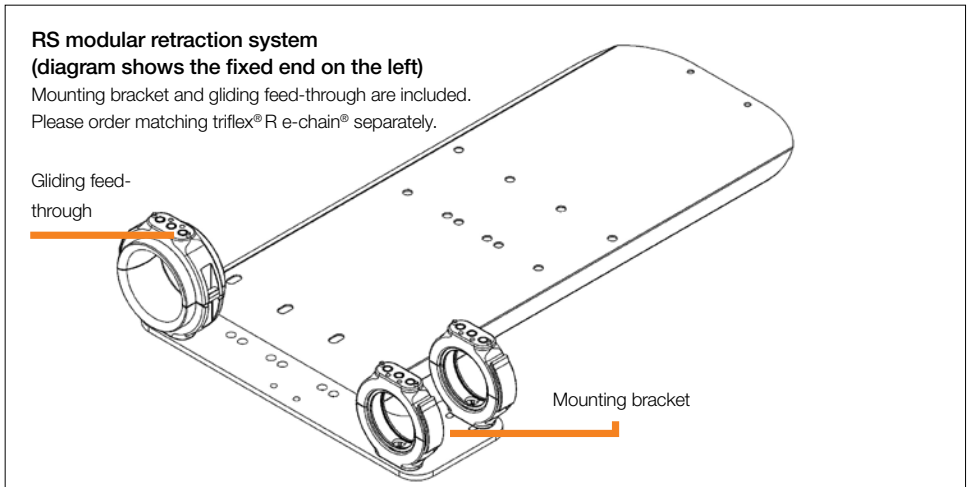
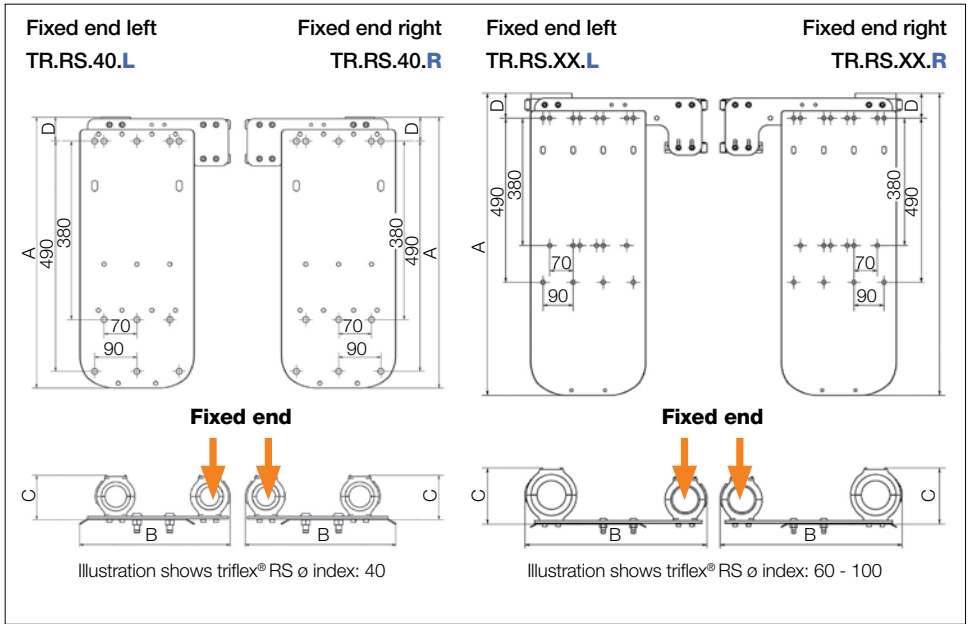


Option: triflex® RS with cover
for more mounting space

RS Retraction system

Modular retraction system

Installation height | RS modular retraction system



Product range

RS - R(etraction) S(ystem)

Product range | RS modular retraction system

∅			≤ [mm]	A [mm]	B [mm]	C [mm]	D [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.	▶	-	-	-	-	-	-	-	

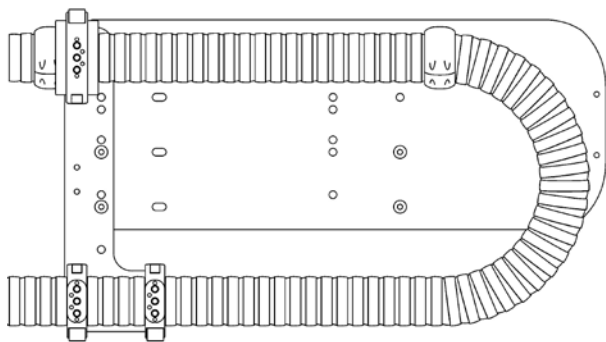
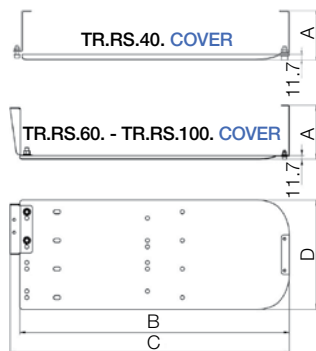
1) These are the maximum values. In normal operation a filling of no more than 70% is advised.

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

Product range | Cover, optional

∅	Optional cover retrofit kit	A [mm]	B [mm]	C [mm]	D [mm]	Load* ≤ [kg]	Weight [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



 Order key

TR.RS.XX.L / R



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

RS Accessories

RS retraction system and matching e-chain®

System design | RSP and matching e-chains®

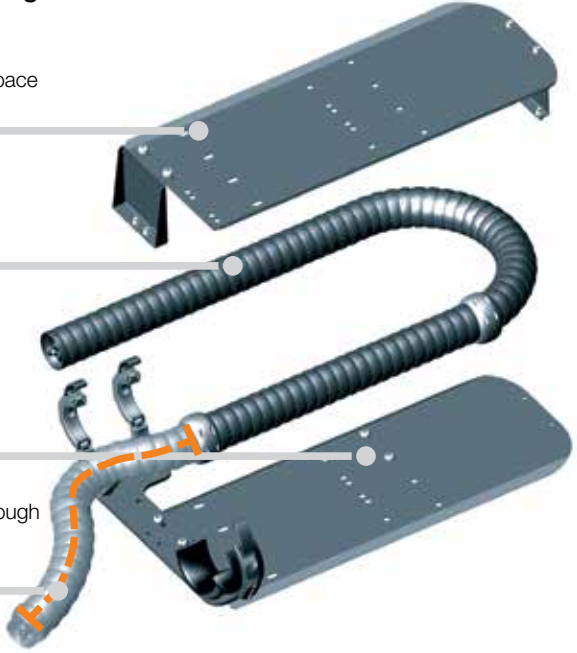
Optional cover for additional installation space on the robot: **TR.RS.XX.COVER**


Matching triflex® R e-chains® for RS with integrated fiber-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.COVER
+ 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.0
TRE.RS.XX.R.LLLL.0.B



Product range

e-chain® and cable length calculation

Product range | Matching e-chains® for RS

ø Index	Part No. TRC enclosed	Part No. TRE "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*

LLLL [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 Index	Bend radius R [mm]	e-chain® length* [mm]	Number of e-chain® links	Total e-chain® length [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

Up to 490 mm retraction length possible with triflex® RSE

For TRC·TRE·TRCF series with a \varnothing index of 40-100 mm (please order matching e-chains® separately)

Simple, linear retraction without bends, fiber-rods or guide rollers

Special linear guide avoids small bend radii

Maintenance-free igus® drylin® W linear unit

Custom connection possibilities using adapter consoles

Compact design, no loops

Cost-effective

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 \varnothing -index of 40-100 mm
- Special linear guide avoids small bend radii
- Up to 490 mm retraction length possible
- Simple, linear retraction without bends, fiber-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

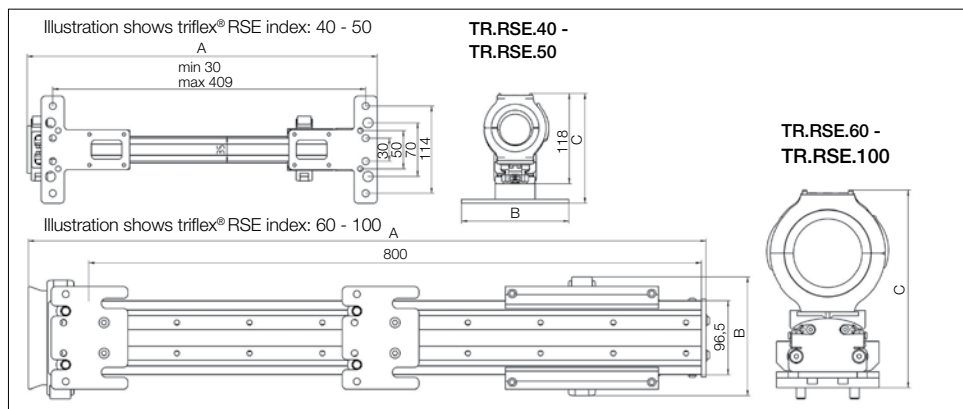


Linear TR.RSE retraction system for installation sizes
60-100 with attachment brackets for a wide variety
of robot models

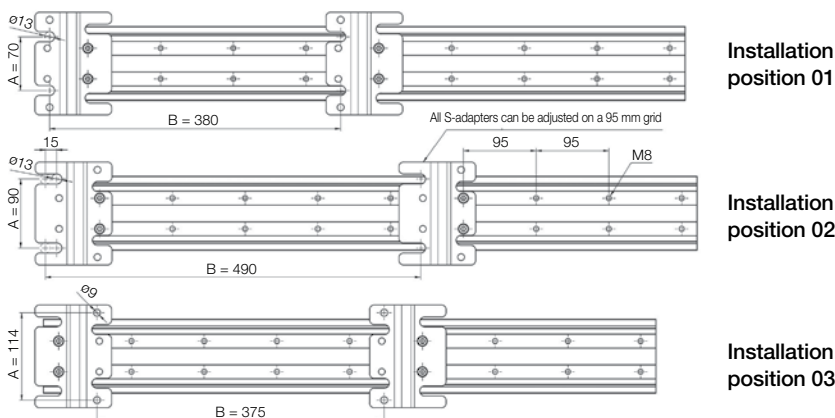
RSE linear accessories

Technical data

Dimensions | RSE linear, cost-effective linear retraction system



Possible installation positions for TR.RSE.60 - TR.RSE.100 | RSE linear



Installation position 01

A [mm]	B [mm]	Thread size
70	190	M12
70	285	M12
70	380	M12
70	475	M12
70	570	M12
70	665	M12
70	760	M12

Installation position 02

A [mm]	B [mm]	Thread size
90	175 - 205	M12
90	270 - 300	M12
90	365 - 395	M12
90	460 - 490	M12
90	555 - 585	M12
90	650 - 680	M12
90	745 - 775	M12

Installation position 03

A [mm]	B [mm]	Thread size
114	185	M8
114	280	M8
114	375	M8
114	470	M8
114	565	M8
114	660	M8

Product range

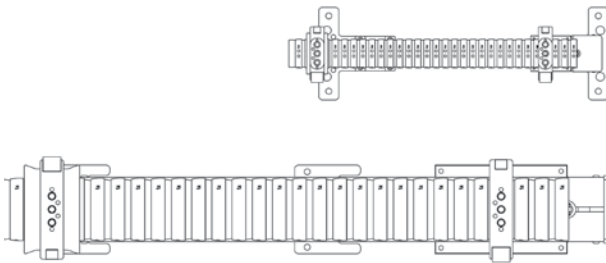
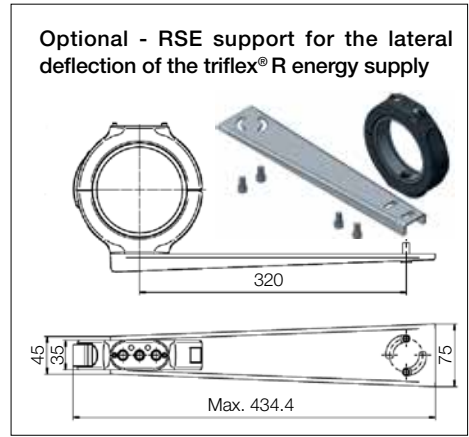
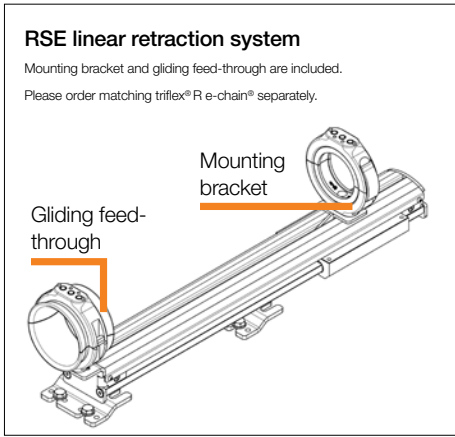
RSE linear for series TRC·TRE·TRCF

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

ø Index	Part No. RSE linear	Retraction length ¹⁾ ≤ [mm]	A [mm]	B [mm]	C [mm]	Weight [kg]	Part No. 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

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.



 **Order key**

TR.RSE.XXX



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 meters	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	

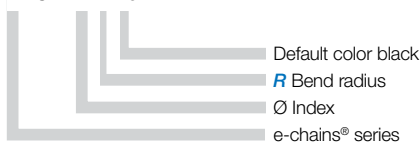


 **Order key e-chains®**

TRC .XX.R.0

TRE .XX.R.0.B

TRCF .XX.R.0



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

1) Available for B- and C-versions

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

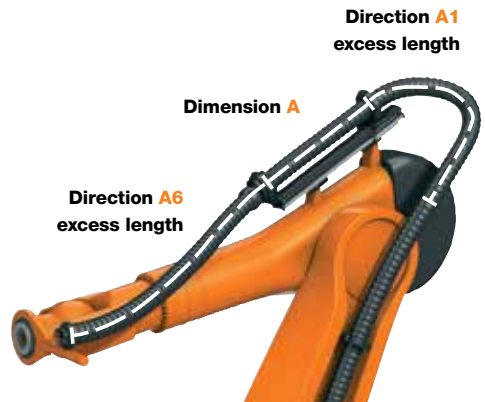
Please order protectors with screw connections or quick release as limit protectors.

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		A [mm]
	R [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

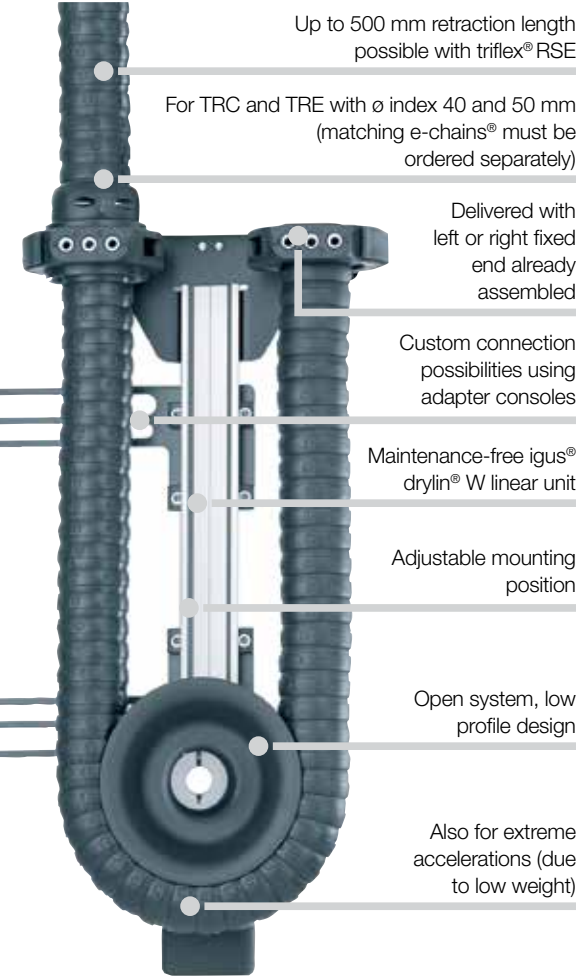
Excess length in direction A6 + Dimension A + Excess length in direction A1 = Total e-chain® length



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 self-lubricating 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

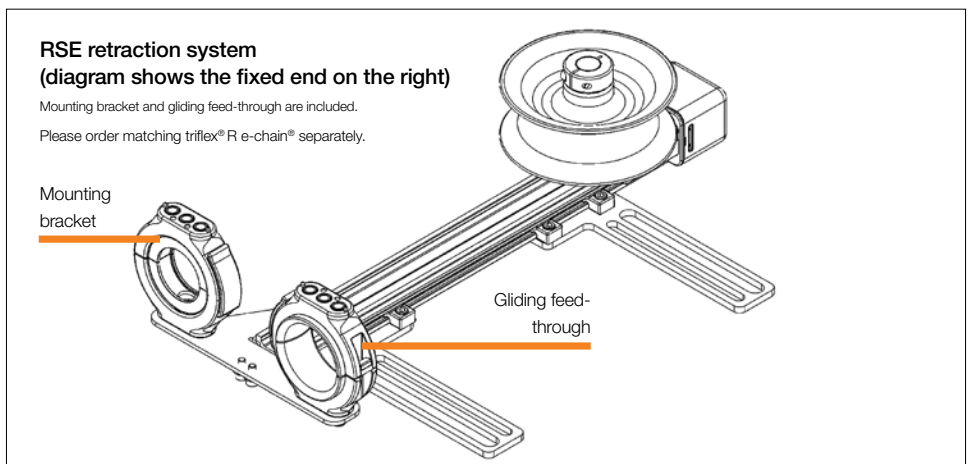
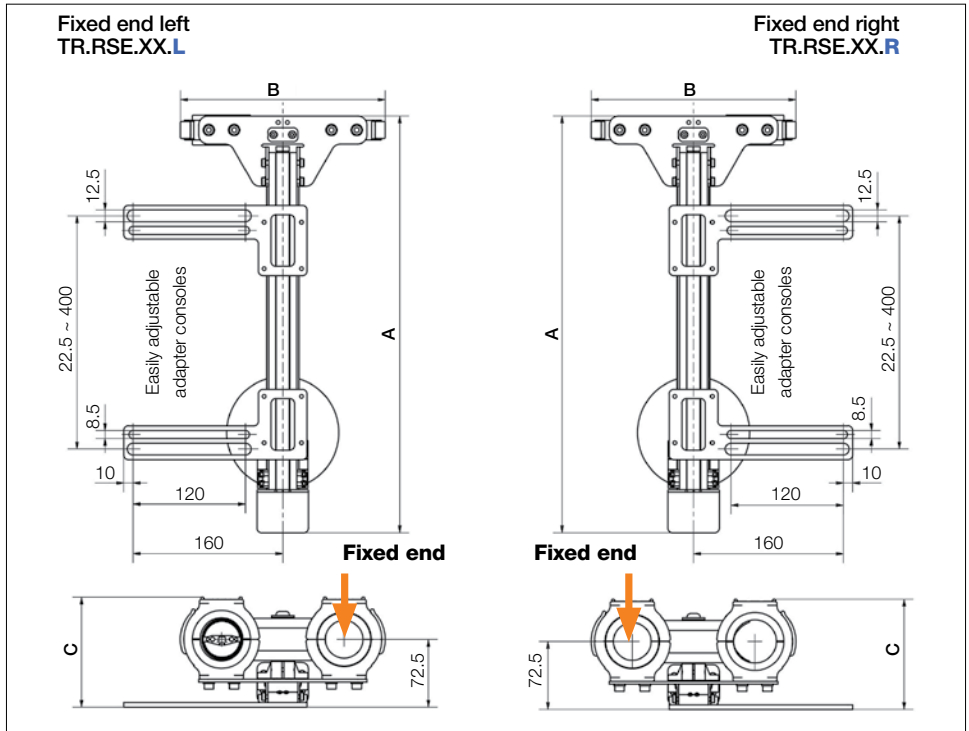


e-chain® is guided closely to the arm with a low profile

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

∅ Index	Part No. fixed end left	Part No. fixed end right	Retraction length ¹⁾ ≤ [mm]	A [mm]	B [mm]	C [mm]	Weight [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

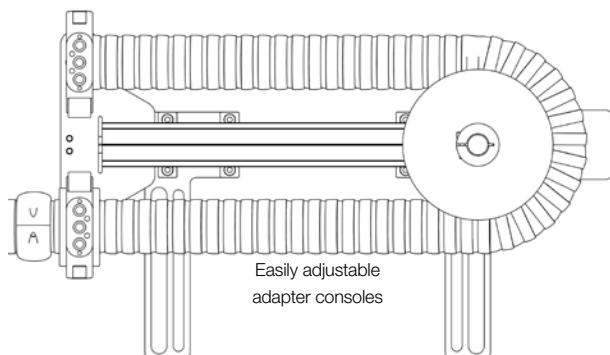
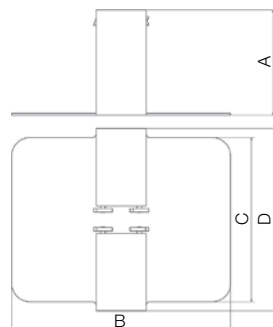
1) These are the maximum values. In normal operation a filling of no more than 70% is advised.

Please order matching triflex® R e-chain® separately

Product range | Cover, optional

∅ Index	Optional cover retrofit kit	A [mm]	B [mm]	C [mm]	D [mm]	Load* ≤ [kg]	Weight [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 = Fixed end right
L = 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)

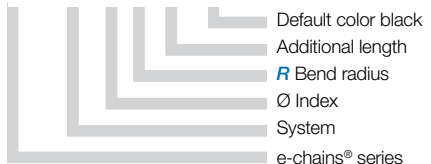
System	Insert Ø index XX / select fixed end .L / .R	TR.RS.40.L
+ Cover	Insert Ø index XX / Insert Ø index XX (cover optional)	TR.RSE.40.COVER
+ e-chain®	Insert ø-index XX / Insert bend radius R / Insert standard length LLLL	TRC.RSE.40.058.500.0
Order text: TR.RSE.40.L + TR.RS.40.COVER + TRC.RSE.40.058.500.0		



Order key e-chains®

TRC.RSE.XX.R.LLLL.0

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



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

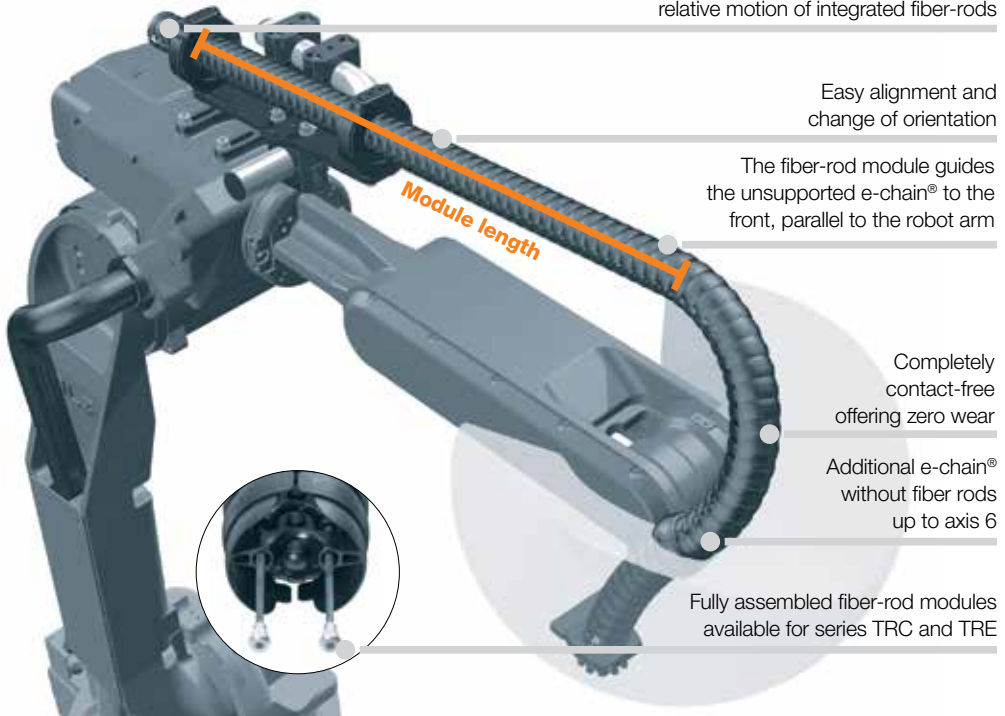
*Values are related to the e-chain® length within the system

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

Fiber rod modules and universal installation sets

5 rigidly connected e-chain® links allow relative motion of integrated fiber-rods



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

We supply fully assembled fiber-rod modules for triflex® R e-chains®, series TRC and TRE. The integrated fiber-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 fiber-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 fiber-rods. This results in a fully contact-free and therefore zero-wear energy supply system, designed for moderate movements with limited rotational motion of the axes. Additional e-chains® without fiber-rods for the final axis area needs to be ordered separately.



