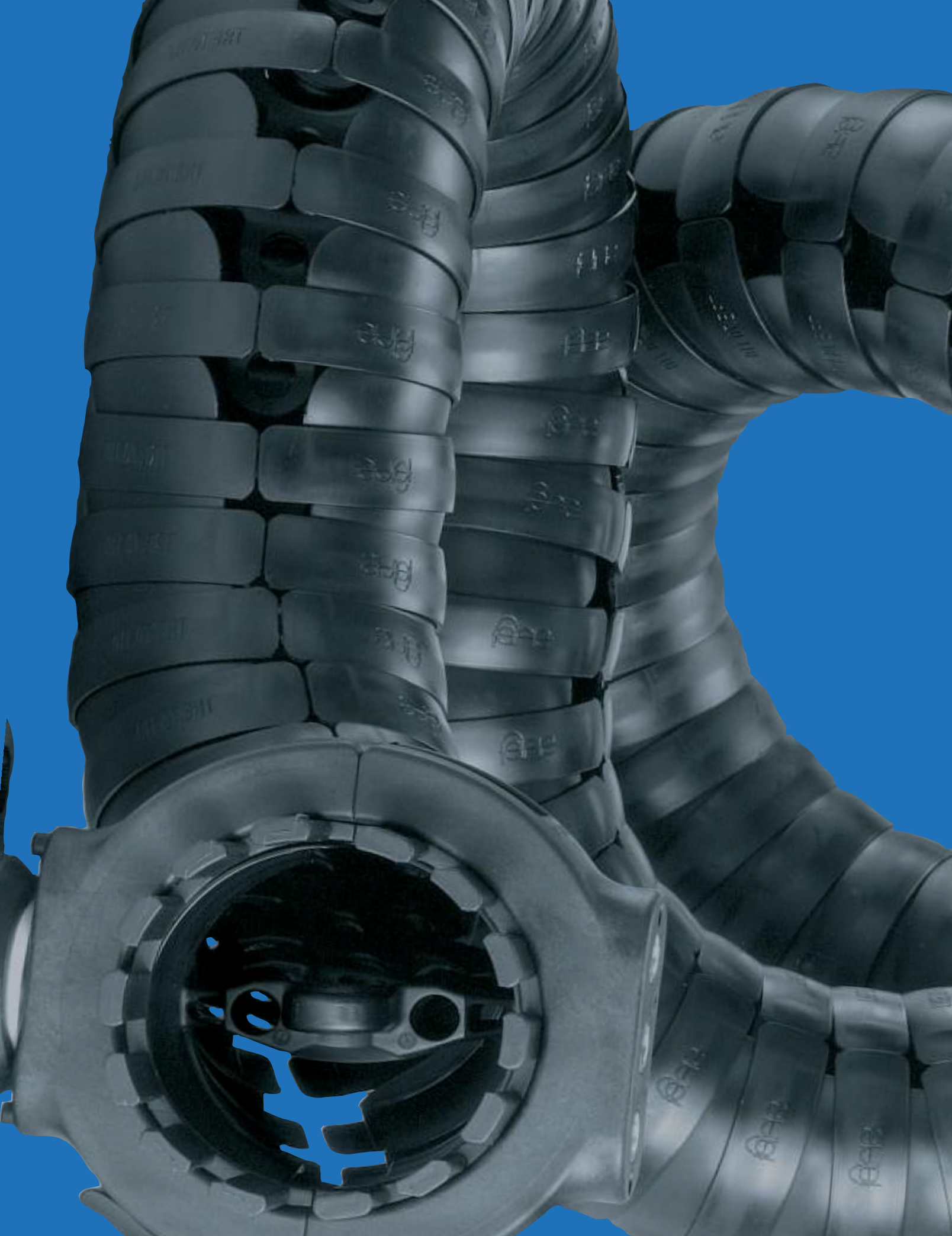






Triflex[®] R E-Z Triflex[®] Triflex[®] TwisterChain[®]

Energy Chain System®

Triflex® R Series

Energy Chains® for robotics applications



The igus® Triflex® R system is the first choice for multiaxis-robots. Three versions are available: TRC: Closed design, TRE: "E-Z" design, easy to fill from outside, TRL: The "light" version of the "E-Z" design. It is universal for reliable energy supply, in general machinery with multi-axis 3D movements

TRC- closed design

- Energy supply for multi-axis 3D-movements
- High torsional stability
- Easy shortening and lengthening
- Small bend radius
- High tensile force capacity
- If a smooth and robust exterior is needed

➤ See page 8.13



TRE- "E-Z" design

- Cables are easy to install and replace
- Energy supply for multi-axis 3D-movements
- High torsional stability
- Easy shortening and lengthening
- Small bend radius
- High tensile force capacity

➤ See page 8.15



TRL- light design

- If a light weight, cost-efficient and easy to fill 3D Energy Chain® is necessary
- If a 3D Energy Chain® for easy 3D-movements is needed
- If an easy to use 3D Energy Chain® is needed
- If a 3D Energy Chain® for nonrobotic-applications is needed

➤ See page 8.17

Energy Chain System®

Triflex® Series

Energy Chains® for robotics applications



The Triflex® series was developed to realize safe energy supply in the case of multi-dimensional movements. In doing so the flexibility of a hose was combined with the stability of an Energy Chain® and its defined radii. 2 versions are available: Easy to fill **E-Z Triflex®** and the closed **Triflex®**.

Simple filling - E-Z Triflex®

- If easy filling and complex movements are necessary
- Very fast cable assembly with "E-Z" principle
- Simple filling from two sides
- For reparations or supplements of existing Triflex® Systems
- For simple 3D-applications

➤ See page 8.31

Closed version Triflex®

- For applications with one, two or three directions of motion (combined circle- and stroke-movements)
- Completely enclosed - protection against dirt and chips

➤ See page 8.43

Rotary motion with TwisterChain®

The TwisterChain® product line offers the biggest selection for rotary movements. TwisterChain® solutions are available with Guide Troughs:

TwisterChain®

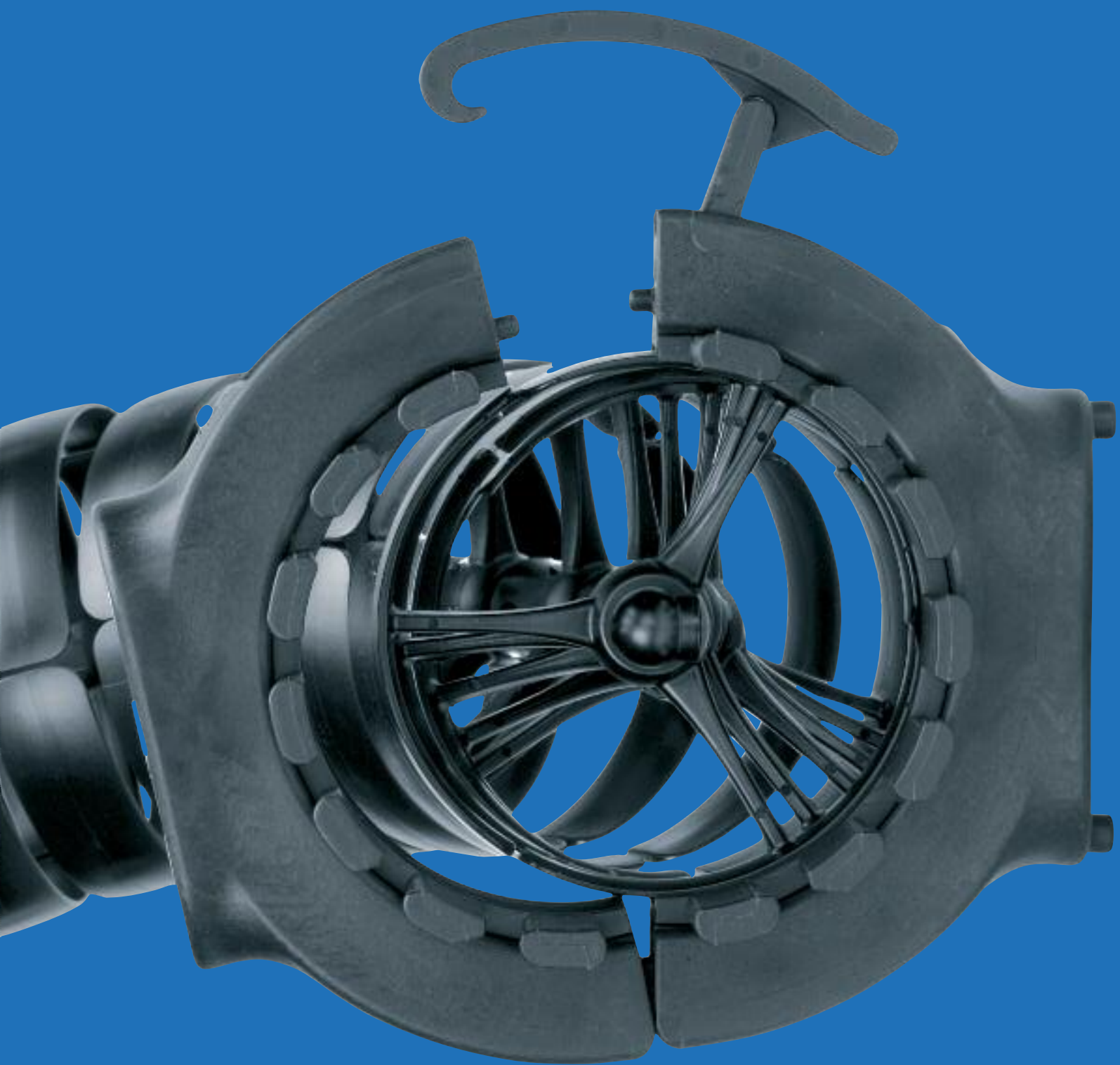
- Modular interior separation
- Crossbars can be opened on both sides
- At rotating speeds up to 90°/s
- igus® TwisterChain® for circular motions up to 540° (with special attachments)

➤ See page 8.57



Triflex[®] R





Triflex® R - 3-dimensional Energy Chains® for robots

Triflex® R is the third generation of multi-axis Energy Chains®. Design features include:

- Optional fiber rod for spring loading of the Triflex® R
- Approximately $\pm 10^\circ$ twist per chain link
- High tensile strength of the ball-and-socket joint
- Easy assembly and modification due to single molded link design. No support elements (steel cables, spring suspensions etc.) are necessary

The Triflex® R product family now comprises more than 100 components meeting all requirements ranging from those of small palleting robots to large welding robots.