Product range

For series TRC·TRE

Part No. fiber-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.40.0900.1.0	TRE.F.40.0900.1.0.B	≈ 0.9
TRC.F.40.0800.1.0*	TRE.F.40.0800.1.0.B*	≈ 0.8
TRC.F.40.0700.1.0	TRE.F.40.0700.1.0.B	≈ 0.7
TRC.F.40.0600.1.0	TRE.F.40.0600.1.0.B	≈ 0.6
TRC.F.40.0500.1.0	TRE.F.40.0500.1.0.B	≈ 0.5
TRC.F.40.0400.1.0	TRE.F.40.0400.1.0.B	≈ 0.4
TRC.60	TRE.60	
TRC.F.60.1400.1.0	TRE.F.60.1400.1.0.B	≈ 1.4
TRC.F.60.1200.1.0	TRE.F.60.1200.1.0.B	≈ 1.2
TRC.F.60.1000.1.0*	TRE.F.60.1000.1.0.B*	≈ 1.0
TRC.F.60.0800.1.0	TRE.F.60.0800.1.0.B	≈ 0.8
TRC.F.60.0600.1.0	TRE.F.60.0600.1.0.B	≈ 0.6
TRC.F.60.0400.1.0	TRE.F.60.0400.1.0.B	≈ 0.4

TRC.70	TRE.70	
TRC.F.70.1800.1.0	TRE.F.70.1800.1.0.B	≈ 1.8
TRC.F.70.1600.1.0	TRE.F.70.1600.1.0.B	≈ 1.6
TRC.F.70.1400.1.0	TRE.F.70.1400.1.0.B	≈ 1.4
TRC.F.70.1200.1.0*	TRE.F.70.1200.1.0.B*	≈ 1.2
TRC.F.70.1000.1.0	TRE.F.70.1000.1.0.B	≈ 1.0
TRC.F.70.0800.1.0	TRE.F.70.0800.1.0.B	≈ 0.8

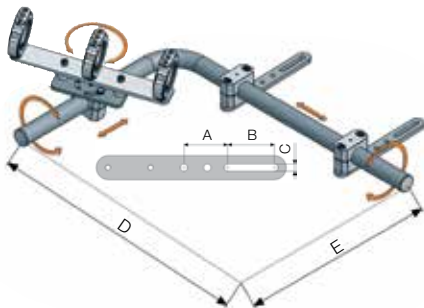
Part No. fiber-rod modules for TRC / TRE		Length [m]
TRC.85	TRE.85	
TRC.F.85.2000.1.0	TRE.F.85.2000.1.0.B	≈ 2.0
TRC.F.85.1800.1.0	TRE.F.85.1800.1.0.B	≈ 1.8
TRC.F.85.1600.1.0	TRE.F.85.1600.1.0.B	≈ 1.6
TRC.F.85.1400.1.0*	TRE.F.85.1400.1.0.B*	≈ 1.4
TRC.F.85.1200.1.0	TRE.F.85.1200.1.0.B	≈ 1.2
TRC.F.85.1000.1.0	TRE.F.85.1000.1.0.B	≈ 1.0
TRC.F.85.0800.1.0	TRE.F.85.0800.1.0.B	≈ 0.8
TRC.100	TRE.100	
TRC.F.100.2000.1.0	TRE.F.100.2000.1.0.B/ /C ¹⁾	≈ 2.0
TRC.F.100.1800.1.0	TRE.F.100.1800.1.0.B/ /C ¹⁾	≈ 1.8
TRC.F.100.1600.1.0	TRE.F.100.1600.1.0.B/ /C ¹⁾	≈ 1.6
TRC.F.100.1400.1.0*	TRE.F.100.1400.1.0.B/ /C ¹⁾ *	≈ 1.4
TRC.F.100.1200.1.0	TRE.F.100.1200.1.0.B/ /C ¹⁾	≈ 1.2
TRC.F.100.1000.1.0	TRE.F.100.1000.1.0.B/ /C ¹⁾	≈ 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.125.1600.1.0	TRE.F.125.1600.1.0	≈ 1.6
TRC.F.125.1400.1.0	TRE.F.125.1400.1.0	≈ 1.4
TRC.F.125.1200.1.0	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



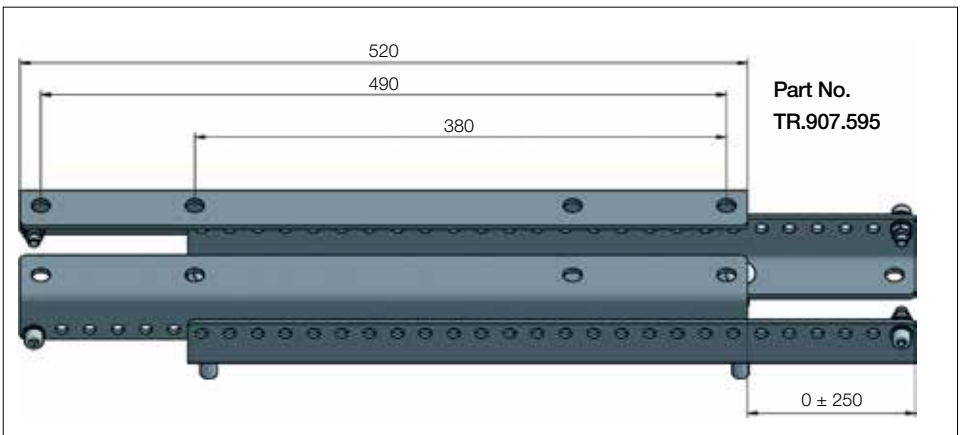
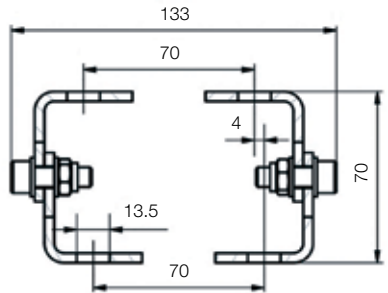
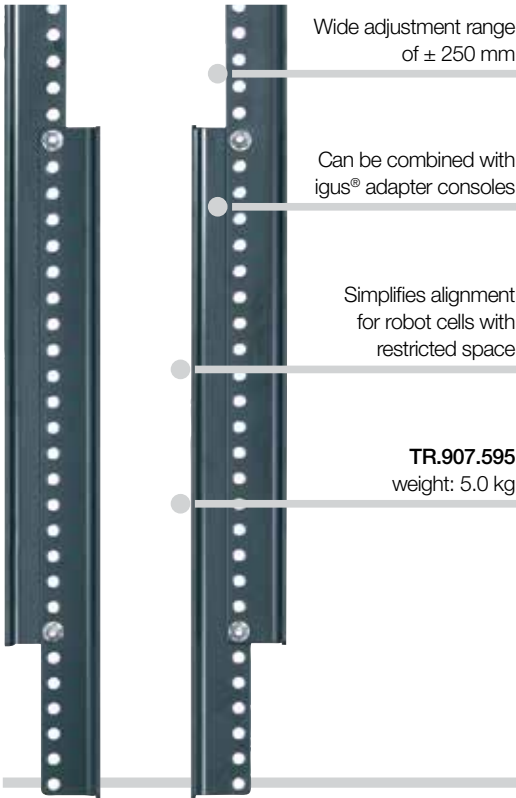
Ø Index	Part No.	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	Weight [kg]
40.	▶ TR.40.80	40	30	8.4	475	325	3.6
60.	▶ TR.60.80	40	30	8.4	475	325	4.3
70.	▶ TR.70.80	75	80	12.6	875	575	5.9
85.	▶ TR.85.80	75	80	12.6	875	575	6.3
100.	▶ TR.100.80	75	80	12.6	875	575	6.3
125.	▶ TR.125.80	75	80	12.6	875	575	8.5

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.



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	MH6 HP 20 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	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



For use with a heavy duty connection, compact connection, and quick release units

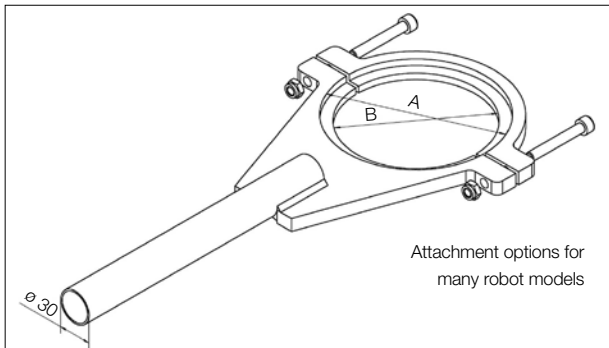
Easy and fast alignment of the fixed end relative to the tool position

Depending on robot design, with or without recess

Clamps for attachment to axis 6

The clamp is used to attach a mounting bracket to axis 6, with a bar (\varnothing 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**



Attachment options for many robot models



Product range

Clamps

Part No. Clamp	Robot model		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
TR.908.347	Stäubli TX ₂ 00	yes	145	125	1.9
TR.907.667.125	for custom flange	no	125	= A	2.1
TR.907.667.140	KUKA Quantec small flange	no	140	= A	2.2
TR.907.667.142	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
TR.907.667.220	KUKA KR 360-2	no	220	= A	2.82
	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

triflex® R Assembly

Assembly videos online

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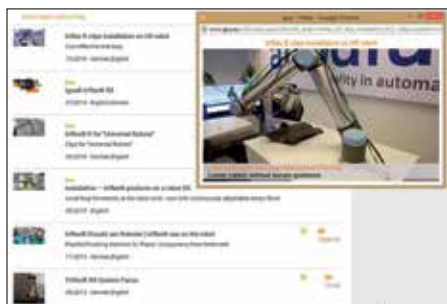
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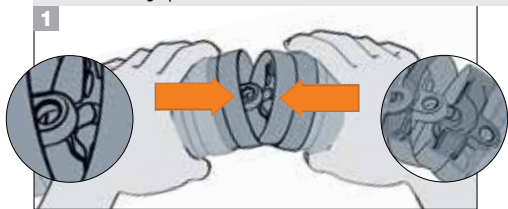
► www.igus.com/downloads

triflex® R TRC

Assembly instructions



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



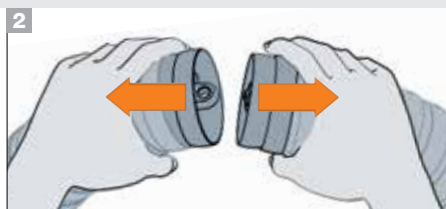
Engage the e-chain® links on the lower side. Use the chamfered side of the ball to open the socket and click together.



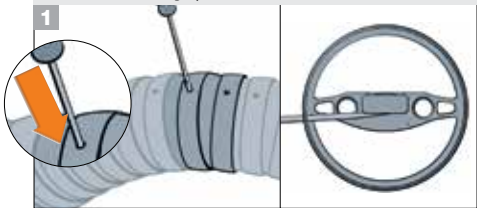
Disassembly | TRC.30 · TRC.40 · TRC.60



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



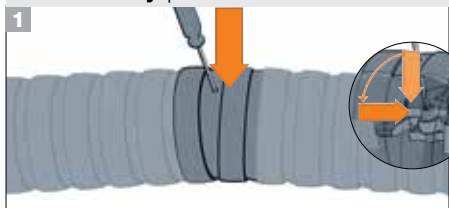
Disassembly | TRC.70 · TRC.85 · TRC.100



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.

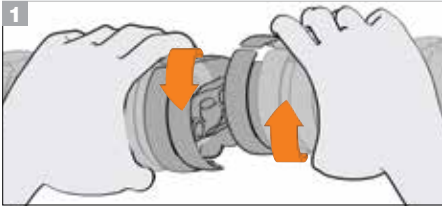


triflex® R TRE.B

Assembly instructions



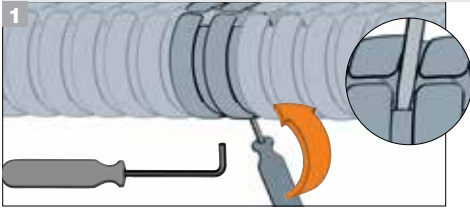
Assembly | TRE.B



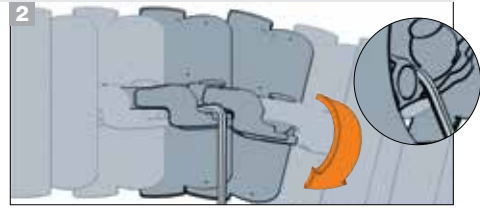
Engage the e-chain® links on the lower side. Use the chamfered side of the ball to open the socket and slightly rotate the e-chain® links to click together. Push the socket downward onto the ball in a straight motion. An audible "click" can be heard on successful connection.



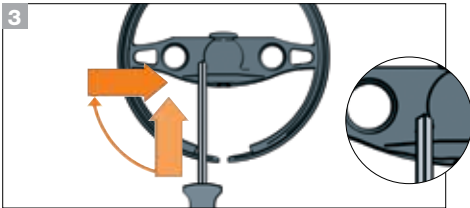
Disassembly | TRE.B



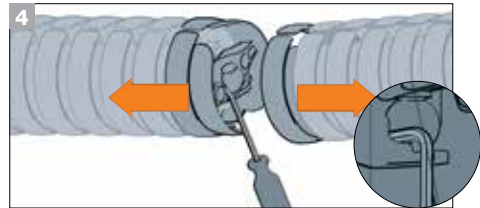
Introduce disassembly tool into the e-chain®.



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.

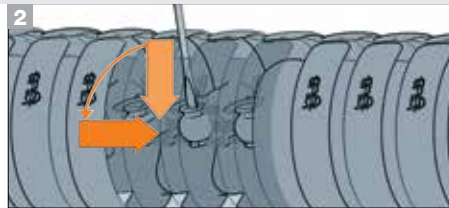
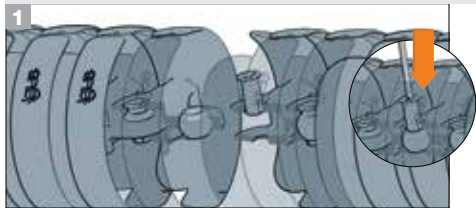


triflex® R TRE.C

Assembly instructions

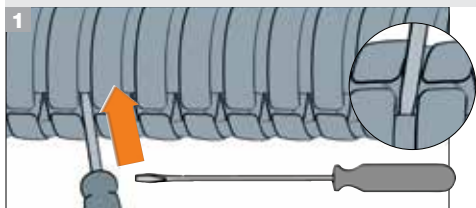


Assembly | TRE.100.C · TRE.125 · TRC.125



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

Disassembly | TRE.C



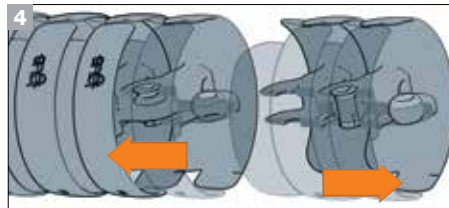
Insert slotted screwdriver into the e-chain® centrally through "easy" slot.



Unlatch bolt by rotating it 90°.



Push bolts through.



Simply slide the e-chain® links apart.

Filling | TRE.C



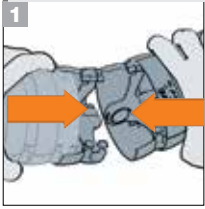
Very simple filling with "easy" design - simply push cables in ... and pull them out.

triflex® R TRCF

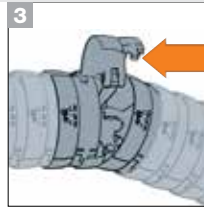
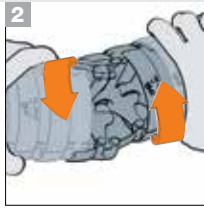
Assembly instructions



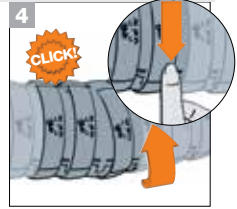
Assembly | TRCF



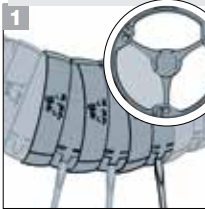
Attach e-chain® parts at an angle and push them together.



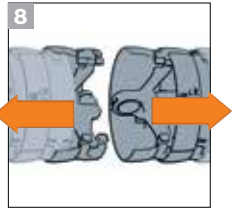
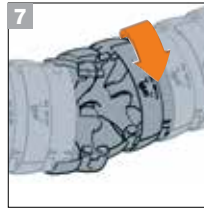
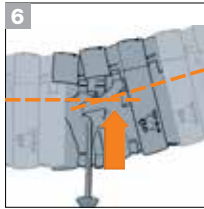
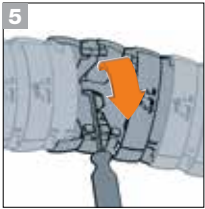
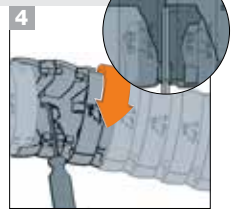
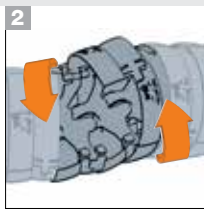
To close, simply snap the opened cover.



Disassembly | TRCF

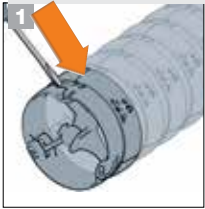


Using a screwdriver, unlatch the lid of three e-chain® links as marked. Open two lids by gently twisting the e-chain® links from each other. Introduce disassembly tool between ball and socket.

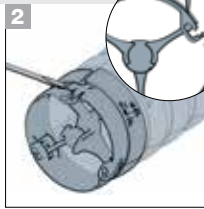


Then by turning the e-chain® links against the stop given by the disassembly tool - push the socket over the ball. Slightly bend the e-chain®, then turn and pull apart.

Opening | TRCF



Open the lid with a screwdriver.



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

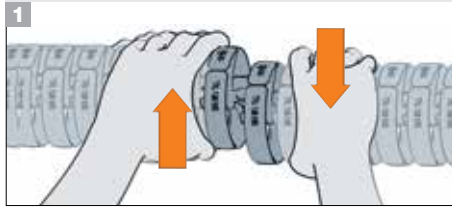


triflex[®] R TRL

Assembly instructions



Assembly | TRL

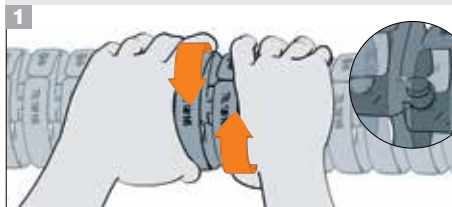


Attach ball with round side over socket.

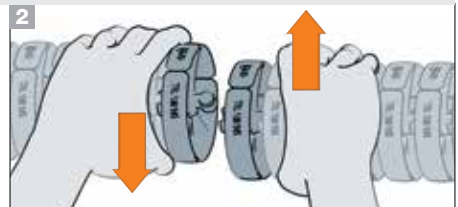


Press the ball into the socket ...

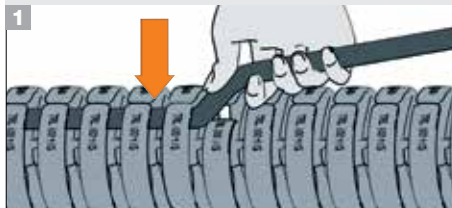
Disassembly | TRL



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.

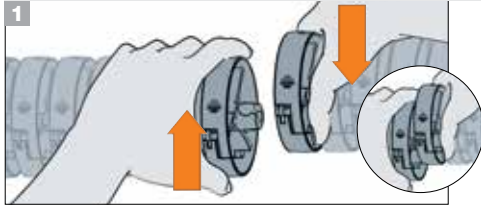


triflex[®] R TRLF

Assembly instructions



Assembly | TRLF

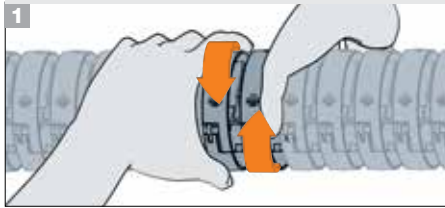


Attach ball with round side over socket.

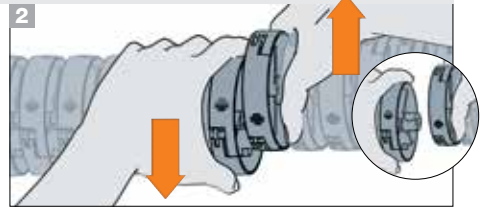


Press ball into the socket.

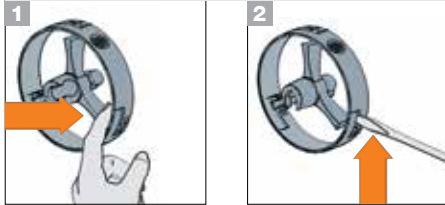
Disassembly | TRLF



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

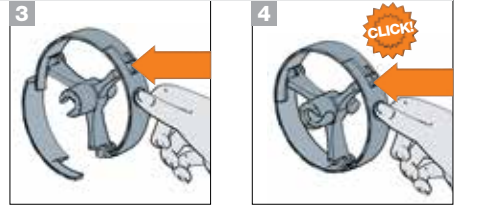


Opening operation | TRLF



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.

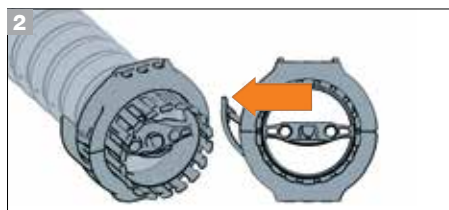
triflex® R Assembly

Assembly instructions mounting bracket & disassembly tool

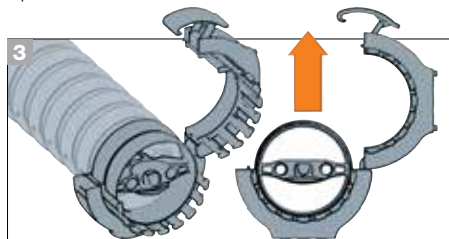
Opening | Standard-mounting brackets



Standard mounting brackets can be opened without tools.

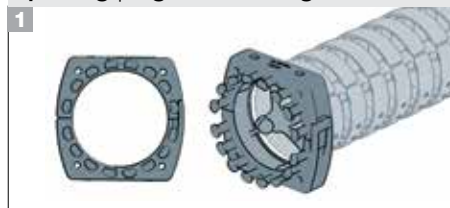


Open the side lever to unlock the bracket.

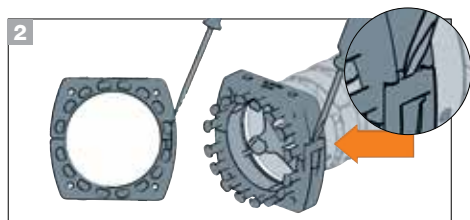


Flip open the mounting bracket and remove the e-chain®.