Typical industries and applications

- Robotics/Automation
- Machine tools
- Handling machines - 6-axis
- Packaging machines
- General mechanical engineering, etc.



IF-Design awards for
TRC and TRL-design



Series TRC - Electrically conductive
ESD/ATEX version upon request



Cleanroom suitability
upon request



UL94-V2
classification





Triflex® RS - universal module for all motions on a robot

Triflex® RS is a very compact universal assembly that is mounted to installation points available on the robot. Thanks to the low profile and the Triflex® R cable carrier parallel to the robotic arm, applications with extremely low installation space can be achieved.



Fiber-rod module for directed pretension and universal assembly kit for multifaceted adjustments



Triflex® R Set - Routed closely on the robotic arm for extreme flatness

Energy Chain System®

Series Triflex® R

Selection Guide



TRC Version -
closed design

TRE Version - "E-Z" design-
simply press cables in



TRL Version - 3-chamber system -
the "light" version of the "E-Z"
design simply press cables in

Select this system for:

- The first choice for multi-axis-robots
- **Three versions are available:** TRC: Closed design, TRE: "E-Z" design, easy to fill from outside, TRL: The "light" version of the "E-Z" design
- Universal for general machinery
- Multi-axis (3D) movement
- High torsional stability
- Easy shortening and lengthening
- Smooth interior and exterior edges (TRC)
- Small bend radius
- 1 Ball-and-2 socket principle
- Cables easy to assemble and to replace (TRE/TRL-version)
- Triflex® R-Set - compact module for all movements on robots, which can be fixed on existing fastening points
- TRL - one piece, very lightweight
- High tensile strengths without additional elements like steel cable and spring elements etc
- You can find more technical data about the material, chemical resistance, temperatures ► **Design, Chapter 1**

Selection table

Series	Inner height		max. cable ø		Outer width		Bending radii		Pitch	
	Bi 1 in. (mm)	Bi 2 in. (mm)	d1 in. (mm)	d2 in. (mm)	Ba in. (mm)	R in. (mm)			in. (mm)	

"TRC" - Triflex® R closed design, dirt-resistant

TRC-30	.47 (12)	.39 (10)	.39 (10)	.31 (8)	1.36 (34.5)	1.97 (50)	.44 (11.3)
TRC-40	.59 (15)	.51 (13)	.51 (13)	.43 (11)	1.69 (43)	2.28 (58)	.55 (13.9)
TRC-60	.88 (22.5)	.77 (19.5)	.81 (20.5)	.69 (17.5)	2.56 (65)	3.43 (87)	.80 (20.4)
TRC-70	1.10 (28)	.94 (24)	1.02 (26)	.87 (22)	3.19 (81)	4.33 (110)	1.01 (25.6)
TRC-85	1.30 (33)	1.10 (28)	1.22 (31)	1.02 (26)	3.72 (94.5)	5.31 (135)	1.20 (30.6)
TRC-100	1.48 (37.5)	1.28 (32.5)	1.40 (35.5)	1.20 (30.5)	4.25 (108)	5.71 (145)	1.36 (34.5)
TRC-125**	1.70 (43.3)	1.70 (43.3)	1.61 (41)	1.61 (41)	5.31 (135)	7.17 (182)	1.76 (44.6)

"TRE" - Triflex® R "E-Z" design for fast installation of cables

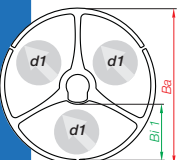
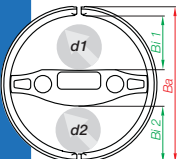
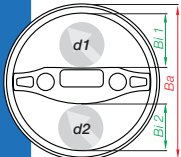
TRE-30	.47 (12)	.39 (10)	.39 (10*)	.31 (8*)	1.36 (34.5)	1.97 (50)	.44 (11.3)
TRE-40	.59 (15)	.51 (13)	.51 (13*)	.43 (11*)	1.69 (43)	2.28 (58)	.55 (13.9)
TRE-60	.88 (22.5)	.77 (19.5)	.81 (20.5*)	.69 (17.5*)	2.56 (65)	3.43 (87)	.80 (20.4)
TRE-70	1.10 (28)	.94 (24)	1.02 (26*)	.87 (22*)	3.19 (81)	4.33 (110)	1.01 (25.6)
TRE-85	1.30 (33)	1.10 (28)	1.22 (31*)	1.02 (26*)	3.72 (94.5)	5.31 (135)	1.20 (30.6)
TRE-100	1.48 (37.5)	1.28 (32.5)	1.40 (35.5*)	1.20 (30.5*)	4.25 (108)	5.71 (145)	1.36 (34.5)
TRE-125**	1.70 (43.3)	1.70 (43.3)	1.61 (41*)	1.61 (41*)	5.31 (135)	7.17 (182)	1.76 (44.6)

"TRL" - a light and economical alternative with an "E-Z" design

TRL-30	.47 (12)	.39 (10)	.39 (10*)	.31 (8*)	1.36 (34.5)	1.97 (50)	.44 (11.3)
TRL-40	.59 (15)	—	.51 (13*)	—	1.69 (43)	2.28 (58)	.55 (13.9)
TRL-60	.91 (23)	—	.81 (20.5*)	—	2.56 (65)	3.43 (87)	.80 (20.4)
TRL-70	1.10 (28)	—	1.02 (26*)	—	3.19 (81)	4.33 (110)	1.01 (25.6)
TRL-100	1.50 (38)	—	1.40 (35.5*)	—	4.25 (108)	5.31 (145)	1.36 (34.5)

* For quick and easy insertion / removal of cables using the E-Z Chain® principle, we recommend a maximum cable diameter of 70% of the specified value.

** If shortening/lengthening of a "filled" Triflex® TRC/TRE-125 is required, cable diameter changes to Ø 1.42" (36 mm).



Energy Chain System®

Series Triflex® R

Assembly Instructions - TRC Series

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



Hold two pieces together at inner radius and move socket up against the ball's wedged end

Separating | TRC-30 · TRC-40 · TRC-60



Bend Triflex® R into its radius and twist apart, counter-clockwise

Separating | TRC-70 · TRC-85 · TRC-100



Insert screwdriver into the opening of the socket from the top. Then twist apart, counter-clockwise

Assembly | Separating | TRC-125



Connector principle = Ball head clevis joint (similar to the proven trailer hitch design)
Improved assembly/disassembly for large sizes. Faster assembly with less effort

Energy Chain System®

Series Triflex® R

Assembly Instructions - TRE Series

Assembly | TRE-30 · TRE-40 · TRE-60 · TRE-70 · TRE-85 · TRE-100



Hold two pieces together at inner radius and move socket up against the ball's wedged end.

Push until a clicking sound indicates a secure fit of socket onto the ball (Energy Chain® section exposed for the purpose of demonstration)

Separating | TRE-30 · TRE-40 · TRE-60



Bend Triflex® R into its radius and twist apart, counter-clockwise

Separating | TRE-70 · TRE-85 · TRE-100



Insert screwdriver into the opening of the socket from the top. Then twist apart, counter-clockwise

Filling | TRE-30 · TRE-40 · TRE-60 · TRE-70 · TRE-85 · TRE-100



Easy to fill - simply press cables in...

...and easy to take the cables out

Energy Chain System®

Series Triflex® R

Assembly Instructions - TRL Series

Assembly | TRL-30 · TRL-40 · TRL-60 · TRL-70 · TRL-100



igus® Triflex® R TRL - very easy to assemble - simply press the ball into the socket, ready!

Separating | TRL-30 · TRL-40 · TRL-60 · TRL-70 · TRL-100



Just twist the ball slightly to remove it from its socket

Filling | TRL-40 · TRL-30 · TRL-60 · TRL-70 · TRL-100



Easy to fill - simply press cables in...

...and easy to take the cables out

Installation | Mounting bracket in this case, a "light" bracket with an intermediate connection



Easy assembly - open the mounting bracket, install the chain and snap the mounting bracket shut again.

To open, push a screwdriver against one side or manually pry apart

Price Index



Series Triflex® TRC

Special Options Available



Cleanroom suitability upon request



iF-Design Award Winner
Triflex® R Series



ESD classification:
Electrically conductive
ESD/ATEX version upon request



Flammability Class
VDE 0304 IIC UL94 V2

Assembly Tips



Easy assembly and quick access to cables and hoses thanks to a unique ball-and-socket design.