Opening | Light-mounting brackets



Light mounting brackets can be opened with a screwdriver.



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



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

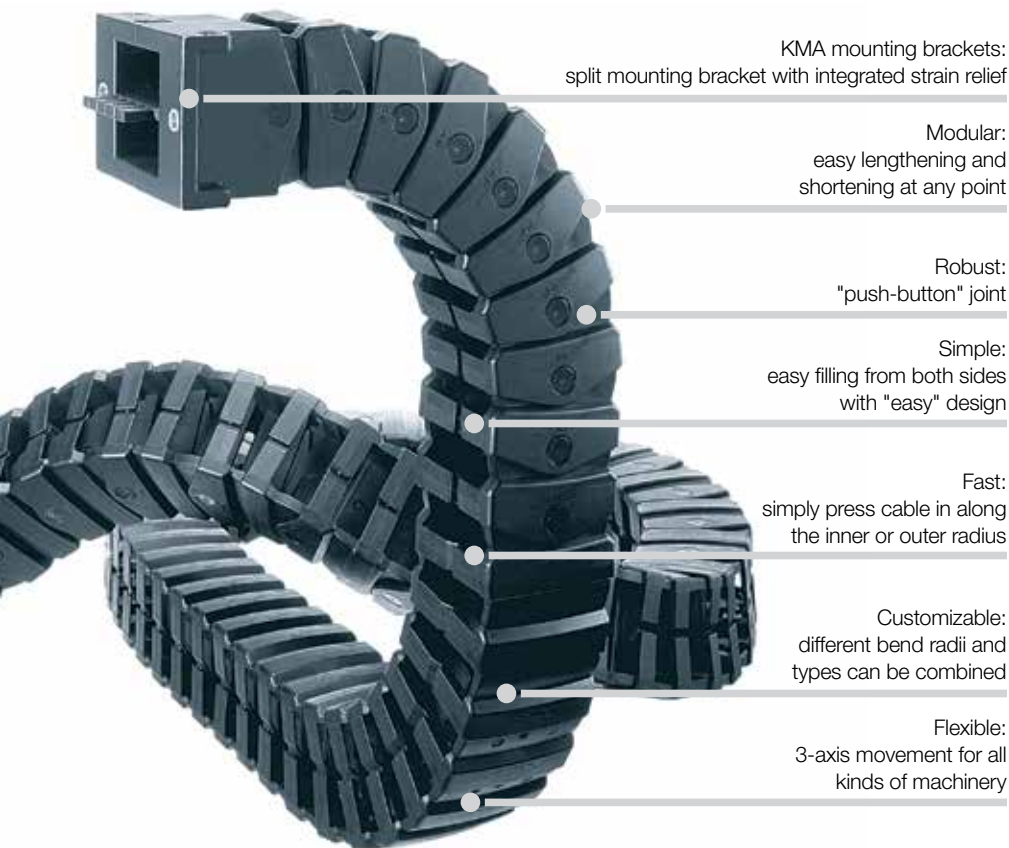
For series	Part No.
TRCF.B	Disassembly tool
TRCF.65	MAT0051135
TRCF.85	MAT0050170
TRCF.100	MAT0050172





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

Customizable:
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®.

 UL94-V2
classification

 **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.com/E332
E332.32	17	32	50	075 - 250	25	▶ www.igus.com/E332
E332.50	26	50	68	100 - 250	30	▶ www.igus.com/E332
E332.75	38.5	75	96	140 - 300	36	▶ www.igus.com/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.com/E332
E332.32	17	32	50	075 - 250	25	▶ www.igus.com/E332
E332.50	26	50	68	100 - 250	30	▶ www.igus.com/E332
E332.75	38.5	75	96	140 - 300	36	▶ www.igus.com/E332



Triple-axis movement - “easy” design with *RBR* (Reverse Bend Radius)

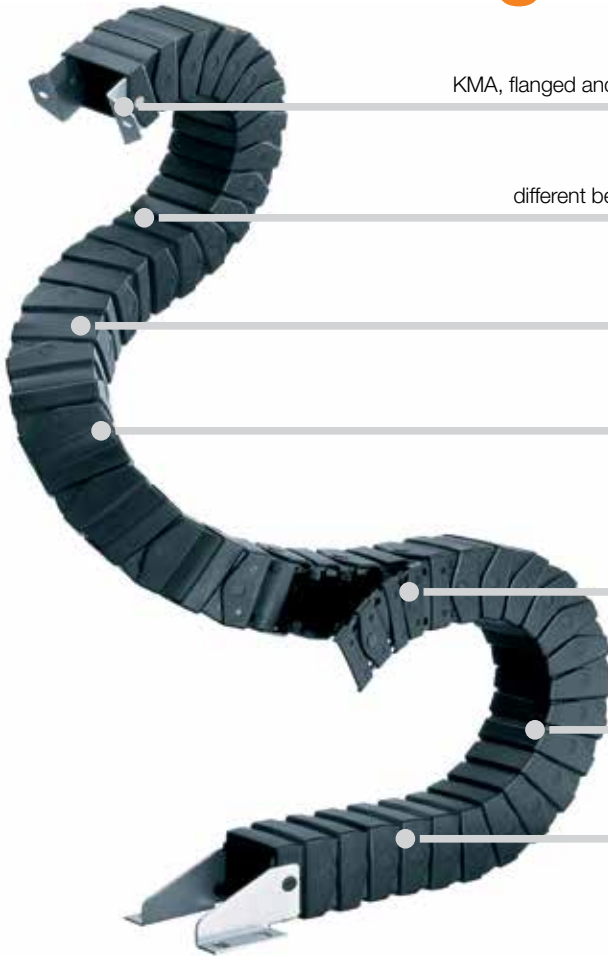
easy filling from both sides

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

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

 Available from stock.
Shipped from stock in as little as 24 hours.

triflex[®] advantages



Universal:
KMA, flanged and angled mounting brackets available

Customizable:
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[®].



iF product design award
1992 igus[®] Series triflex[®]

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.com/332
332.32	32	50	075 - 250	25	▶ www.igus.com/332
332.50	50	68	100 - 250	30	▶ www.igus.com/332
332.75	75	96	140 - 300	36	▶ www.igus.com/332
352.50*	50	68	100 - 250	30	▶ www.igus.com/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.com/332
332.32	32	50	075 - 250	25	▶ www.igus.com/332
332.50	50	68	100 - 250	30	▶ www.igus.com/332
332.75	75	96	140 - 300	36	▶ www.igus.com/332
352.50*	50	68	100 - 250	30	▶ www.igus.com/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.com/333
333.32	32	50	075 - 250	25	▶ www.igus.com/333
333.50	50	68	100 - 250	30	▶ www.igus.com/333
333.75	75	96	140 - 300	36	▶ www.igus.com/333
353.50*	50	68	100 - 250	30	▶ www.igus.com/353

*Series 352/353 openable



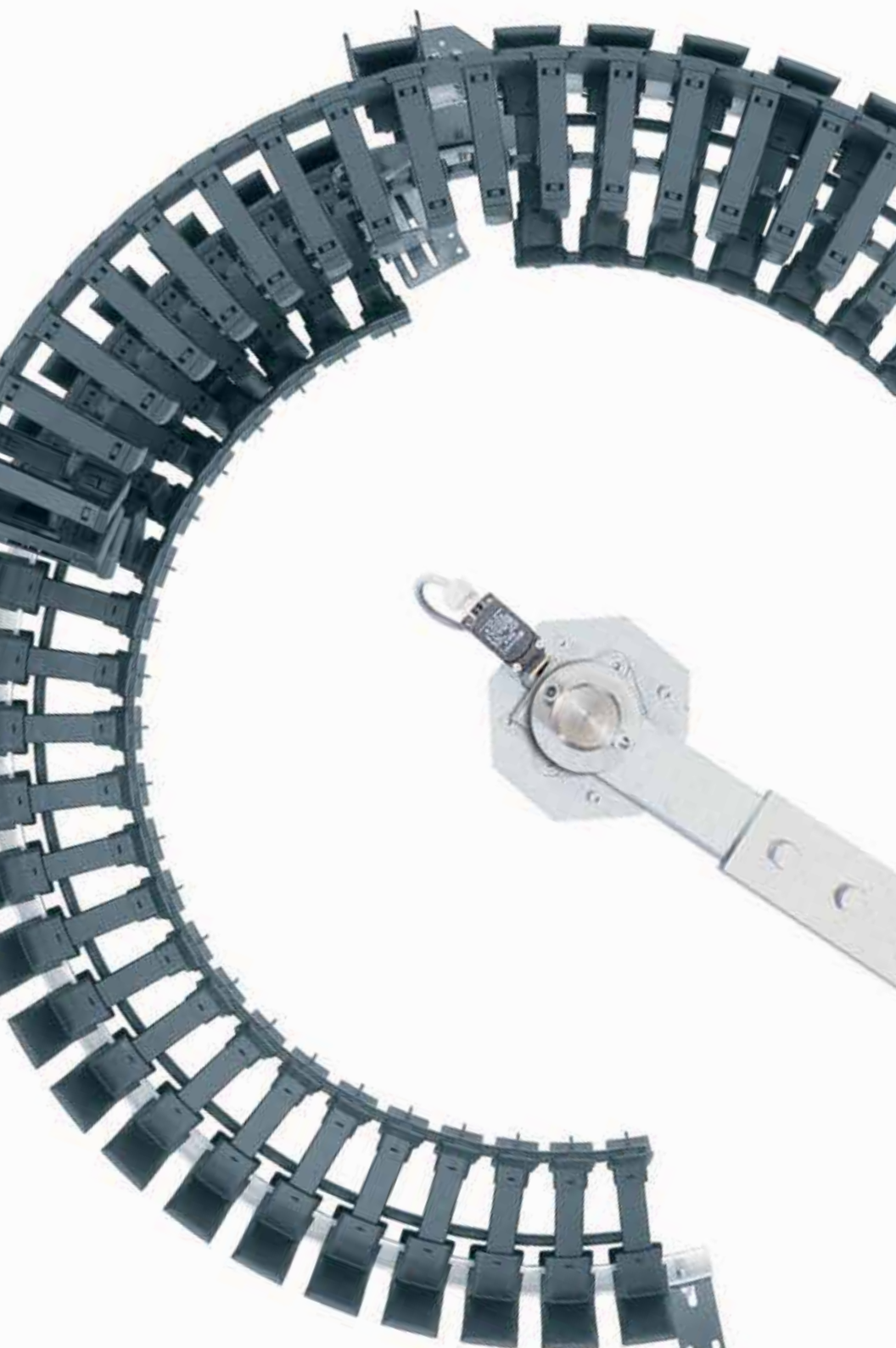
Complete product range with ordering options,

3D-CAD, configurators, PDF, applications ▶ www.igus.com/triflex



Available from stock.

Shipped from stock in as little as 24 hours.





e-chains[®] for circular & rotary movements

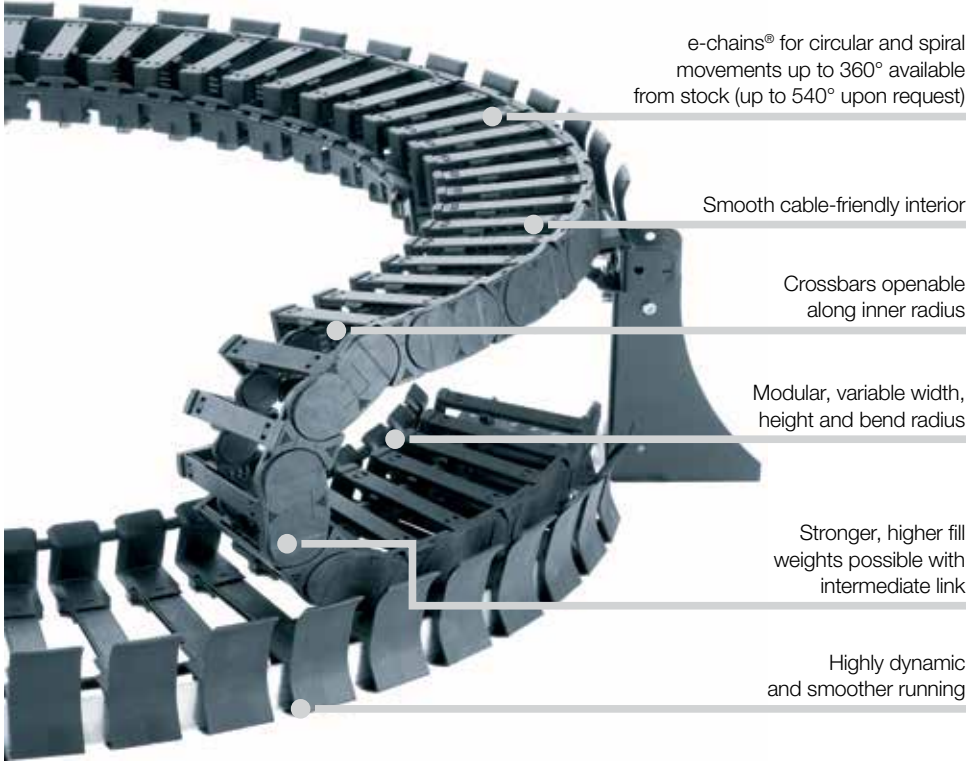
twisterchain[®]

twisterband

Circular movement with
standard e-chains[®]

(*RBR* Reverse Bend Radius)

twisterchain[®] advantages



e-chains[®] for circular and spiral movements up to 360° available from stock (up to 540° upon request)

Smooth cable-friendly interior

Crossbars openable along inner radius

Modular, variable width, height and bend radius

Stronger, higher fill weights possible with intermediate link

Highly dynamic and smoother running

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



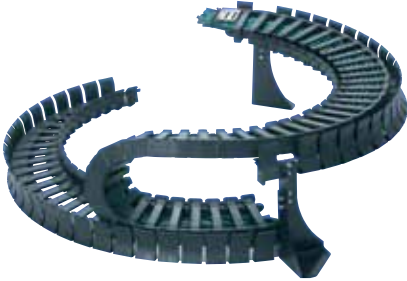
e-chains[®] for circular movements up to 360° available from stock (up to 540° upon request)



UL94-V0 classification upon request

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		100 - 250	400 - 600	118
TC42	42	87.5 - 200	110.5 - 223		100 - 250	400 - 850	120
TC56	56	125 - 200	155 - 230		150 - 400	650 - 850	122



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

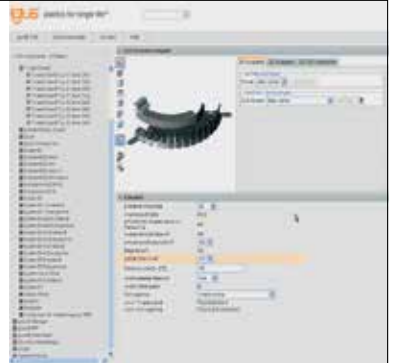


Available from stock.
Shipped from stock in as little as 24 hours.

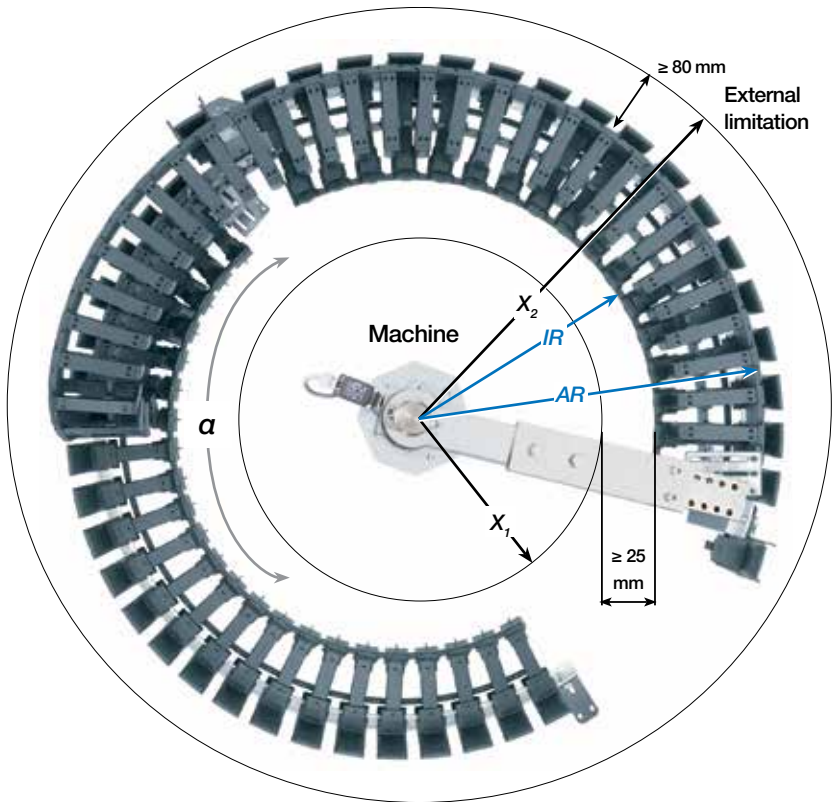
Quickly generate complete twisterchain® 3D CAD models

- 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.com/twister-configurator

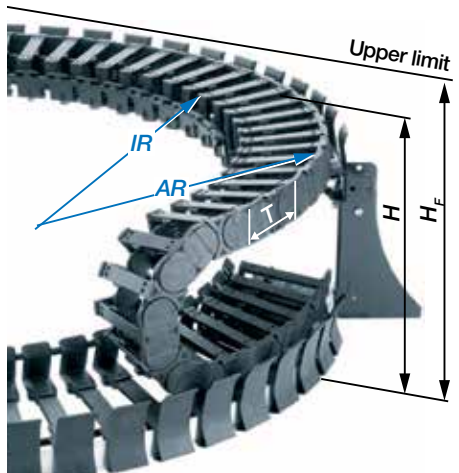
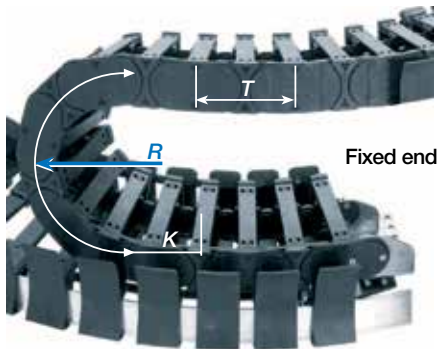


Technical data



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®

X₁ = Inner machine construction space
X₂ = 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 °F, igumid G	-40°F / +248°F
	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	TC56.12.250/650.0 = e-chain® openable along the inner radius, from both sides <i>Bi</i> 125 mm inner width, <i>R</i> 250 mm bend radius / <i>AR</i> 650 mm outer radius, colour black
	Series		
	Inner height		
	Width index (depends on <i>Bi</i>)		
	Bend radius <i>R</i>		
	Outer radius <i>AR</i>		
	Standard colour black		

twisterchain® TC32

32 mm inner height - product range

AR [mm]	Bi [mm]	Ba [mm]	X ₂ [mm]	X ₁ [mm]	R 100 [mm] TC32 ...	R 125 [mm] TC32 ...	R 150 [mm] TC32 ...	R 175 [mm] TC32 ...	R 200 [mm] TC32 ...	R 250 [mm] 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
H ⁺²⁰ ₀	254	304	354	404	454	554
K	465	550	620	700	780	940

Pitch [mm/link]	56
Links/m	18
corresponds to [mm]	1,008

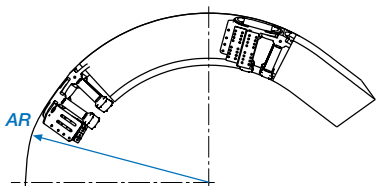


twisterchain® 2nd generation from igus® - successfully tested for over 1 million cycles in the igus® laboratory

Installation dimensions

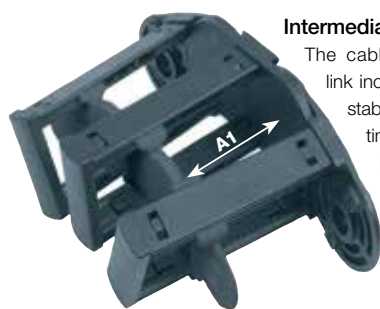
Dimension A1 depending on outer radius AR

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



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

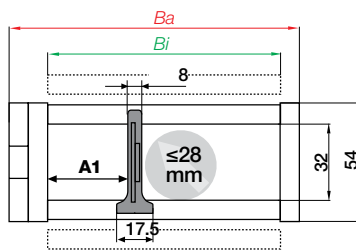
Dimension A1 always with tolerance of ± 2.5 mm



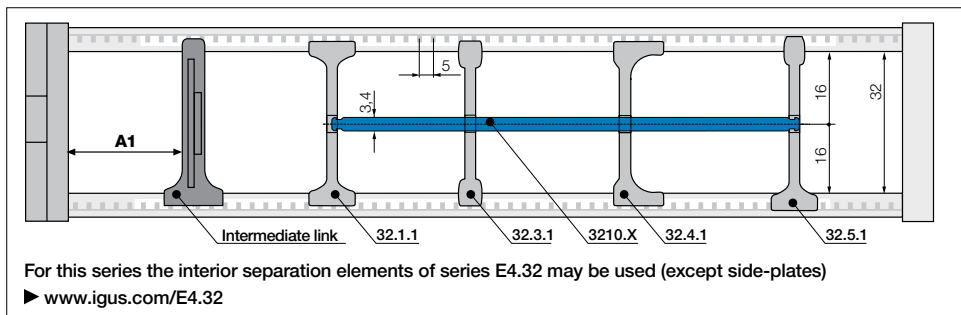
Intermediate link

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 TC32 | interior separation



For this series the interior separation elements of series E4.32 may be used (except side-plates)

► www.igus.com/E4.32

- 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® 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	-	-	187.150/650	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
H ⁻⁰ ₊₂₅	267	317	367	417	467	567
K	500	650	725	800	875	1,050

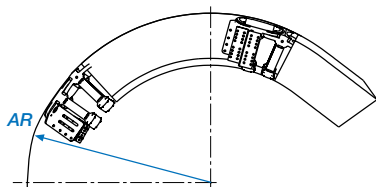
Pitch [mm/link]	67
Links/m	15
corresponds to [mm]	1,005

Installation dimensions

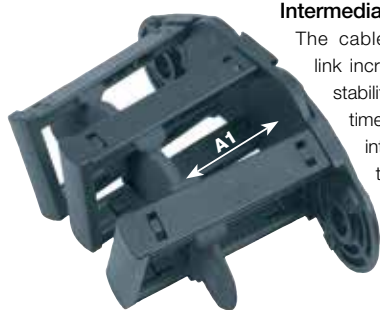
Dimension A1 depending on outer radius AR

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



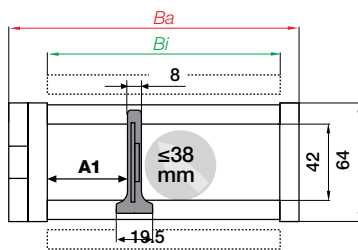
Note: outer radius *AR* (see drawing) determines dimension **A1**!



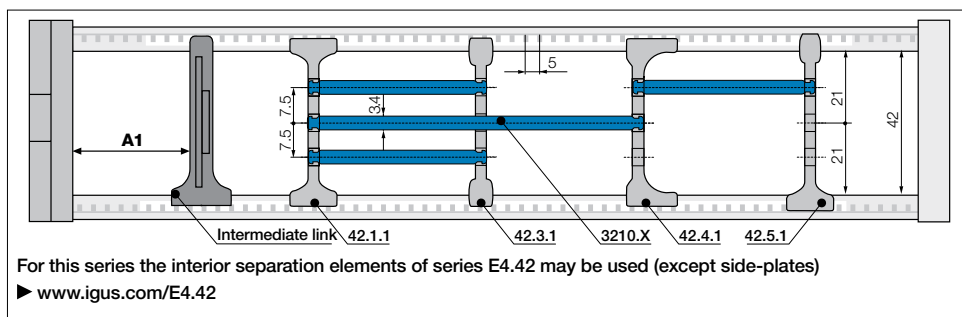
Intermediate link

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



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

- X_i* = Inner machine construction space
- X_e* = 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 [mm]	Bi [mm]	Ba [mm]	X ₂ [mm]	X ₁ [mm]	R 150 [mm] TC56 ...	R 200 [mm] TC56 ...	R 250 [mm] TC56 ...	R 300 [mm] TC56 ...	R 400 [mm] 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
H ⁻⁰ ₊₂₅	384	484	584	684	884
K	750	900	1,050	1,225	1,450

Pitch [mm/link]	91
Links/m	11
corresponds to [mm]	1,001

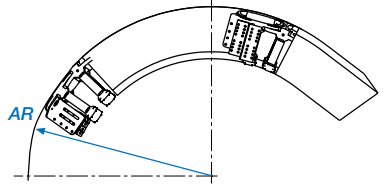
twisterchain® in a guide trough type O1 for rotary movement
on an articulated robot - long service life and robust:
tested successfully for more than 1,000,000 cycles



Installation dimensions

Dimension A1 depending on outer radius AR

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



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

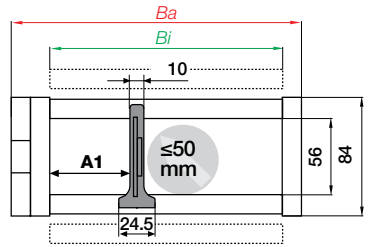
Dimension A1 always with tolerance of ± 2.5 mm

Intermediate link

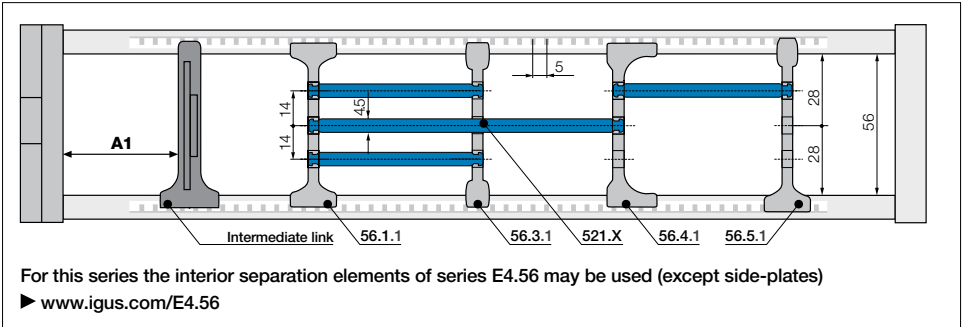
The cable-friendly intermediate link increases the strength and stability of twisterchain® many times over. It also serves as interior separation, dividing the filling space into two chambers. Outer radius *AR* determines dimension **A1**.



Dimensions



Series TC56 | interior separation



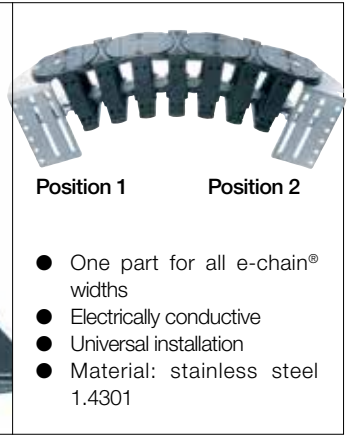
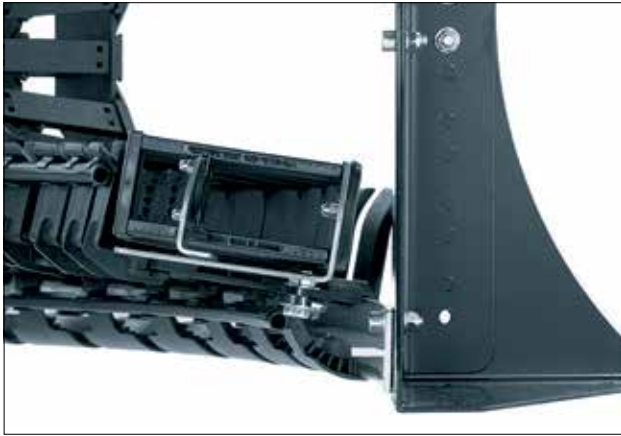
- i** *AR* = Outer radius of e-chain®
- IR* = Inner radius e-chain®
- R* = Bend radius e-chain®

- X_i = Inner machine construction space
- X_o = Outer machine construction space
- A1* = Intermediate link position

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

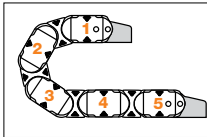
twisterchain® accessories

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



Note: twisterchain® e-chains® must always end with an outer side link. An outer side link should always be the first e-chain® link at the moving end. Please note when calculating!

TC3200.34.VS.E



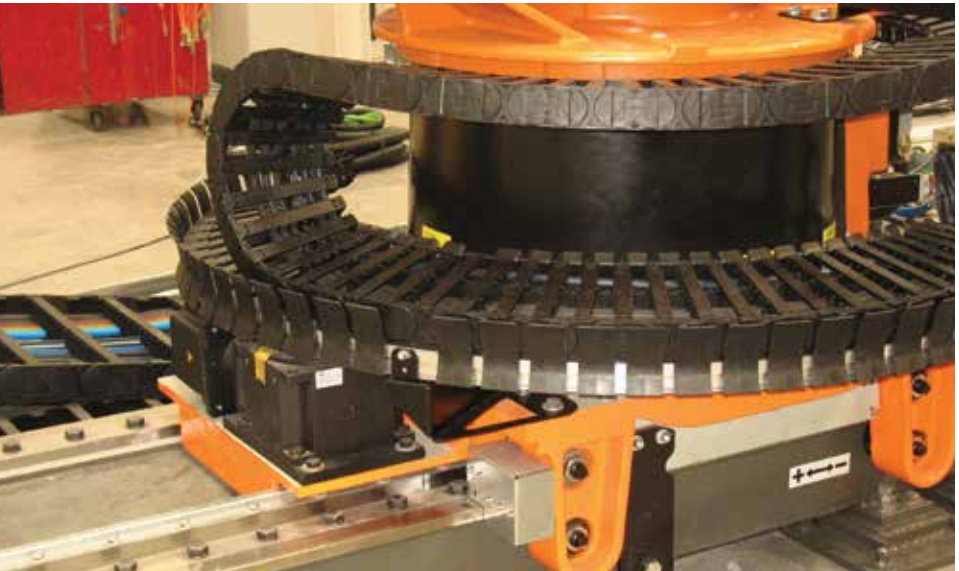
Order example

- Stainless steel (standard)
- Standard: bolted
- Full set
- Series

Applications



twisterchain® used on a cleaning robot

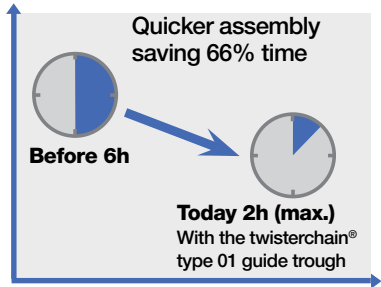
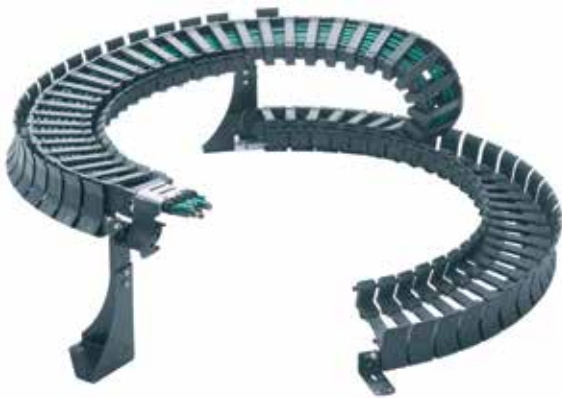


twisterchain® used on axis 1 of a robot

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.	Part No.	Part No.
		min.-max. α	complete trough	upper/lower run trough	lower run trough
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

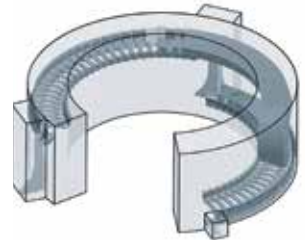
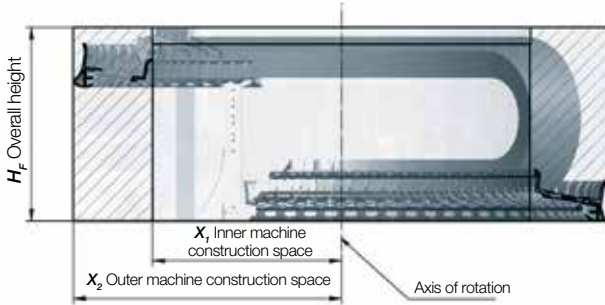
- R* - bend radius, please add required value
- Bi* - width index, please add required value
- Outer radius of e-chain®
- Angle of rotation of application (90°, 180°, 270°, 360°)
- Trough version
- Guide trough of selected series

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



Min. required construction space of igus® twisterchain® guide trough system

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]											
		87.5	100	108	125	137.5	150	162.5	168	175	187.5	200	
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

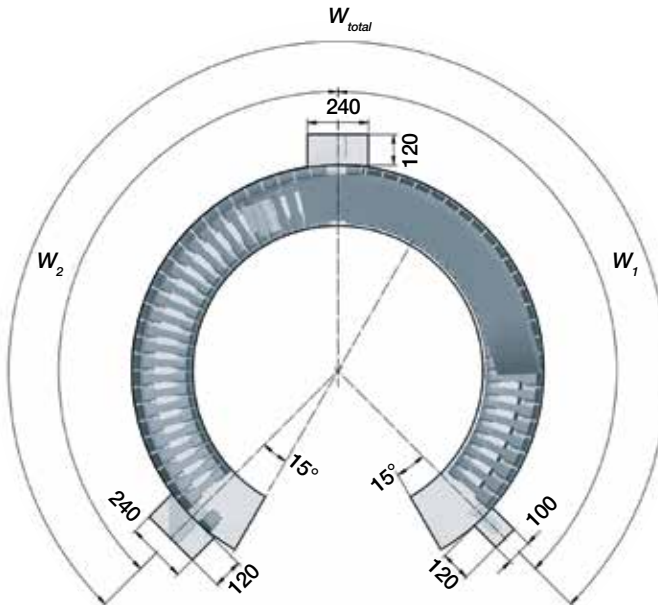
Angle of rotation for 360° | W_2 angle of upper run twisterchain[®] guide trough

Part No.	AR	R [mm]	100	125	150	175	200	250	300	400
series	[mm]		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°

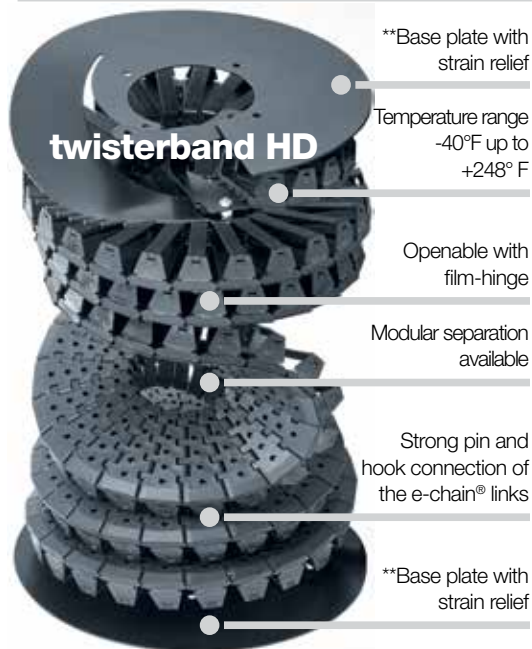


AR = Outer radius of e-chain[®]
 IR = Inner radius e-chain[®]
 R = Bend radius e-chain[®]

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

twisterband



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


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

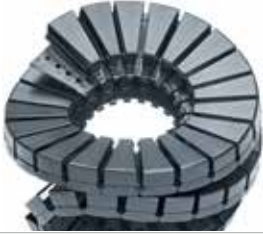
- Rotary movements up to 7000° (depending on installation orientation, vertical: up to 3,000°, horizontal: 7,000° and more possible)
- Rotary speeds up to 360°/s possible
- Available in 3 different versions: openable with film-hinge or openable "easy" design
- HD version with very strong pin and hook connection for an even longer service life as well as for temperatures below 32°F
- 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!



Selection table

Series	Inner height <i>hi</i> [mm]	Inner width <i>Bi</i> [mm]	$\varnothing X_1$ [mm]	$\varnothing X_2$ [mm]	$\geq R$ [mm]	$\leq R$ [mm]	$\leq d1$ 	Interior separation	igus® online
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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.com/twisterband
TB20.44.12	12	44	50	220	034	057	9	–	www.igus.com/twisterband
TB20.44.18	18	44	50	220	034	057	14	Yes	www.igus.com/twisterband
TB29.27.22	22	27	200	320	069	082	17	Yes	www.igus.com/twisterband
TB30.75.22	22	75	90	330	044	077	17	Yes	www.igus.com/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.com/twisterbandHD
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Other sizes available upon request. X_1 = inner machine construction space X_2 = outer machine construction space



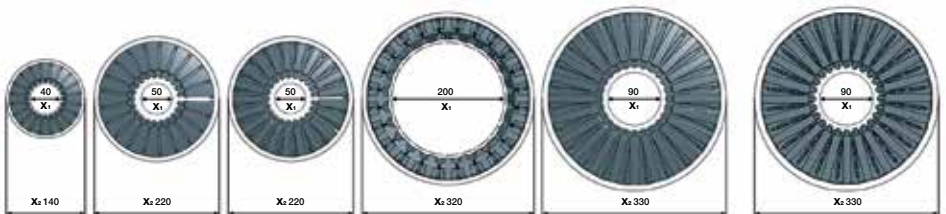
The complete range with ordering options,

3D-CAD, configurators, PDF, application examples ► www.igus.com/twisterband



Available from stock.

Shipped from stock in as little as 24 hours.



TB12.23.9.

TB20.44.12.

TB20.44.18.

TB29.27.22.

TB30.75.22.

TB30HD.75.22



Bi = Inner width e-chain®
hi = Inner height e-chain®

X_1 = Inner machine construction space
 X_2 = Outer machine construction space

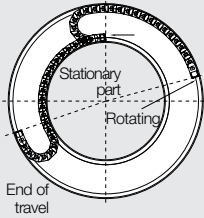
$\geq R$ = Min. bend radius e-chain®
 $\leq R$ = Max. bend radius e-chain®

d1 = Max. cable diameter
XX = Number of ribbons

Rotary motion *RBR*



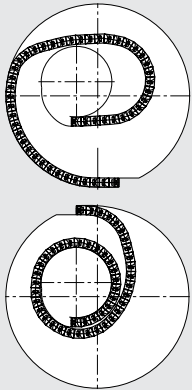
We recommend pivoting mounting brackets for most applications with rotary motion with *RBR*



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

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 developed 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.

Technical data - rotary motion *RBR*

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

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

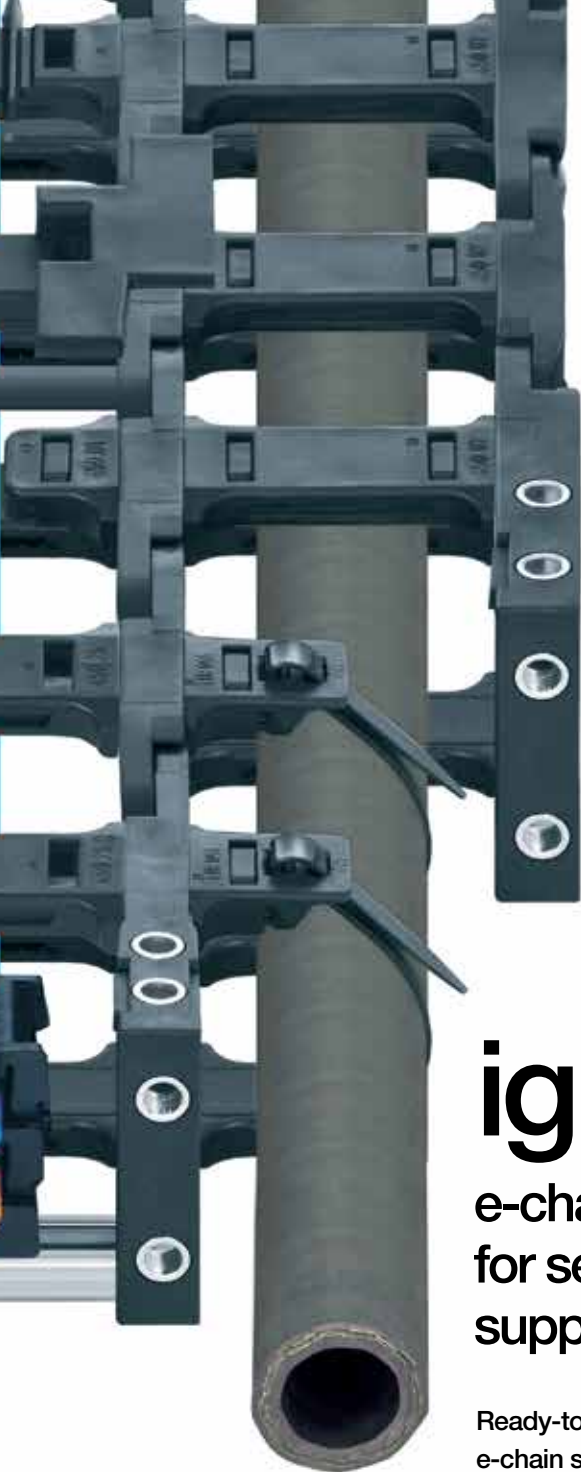
Table of **RBR** e-chains® available from stock

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.**
Shipped from stock in as little as 24 hours.



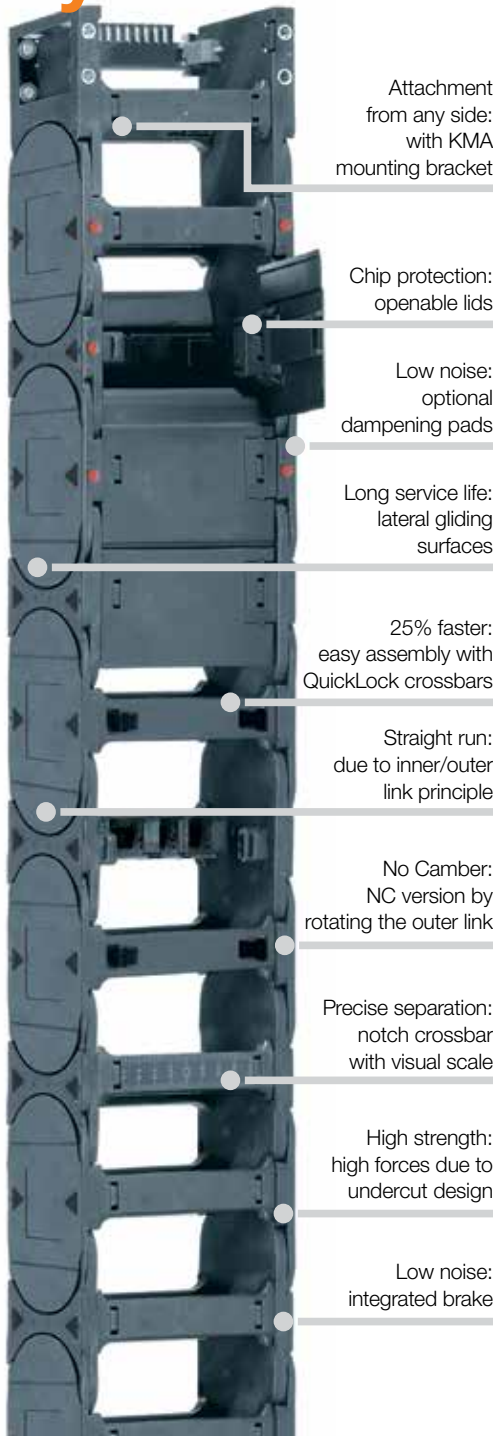


igus[®] E4.1

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

Ready-to-install assembled
e-chain systems[®] e.g. for axis 7 -
readychain[®] ► From page 188

System E4.1 advantages



Attachment from any side: with KMA mounting bracket

Chip protection: openable lids

Low noise: optional dampening pads

Long service life: lateral gliding surfaces

25% faster: easy assembly with QuickLock crossbars

Straight run: due to inner/outer link principle

No Camber: NC version by rotating the outer link

Precise separation: notch crossbar with visual scale

High strength: high forces due to undercut design

Low noise: integrated brake

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.com/E4.21
E4.28	28	40 - 300	60 - 320	42	055 - 250	2.50	► www.igus.com/E4.28
E4.32	32	50 - 400	73 - 423	54	063 - 300	3.30	► www.igus.com/E4.32
E4.42	42	50 - 400	76 - 426	64	075 - 350	4.00	► www.igus.com/E4.42
E4.56	56	50 - 600	84 - 634	84	135 - 500	5.00	► www.igus.com/E4.56
E4.80	80	50 - 600	100 - 650	108	150 - 1.000	6.20	► www.igus.com/E4.80
E4.112	112	50 - 600	102 - 652	140	200 - 1.000	6.50	► www.igus.com/E4.112
E4.162	162	200 - 600	256 - 656	195	250 - 1.000	6.75	► www.igus.com/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.com/H4.32
H4.42	42	50 - 400	76 - 426	64	075 - 350	4.00	► www.igus.com/H4.42
H4.56	56	50 - 600	84 - 634	84	135 - 500	5.00	► www.igus.com/H4.56
H4.80	80	50 - 600	100 - 650	108	150 - 1.000	6.20	► www.igus.com/H4.80



e-tubes

fully enclosed,
excellent cable protection

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



The complete range with ordering options,

3D-CAD, configurators, PDF, application examples ► www.igus.com/E4.1



Available from stock.

Shipped from stock in as little as 24 hours.