Usage Guidelines



- If a secure cable guide is required for multi-dimensional (3D-) movements
- If high torsional stability is required
- If the system has to be shortened or lengthened easily
- If a small bending radius is required
- If high tensile strength is important



- For circular movements with high loads
➤ **TwisterChain System**
- If simple filling is required
➤ **Triflex® R, TRE**
- If a simpler and cost effective solution is required
➤ **Triflex® R, TRL**

Features & Benefits

- 1 High stability - Due to outer stop dogs, defined stops for radius and torsion
- 2 Easy installation and dismantling - An injection molded component. No other components (steel cables, spring suspensions etc.) are required
- 3 High tensile strength due to special ball-and-socket principle, enables flexible movement along all axes
- 4 Impact-resistant, dirt-repelling, rugged and abrasion-resistant, smooth, rounded exterior
- 5 Triflex® R-Set - compact module for all movements on robots, which can be fixed on existing fastening points
- 6 Able to move multi-dimensionally - High degree of flexibility, even on the 6th axis. Twist up to approx. $\pm 10^\circ$ per link possible in longitudinal axis. This assists guiding the cables and lines around difficult configurations
- 7 Small bend radius & short pitch - Space-saving installation
- 8 Easy attachment onto the robot/machine reduces setup time



Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example: 6.56 ft (2m) or 144 links

6.56 ft (2 m) TRC-40-058-0



Energy Chain®

1 set mounting bracket with strain relief TR40-01



Mounting Bracket

2 intermediate links without strain relief TR40-02



Mounting Bracket

+23.6" (600 mm) fiber rods TRCF-40-0600-1

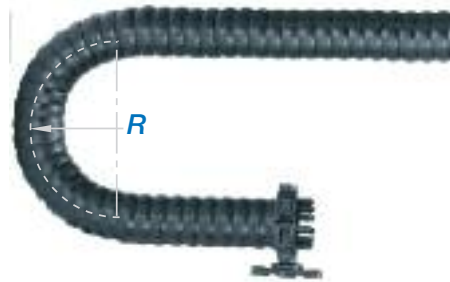
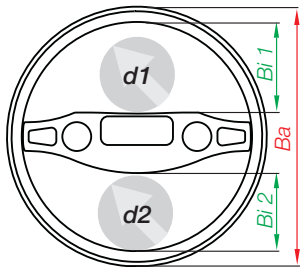


Fiber Rods

Energy Chain System® Series Triflex® R TRC - Fully enclosed



Triflex® R
TRC



"TRC" - Triflex® R closed design, dirt-resistant

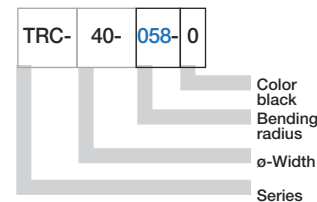
Series	Inner height				max. cable ø				Outer width		Bending radii	
	Bi 1		Bi 2		d1		d2		Ba		R	
	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)
TRC-30-050-0	.47	(12)	.39	(10)	.39	(10)	.31	(8)	1.36	(34.5)	1.97	(50)
TRC-40-058-0	.59	(15)	.51	(13)	.51	(13)	.43	(11)	1.69	(43)	2.28	(58)
TRC-60-087-0	.88	(22.5)	.77	(19.5)	.81	(20.5)	.69	(17.5)	2.56	(65)	3.43	(87)
TRC-70-110-0	1.10	(28)	.94	(24)	1.02	(26)	.87	(22)	3.19	(81)	4.33	(110)
TRC-85-135-0	1.30	(33)	1.10	(28)	1.22	(31)	1.02	(26)	3.72	(94.5)	5.31	(135)
TRC-100-145-0	1.48	(37.5)	1.28	(32.5)	1.40	(35.5)	1.20	(30.5)	4.25	(108)	5.71	(145)
TRC-125-182-0**	1.70	(43.3)	1.70	(43.3)	1.61	(41)	1.61	(41)	5.31	(135)	7.17	(182)

* For quick and easy insertion / removal of cables using the E-Z Chain® principle, we recommend a maximum cable diameter of 70% of the specified value.

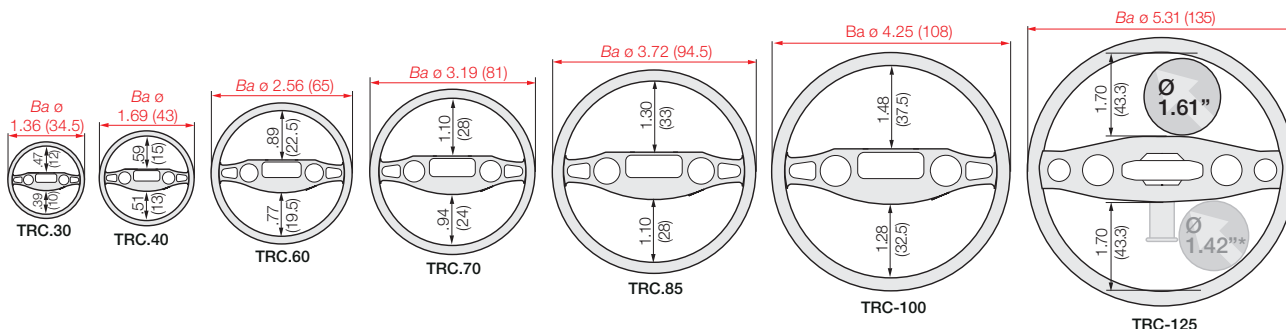
** If shortening/lengthening of a "filled" Triflex® TRC-125 is required, cable diameter changes to Ø 1.42" (36 mm).

Part No.	Pitch		Weight		Links	
	in.	(mm)	lbs/ft	(kg/m)	links/ft	links/ m
TRC-30-	.44	(11.3)	≈ 0.18	≈ 0.27	27.27	(89)
TRC-40-	.55	(13.9)	≈ 0.25	≈ 0.37	21.82	(72)
TRC-60-	.80	(20.4)	≈ 0.57	≈ 0.85	15.00	(49)
TRC-70-	1.01	(25.6)	≈ 0.89	≈ 1.32	11.88	(39)
TRC-85-	1.20	(30.6)	≈ 1.18	≈ 1.75	10.00	(33)
TRC-100-	1.36	(34.5)	≈ 1.60	≈ 2.38	8.82	(29)
TRC-125-**	1.76	(44.6)	≈ 3.16	≈ 4.70	6.82	(23)

Part No. structure



Series TRC - Dimensions



Material - permitted temperature

igumid NB / -40°F (-40°C) up to +176°F (+80° C)

Flammability Class, igumid NB

VDE 0304 IIC UL94 V2

Technical Data



Details of material
properties

► Chapter 1

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFO: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Price Index



Series Triflex® TRE

Special Options Available



Cleanroom suitability upon request



Flammability Class
VDE 0304 IIC UL94 V2

Assembly Tips



Easy to fill - simply press cables in - "E-Z" Principle

Usage Guidelines



- When an easy to fill 3D Energy Chain® is needed
- If a secure cable guide is required for multi-dimensional 3D-movements
- If high torsional stability is required
- If the system has to be shortened or lengthened easily
- If a small bending radius is required
- If high tensile strength is important



- For circular movements with high loads
 - TwisterChain® System
- If a fully enclosed solution is required
 - Triflex® R, TRC
- If a more simple and cost effective solution is required
 - Triflex® R, TRL

Features & Benefits

- 1 For special cases also available: Fibre rods, universal assembly kit and FlexBar
- 2 Impact-resistant, dirt-repelling, rugged and abrasion-resistant, smooth, rounded exterior
- 3 Easy opening mechanism for easy filling with cable and hose packages
- 4 High tensile strength due to special ball-and-socket principle, enables flexible movement along all axes
- 5 Triflex® R-Set - compact module for all movements on robots, which can be fixed on existing fastening points
- 6 Easy installation and dismantling - An injection molded component. No other components (steel cables, spring suspensions etc.) are required
- 7 Able to move multi-dimensionally - High degree of flexibility, even on the 6th axis. Twist up to approx. $\pm 10^\circ$ per link possible in longitudinal axis. This assists guiding the cables and lines around difficult configurations
- 8 Small bend radius & short pitch - Space-saving installation
- 9 High stability - Due to outer stop dogs, defined stops for radius and torsion
- 10 Easy attachment onto the robot/machine reduces setup time



Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example: 6.56 ft (2m) or 144 links

6.56 ft (2 m) TRE-40-058-0



Energy Chain®

1 set mounting bracket with strain relief TR40-01



Mounting Bracket

2 intermediate links without strain relief TR40-02



Mounting Bracket

+23.6" (600 mm) fiber rods TREF-40-0600-1

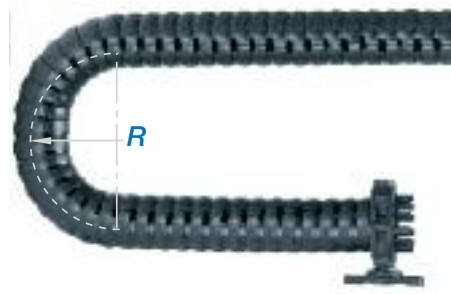
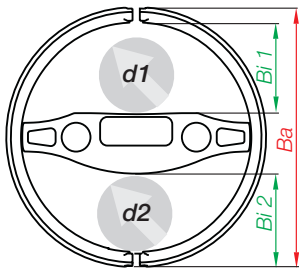


Fiber Rods

Energy Chain System® Series Triflex® R TRE - Easy to fill



Triflex® R
TRE



"TRE" - Triflex® R E-Z design, dirt-resistant

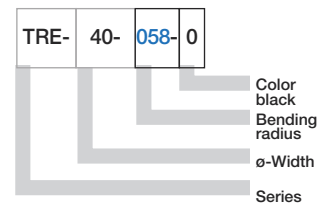
Series	Inner height				max. cable ø				Outer width		Bending radii	
	Bi 1		Bi 2		d1		d2		Ba		R	
	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)
TRE-30-050-0	.47	(12)	.39	(10)	.39	(10*)	.31	(8*)	1.36	(34.5)	1.97	(50)
TRE-40-058-0	.59	(15)	.51	(13)	.51	(13*)	.43	(11*)	1.69	(43)	2.28	(58)
TRE-60-087-0	.88	(22.5)	.77	(19.5)	.81	(20.5*)	.69	(17.5*)	2.56	(65)	3.43	(87)
TRE-70-110-0	1.10	(28)	.94	(24)	1.02	(26*)	.87	(22*)	3.19	(81)	4.33	(110)
TRE-85-135-0	1.30	(33)	1.10	(28)	1.22	(31*)	1.02	(26*)	3.72	(94.5)	5.31	(135)
TRE-100-145-0	1.48	(37.5)	1.28	(32.5)	1.40	(35.5*)	1.20	(30.5*)	4.25	(108)	5.71	(145)
TRE-125-182-0**	1.70	(43.3)	1.70	(43.3)	1.61	(41*)	1.61	(41*)	5.31	(135)	7.17	(182)

* For quick and easy insertion / removal of cables using the E-Z Chain® principle, we recommend a maximum cable diameter of 70% of the specified value.