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



Special e-chain® link contour provides low rolling noise

Optional noise dampening pads

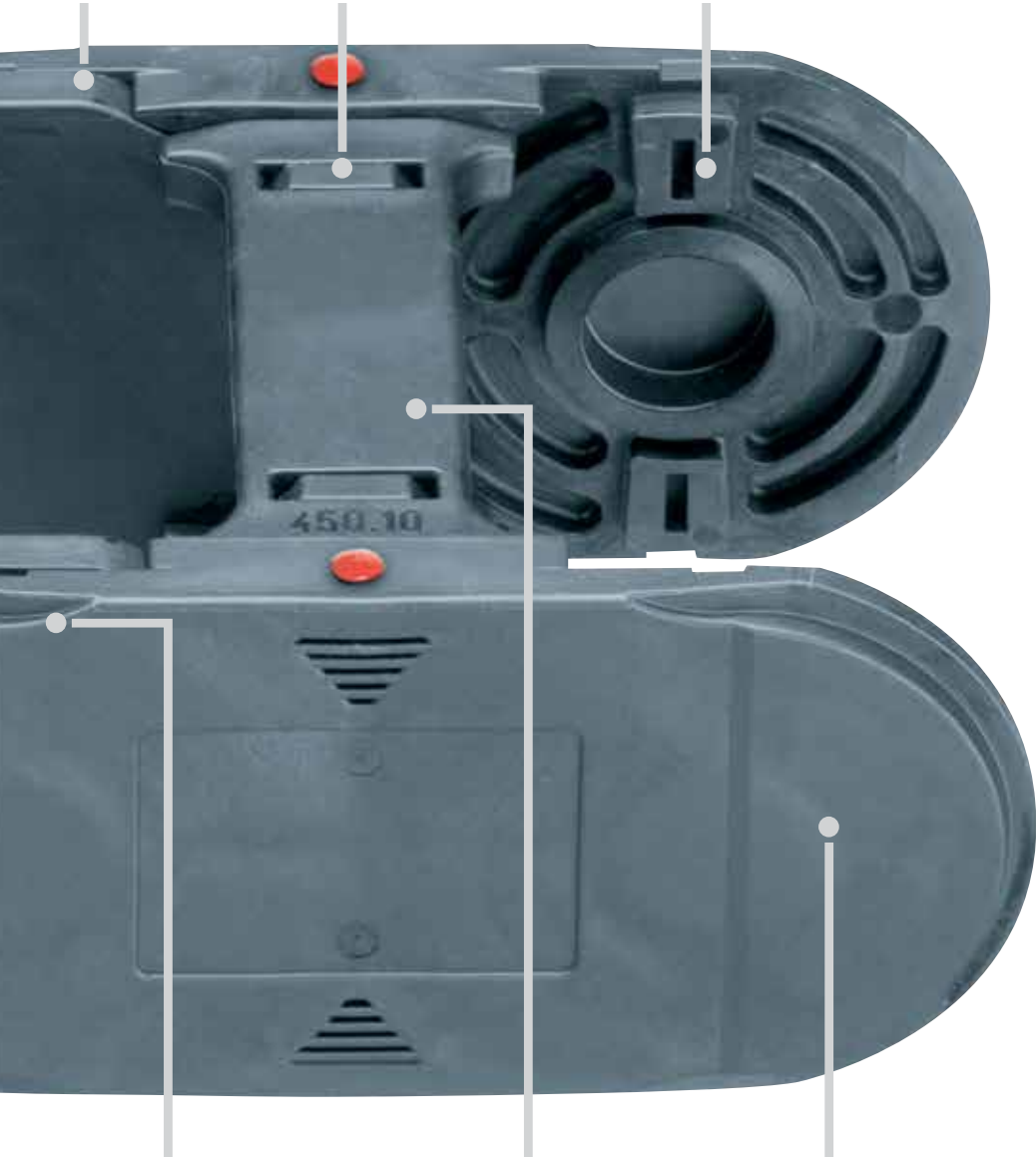
Straight run and fast assembly due to inner/outer-link design

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



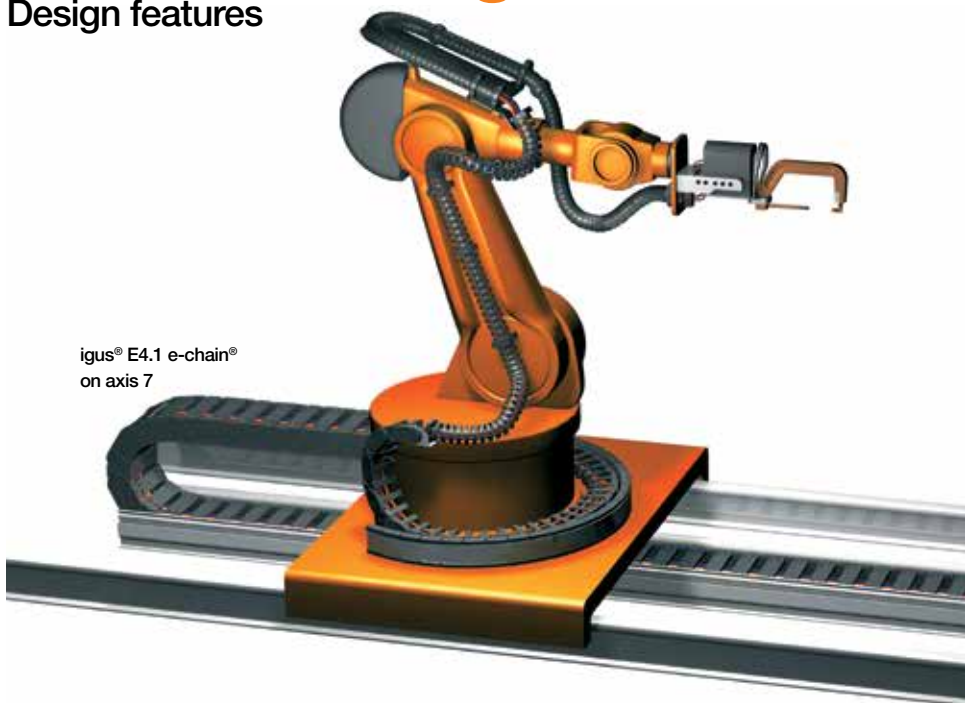
Very high stability due to
the undercut design

Cable-friendly,
rounded crossbar

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

E4.1 advantages

Design features



iglus® 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 optimized 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.

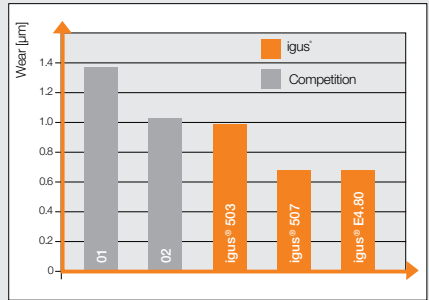


Plastic openable crossbars offer long service life

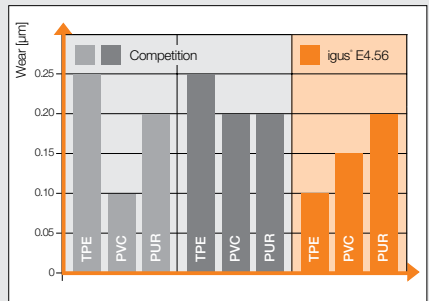
igus® laboratory tests have shown that the lowest cable abrasion occurs on e-chains® with plastic crossbars that also have a cable-friendly, rounded design. The holding force is equally impressive. The igus® test lab conducted tensile force tests on openable crossbars made from various materials. igus®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



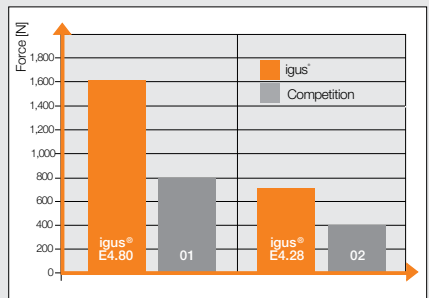
Optimized, rounded igus® separators and cable-friendly plastic crossbars increase service life of cables



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



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



Retention force comparison between plastic and aluminum 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 [°F]	Approvals and standards	Oil-resistant	Torsion resistant	v max. twisted [°/s]	a max. twisted [°/s²]	Page
Control cables, twistable										
CF77.UL.D	PUR		6.8	-13/ +176		✓	✓	180	60	150
CFROBOT2	PUR	✓	10	-13/ +176		✓	✓	180	60	154
Data cable, twistable										
CFROBOT3	PUR	✓	10	-13/ +176		✓	✓	180	60	156
Measuring system cable, twistable										
CFROBOT4	PUR	✓	10	-13/ +176		✓	✓	180	60	158
Fibre Optic Cable, twistable										
CFROBOT5	TPE		10	-31/ +176		✓	✓	180	60	162
Motor cables, twistable										
CFROBOT6	PUR		10	-13/ +176		✓	✓	180	60	164
CFROBOT7	PUR	✓	10	-13/ +176		✓	✓	180	60	166
CFROBOT	TPE	✓	10	-31/ +194		✓	✓	180	60	170
Bus cable, twistable										
CFROBOT8	PUR	✓	10	-13/ +158		✓	✓	180	60	172
Hybrid cable, twistable										
CFROBOT9	PUR	✓	10	-13/ +176		✓	✓	180	60	176



Available from stock.

Shipped from stock in as little as 24 hours.



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.com/chainflexlife

chainflex®

lasts - or your money back!

From a customer's point of view, an energy supply system just has to function properly for it to be operational. However, achieving this requires all components, including cables, to be incredibly reliable. In the 1980s, huge increases of loads in automation technology resulted in frequent cable failure, in otherwise functional energy supply systems. In certain extreme cases, cable corkscrewing and core ruptures brought production lines to a standstill, resulting in lost profits coupled with high repair/replacement costs.

To resolve this problematic and expensive customer issue, igus® developed complete energy supply systems, including e-chain® cable carriers and chainflex® continuous flex cables. For over 25 years, igus® has continuously tested and developed these products to prevent machine downtimes in factories around the world.

7 rules for a good cable:

1. Strain-relieving center element

The center core should be filled with a high-quality, high tensile strength center element to protect conductors from falling into the center of the cable.

2. Conductor structure

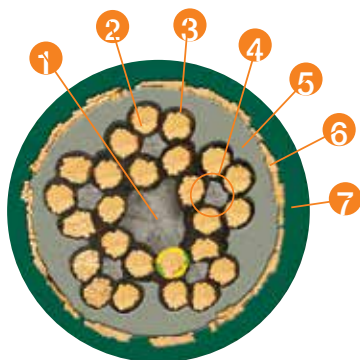
The copper stranding in chainflex® continuous-flex cables is chosen in accordance with tested and proven designs. The test results from the igus® lab indicate that a medium to fine conductor strand diameter is preferable. Many competitive cable manufacturers will employ an extra-fine conductor strand, which has the tendency to kink when subjected to a high number of cycles. Using findings from long-term cable testing, igus® uses a combination of conductor strand diameter, pitch-length, and pitch direction to achieve the best service life and performance, even in the most demanding applications.

3. Conductor insulation

Insulation materials within the cable must be resistant to adhering to one another. The insulation must also support the stranded individual wires of the conductor. Only the highest quality high-pressure extruded PVC or TPE materials should be used.



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



4. Cable core

Individual conductors are bundled into groups, which are cabled together in a single layer surrounding the cable core. This design enables pulling and compressing forces of the bending motion to balance and cancel out torsional forces. Special attention is given to pitch length and direction. The cable's inner jacket will also help to maintain the integrity of the cable core and provide a continuous surface for the shield.

5. Inner jacket

A pressure extruded inner jacket should be used for cables subjected to continuous-flexing, as opposed to inexpensive fleece wrap or filler. This extruded inner jacket both ensures that the insulated conductors are efficiently guided, as well as maintaining the integrity of the cable core and providing a continuous surface for the overall shield.

6. Shield design

A high-quality braided shield provides electromagnetic interference (EMI) protection for the cable. An optimized braid angle prevents the shield strands from breaking over the linear axis and increases torsional stability. The shield has an optical coverage of approximately 90%, providing maximum shield effectiveness.

7. Outer jacket

The outer jacket material must be resistant to UV radiation, abrasion, oils, and chemicals, as well as being cost-effective. However, the outer jacket of a cable for dynamic applications must be resistant to abrasion, and remain flexible while providing support. For best wear rates and service life, the outer jacket should be extruded under pressure.

Order your chainflex® catalog for free!

► www.igus.com/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 used in linear e-chain® systems.

Stranded conductors, 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-optimized 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 optimized 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-optimized cores from possible damage.

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

Unlike cables for linear e-chain systems®, 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 e-chain® over a distance of one meter with a torsion of +/- 180° at least 5 million times.



Torsion tested

igus® conducts a torsion test carried out with a 2,500 mm e-chain® at 270° torsion handling 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
- Fiber Optic Cables
- Motor and Servo cables
- Bus cables
- Hybrid cables

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



chainflex[®] guarantee

Guaranteed service life⁽¹⁾

chainflex [®] cable	Temperature, from/to [°F]	v max. [°/s]		a max. [°/s ²]	
		Twisted		Twisted	
Twistable cables					
Control cables, twistable					
 CF77.UL.D	-13 / +5 +5 / +158 +158 / +176	180		60	
 CFROBOT2	-25 / +5 +5 / +158 +158 / +176	180		60	
Data cable, twistable					
 CFROBOT3	-13 / +5 +5 / +158 +158 / +176	180		60	
Measuring system cable, twistable					
 CFROBOT4	-13 / +5 +5 / +158 +158 / +176	180		60	
Fiber Optic Cable, twistable					
 CFROBOT5	-13 / +5 +5 / +158 +158 / +176	180		60	
Motor cables, twistable					
 CFROBOT6	-13 / +5 +5 / +158 +158 / +176	180		60	
 CFROBOT7	-13 / +5 +5 / +158 +158 / +176	180		60	
 CFROBOT	-31 / -13 -13 / +158 +158 / +194	180		60	
Bus cable, twistable					
 CFROBOT8	-13 / +5 +5 / +140 +140 / +158	180		60	
Hybrid cable, twistable					
 CFROBOT9	-13 / +5 +5 / +158 +158 / +176	180		60	

chainflex[®] guarantee

Guaranteed service life⁽¹⁾

Bend radius min. [factor x d]		Bend radius min. [factor x d]		Bend radius min. [factor x d]		Page
5 million cycles *		7.5 million cycles *		10 million cycles *		
±150		±90		±30		150
±180		±120		±60		
±150		±90		±30		
±150		±90		±30		154
±180		±120		±60		
±150		±90		±30		
±150		±90		±30		156
±180		±120		±60		
±150		±90		±30		
±150		±90		±30		158
±180		±120		±60		
±150		±90		±30		
±150		±90		±30		162
±180		±120		±60		
±150		±90		±30		
±150		±90		±30		164
±180		±120		±60		
±150		±90		±30		
±150		±90		±30		166
±180		±120		±60		
±150		±90		±30		
±150		±90		±30		170
±180		±120		±60		
±150		±90		±30		
±150		±90		±30		172
±180		±120		±60		
±150		±90		±30		
±150		±90		±30		176
±180		±120		±60		
±150		±90		±30		







* Higher number of cycles? Calculate service life online: ► www.igus.com/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 flexible fixed	min. 6.8 x d min. 5 x d min. 4 x d
	Temperature	e-chain® twisted flexible fixed	-13°F to +176°F (-25°C to +80°C) -40°F to +176°F (-40°C to +80°C) -58°F to +176°F (-50°C to +80°C)
	v max.	twisted	180 °/s
	a max.	twisted	60 °/s ²
	Travel distance	Especially for robots and movements in the 3D range.	
	Torsion	± 180°, with 3.28 ft (1 m) cable length	

Cable structure

	Conductors	Conductor consisting of bare copper wires (according to EN 60228)
	Core insulation	Mechanically high-quality TPE mixture.
	Core structure	Number of conductors < 12: Conductors cabled in a layer with short pitch length. Number of conductors ≥ 12: Conductors combined in bundles and cabled together around a high tensile strength core, using short pitch lengths and specific pitch directions for low-torsion cable structure.
	Color code	24-22 AWG: Color code in accordance with DIN 47100 20-6 AWG: Black cores with white numbers, one conductor green-yellow. CF77-UL-03-04-INI: brown, blue, black, white
	Outer jacket	Low-adhesion, highly abrasion resistant mixture on the basis of PUR, adapted to suit the requirements in e-chains® (following DIN VDE 0282 Part 10)). Color: Window gray (similar to RAL 7040) CF77-UL-03-04-INI: Color: Colza yellow (similar to RAL 1021)

Electrical information



	Nominal voltage	24-22 AWG: 300V 20-6 AWG: 1000 V
	Testing voltage	2000 V (following DIN EN 50396)

Image exemplary

igus® chainflex® CF77.UL.D

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 EN 50267-2-1
	UL/CSA	24-22 AWG: Style 10493 and 20233, 300 V, 80 °C 20-6 AWG: Style 11323 and 21223, 1000 V, 80 °C
	NFPA 79	Complies to NFPA 79-2015, chapter 12.9
	DNV-GL	Certified according to GL type testing – Certificate No. 61 935-14 HH
	EAC	Certified according to No. TC RU C-DE.ME77.B.01254
	CTP	Certified according to No. C-DE.PB49.B.00416
	CEI	Following CEI 20-35
	Lead free	Following 2011/65/EC (RoHS-II)
	Clean room	According to ISO Class 1. Outer jacket material complies with CF77-UL-05-12-D, tested by IPA according to standard 14644-1
	DESINA	According to VDW, DESINA standardization
	CE	Following 2014/35/EU

Guaranteed as the service life

Cycles *		5 million		7.5 million	10 million
Temperature, from/to [°F]	v max. [°/s] twisted	a max. [°/s] twisted	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]
-13/+5			±150	±90	±30
+5/+158	180	60	±180	±120	±60
+158/+176			±150	±90	±30

* Higher number of cycles possible - please ask for your individual calculation

Typical application areas

- For heavy duty applications with torsion movements
- Almost unlimited resistance to oil
- Indoor and outdoor applications with average sun radiation
- Especially for robots and movements in the 3D area
- Robots, handling, spindle drives



chainflex® CF77-UL-D

PUR control cable, twistable

igus® chainflex® CF77.UL.D

Image exemplary

Part No.	AWG	Number of Conductors and rated cross section [mm ²]	Outer diameter max.		Copper index		Weight	
			in.	mm	lbs/mft	kg/km	lbs/mft	kg/km
CF77-UL-02-04-D	24	4 x 0.25	0.22	5.5	7.4	11	23.5	35
CF77-UL-03-04-INI	22	4 x 0.34	0.24	6.0	11.4	17	26.9	40
CF77-UL-05-04-D	20	4 G 0.5	0.24	6.0	14.8	22	29.6	44
CF77-UL-05-05-D	20	5 G 0.5	0.26	6.5	18.8	28	34.9	52
CF77-UL-05-07-D	20	7 G 0.5	0.30	7.5	27.6	41	53.8	80
CF77-UL-05-12-D	20	12 G 0.5	0.39	10.0	44.3	66	88.7	132
CF77-UL-05-18-D	20	18 G 0.5	0.47	12.0	66.5	99	123.6	184
CF77-UL-05-25-D	20	25 G 0.5	0.55	14.0	92.7	138	166.0	247
CF77-UL-05-30-D	20	30 G 0.5	0.59	15.0	110.9	165	218.4	325
CF77-UL-07-03-D	18	3 G 0.75	0.26	6.5	16.1	24	37.0	55
CF77-UL-07-04-D	18	4 G 0.75	0.28	7.0	21.5	32	43.0	64
CF77-UL-07-05-D	18	5 G 0.75	0.30	7.5	26.9	40	50.4	75
CF77-UL-07-07-D	18	7 G 0.75	0.33	8.5	37.6	56	71.2	106
CF77-UL-07-12-D	18	12 G 0.75	0.47	12.0	64.5	96	129.0	192
CF77-UL-07-18-D	18	18 G 0.75	0.53	13.5	96.1	143	174.7	260
CF77-UL-07-20-D	18	20 G 0.75	0.57	14.5	106.8	159	196.2	292
CF77-UL-07-25-D	18	25 G 0.75	0.63	16.0	133.0	198	247.3	368
CF77-UL-07-36-D	18	36 G 0.75	0.75	19.0	199.6	297	352.1	524
CF77-UL-07-42-D ¹⁾	18	42 G 0.75	0.83	21.0	245.3	365	405.9	604
CF77-UL-10-02-D	17	2 G 1.0	0.26	6.5	14.8	22	36.3	54
CF77-UL-10-03-D	17	3 G 1.0	0.26	6.5	21.5	32	43.7	65
CF77-UL-10-04-D	17	4 G 1.0	0.28	7.0	28.9	43	53.1	79
CF77-UL-10-05-D	17	5 G 1.0	0.31	8.0	35.6	53	65.2	97
CF77-UL-10-07-D	17	7 G 1.0	0.35	9.0	49.7	74	80.0	119
CF77-UL-10-12-D	17	12 G 1.0	0.49	12.5	85.3	127	157.2	234
CF77-UL-10-18-D	17	18 G 1.0	0.59	15.0	128.3	191	227.8	339
CF77-UL-10-25-D	17	25 G 1.0	0.69	17.5	177.4	264	303.7	452
CF77-UL-10-42-D	17	42 G 1.0	0.89	22.5	310.4	462	475.8	708
CF77-UL-15-03-D	16	3 G 1.5	0.30	7.5	32.3	48	57.8	86
CF77-UL-15-04-D	16	4 G 1.5	0.31	8.0	43.0	64	70.6	105
CF77-UL-15-05-D	16	5 G 1.5	0.33	8.5	53.8	80	84.0	125
CF77-UL-15-07-D ¹⁾	16	7 G 1.5	0.41	10.5	74.6	111	116.9	174
CF77-UL-15-12-D	16	12 G 1.5	0.55	14.0	128.3	191	207.0	308

¹⁾ Delivery time upon request

Note: The mentioned outer diameters are maximum values.

G = with green-yellow earth core x = without earth core

¹⁾ Using the cables with "7 G 1.5 mm²" and "7 G 2.5 mm²" it is essential: Bend radius $\geq 17.5 \times d$ with travel distance ≥ 5 m.

When the travel distance is not less than 5 m, a bend radius not less than $17.5 \times d$ 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

Product range



Part No.	AWG	Number of Conductors and rated cross section [mm ²]	Outer diameter max.		Copper index		Weight	
			in.	mm	lbs/mft	kg/km	lbs/mft	kg/km
CF77-UL-15-18-D	16	18 G 1.5	0.67	17.0	192.2	286	320.5	477
CF77-UL-15-25-D	16	25 G 1.5	0.77	19.5	266.1	396	423.3	630
CF77-UL-15-36-D ¹⁾	16	36 G 1.5	0.93	23.5	399.1	594	598.7	891
CF77-UL-15-42-D ¹⁾	16	42 G 1.5	1.04	26.5	489.9	729	698.8	1040
CF77-UL-25-03-D	14	3 G 2.5	0.33	8.5	53.8	80	83.3	124
CF77-UL-25-04-D	14	4 G 2.5	0.37	9.5	71.2	106	104.2	155
CF77-UL-25-05-D	14	5 G 2.5	0.41	10.5	88.7	132	129.0	192
CF77-UL-25-07-D ¹⁷⁾	14	7 G 2.5	0.49	12.5	124.3	185	181.4	270
CF77-UL-25-12-D	14	12 G 2.5	0.69	17.5	213.0	317	356.1	530
CF77-UL-40-04-D	12	4 G 4.0	0.45	11.5	118.3	176	172.0	256
CF77-UL-40-05-D	12	5 G 4.0	0.47	12.0	142.5	212	202.9	302
CF77-UL-60-05-D	10	5 G 6.0	0.55	14.0	213.0	317	287.6	428
CF77-UL-100-05-D	8	5 G 10.0	0.75	19.0	354.8	528	486.5	724
CF77-UL-160-05-D	6	5 G 16.0	0.89	22.5	567.8	845	737.8	1098


¹⁾ Delivery time upon request

¹⁷⁾ Using the cables with "7 G 1.5 mm²" and "7 G 2.5 mm²" it is essential: bending radius 17 x d with travel distance ≥ 5 m.

When the travel distance is not less than 5 m, a bending radius not less than 17 x d has to be used.

Note: The mentioned outer diameters are maximum values.