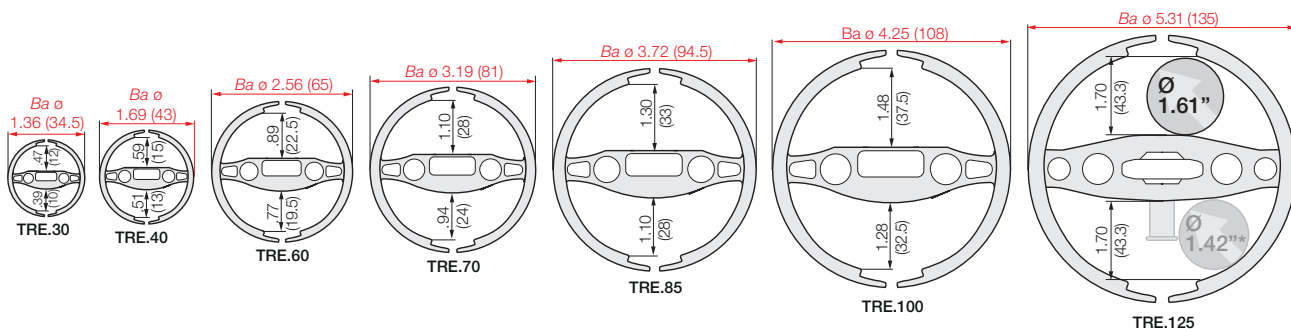
** If shortening/lengthening of a "filled" Triflex® TRE-125 is required, cable diameter changes to Ø 1.42" (36 mm).

Part No.	Pitch		Weight		Links	
	in.	(mm)	lbs/ft	(kg/m)	links/ft	links/ m
TRE-30-	.44	(11.3)	≈ 0.18	≈ 0.27	27.27	(89)
TRE-40-	.55	(13.9)	≈ 0.25	≈ 0.37	21.82	(72)
TRE-60-	.80	(20.4)	≈ 0.57	≈ 0.85	15.00	(49)
TRE-70-	1.01	(25.6)	≈ 0.89	≈ 1.32	11.88	(39)
TRE-85-	1.20	(30.6)	≈ 1.18	≈ 1.75	10.00	(33)
TRE-100-	1.36	(34.5)	≈ 1.60	≈ 2.38	8.82	(29)
TRE-125-*	1.76	(44.6)	≈ 3.16	≈ 4.70	6.82	(23)

Part No. structure



Series TRE - Dimensions



Material - permitted temperature

igumid NB / -40°F (-40°C) up to +176°F (+80° C)

Flammability Class, igumid NB

VDE 0304 IIC UL94 V2

Technical Data



Details of material properties

► Chapter 1

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Price Index



Series Triflex® TRC

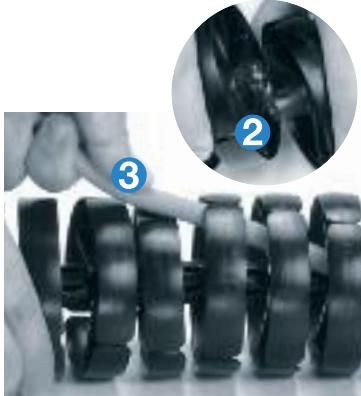
Special Options Available



Cleanroom suitability upon request

iF-Design Award Winner
Triflex® R SeriesFlammability Class
VDE 0304 IIC UL94 V2

Assembly Tips



To close, push and click shut

Usage Guidelines



- When an easy to fill, economical 3D Energy Chain® is needed
- When 3D Energy Chain® for easily manageable operating conditions is needed
- When a very easy to use 3D Energy Chain® is needed



- For circular movements with high loads
➤ **System TwisterChain®**
- If a fully enclosed solution is required
➤ **Triflex® R - TRC**
- When a rugged, easy to fill variant is needed
➤ **Triflex® R - TRE**

Features & Benefits

- 1 Triflex® R light - save twice on purchasing and installation, single-piece element, easy to fill using Easy Chain® principle, matching Triflex® R standard mounting brackets
- 2 High tensile strength due to special ball-and-socket principle, enables flexible movement along all axes
- 3 Easy opening mechanism for easy filling with cable and hose packages
- 4 Easy installation and dismantling - An injection molded component. No other components (steel cables, spring suspensions etc.) are required
- 5 Able to move multi-dimensionally - High degree of flexibility, even on the 6th axis. Twist up to approx. $\pm 10^\circ$ per link possible in longitudinal axis. This assists guiding the cables and lines around difficult configurations
- 6 Small bend radius & short pitch - Space-saving installation
- 7 Economical and light mounting bracket with strain relief or intermediate link



Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example: 6.56 ft (2m) or 144 links

6.56 ft (2 m) xxx-xx-xxx



Energy Chain®

1 set mounting bracket with strain relief TR70-01-Z1

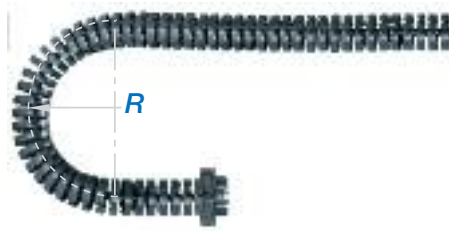
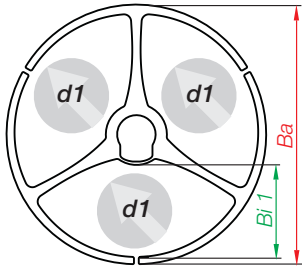


Mounting Bracket

Energy Chain System® Series Triflex® R TRL - Light and economical



Triflex® R
TRL



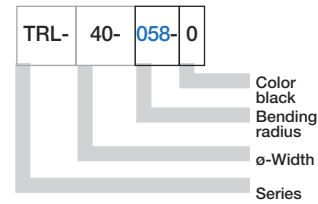
"TRL" - a light and economical alternative with an "E-Z" design

Series	Inner height				max. cable ø				Outer width		Bending radii	
	Bi 1		Bi 2		d1		d2		Ba		R	
	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)
TRL-30-050-0	.47	(12)	.39	(10)	.39	(10*)	.31	(8*)	1.36	(34.5)	1.97	(50)
TRL-40-058-0	.59	(15)	—	—	.51	(13*)	—	—	1.69	(43)	2.28	(58)
TRL-60-087-0	.91	(23)	—	—	.81	(20.5*)	—	—	2.56	(65)	3.43	(87)
TRL-70-110-0	1.10	(28)	—	—	1.02	(26*)	—	—	3.19	(81)	4.33	(110)
TRL-100-145-0	1.50	(38)	—	—	1.40	(35.5*)	—	—	4.25	(108)	5.31	(145)

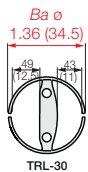
* For quick and easy insertion / removal of cables using the E-Z Chain® principle, we recommend a maximum cable diameter of 70% of the specified value.

Part No.	Pitch		Weight		Links	
	in.	(mm)	lbs/ft	(kg/m)	links/ft	links/ m
TRL-30-	.44	(11.3)	≈ 0.18	≈ 0.27	27.27	(89)
TRL-40-	.55	(13.9)	≈ 0.25	≈ 0.37	21.82	(72)
TRL-60-	.80	(20.4)	≈ 0.57	≈ 0.85	15.00	(49)
TRL-70-	1.01	(25.6)	≈ 0.89	≈ 1.32	11.88	(39)
TRL-100-	1.36	(34.5)	≈ 1.60	≈ 2.38	8.82	(29)

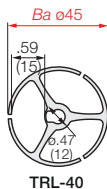
Part No. structure



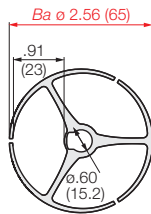
Series TRL - Dimensions



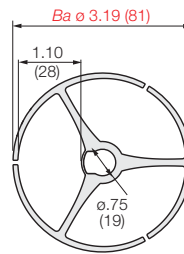
TRL-30



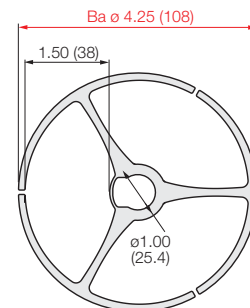
TRL-40



TRL-60



TRL-70



TRL-100

Material - permitted temperature

igumid NB / -40°F (-40°C) up to +176°F (+80° C)

Flammability Class, igumid NB

VDE 0304 IIC UL94 V2

Technical Data



Details of material
properties

► Chapter 1

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/Rfq: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS