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.com/CF77-UL-D

 Available from stock.
Shipped from stock in as little as 24 hours









chainflex® CFROBOT2






PUR control cable, twistable

- For torsion applications
- 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	-13°F to +176°F (-25°C to +80°C)
		flexible	-40°F to +176°F (-40°C to +80°C)
		fixed	-58°F to +176°F (-50°C to +80°C)
	v max.	twisted	180 °/s
	a max.	twisted	60 °/s ²
	Travel distance	Especially for robots and movements in the 3D range, Class 7	
	Torsion	± 180°, with 3.28 ft. (1 m) cable length	

Cable structure

	Conductors	Conductor consisting of bare copper wires (according to EN 60228).
	Core insulation	Mechanically high-quality TPE mixture.
	Core identification	Black with white numbers, one conductor green-yellow.
	Element shield	Extremely torsion-resistant tinned braided copper shield. Coverage approx. 85% optical.
	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 VDE 0282 Part 10). Color: Dark blue (similar to RAL 5011)

Electrical information












	Nominal voltage	300V
	Testing voltage	2000 V (following DIN EN 50396)

Properties and approvals

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

Image exemplary

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)
	Halogen-free	Following EN 50267-2-1
	UL/CSA	Style 10493 and 20317, 300 V, 80 °C
	NFPA	Following NFPA 79-2015, chapter 12.9
	EAC	Certified according to No. TC RU C-DE.ME77.B.01254
	CTP	Certified according to No. C-DE.PB49.B.00416
	CEI	Following CEI 20-35
	Lead free	Following 2011/65/EC (RoHS-II)
	Clean room	According to ISO Class 1. Outer jacket material complies with CF27-07-05-02-01-D - tested by IPA according to standard 14644-1
	CE	Following 2014/35/EU

Guaranteed as the service life

Cycles *		5 million		7.5 million	10 million
Temperature, from/to [°F]	v max. [°/s] twisted	a max. [°/s] twisted	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]
-13/+5	180	60	±150	±90	±30
+5/+158			±180	±120	±60
+158/+176			±150	±90	±30

* Higher number of cycles possible - please ask for your individual calculation

Typical mechanical application areas

- For heaviest duty applications with torsion movements
- Almost unlimited resistance to oil
- Indoor and outdoor applications, UV resistant
- Especially for robots and movements in the 3D area
- Robots, handling, spindle drives

Part No.	AWG	Number of Conductors and rated cross section [mm ²]	Outer diameter max.		Copper index		Weight	
			in.	mm	lbs/mft	kg/km	lbs/mft	kg/km
CFROBOT2-07-04-C	18	4 x 0.75	0.33	8.5	30.2	45	56.4	84
CFROBOT2-07-05-C	18	5 x 0.75	0.33	8.5	36.3	54	63.2	94
CFROBOT2-07-07-C	18	7 x 0.75	0.39	10.0	50.4	75	87.4	130
CFROBOT2-07-12-C ¹⁾	18	12 x 0.75	0.55	14.0	88.0	131	147.2	219
CFROBOT2-07-18-C	18	18 x 0.75	0.65	16.5	132.4	197	215.7	321

¹⁾ Delivery time upon request

Note: The mentioned outer diameters are maximum values.

G = with green-yellow earth core x = without earth core









chainflex® CFROBOT3







PUR data cable, twistable

- For torsion applications
- 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 -13°F to +176°F (-25°C to +80°C) flexible -40°F to +176°F (-40°C to +80°C) fixed -58°F to +176°F (-50°C to +80°C)
	v max.	twisted 180°/s
	a max.	twisted 60°/s ²
	Travel distance	Especially for robots and movements in the 3D range, Class 7
	Torsion	± 180°, with 3.28 ft (1 m) cable length

Cable structure

	Conductor	Conductor consisting of bare copper wires (according to EN 60228).
	Conductor insulation	Mechanically high-quality TPE mixture.
	Color code	Color code in accordance with DIN 47100.
	Inner jacket	PUR mixture adapted to suit the requirements in e-chains®
	Overall shield	Extremely torsion-resistant tinned braided copper shield. Coverage approx. 85% optical.
	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 VDE 0282 Part 10). Color: Dark blue (similar to RAL 5011)

Electrical information

	Nominal voltage	300 V
	Testing voltage	2000 V (following DIN EN 50396)











Properties and approvals

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

Image exemplary

igus chainflex® CFROBOT3

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	Complies to NFPA 79-2015, chapter 12.9
	EAC	Certified according to No. TC RU C-DE.ME77.B.01254
	CTP	Certified according to No. C-DE.PB49.B.00416
	CEI	Following CEI 20-35
	Lead free	Following 2011/65/EC (RoHS-II)
	Clean room	According to ISO Class 1. Outer jacket material complies with CF27-07-05-02-01-D - tested by IPA according to standard 14644-1
	CE	Following 2014/35/EU

Guaranteed as the service life

Cycles *			5 million	7.5 million	10 million
Temperature, from/to [°F]	v max. [°/s] twisted	a max. [°/s] twisted	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]
-13/+5			±150	±90	±30
+5/+158	180	60	±180	±120	±60
+158/+176			±150	±90	±30

* Higher number of cycles possible - please ask for your individual calculation

Typical mechanical application areas

- For heaviest duty applications with torsion movements
- Almost unlimited resistance to oil
- Indoor and outdoor applications, UV resistant
- Especially for robots and movements in the 3D area
- Robots, handling, spindle drives

Part No.	AWG	Number of Conductors and rated cross section [mm ²]	Outer diameter max.		Copper index		Weight	
			in.	mm	lbs/mft	kg/km	lbs/mft	kg/km
CFROBOT3-02-04-02	24	4 PR x 0.25	0.35	9.0	26.9	40	68.5	102
CFROBOT3-02-06-02	24	6 PR x 0.25	0.41	10.5	37.0	55	93.4	139
CFROBOT3-02-08-02	24	8 PR x 0.25	0.49	12.5	47.0	70	105.5	157
CFROBOT3-05-05-02	20	5 PR x 0.5	0.51	13.0	60.5	90	149.8	223

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 torsion applications
- 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	-13°F to +176°F (-25°C to +80°C)
		flexible	-40°F to +176°F (-40°C to +80°C)
		fixed	-58°F to +176°F (-50°C to +80°C)
	v max.	twisted	180°/s
	a max.	twisted	60°/s ²
	Travel distance	Especially for robots and movements in the 3D range, Class 7	
	Torsion	± 180°, with 3.28 ft (1 m) cable length	

Cable structure

	Conductor	Conductor consisting of bare copper wires (according to EN 60228).	
	Conductor insulation	Mechanically high-quality TPE mixture.	
	Color code	According to measuring system specification. ▶ Product range table	
	Element shield	Extremely torsion-resistant tinned braided copper shield. Coverage approx. 85% optical	
	Overall shield	Torsion resistant tinned braided copper shield. Coverage approx. 80% optical.	
	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 VDE 0282 Part 10). Color: Dark blue (similar to RAL 5011)	

Electrical information
















	Nominal voltage	30 V
	Testing voltage	500 V

Image exemplary

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 EN 50267-2-1
	UL/CSA	Style 1589 and 20236, 30 V, 80°C
	NFPA	Complies to NFPA 79-2015, chapter 12.9
	EAC	Certified according to No. TC RU C-DE.ME77.B.01218
	CTP	Certified according to No. C-DE.PB49.B.00416
	CEI	Following CEI 20-35
	Lead free	Following 2011/65/EC (RoHS-II)
	Clean room	According to ISO Class 1. Outer jacket material complies with CF27-07-05-02-01-D - tested by IPA according to standard 14644-1
	CE	Following 2014/35/EU

Guaranteed as the service life

Cycles *		5 million		7.5 million	10 million
Temperature, from/to [°F]	v max. [°/s] twisted	a max. [°/s] twisted	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]
-13/+5			±150	±90	±30
+5/+158	180	60	±180	±120	±60
+158/+176			±150	±90	±30

* Higher number of cycles possible - please ask for your individual calculation


Typical application areas

- For heaviest duty applications with torsion movements
- Almost unlimited resistance to oil
- Indoor and outdoor applications, UV resistant
- Especially for robots and movements in the 3D area
- Robots, handling, spindle drives



chainflex® CFROBOT4

PUR measuring system cable, twistable



igus® chainflex® CFROBOT4

Image exemplary

Part No.	AWG	Number of Conductors and rated cross section [mm ²]	Outer diameter max.		Copper index		Weight	
			in.	mm	lbs/mft	kg/km	lbs/mft	kg/km
CFROBOT4-001	26	3 STP x 0.14	0.41	10.5	43.7	65	80.0	119
	26	4 x 0.14						
	20	2 x 0.5						
CFROBOT4-002 ¹⁾	26	3 STP x 0.14	0.41	10.5	47.0	70	82.0	122
	20	2 SC x 0.5						
CFROBOT4-006	26	3 STP x 0.14	0.45	11.5	52.4	78	96.1	143
	26	4 x 0.14						
	24	4 x 0.22						
	20	2 x 0.5						
CFROBOT4-009	24	4 PR x 0.25	0.37	9.5	34.3	51	62.5	93
	20	2 x 0.5						
CFROBOT4-015	26	4 PR x 0.14	0.35	9.0	34.9	52	64.5	96
	20	4 x 0.5						
CFROBOT4-028 ¹⁶⁾	26	2 PR x 0.20	0.30	7.5	31.6	47	50.4	75
	22	2 x 0.38						

¹⁾ Delivery time upon request

¹⁶⁾ Color outer jacket: Yellow-green (RAL 6018)

Note: The mentioned outer diameters are maximum values.

G = with green-yellow earth core **x** = without earth core

STP = Individually shielded Twisted Pair **PR** = Twisted Pair

SC = Individually shielded Conductor **SHLD** = Shielded Precable

Product range



Part No.	Core group	Color code
CFROBOT4-001	3x(2x0,14)C	green/yellow, black/brown, red/orange
	4x0,14	gray/blue/white-yellow/white-black
	2x0,5	brown-red/brown-blue
CFROBOT4-006	3x(2x0,14)C	green/yellow, black/brown, red/orange
	(4x0,14)	gray/blue/white-yellow/white-black
	(4x0,22)	brown-yellow/brown-gray/green-black/green-red
CFROBOT4-009	(2x0,5)	brown-red/brown-blue
	4x(2x0,25)	brown/green, blue/violet, gray/pink, red/black
	2x0,5	white, brown
CFROBOT4-015	4x(2x0,14)	brown/green, blue/violet, gray/pink, red/black
	4x0,5	blue, white, brown-green, white-green
	CFROBOT4-028 ¹⁶⁾	2x(2x0,20)
	(2x0,38)	red/black



 Order example: CFROBOT4-009 - in your desired length (0.5 m steps)
CFROBOT4 chainflex® Series -009 Code measuring system type

 Online order ► www.chainflex.com/CFROBOT4







 Available from stock.
Shipped from stock in as little as 24 hours

chainflex® CFROBOT5





TPE Fiber Optic Cable, twistable

- For torsion applications
- 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 flexible fixed	min. 10 x d min. 8 x d min. 5 x d
 Temperature	e-chain® twisted flexible fixed	-31°F to +176°F (-35°C to +80°C) -58°F to +176°F (-50°C to +80°C) -67°F to +176°F (-55°C to +80°C)
 v max.	twisted	180°/s
 a max.	twisted	60°/s ²
 Travel distance	Especially for robots and movements in the 3D range	
 Torsion	± 180°, with 3.28 ft. (1 m) cable length	

Cable structure

 Conductor	50/125 µm, 62.5/125 µm special fixed wire elements with aramide strain relief.	
 Core construction	Optical fibers cabled with high-tensile aramide dampers around a central reinforced filler element.	
 Color code	▶ 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®. Color: 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 EN 50267-2-1	

Image exemplary

Product range

-  **Lead free** Following 2011/65/EC (RoHS-II)
-  **Clean room** According to ISO Class 1. Outer jacket material complies with CF9.15.07 - tested by IPA according to standard 14644-1
-  **CE** Following 2014/35/EU

Guaranteed as the service life

Cycles *				5 million	7.5 million	10 million
Temperature, from/to [°F]	v max. [°/s] twisted	a max. [°/s] twisted	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]
-31/-13			±150	±90	±30	
-13/+158	180	60	±180	±120	±60	
+158/+176			±150	±90	±30	

* Higher number of cycles possible - please ask for your individual calculation

Typical mechanical application areas

- For heaviest duty applications with torsion movements
- Almost unlimited resistance to oil, also to bio-oils
- Indoor and outdoor applications, UV resistant
- Especially for robots and movements in the 3D area
- Robots, handling


Part No.	Fiber Count	Fiber Diameter approx. [µm]	Outer diameter max.		Weight	
			in.	mm	lbs/mft	kg/km
CFROBOT5-500	2	62,5/125	0.33	8.5	58.5	87
CFROBOT5-501	2	50/125	0.33	8.5	58.5	87

Note: The mentioned outer diameters are maximum values.


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

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 fibers

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

 **Available from stock.**
Shipped from stock in as little as 24 hours









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 flexible fixed	min. 10 x d min. 8 x d min. 5 x d
 Temperature	e-chain® twisted flexible fixed	-13°F to +176°F (-25°C to +80°C) -40°F to +176°F (-40°C to +80°C) -58°F to +176°F (-50°C to +80°C)
 v max.	twisted	180 °/s
 a max.	twisted	60 °/s ²
 Travel distance	Especially for robots and movements in the 3D range	
 Torsion	± 180°, with 3.28 ft. (1 m) cable length	

Cable structure

 Conductor	Conductor consisting of bare copper wires (according to EN 60228).	
 Conductor insulation	Mechanically high-quality TPE mixture.	
 Color code	Power conductors: Black with white numbers, one conductor green-yellow. See Table	
 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 VDE 0282, Part 10). Color: Dark blue (similar to RAL 5011)	

Electrical information

 Nominal voltage	1000 V
 Testing voltage	4000 V (following DIN EN 50396)

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, WW-1
 Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 - status 1992)
 Halogen-free	Following DIN EN 60754

Image exemplary

Product range

	UL/CSA	Style 10492 and 21223, 1000 V, 80 °C
	NFFA	Complies to NFFA 79-2012, chapter 12.9
	EAC	Certified according to No. TC RU C-DE.ME77.B.01255
	CTP	Certified according to No. C-DE.PB49.B.00420
	CEI	Following CEI 20-35
	Lead free	Following 2011/65/EC (RoHS-II)
	Clean room	According to ISO Class 1. Outer jacket material complies with CF27-07-05-02-01-D - tested by IPA according to standard 14644-1
	CE	Following 2014/35/EU

Guaranteed as the service life

Cycles *		5 million		7.5 million	10 million
Temperature, from/to [°F]	v max. [°/s] twisted	a max. [°/s] twisted	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]
-13/+5			±150	±90	±30
+5/+158	180	60	±180	±120	±60
+158/+176			±150	±90	±30

* Higher number of cycles possible - please ask for your individual calculation

Typical mechanical application areas

- For heaviest duty applications with torsion movements
- Almost unlimited resistance to oil
- Indoor and outdoor applications, UV resistant
- Especially for robots and movements in the 3D area
- Robots, handling, spindle drives

Part No.	AWG	Number of Conductors and rated cross section [mm ²]	Outer diameter max.		Copper index		Weight	
			in.	mm	lbs/mft	kg/km	lbs/mft	kg/km
CFROBOT6-100-03	8	3 x 10.0	0.63	16.0	213.0	317	278.2	414
CFROBOT6-160-03	6	3 x 16.0	0.73	18.5	341.4	508	415.3	618
CFROBOT6-250-03	4	3 x 25.0	0.91	23.0	534.2	795	646.4	962
CFROBOT6-350-03	2	3 x 35.0	1.00	25.5	753.9	1122	872.2	1298

Note: The mentioned outer diameters are maximum values

G = with green-yellow earth core x = without earth core









chainflex® CFROBOT7






PUR motor cable, twistable

- For torsion applications
- 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 flexible fixed	min. 10 x d min. 8 x d min. 5 x d
	Temperature	e-chain® twisted flexible fixed	-13°F to +176°F (-25°C to +80°C) -40°F to +176°F (-40°C to +80°C) -58°F to +176°F (-50°C to +80°C)
	v max.	twisted	180 °/s
	a max.	twisted	60 °/s ²
	Travel distance	Especially for robots and movements in the 3D range	
	Torsion	± 180°, with 3.28 ft. (1 m) cable length	

Cable structure

	Conductor	Conductor consisting of bare copper wires (according to EN 60228).	
	Conductor insulation	Mechanically high-quality TPE mixture.	
	Color code	Power conductors: Black with white numbers, one conductor green-yellow. See Table 2 Control pairs: Black with white numbers. Control Pair 1: Printed 5 and 6 Control Pair 2: Printed 7 and 8 4 Control pairs: Color code in accordance with DIN 47100	
	Overall shield	Extremely torsion-resistant tinned braided copper shield. 85% optical coverage	
	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 VDE 0282, Part 10). Color: Dark blue (similar to RAL 5011)	














Electrical information

	Nominal voltage	1000 V
	Testing voltage	4000 V (following DIN EN 50396)

Properties and approvals

Image exemplary

Product range

	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 EN 50267-2-1
	UL/CSA	Style 10492 and 21223, 1000 V, 80°C
	NFPA	Complies to NFPA 79-2012, chapter 12.9
	EAC	Certified according to No. TC RU C-DE.ME77.B.02324
	CTP	Certified according to No. C-DE.PB49.B.00420
	CEI	Following CEI 20-35
	Lead free	Following 2011/65/EC (RoHS-II)
	Clean room	According to ISO Class 1. Outer jacket material complies with CF27-07-05-02-01-D - tested by IPA according to standard 14644-1
	CE	Following 2014/35/EU

Guaranteed as the service life

Cycles *		5 million		7.5 million	10 million
Temperature, from/to [°F]	v max. [°/s] twisted	a max. [°/s] twisted	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]
-13/+5			±150	±90	±30
+5/+158	180	60	±180	±120	±60
+158/+176			±150	±90	±30

* Higher number of cycles possible - please ask for your individual calculation

Typical mechanical application areas

- For heaviest duty applications with torsion movements
- Almost unlimited resistance to oil
- Indoor and outdoor applications, UV resistant
- Especially for robots and movements in the 3D area
- Robots, handling, spindle drives



chainflex® CFROBOT7

PUR motor cable, twistable



Image exemplary

Part No.	AWG	Number of Conductors and rated cross section [mm ²]	Outer diameter max.		Copper index		Weight		
			in.	mm	lbs/mft	kg/km	lbs/mft	kg/km	
without control pair									
CFROBOT7-15-03-C	16	3 x 1.5	0.33	8.5	43.0	64	69.2	103	
CFROBOT7-15-04-C	16	4 x 1.5	0.37	9.5	55.1	82	85.3	127	
CFROBOT7-25-03-C	14	3 x 2.5	0.39	10.0	65.9	98	98.8	147	
CFROBOT7-25-04-C	14	4 x 2.5	0.41	10.5	85.3	127	122.3	182	
CFROBOT7-60-04-C	10	4 x 6.0	0.59	15.0	198.9	296	270.8	403	
2 control pairs									
CFROBOT7-15-15-02-02-C	16	4 x 1.5	0.65	16.5	141.8	211	218.4	325	
	16	2 PR x 1.5							
CFROBOT7-25-15-02-02-C	14	4 x 2.5	0.67	17.0	174.0	259	256.0	381	
	16	2 PR x 1.5							
4 control pairs									
CFROBOT7-40-02-02-04-C	12	4 x 4.0	0.67	17.0	181.4	270	258.0	384	
	24	4 PR x 0.25							

Note: The mentioned outer diameters are maximum values.

G = with green-yellow earth core x = without earth core

STP = Individually shielded Twisted Pair
SC = Individually shielded Conductor

PR = Twisted Pair
SHLD = Shielded Precable

Product range



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.com/CFROBOT7



Available from stock.
Shipped from stock in as little as 24 hours









chainflex® CFROBOT





TPE spindle cable/single core, twistable

- For torsion applications
- TPE outer jacket
- Shielded
- Oil-resistant, bio-oil resistant
- PVC-free
- UV resistant
- Flame-retardant
- Hydrolysis and microbe-resistant



Dynamic information

 Bend radius	e-chain® twisted flexible fixed	min. 10 x d min. 8 x d min. 5 x d
 Temperature	e-chain® twisted flexible fixed	-31°F to +194°F (-35°C to +90°C) -49°F to +212°F (-45°C to +100°C) -58°F to +212°F (-50°C to +100°C)
 v max.	twisted	180°/s
 a max.	twisted	60°/s ²
 Travel distance		Especially for robots and movements in the 3D range
 Torsion		± 180°, with 3.28 ft. (1 m) cable length




Cable structure

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






Electrical information

 Nominal voltage		1000 V
 Testing voltage		4000 V (following DIN EN 50396)

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
	NFFPA	Complies to NFFPA 79-2012, chapter 12.9
	EAC	Certified according to No. TC RU C-DE.ME77.B.02324
	CTP	Certified according to No. C-DE.PB49.B.00420
	CEI	Following CEI 20-35
	Lead free	Following 2011/65/EC (RoHS-II)
	Clean room	According to ISO Class 1. Outer jacket material complies with CF34-UL-25-04-D - tested by IPA according to standard 14644-1
	CE	Following 2014/35/EU

Guaranteed as the service life

Cycles *		5 million		7.5 million	10 million
Temperature, from/to [°F]	v max. [°/s] twisted	a max. [°/s] twisted	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]
-31/-13	180	60	±150	±90	±30
-13/+158			±180	±120	±60
+158/+176			±150	±90	±30

* Higher number of cycles possible - please ask for your individual calculation

Typical mechanical application areas

- For heaviest duty applications with torsion movements
- Almost unlimited resistance to oil, also with bio-oils
- Indoor and outdoor applications, UV resistant
- Especially for robots and movements in the 3D area
- Robots, handling, spindle drives

Part No.	AWG	Number of Conductors and rated cross section [mm ²]	Outer diameter max.		Copper index		Weight	
			in.	mm	lbs/mft	kg/km	lbs/mft	kg/km
CFROBOT-035	8	1 x 10.0	0.41	10.5	90.0	134	140.4	209
CFROBOT-036	6	1 x 16.0	0.47	12.0	135.7	202	196.9	293
CFROBOT-037	4	1 x 25.0	0.57	14.5	213.7	318	305.1	454
CFROBOT-038	2	1 x 35.0	0.61	15.5	289.6	431	385.7	574
CFROBOT-039	1	1 x 50.0	0.71	18.0	403.9	601	524.8	781

Note: The mentioned outer diameters are maximum values
G = with green-yellow earth core **x**= without earth core









chainflex® CFROBOT8

PUR bus cable, twistable








- For torsion applications
- 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 flexible fixed	min. 10 x d min. 8 x d min. 5 x d
	Temperature	e-chain® twisted flexible fixed	-13°F to +158°F (-25°C to +70°C) -40°F to +158°F (-40°C to +70°C) -58°F to +158°F (-50°C to +70°C)
	v max.	twisted	180 °/s
	a max.	twisted	60 °/s ²
	Travel distance	Robots and motions in 3D area, Class 1	
	Torsion	± 180°, with 3.28 ft. (1 m) cable length	

Cable structure

	Conductor	Conductor consisting of bare copper wires (following EN 60228).
	Conductor insulation	According to bus specification.
	Core construction	According to bus specification.
	Color code	According to bus specification. ▶ See table
	Intermediate layer	Foil taping over the external layer.
	Overall shield	Torsion resistant tinned braided copper shield. 80% optical coverage
	Outer jacket	Low-adhesion, highly abrasion resistant mixture on the basis of PUR, adapted to suit the requirements in e-chains® Color: Dark blue (similar to RAL 5011)

Electrical information














	Nominal voltage	30 V
	Testing voltage	500 V

image exemplary

igus® chainflex® CFROBOT8-045

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	Certified according to No. TC RU C-DE.ME77.B.01218
	CTP	Certified according to No. C-DE.PB49.B.00416
	CEI	Following CEI 20-35
	Lead free	Following 2011/65/EC (RoHS-II)
	Clean room	According to ISO Class 1. Outer jacket material complies with CF27-07-05-02-01-D - tested by IPA according to standard 14644-1
	CE	Following 2014/35/EU

Guaranteed as the service life

Cycles *		5 million		7.5 million	10 million
Temperature, from/to [°F]	v max. [°/s] twisted	a max. [°/s] twisted	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]
-13/-5			±150	±90	±30
-5/+158	180	60	±180	±120	±60
+158/+176			±150	±90	±30

* Higher number of cycles possible - please ask for your individual calculation

Typical mechanical application areas

- For heaviest duty applications with torsion movements
- Almost unlimited resistance to oil, also with bio-oils
- Indoor and outdoor applications, UV resistant
- Especially for robots and movements in the 3D area
- Robots, handling, spindle drives



chainflex® CFROBOT8

PUR bus cable, twistable

igus® chainflex® CFROBOT8.045




Image exemplary

Part No.	AWG	Number of Conductors and rated cross section [mm ²]	Outer diameter max.		Copper index		Weight	
			in.	mm	lbs/mft	kg/km	lbs/mft	kg/km
Profibus								
CFROBOT8-001	22	1 PR x 0.35	0.31	8.0	19.5	29	41.7	62
CAN-Bus								
CFROBOT8-022	20	2 PR x 0.5	0.28	7.0	28.9	43	48.4	72
Ethernet/CAT5e								
CFROBOT8-045	26	4 STP x 0.14	0.33	8.5	26.2	39	46.4	69
Ethernet/CAT6								
CFROBOT8-049	26	4 PR x 0.14	0.35	9.0	25.5	38	45.7	68
Ethernet/CAT6A								
CFROBOT8-050	26	4 PR x 0.15	0.41	10.5	36.3	54	85.3	127
Ethernet/CAT7								
CFROBOT8-052	26	4 PR x 0.15	0.41	10.5	37.0	55	86.7	129
Profinet								
EtherCAT → CFROBOT8-060	22	2 PR x 0.34	0.33	8.5	24.2	36	47.0	70

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.