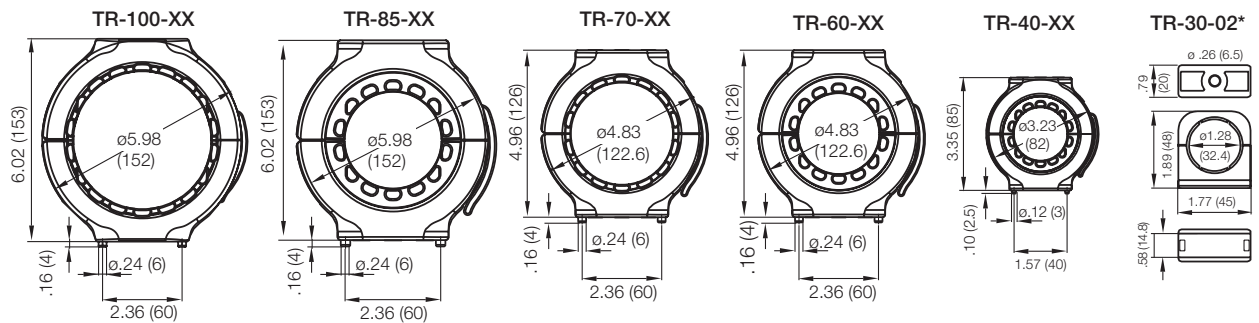
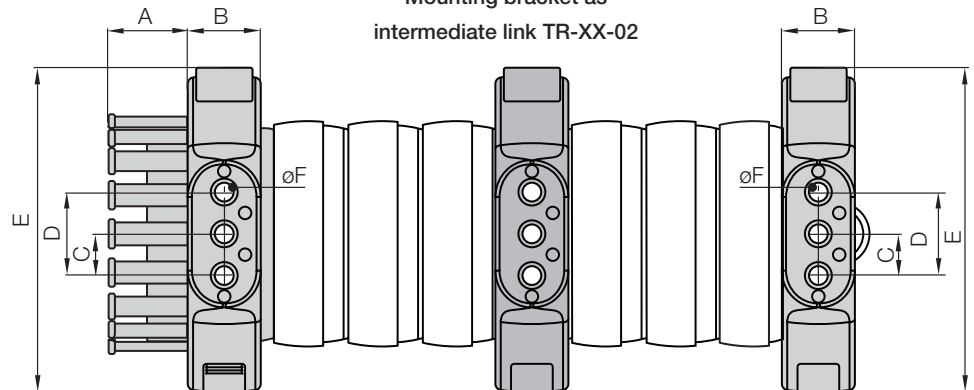
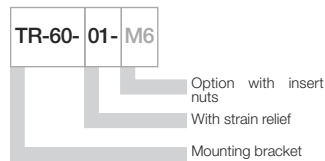


**Option 1: Standard mounting brackets**

- Quick and easy installation
- Short downtimes when swapping a harnessed Triflex® R system
- Mounting bracket **1** with strain relief available
- Mounting bracket also as **2** intermediate link
- Quick assembly by means of snap lock
- Bracket holes for common robot types
- Can be attached at the ends or anywhere in between

Mounting bracket with
strain relief TR-XX-01Mounting bracket without
strain relief TR-XX-02Mounting bracket as
intermediate link TR-XX-02

Part No. structure



For Series	Mounting bracket with strain relief	Mounting bracket as intermediate link	A in. (mm)	B in. (mm)	C in. (mm)	D in. (mm)	E in. (mm)	ØF in. (mm)
TRC/TRE/TRL-30- ➔	—	TR-30-02	*	*	*	*	*	*
TRC/TRE/TRL-40- ➔	TR-40-01-M6	TR-40-02-M6	.70 (17.8)	.83 (21)	.53 (13.5)	1.06 (27)	3.35 (85)	.26 (6.5)
TRC/TRE/TRL-60- ➔	TR-60-01-M8	TR-60-02-M8	.98 (25)	1.38 (35)	.79 (20)	1.57 (40)	4.96 (126)	.35 (9)
TRC/TRE/TRL-70- ➔	TR-70-01-M8	TR-70-02-M8	.98 (25)	1.38 (35)	.79 (20)	1.57 (40)	4.96 (126)	.35 (9)
TRC/TRE-85- ➔	TR-85-01-M8	TR-85-02-M8	1.57 (40)	1.38 (35)	.79 (20)	1.57 (40)	6.02 (153)	.35 (9)
TRC/TRE/TRL-100- ➔	TR-100-01-M8	TR-100-02-M8	1.50 (38)	1.38 (35)	.79 (20)	1.57 (40)	6.02 (153)	.35 (9)

TRC/TRE-125 Dimensions and delivery time upon request!

* = dimensions in drawing

Strain relief is possible on the moving end and/or the fixed end.

Standard: Trough holes in ØF - Option: with insert nuts, steel, M6/M8

Energy Chain System® Series Triflex® R Light Duty Mounting Brackets

igus®

Triflex®
R



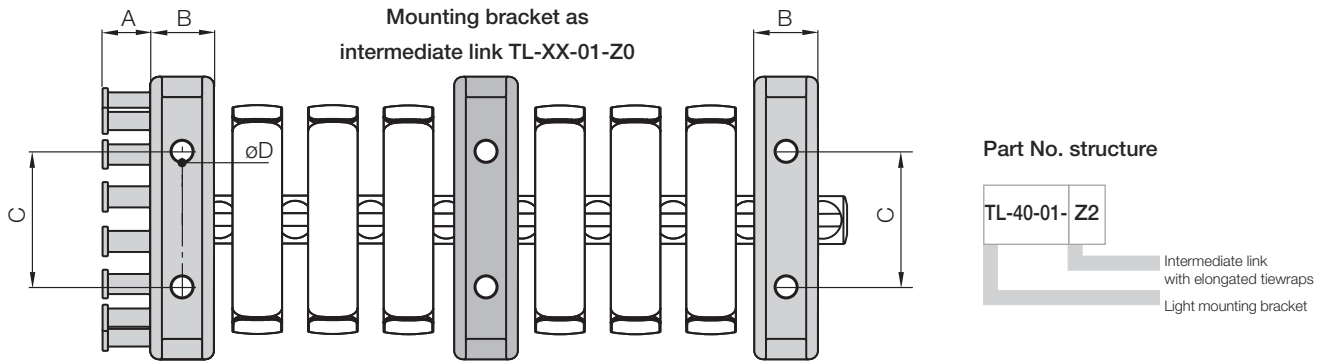
Option 2: Light mounting brackets

- Standard for TRL version, also compatible with all Triflex® R versions (TRC/TRE)
- Mounting bracket ① with strain relief available
- Mounting bracket also as ② intermediate link available
- Economical and light
- For simple 3D-movements and loads
- Consists of two halves - easy to assemble

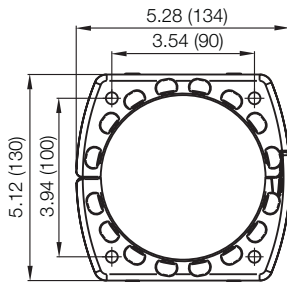


Mounting bracket with
strain relief TL-XX-01-Z2

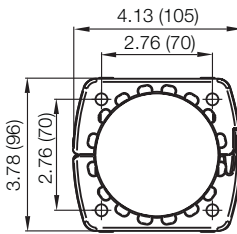
Mounting bracket without
strain relief TL-XX-01-Z0



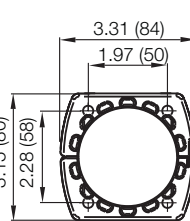
TL-100



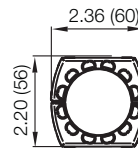
TL-70



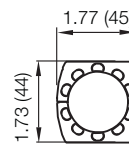
TL-60



TL-40



TL-30



For Series Style

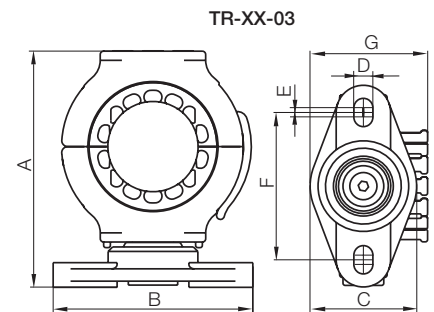
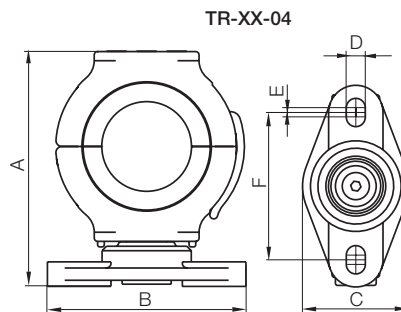
		Part No.	A in. (mm)	B in. (mm)	C in. (mm)	D in. (mm)
TRE/TRC/TRL-30	➤ Without Tiewraps	TL-30-01-Z0	—	.51 (13)	.94 (24)	.18 (4.5)
	➤ With Standard Tiewraps	TL-30-01-Z1	.49 (12.5)	.51 (13)	.94 (24)	.18 (4.5)
TRE/TRC/TRL-40	➤ Without Tiewraps	TL-40-01-Z0	—	.55 (14)	1.42 (36)	.23 (5.8)
	➤ With Standard Tiewraps	TL-40-01-Z1	.49 (12.5)	.55 (14)	1.42 (36)	.23 (5.8)
	➤ With Elongated Tiewraps	TL-40-01-Z2	.79 (20)	.55 (14)	1.42 (36)	.23 (5.8)
TRE/TRC/TRL-60	➤ Without Tiewraps	TL-60-01-Z0	—	.79 (20)	1.89 (48)	.23 (5.8)
	➤ With Standard Tiewraps	TL-60-01-Z1	.67 (17)	.79 (20)	1.89 (48)	.23 (5.8)
	➤ With Elongated Tiewraps	TL-60-01-Z2	1.06 (27)	.79 (20)	1.89 (48)	.23 (5.8)
TRE/TRC/TRL-70	➤ Without Tiewraps	TL-70-01-Z0	—	1.06 (27)	2.52 (64)	.26 (6.5)
	➤ With Standard Tiewraps	TL-70-01-Z1	.69 (17.5)	1.06 (27)	2.52 (64)	.26 (6.5)
	➤ With Elongated Tiewraps	TL-70-01-Z2	1.08 (27.5)	1.06 (27)	2.52 (64)	.26 (6.5)
TRE/TRC/TRL-100	➤ Without Tiewraps	TL-100-01-Z0	—	1.18 (30)	2.52 (64)	.26 (6.5)
	➤ With Standard Tiewraps	TL-100-01-Z1	.89 (22.5)	1.18 (30)	2.52 (64)	.26 (6.5)
	➤ With Elongated Tiewraps	TL-100-01-Z2	1.67 (42.5)	1.18 (30)	2.52 (64)	.26 (6.5)