Product range



Part No.	Characteristic Impedance [Ω]	Core group	Color code
Profibus			
CFROBOT8-001	150	(2 x 0,35)C	red, green
CAN-Bus			
CFROBOT8-022	120	(4 x 0,5)C	white, green, brown, yellow (Star-quad stranding)
Ethernet/CAT5e			
CFROBOT8-045	100	4 x (2 x 0,14)C	white-green/green, white-orange/orange, white-blue/blue, white-brown/brown
Ethernet/CAT6			
CFROBOT8-049	100	4 x (2 x 0,14)C	white-green/green, white-orange/orange, white-blue/blue, white-brown/brown
Ethernet/CAT6A			
CFROBOT8-050	100	4 x (2 x 0,15)C	white-green/green, white-orange/orange, white-blue/blue, white-brown/brown
Ethernet/CAT7			
CFROBOT8-052	100	4 x (2 x 0,15)C	white-green/green, white-orange/orange, white-blue/blue, white-brown/brown
Profinet			
CFROBOT8-060	100	(2 x (2 x 0,34))C	white/blue, yellow/orange

 Order example: CFROBOT8-052 - in your desired length (0.5 m steps)
CFROBOT8 chainflex® series -052 Code bus type

 Online order ► www.chainflex.com/CFROBOT8

 Available from stock.
Shipped from stock in as little as 24 hours









chainflex® CFROBOT9






PUR hybrid cable, twistable

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



Dynamic information

	Bend radius	e-chain® twisted flexible fixed	min. 10 x d min. 8 x d min. 5 x d
	Temperature	e-chain® twisted flexible fixed	-25 °C to +80 °C -40 °C to +80 °C (following DIN EN 60811-504) -50 °C to +80 °C (following DIN EN 50305)
	v max.	twisted	180 °/s
	a max.	twisted	60 °/s²
	Travel distance		Especially for robots and movements in the 3D range
	Torsion		± 180°, with 3.28 ft. (1 m) cable length

Cable structure

	Conductor	Conductor consisting of bare copper wires (according to EN 60228).	
	Core insulation	Mechanically high-quality TPE mixture.	
	Core identification	► See table	
	Element shield	Extremely torsion-resistant tinned braided copper shield. 85% optical coverage	
	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 VDE 0282, Part 10). Color: Dark blue (similar to RAL 5011)	

Electrical information












	Nominal voltage	300 V
	Testing voltage	2000 V (following DIN EN 50396)

Properties and approvals

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

Image exemplary

Product range

	Flame-resistance	According to IEC 60332-1-2, CEI 20-35, FT1, WW-1
	Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 - status 1992)
	Halogen-free	Following EN 50267-2-1
	UL/CSA	24-20 AWG: Style 10467 and 20317, 300 V, 80 °C 18-17 AWG: Style 10493 and 20317, 300 V, 80 °C
	NFPA	Complies to NFPA 79-2012, chapter 12.9
	EAC	Certified according to No. TC RU C-DE.ME77.B.01254
	CTP	Certified according to No. C-DE.PB49.B.00416
	CEI	Following CEI 20-35
	Lead free	Following 2011/65/EC (RoHS-II)
	Clean room	According to ISO Class 1. 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 [°F]	v max. [°/s] twisted	a max. [°/s] twisted	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]
-13/-5			±150	±90	±30
-5/+158	180	60	±180	±120	±60
+158/+176			±150	±90	±30

* Higher number of cycles possible - please ask for your individual calculation

Typical mechanical application areas

- For heaviest duty applications with torsion movements
- Almost unlimited resistance to oil
- Indoor and outdoor applications, UV resistant
- Especially for robots and movements in the 3D area
- Robots, handling, spindle drives



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



chainflex® CFROBOT9

PUR hybrid cable, twistable

igus® chainflex® CFROBOT9

Image exemplary

Part No.	AWG	Number of Conductors and rated cross section [mm ²]	Outer diameter max.		Copper index		Weight	
			in.	mm	lbs/mft	kg/km	lbs/mft	kg/km
CFROBOT9-001	17	5 x 1.0	0.41	10.5	57.8	86	95.4	142
	17	2 x 1.0 SHLD						
CFROBOT9-002	18	6 x 0.75	0.45	11.5	55.1	82	97.4	145
	18	3 x 0.75 SHLD						
CFROBOT9-003	20	2 x 0.5	0.39	10.0	19.5	29	53.8	80
	20	2 x 0.5 SHLD						
CFROBOT9-004	17	16 x 1.0	0.63	16.0	139.1	207	217.7	324
	17	2 x 1.0 SHLD						
CFROBOT9-005	17	23 x 1.0	0.77	19.5	192.2	286	310.4	462
	17	2 x 1.0 SHLD						
CFROBOT9-006	17	24 x 1.0	0.79	20.0	200.9	299	319.9	476
	17	2 x 1.0 SHLD						
CFROBOT9-007	24	15 STP x 0.25	0.73	18.5	164.6	245	258.0	384
	24	2 x 0.25 SHLD						
CFROBOT9-010	24	4 STP x 0.25	0.41	10.5	44.3	66	80.6	120

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

Product range



Part No.	Core group	Color code
CFROBOT9-001	5G1.0 (2x1.0)C	Conductors black with white numbers, one conductor green-yellow Conductors black with white numbers 5-6
CFROBOT9-002	2x3x0.75 (3x0.75)C	Conductors black with white numbers 4-9 Conductors black with white numbers 1-3
CFROBOT9-003	2x0.5 (2x0.5)C	blue/black white/brown
CFROBOT9-004	16G1.0 (2x1.0)C	Conductors black with white numbers 1-4, 7-17, one conductor green-yellow Conductors black with white numbers 5-6
CFROBOT9-005	23G1.0 (2x1.0)C	Conductors black with white numbers 1-4, 7-24, one conductor green-yellow Conductors black with white numbers 5-6
CFROBOT9-006	24G1.0 (2x1.0)C	Conductors black with white numbers 1-4, 7-25, one conductor green-yellow Conductors black with white numbers 5-6
CFROBOT9-007	15x(2x0.25)C (4x0.25)C)C	Color code according to DIN 47100 white/green/brown/yellow (CAN Bus)
CFROBOT9-010	4x(2x0.25)C)C	white/brown, green/yellow, gray/pink, blue/red







igus[®]
robotics
harnessed hoses and
cables for robots

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.

Shipped from stock in as little as 24 hours

readychain[®] robot

Ready to install harnessed e-chain systems[®] 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

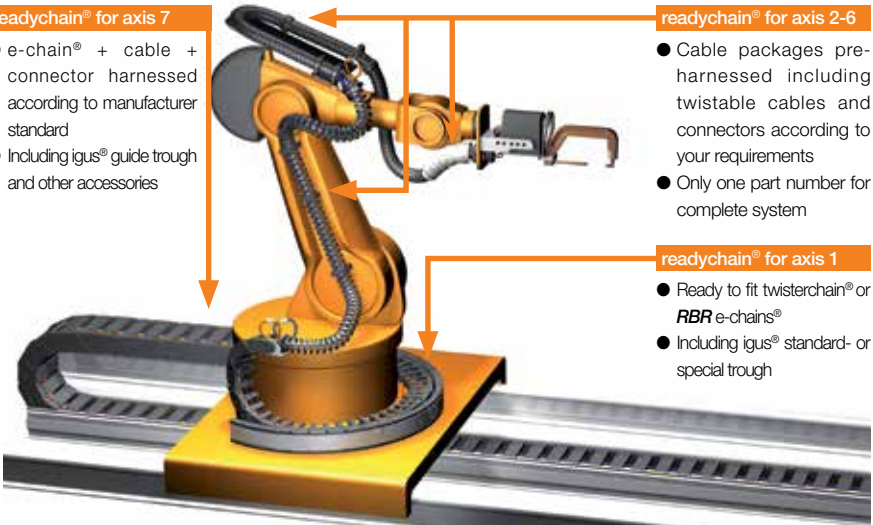
- e-chain[®] + cable + connector harnessed according to manufacturer standard
- Including igus[®] guide trough and other accessories

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, customized 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.com/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 inquiry.



David Sandiland
Automotive and Robotics
Sales Manager
Phone: 905.760.8448
Fax: 905.760.8688
Cell: 705.313.2574
dsandiland@igus.net

Product range

triflex® readychain® dress-packs

Hose packages for welding robots

Product range
Part No.

Dress pack

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

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







readychain[®] robot

Harnessed cables for robots - Kuka Quantec

Cable type Part No.	Base article	Number of cores and conductor nominal cross section [mm ²]	ø [mm]	By	According to
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
Motor cable (Angled on socket)					
MAT904105004	CFSPECIAL-792-011	(5x(2x6.0+2x2.5)+(2x(6x1.0)C)C	35.5	X30	X30.1
Data cable					
MAT904105005	CFBUS-PUR-H01-060	(4x0.38)C+4x1.5	11.5	X31	X31.1
Motor cable Single axis (7th axis)					
MAT904105006	CF270-UL-25-15-02-01-D	(4G2.5+(2x1.5)C)C	14.0	XM...	X...
MAT904105007	CF270-UL-40-15-02-01-D	(4G4.0+(2x1.5)C)C	15.0	XM...	X...
Motor cable Single axis (7th axis)					
MAT904105008	CF270.UL.60.15.02.01.D	(4G6.0+(2x1.5)C)C	16.5	XM...	X...
Control cable (7. axis)					
MAT904105009	CF112-02-04-02	(4x(2x0.25)C)C	11.0	Control cable single axis	
Earth-core					
MAT904105010	CFPE-160-01	1G16.0	9.5	Connector plate	Robot







readychain[®] robot

Harnessed cables for robots - Kuka Fortec

Cable type Part No.	Base article	Number of cores and conductor nominal cross section [mm ²]	ø [mm]	By	According to
Product range - Kuka Fortec					
Motor cable (Angled on socket)					
					
MAT904105011	CFSPPECIAL-792-014	((6x1.5)C+3x(3x4)+1G6)C	28.0	X30.1	X30.1.1
MAT904105012	CFSPPECIAL-792-013	(2x(3x1.5)C+3x(3x10)+1G10)C	29.5	X30.4	X30.4.1
Data cable					
					
MAT904105005	CFBUS-PUR-H01-060	(4x0.38)C+4x1.5	11.5	X31	X31.1
Motor cable Single axis (7th axis)					
					
MAT904105006	CF270-UL-25-15-02-01-D	(4G2.5+(2x1.5)C)C	14.0	XM...	X...
MAT904105007	CF270-UL-40-15-02-01-D	(4G4.0+(2x1.5)C)C	15.0	XM...	X...
Motor cable Single axis (7th axis)					
					
MAT904105008	CF270.UL.60.15.02.01.D	(4G6.0+(2x1.5)C)C	16.5	XM...	X...
Control cable (7th axis)					
					
MAT904105013	CF112-02-04-02	(4x(2x0.25)C)C	11.0	Control cable single axis	
Earth-core					
					
MAT904105010	CFPE-160-01	1G16.0	9.5	Connector plate	Robot

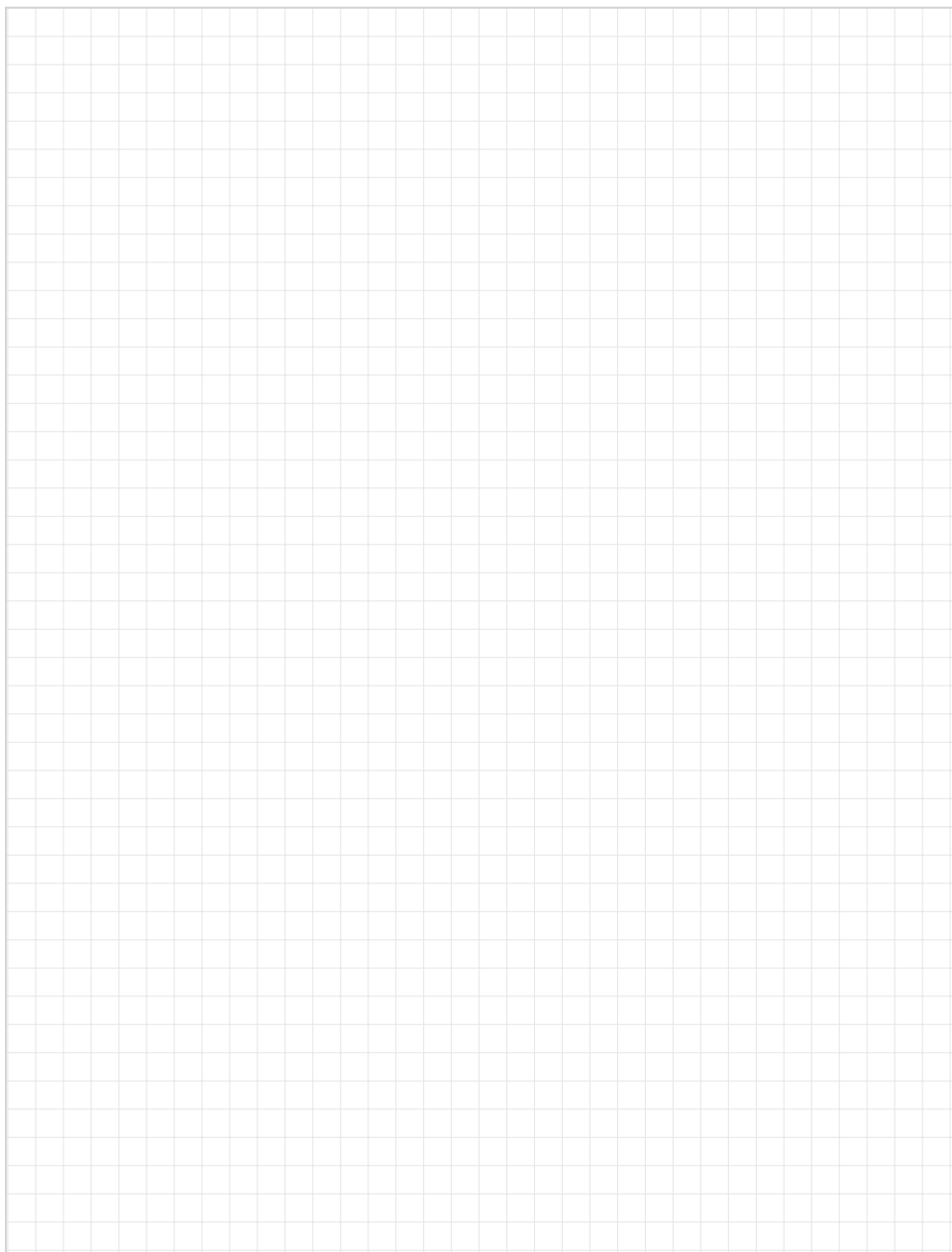
readychain[®] robot

Harnessed cables for robots - Kuka Titan

Cable type Part No.	Base article	Number of cores and conductor nominal cross section [mm ²]	ø [mm]	By	According to
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
MAT904105014	CFSPECIAL-792-014	((6x1.5)C+3x(3x4)+1G6)C	28.0	X30.2	X30.2.1
MAT904105015	CFSPECIAL-792-014	(2x(3x1.5)C+3x(3x10)+1G10)C	29.5	X30.3	X30.3.1
Data cable					
					
MAT904105005	CFBUS-PUR-H01-060	(4x0.38)C+4x1.5	11.5	X31	X31.1
Motor cable Single axis (7th axis)					
					
MAT904105006	CF270-UL-25-15-02-01-D	(4G2.5+(2x1.5)C)C	14.0	XM...	X...
MAT904105007	CF270-UL-40-15-02-01-D	(4G4.0+(2x1.5)C)C	15.0	XM...	X...
Motor cable Single axis (7th axis)					
					
MAT904105008	CF270-UL-60-15-02-01-D	(4G6.0+(2x1.5)C)C	16.5	XM...	X...
Control cable (7th axis)					
					
MAT904105013	CF112-02-04-02	(4x(2x0.25)C)C	11.0	Control cable single axis	
Earth-core					
					
MAT904105010	CFPE-160-01	1G16.0	9.5	Connector plate	Robot

readychain[®] robot

My sketches



igus® readychain®

Ready to install harnessed e-chain systems® 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
- Utilize 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 optimization



Further information, videos,
configurators and product finders
▶ www.igus.com/RCclassic



6 Advantages: readychain® standard



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

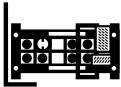
Reduction of installation time
Reduction of logistics cost
Procurement optimization



Further information, videos,
configurators and product finders
▶ www.igus.com/RCstandard



9 Advantages: readychain® standard+



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

Reduction of installation time
Reduction of logistics cost
Procurement optimization



Further information, videos,
configurators and product finders
▶ www.igus.com/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 optimization



Further information, videos,
configurators and product finders
▶ www.igus.com/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 customized e-chain systems®. 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



Customized cable assembling

readychain[®] rack

Modular, quick and ready-to-install

1 Everything from one source

The readychain[®] system includes pre-assembled, customized e-chain systems[®]. 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.



2 Flexible components

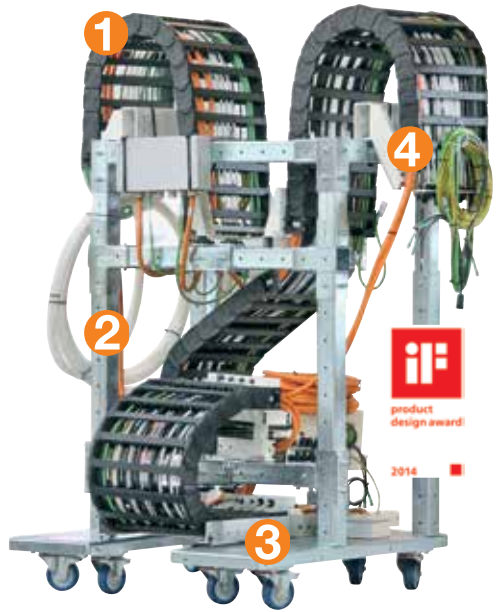
The telescopic supports and braces of the readychain[®] rack allow flexible adaptation to the installation needs on site. Changes in serial production can be undertaken easily. By using modular parts, additional components can also be easily attached to the rack.

3 Sustainable use

The components of the readychain[®] rack are galvanized 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.

4 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®



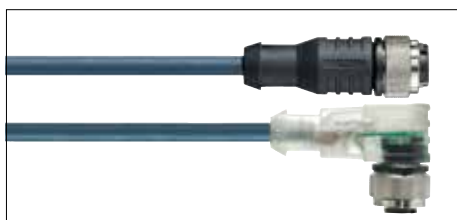
4,400 drive cables in accordance with 24 manufacturer standards, from stock



Catalog standards: Video/vision/bus technology



Catalogue standards: network/ethernet/FOC/Field bus



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

igus® hoses and attachments



Configured online with hose cable configurator





1

readychain® service

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



System acceptance on your machine



2

readychain® service

- Component selection
- Interface optimizations
- Documentation
- Integrated project management
- Cost optimization



Project planning



3

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



4

readychain® installation

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



Installation on site

igus® readychain®

Cable assembly

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



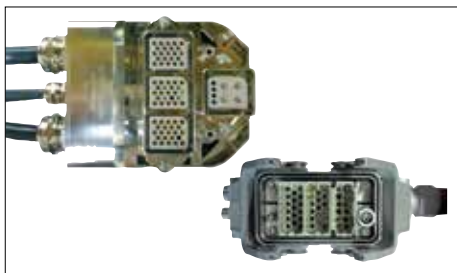
Process reliability, crimp force monitored, automated, time-optimised



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



readychain[®]

igus[®] - everything from stock

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



29,600 ft² test lab - more than 15,000 tests every year



Quickly within reach



Numerous strain relief solutions



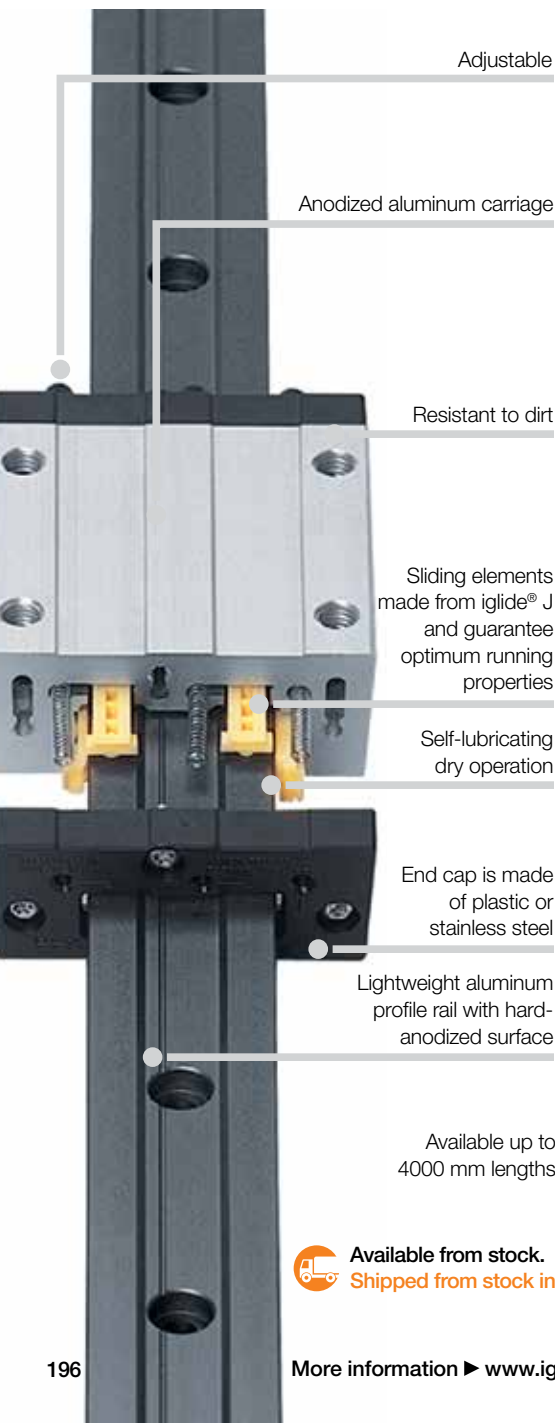
More than 8,000 cables per week



Just In Time supply

drylin® T advantages

Sliding instead of rolling



For applications in automation and material handling systems - drylin® T

igus® drylin® T rail guide systems were originally developed for applications in both automation and material 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.

- Self-lubricating
- Adjustable or automatic bearing clearance
- Automatic clearance adjustment
- Lightweight
- 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.