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFO: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Option 3: Swivel mounting brackets

- Swivel bearings are used to lessen the motion of the cables requiring guidance, while allowing for extreme twisting and bending. This relieves cables with highly sensitive bending radii (such as fiber optic cables) when following a robot's movements.
- Available in 2 designs (with or without strain relief)
- Pivoting bearing with a maintenance-free igubal® ball-and-socket joint
- Minimization of critical bending cycles
- Gentler motion

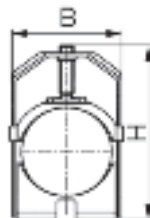
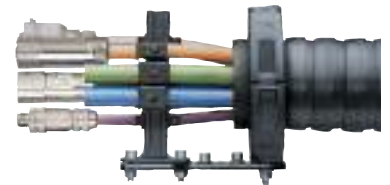


For Series	Swivel bracket with tiewrap plate	Swivel bracket as intermediate link	A in. (mm)	B in. (mm)	C in. (mm)	D in. (mm)	E in. (mm)	F in. (mm)	G* in. (mm)
TRC/TRE/TRL-40	TR-40-03	TR-40-04	4.13 (105)	3.50 (89)	1.85 (47)	.33 (8.4)	.19 (4.1)	2.56 (65)	2.03 (51.8)
TRC/TRE/TRL-60	TR-60-03	TR-60-04	5.98 (152)	4.65 (118)	2.56 (65)	.41 (10.5)	.24 (5.5)	3.44 (87.5)	2.89 (73.5)
TRC/TRE/TRL-70	TR-70-03	TR-70-04	5.98 (152)	4.65 (118)	2.56 (65)	.41 (10.5)	.24 (5.5)	3.44 (87.5)	2.89 (73.5)
TRC/TRE-85	TR-85-03	TR-85-04	7.05 (179)	4.65 (118)	2.56 (65)	.41 (10.5)	.24 (5.5)	3.44 (87.5)	3.46 (88)
TRC/TRE/TRL-100	TR-100-03	TR-100-04	7.05 (179)	4.65 (118)	2.56 (65)	.41 (10.5)	.24 (5.5)	3.44 (87.5)	3.46 (88)

*only for TR-XX-03

Strain relief systems (only for TRC/TRE) - Secure mounting of large cross sections with igus® standard Chainfix clamps

- 3 versions available for each size
- Multi-axially adjustable, for optimal positioning
- Suitable on all standard robot extensions: Ø 30 mm, Ø 32 mm, Ø 34 mm

Single clamp housing,
including top/bottom
saddle clamps

The dimensions given for H in the table is based on the maximum cable diameter. Cables with smaller diameters may result in lower overall clamp housing heights.

Igus® recommends strain relieving the moving end of a robotic application.

Part No. Steel	Part No. Stainless Steel	in.	(ø mm)	B	H
CFX12-1	CFX12-1E	.24 - .47	(6 - 12)	.63 (16)	1.57 (40)
CFX14-1	CFX14-1E	.47-.55	(12 - 14)	.71 (18)	1.97 (50)
CFX16-1	CFX16-1E	.55-.63	(14 - 16)	.79 (20)	2.05 (52)
CFX18-1	CFX18-1E	.63-.71	(16 - 18)	.87 (22)	2.13 (54)
CFX20-1	CFX20-1E	.71-.79	(18 - 20)	.94 (24)	2.20 (56)
CFX22-1	CFX22-1E	.79-.87	(20 - 22)	1.02 (26)	2.28 (58)
CFX26-1	CFX26-1E	.87-1.02	(22 - 26)	1.18 (30)	2.64 (67)
CFX30-1	CFX30-1E	1.02-1.18	(26 - 30)	1.34 (34)	2.80 (71)
CFX34-1	CFX34-1E	1.18-1.34	(30 - 34)	1.50 (38)	2.95 (75)
CFX38-1	CFX38-1E	1.34-1.50	(34 - 38)	1.65 (42)	3.11 (79)
CFX42-1	CFX42-1E	1.50-1.65	(38 - 42)	1.81 (46)	3.27 (83)

Energy Chain System® Series Triflex® R Strain Relief

igus®

Triflex®
R

Triflex® R Quick exchange kit

- Ideal for Triflex® R ReadyChain®
- One-time-only alignment
- No repeat alignment upon exchange of ReadyChain®
- Exchange of the Triflex® R unit including cables without any tools

For
Series

Part No. Quick exchange kit	
TRC/TRE-60 ➤ TR-60-22-	
TRC/TRE-70 ➤ TR-70-22-	
TRC/TRE-85 ➤ TR-85-22-	
TRC/TRE-100 ➤ TR-100-22-	



For desired pillow block opening, Ø 30, 32, or 34 mm please fill in the blank with the appropriate dimension.
For example: TR-100-21-01-

With or without strain relief

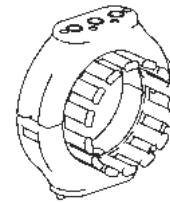


Pillow block available in 30, 32 and 34 mm opening

- 2 versions for each size available (with or without strain relief)
- Safe and simple. Affix the cables with tiewraps
- Pillow block sizes available for connections to standard extensions of many robot manufacturers: Ø 30 mm, Ø 32 mm, Ø 34 mm

For Energy Chain®	Part No. with strain relief	Part No. without strain relief
TRC/TRE.60	TR-60-21-01-	TR-60-21-02-
TRC/TRE-70	TR-70-21-01-	TR-70-21-02-
TRC/TRE-85	TR-85-21-01-	TR-85-21-02-
TRC/TRE-100	TR-100-21-01-	TR-100-21-02-

For desired pillow block opening, Ø 30, 32, or 34 mm please fill in the blank with the appropriate dimension.
For example: TR-100-21-01-



With strain relief

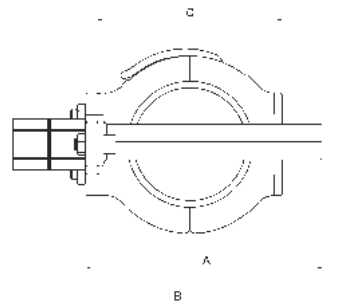


Without strain relief

With profile rail



- External strain relief system for large diameter cables; fits most common robots
- Double C rail for use with igus® CFX clamps
- Robust strain relief for heavy applications
- igus® clamp housings from high-grade steel or steel usable (see table below)

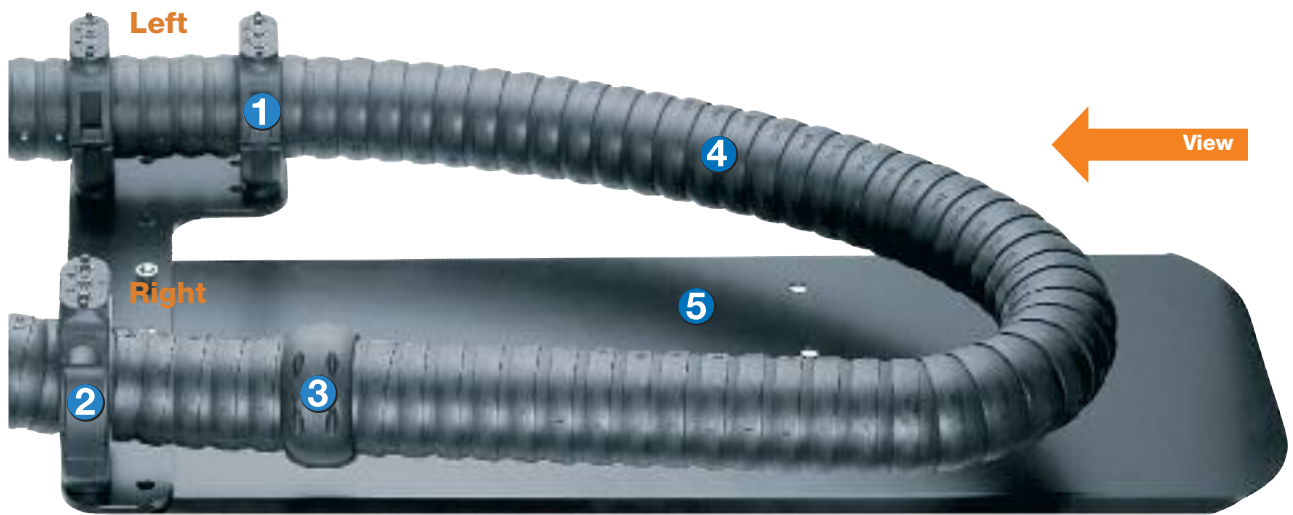


For Series	Part No.	A in. (mm)	B in. (mm)	C in. (mm)	E in. (mm)
TRC/TRE.60	TR-60-20-	—	—	—	—
TRC/TRE-70	TR-70-20-	6.34 (161)	8.35 (212)	4.96 (126)	4.96 (126)
TRC/TRE-85	TR-85-20-	6.34 (161)	8.35 (212)	6.02 (153)	6.10 (155)
TRC/TRE-100	TR-100-20-	6.34 (161)	8.35 (212)	6.02 (153)	6.10 (155)

For desired pillow block opening, Ø 30, 32, or 34 mm please fill in the blank with the appropriate dimension.
For example: TR-100-20-

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFO: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS

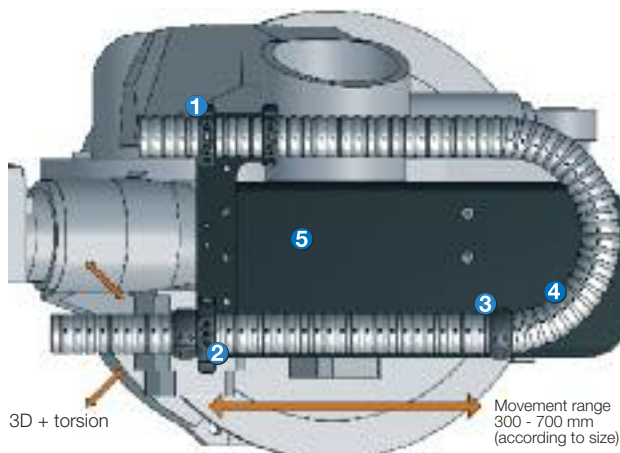




RS Assembly

Triflex® RS is a very compact universal assembly that is mounted to installation points available on the robot. Thanks to the low profile and the Triflex® R chain guide parallel to the robotic arm, applications with extremely low installation space can be achieved. Triflex® RS can be installed parallel to the robotic arm. Triflex® RS with integrated spring mechanism allows efficient energy supply to the robotic head without stress on the cables. The Triflex® R kit offers all advantages of proven Triflex® accessories, such as the FlexBar, universal assembly kit and fiber rod module in one system. All Triflex® R features are also included in the universal Triflex® RS module.