Shipped from stock in as little as 24 hours

Selection table

Product	Specification
	Standard <ul style="list-style-type: none">● Supplied with pre-set running clearance● Clearance can be manually adjusted● Maintenance-free, self-lubricating● Corrosion-free
	Automatic <ul style="list-style-type: none">● Automatic, low-clearance operation● Maintenance-free, self-lubricating● Corrosion-free
	With manual clamp <ul style="list-style-type: none">● Simple clamping version available● Maintenance-free dry running● Corrosion-free
	Heavy Duty <ul style="list-style-type: none">● Used for the most extreme conditions (dirt, adhesive residues, chips, mud, etc.)● More durable than plastic end block version
	Compact <ul style="list-style-type: none">● Narrow linear guide carriage● Dimensionally replaceable with ball bearing guides
	Mini series <ul style="list-style-type: none">● Small, compact, lubrication-free● Easy to install● Durable and cost effective
	Clamps <ul style="list-style-type: none">● Compact and strong for higher clamping forces● Holding force up to 500 N

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

robolink® advantages

Multiple-axis joint - building blocks

Build 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 for constructing customized robots that can be used in unique applications. Always offered 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 encode and INI	With output encoder	With motor encode and INI	With output encoder
Weight	[lbs]	20.9	24.03	40.8	44.53
Reach	[mm]	600		750	
Payload	[lbs]	2.2		6.5	
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 encode and INI	With output encoder	With motor encode and INI	With output encoder
Weight	[lbs]	23	25.79	44	46.3
Reach	[mm]	600		750	
Payload	[lbs]	1		5.5	
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 encode and INI	With output encoder	With motor encode and INI	With output encoder
Weight	[lbs]	19.8	24.25	38.6	42.55
Reach	[mm]	600		750	
Payload	[lbs]	3.3		8.8	
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 encode and INI	With output encoder	With motor encode and INI	With output encoder
Weight	[lbs]	22	26.46	419	44.53
Reach	[mm]	680		780	
Payload	[lbs]	2.2		7.7	
Precision	[mm]	1		1	
Part No.		RL-DQ-RBT-3322S-BC	...-AE	RL-DQ-RBT-5532S-BC	...-AE



Available from stock.

Shipped from stock in as little as 24 hours

roboLink® D components



Joint with plastic
worm gear



Motor kits



Accessories

Electro- mechanical robot arms



roboLink® C arms



roboLink® Q arms



roboLink® online
designer

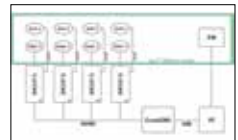
roboLink® W draw-wire technology



Joint with plastic
worm gear

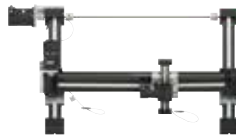


Motor kits



Accessories

Linear robots for predefined surfaces and spaces



Multi-axis modular drylin® linear robots

► www.igus.com/gantry



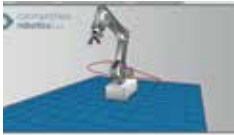
Joint with plastic strain wave gear



Motor kits



Accessories



CPR control



Software for programming articulated joints



The complete range with ordering options,

3D-CAD, configurators, PDF, application examples ► www.igus.eu/roboLink

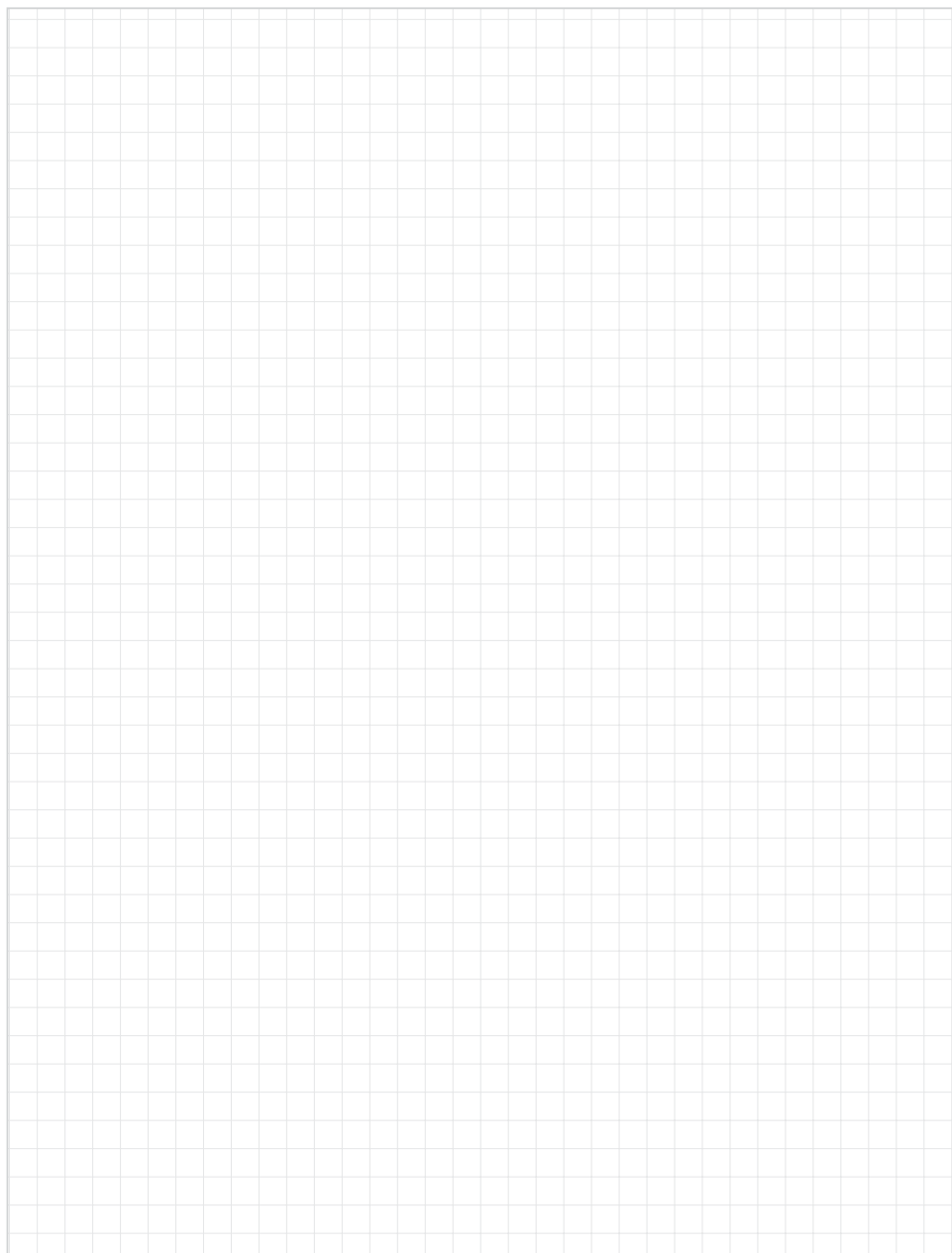


Available from stock.

Shipped from stock in as little as 24 hours

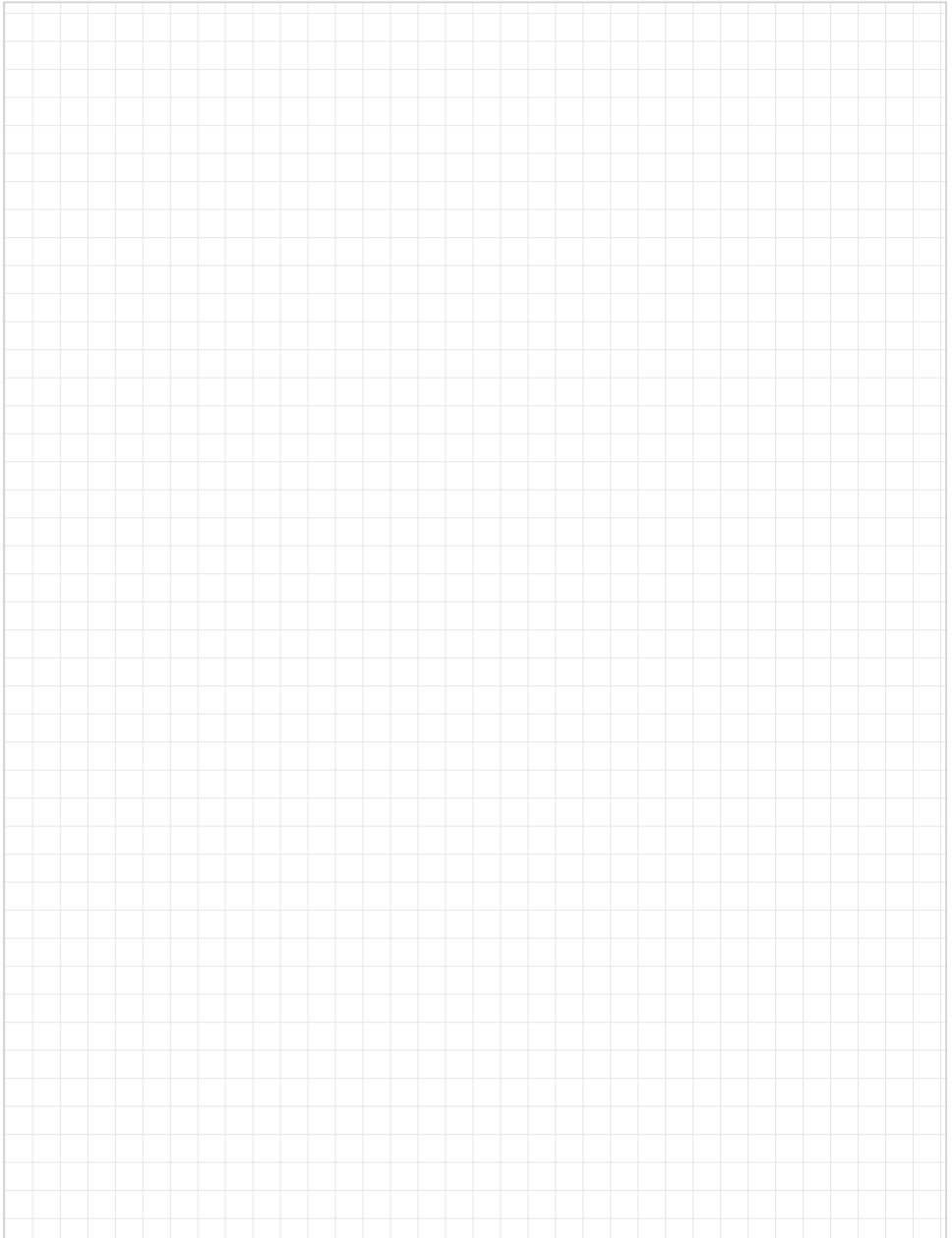
Robotics industry

My sketches



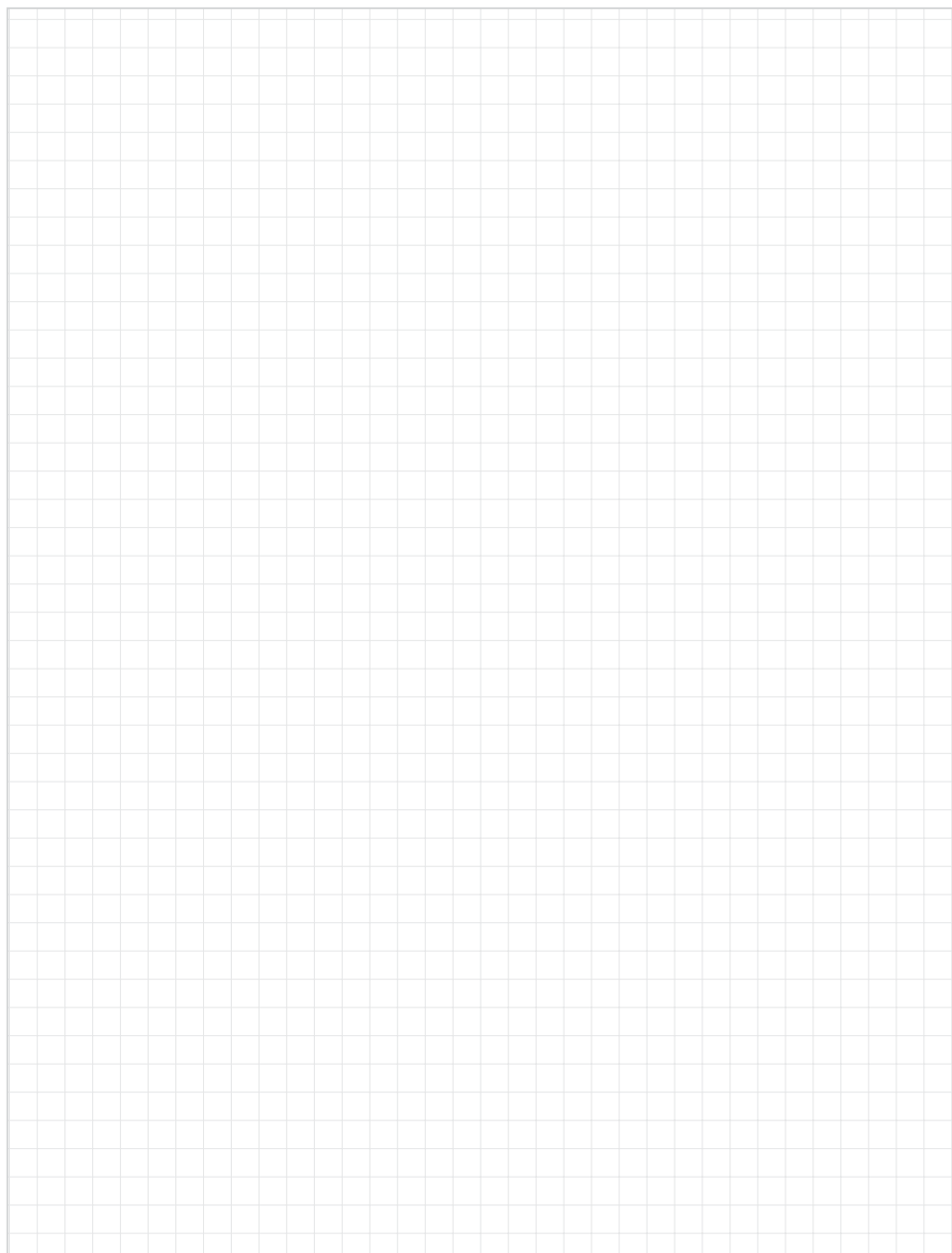
Robotics industry

My sketches



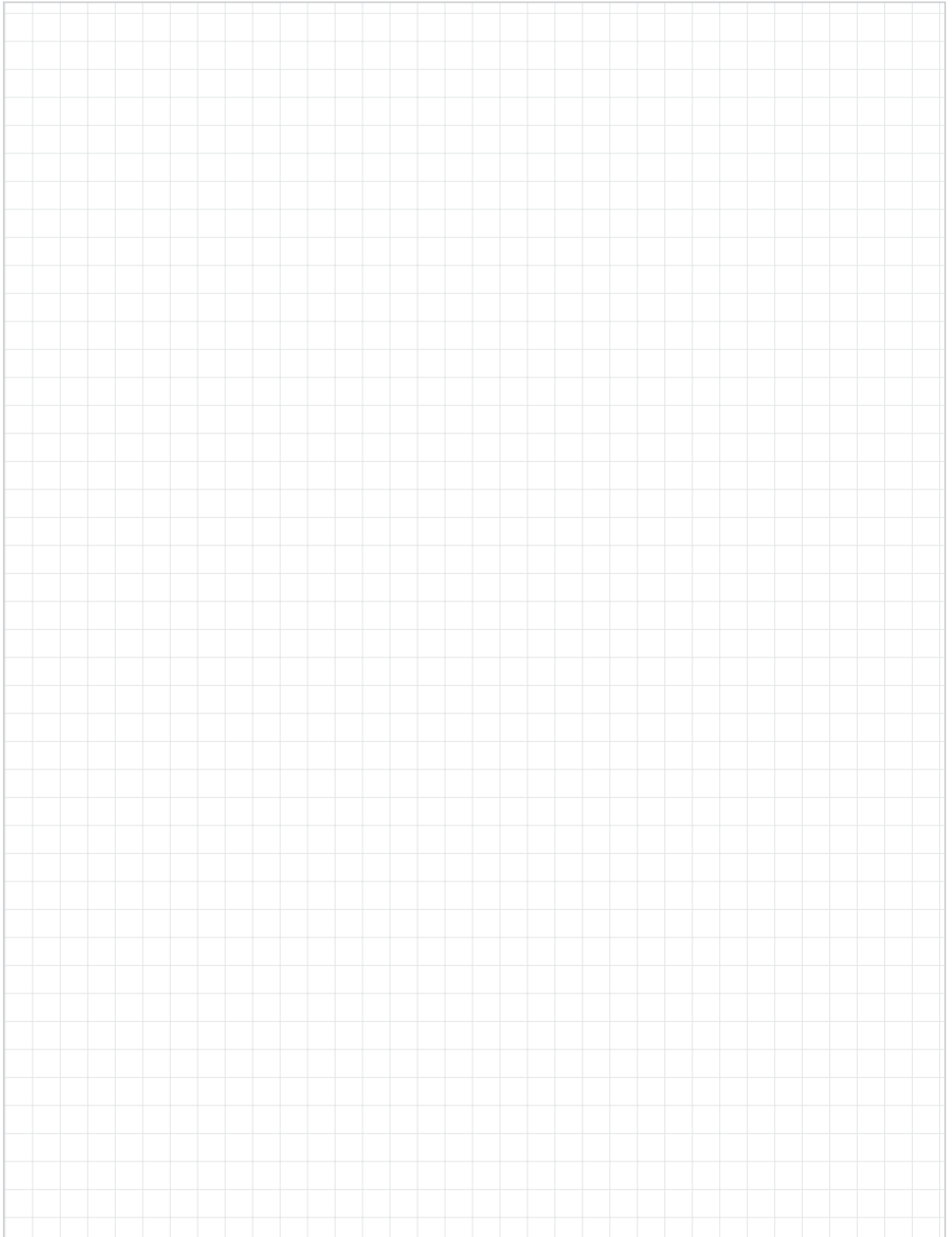
Robotics industry

My sketches



Robotics industry

My sketches



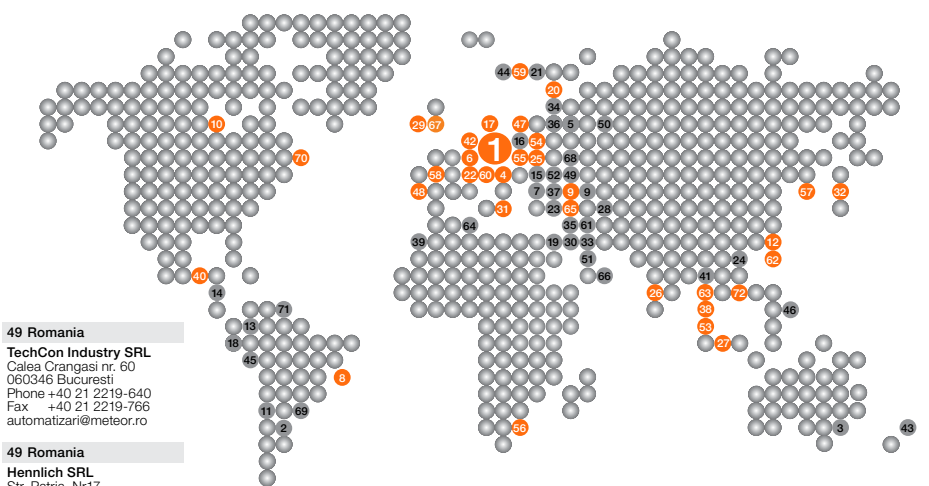


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49 Romania

TechCon Industry SRL
Calea Crangasi nr. 60
060346 Bucuresti
Phone +40 21 2219-640
Fax +40 21 2219-766
automatizari@meteor.ro

49 Romania

Hennlich SRL
Str. Patria, Nr17
310106 Arad
Phone +40 257 21119
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

52 Serbia + Montenegro

Hennlich do Beograd
Radomira Markovica 1/3
11222 Beograd / Srbija
Phone +381 11 63 098 17
Fax +381 11 63 098 20
office@hennlich.rs

53 Singapore-ASEAN HQ

igus® Singapore Pte Ltd
84 Genting Lane
#06-03 Cityneon Design Centre
Singapore 349584
Phone +65 6487 1411
Fax +65 6487 1511
info@igus.com.sg

54 Slovakia

igus® Slovakia s.r.o.
Fatranská 3
949 01 Nitra
Slovakia
Mob. +421 949 459 409
info@igus.sk

54 Slovakia

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

55 Slovenia

Hennlich, d. o. o.
Indrijska tehnika
Podnart 33
SI-4244 Podnart
Phone +386 4 53206-10
Fax +386 4 53206-20
info@hennlich.si

56 South Africa

igus® Pty. Ltd.
Unit 29
Midline Business Park
Cnr Le Roux & Richards Drive
Midrand 1682
Phone +27 11312-1848
Fax +27 11312-1594
sales.sa@igus.de

57 South Korea

igus® Korea Co. Ltd.
613-14 Namchondong,
Namdonggu
Incheon City, 405-846
Phone +82 32 82129-11
Fax +82 32 82129-13
info@igus.kr

58 Spain

igus® S.L.
Ctra. Llobatona, 6
Poligono Noi del Sucre
08840 Viladecans – BCN
Phone +34 936 473950
Fax +34 936 473951
igus.es@igus.es

59 Sweden

igus® AB
Bergs Allé 1
254 52 Helsingborg
Phone +46 42 329270
Fax +46 42 211585
info@igusab.se

59 Sweden – the-chain

OEM Automatic AB
Box 1011 Dalagatan 4
573 28 Tranås
Phone +46 75 2424100
Fax +46 75 2424159
info@aut.oem.se

59 Sweden – dry-tech®

Colly Components AB
Raseborgsgatan 9
P.O. Box 75
164 94 Kista
Phone +46 8 7030100
Fax +46 8 7039841
info@me.colly.se

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
12650 Damascus
Phone +963 311 332 5519
Fax +963 311 334 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
Tharapoom Tower
1550 New Petchaburi Road
Makkasan Rathwahi
Bangkok 10400 Thailand
Phone +66 (0)2 207 0541
Fax +66 (0)2 652 7326
info@igus.co.th

64 Tunisia

BOUDRANT
53, Avenue de Carthage
1000 Tunis – Tunisia
Phone +216 71340244
Fax +216 71348910
info@boudrant.com.tn

65 Turkey

igus® Turkey
Guzeller Org. San. Bölğ.
Galvano Teknik San. Sit.
Cumhuriyet Cad. 2/32
P.K. 41400 Gebze / Kocaeli
Phone +90 262 502 14 06
Fax +90 262 502 14 19
info@igus.com.tr

65 Turkey

HIDREL Hidrolik Elemanlar
Sanayi ve Ticaret A.Ş.
Peremli Sk. No. 7
Tünel Mevkii
34420 Karaköy / Istanbul
Phone +90 212 2494881
Fax +90 212 2920850
info@hidrel.com.tr

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®
Gaswell Rd
Northampton NN4 7PW
Phone +44 1604 677240
Fax +44 1604 677242
sales@igus.co.uk

68 Ukraine

Cominpro Ltd.
Romena Rollana 2,
Office 220
61058 Kharkov
Phone +38 0577174914
Fax +38 0577174914
cominpro@gmail.com

68 Ukraine

Hennlich Ukraine LLC (HQ)
Kramatorska Street 15
84100 Sloviansk City,
Donetsky Region
Phone +38 06262 33540
hennlich@hennlich.com.ua

69 Uruguay

Larrique Rumanes SA
Galicia 1204
Montevideo-Uruguay
Phone +598 29021173
Fax +598-29064824
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

Neumatica Rotonda C.A.
Prolong Av. Michelena
C.C. Atlas Locales B-10 y
B-11
Valencia, Edo. Carabobo
Phone +58 241 832.64.64
+58 241 832.32.50
+58 241 838.88.19
Fax +58 241 832.62.83
ventas@neumaticar.com

72 Vietnam

igus® Vietnam Company Ltd
An Khanh Plaza, 3A Floor
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