- One package for all applications, immediately installable
- Integrated fiber rods to retract cables
- First choice for robotic applications with narrow installation space
- Saves space through low installation height and close routing on the robotic arm
- Excellent service life
- Universally applicable



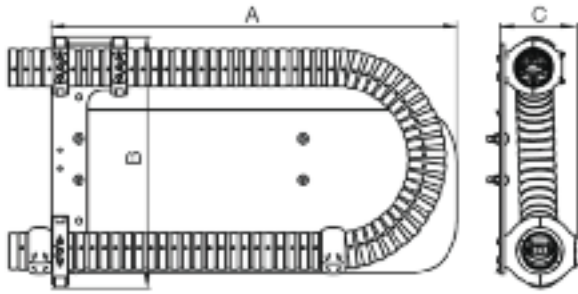
- 1 Mounting brackets for safe fastening
- 2 Glide lead-through for a close and parallel guidance on the robotic arm
- 3 Limit stop dog for a defined free movement
- 4 Integrated recuperating spring prevents loop formations
- 5 Single module, space-saving and quickly mounted on robot



Triflex® RS - Extremely flat design,
guides close to the robotic arm



Integrated recuperating spring
prevents loop formations



Triflex® RS - Fastening point, right

Universal module	Part No.	A	B	C
TRS for Series		in. (mm)	in. (mm)	in. (mm)
TRC-40/TRE-40 ➤ TRC/TRE-RS-40-R		24.41 (620)	11.85 (301)	3.74 (95)
TRC-60/TRE-60 ➤ TRC/TRE-RS-60-R		34.84 (885)	20.79 (528)	5.91 (150)
TRC-70/TRE-70 ➤ TRC/TRE-RS-70-R		34.84 (885)	21.46 (545)	6.57 (167)
TRC-85/TRE-85 ➤ TRC/TRE-RS-85-R		34.84 (885)	22.24 (565)	6.57 (167)
TRC-100/TRE-100 ➤ TRC/TRE-RS-100-R		35.93 (912.5)	24.17 (614)	6.57 (167)

Triflex® RS - Fastening point, right, with cover

Universal module	Part No.	A	B	C
TRS for Series		in. (mm)	in. (mm)	in. (mm)
TRC-40/TRE-40 ➤ TRC/TRE-RS-40-RC		24.41 (620)	11.85 (301)	3.74 (95)
TRC-60/TRE-60 ➤ TRC/TRE-RS-60-RC		34.84 (885)	20.79 (528)	5.91 (150)
TRC-70/TRE-70 ➤ TRC/TRE-RS-70-RC		34.84 (885)	21.46 (545)	6.57 (167)
TRC-85/TRE-85 ➤ TRC/TRE-RS-85-RC		34.84 (885)	22.24 (565)	6.57 (167)
TRC-100/TRE-100 ➤ TRC/TRE-RS-100-RC		35.93 (912.5)	24.17 (614)	6.57 (167)

Triflex® RS - Fastening point, left

Universal module	Part No.	A	B	C
TRS for Series		in. (mm)	in. (mm)	in. (mm)
TRC-40/TRE-40 ➤ TRC/TRE-RS-40-L		24.41 (620)	11.85 (301)	3.74 (95)
TRC-60/TRE-60 ➤ TRC/TRE-RS-60-L		34.84 (885)	20.79 (528)	5.91 (150)
TRC-70/TRE-70 ➤ TRC/TRE-RS-70-L		34.84 (885)	21.46 (545)	6.57 (167)
TRC-85/TRE-85 ➤ TRC/TRE-RS-85-L		34.84 (885)	22.24 (565)	6.57 (167)
TRC-100/TRE-100 ➤ TRC/TRE-RS-100-L		35.93 (912.5)	24.17 (614)	6.57 (167)

Triflex® RS - Fastening point, left, with cover

Universal module	Part No.	A	B	C
TRS for Series		in. (mm)	in. (mm)	in. (mm)
TRC-40/TRE-40 ➤ TRC/TRE-RS-40-LC		24.41 (620)	11.85 (301)	3.74 (95)
TRC-60/TRE-60 ➤ TRC/TRE-RS-60-LC		34.84 (885)	20.79 (528)	5.91 (150)
TRC-70/TRE-70 ➤ TRC/TRE-RS-70-LC		34.84 (885)	21.46 (545)	6.57 (167)
TRC-85/TRE-85 ➤ TRC/TRE-RS-85-LC		34.84 (885)	22.24 (565)	6.57 (167)
TRC-100/TRE-100 ➤ TRC/TRE-RS-100-LC		35.93 (912.5)	24.17 (614)	6.57 (167)

Fastening point,
right



Triflex® R-Set with cover for the additional support
of switch cabinets or valve terminals



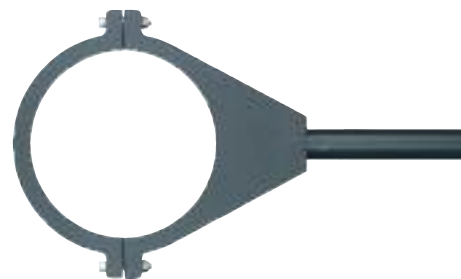
Triflex® R-Set with cover (barrier)

- Creates more mounting space on robots - e.g. for switch cabinets or valve terminals
- For upside down applications
- Enables the use of Triflex® RS in applications with extreme movements



43 Adapter brackets for robots from stock

- 43 adapter bracket types from stock for many different robots
- For all Triflex® RS modules
- For assembly to the side or on top



Triflex® R installed on axis 6
Part No. TR-907-667-Inner Ø

- One axis diameter (Ø30 mm) for all robots
- Easy and fast assembly
- For Triflex® R mounting bracket with CFX clamps (TR-XX-20-30)
- For Triflex® R mounting bracket with profile rail (TR-XX-21-30)
- For TR-XX-22-30 Quick exchange kit



Fiber rod module:

For applications where too much flexibility is not desired.

Fiber rod modules - Intelligent
problem solution through
directed pretension (for TRC/TRE)

TRC/TRE with mounted fiber rods	Length		Max. Load	
	in.	(mm)	lbs/ft	(kg/m)
Triflex® R 40 Series				
TRCF/TREF-40-1000-1	39.37	(1000)	.26	(0.4)
TRCF/TREF-40-0900-1	35.43	(900)	.33	(0.5)
TRCF/TREF-40-0800-1*	31.50	(800)	.40	(0.6)
TRCF/TREF-40-0700-1	27.56	(700)	.46	(0.7)
TRCF/TREF-40-0600-1	23.62	(600)	.53	(0.8)
TRCF/TREF-40-0500-1	19.69	(500)	.60	(0.9)
TRCF/TREF-40-0400-1	15.75	(400)	.67	(1.0)

Triflex® R 60 Series				
TRCF/TREF-60-1400-1	55.12	(1400)	.67	(1.0)
TRCF/TREF-60-1200-1	47.24	(1200)	.80	(1.2)
TRCF/TREF-60-1000-1*	39.37	(1000)	.93	(1.4)
TRCF/TREF-60-0800-1	31.50	(800)	1.07	(1.6)
TRCF/TREF-60-0600-1	23.62	(600)	1.18	(1.8)
TRCF/TREF-60-0400-1	15.75	(400)	1.34	(2.0)

Triflex® R 70 Series				
TRCF/TREF-70-1800-1	70.87	(1800)	.94	(1.4)
TRCF/TREF-70-1600-1	62.99	(1600)	1.07	(1.6)
TRCF/TREF-70-1400-1	55.12	(1400)	1.18	(1.8)
TRCF/TREF-70-1200-1*	47.24	(1200)	1.34	(2.0)
TRCF/TREF-70-1000-1	39.37	(1000)	1.47	(2.2)
TRCF/TREF-70-0800-1	31.50	(800)	1.61	(2.4)

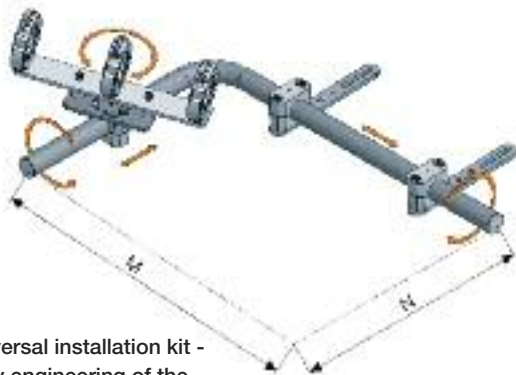
Triflex® R 85 Series				
TRCF/TREF-85-2000-1	78.74	(2000)	.94	(1.4)
TRCF/TREF-85-1800-1	70.87	(1800)	1.1	(1.7)
TRCF/TREF-85-1600-1	70.87	(1600)	1.2	(1.9)
TRCF/TREF-85-1400-1*	55.12	(1400)	1.4	(2.1)
TRCF/TREF-85-1200-1	47.24	(1200)	1.5	(2.3)
TRCF/TREF-85-1000-1	39.37	(1000)	1.7	(2.6)
TRCF/TREF-85-0800-1	31.50	(800)	2.0	(3.0)

Triflex® R 100 Series				
TRCF/TREF-100-2000-1	78.74	(2000)	1.07	(1.6)
TRCF/TREF-100-1800-1	70.87	(1800)	1.34	(2.0)
TRCF/TREF-100-1400-1*	55.12	(1400)	1.61	(2.4)
TRCF/TREF-100-1200-1	47.24	(1200)	1.74	(2.6)
TRCF/TREF-100-1000-1	39.37	(1000)	2.01	(3.0)

* recommended lengths of the fiber rods

Universal installation kit:

Universal installation kit allows the attachment of fiber rod modules in any given position, relative to the robotic arm.



Universal installation kit -
Easy engineering of the
fiber rods (for TRC/TRE)



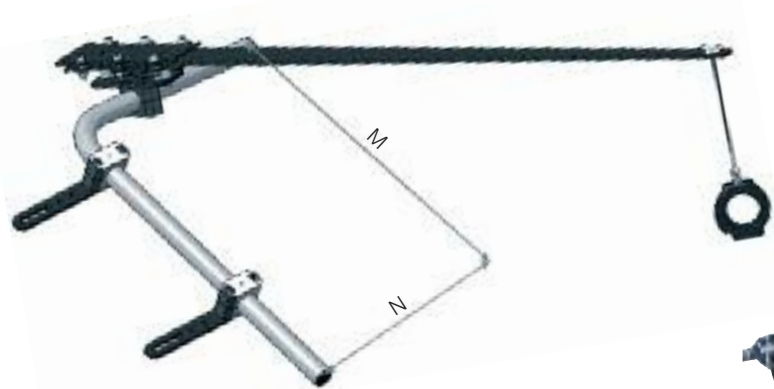
Product range - Universal Installation Kit

FlexBar	Part No.	X	Y	M	N	D
for Series		in. (mm)	in. (mm)	in. (mm)	in. (mm)	in. (mm)
TRC/TRE-40	► TR-40-80	1.57 (40)	1.18 (30)	18.70 (475)	12.80 (325)	.25 (6.3)
TRC/TRE-60	► TR-60-80	1.57 (40)	1.18 (30)	18.70 (475)	12.80 (325)	.25 (6.3)
TRC/TRE-70	► TR-70-80	2.95 (75)	3.15 (80)	34.45 (875)	22.64 (575)	.49 (12.5)
TRC/TRE-85	► TR-85-80	2.95 (75)	3.15 (80)	34.45 (875)	22.64 (575)	.49 (12.5)
TRC/TRE-100	► TR.100-90	2.95 (75)	3.15 (80)	34.45 (875)	22.64 (575)	.49 (12.5)



FlexBar:

For robot-applications with extreme movements in the 4th to 6th axis and avoidance from loops



FlexBar - Universal fiber rod module
for extreme robotic movements (for TRC/TRE)

The igus® universal module as
standard Triflex® R-Set ► page 8.23



Product range - FlexBar

FlexBar	Part No.	X	Y	M	N	D
for Series		in. (mm)	in. (mm)	in. (mm)	in. (mm)	in. (mm)
TRC/TRE-60	► TR-60-90	1.57 (40)	1.18 (30)	18.70 (475)	12.80 (325)	.25 (6.3)
TRC/TRE-70	► TR-70-90	2.95 (75)	3.15 (80)	34.45 (875)	22.64 (575)	.49 (12.5)
TRC/TRE-85	► TR-85-90	2.95 (75)	3.15 (80)	34.45 (875)	22.64 (575)	.49 (12.5)
TRC/TRE-100	► TR.100-90	2.95 (75)	3.15 (80)	34.45 (875)	22.64 (575)	.49 (12.5)

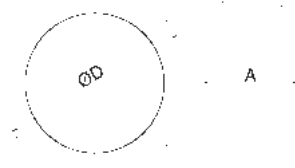


Abrasion Protectors

Protectors are available for maximum cycle life in heavy duty applications with hard impacts and rubbing of Triflex® R against the robot.

- Fast and simple installation and replacement
- Shock absorbing
- Lightweight
- Glides smoothly along robot contours
- Attaches to any link

For Series	Part No.	ØD in. (mm)	A in. (mm)
TRC/TRE-40	TR-40-10	2.20 (56)	1.06 (27)
TRC/TRE-60	TR-60-10	3.31 (84)	1.57 (40)
TRC/TRE-70	TR-70-10	4.13 (105)	1.97 (50)
TRC/TRE-85	TR-85-10	4.65 (118)	2.32 (59)
TRC/TRE-100	TR-100-10	5.24 (133)	2.64 (67)



Triflex® R Cover - Heat Shield

- Protects against weld and metal splatter up to 1082°F (600°C) short term
- Ends are elasticized for sealing
- Easy to replace using hook and loop tape
- Standard length from stock
- Asbestos-free
- Coating: Aramid

For Series Part No. XX= Length of the protective cover - choose from the following standard lengths
Example: TR-40-15- **0500**

		in. (mm)	in. (mm)	in. (mm)	in. (mm)
TRC/TRE-40	TR-40-15-XX	19.68 (500)	39.37 (1000)	59.06 (1500)	78.74 (2000)
TRC/TRE-60	TR-60-15-XX	19.68 (500)	39.37 (1000)	59.06 (1500)	78.74 (2000)
TRC/TRE-70	TR-70-15-XX	19.68 (500)	39.37 (1000)	59.06 (1500)	78.74 (2000)
TRC/TRE-85	TR-85-15-XX	19.68 (500)	39.37 (1000)	59.06 (1500)	78.74 (2000)
TRC/TRE-100	TR-100-15-XX	19.68 (500)	39.37 (1000)	59.06 (1500)	78.74 (2000)



Triflex® R Cover - Protective Jacket

- Temperatures up to room temperature
- Ends are elasticized for sealing
- Easy to replace using hook and loop tape
- Standard length from stock
- Silicone-free
- Coating: none

For Series Part No. XX= Length of the protective cover - choose from the following standard lengths
Example: TR-40-16- **0500**

		in. (mm)	in. (mm)	in. (mm)	in. (mm)
TRC/TRE-40	TR-40-16-XX	19.68 (500)	39.37 (1000)	59.06 (1500)	78.74 (2000)
TRC/TRE-60	TR-60-16-XX	19.68 (500)	39.37 (1000)	59.06 (1500)	78.74 (2000)
TRC/TRE-70	TR-70-16-XX	19.68 (500)	39.37 (1000)	59.06 (1500)	78.74 (2000)
TRC/TRE-85	TR-85-16-XX	19.68 (500)	39.37 (1000)	59.06 (1500)	78.74 (2000)
TRC/TRE-100	TR-100-16-XX	19.68 (500)	39.37 (1000)	59.06 (1500)	78.74 (2000)



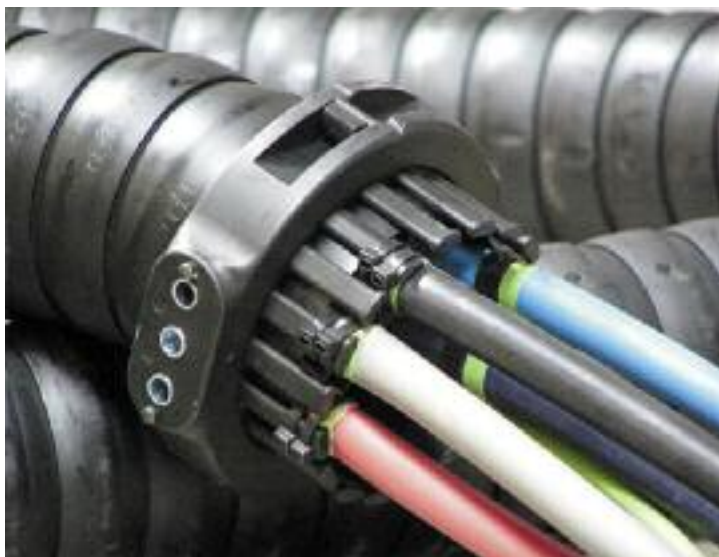
Triflex® R Cover - Light Protective Jacket

- Temperatures up to room temperature
- Ends are elasticized for sealing
- Easy to replace using hook and loop tape
- Standard length from stock
- Silicone-free
- Coating: none

For Series Part No. XX= Length of the protective cover - choose from the following standard lengths
Example: TR-40-17- **0500**

		in. (mm)	in. (mm)	in. (mm)	in. (mm)
TRC/TRE-40	TR-40-17-XX	19.68 (500)	39.37 (1000)	59.06 (1500)	78.74 (2000)
TRC/TRE-60	TR-60-17-XX	19.68 (500)	39.37 (1000)	59.06 (1500)	78.74 (2000)
TRC/TRE-70	TR-70-17-XX	19.68 (500)	39.37 (1000)	59.06 (1500)	78.74 (2000)
TRC/TRE-85	TR-85-17-XX	19.68 (500)	39.37 (1000)	59.06 (1500)	78.74 (2000)
TRC/TRE-100	TR-100-17-XX	19.68 (500)	39.37 (1000)	59.06 (1500)	78.74 (2000)





Space-saving integrated strain relief at the connection point

When filling Triflex® R, sufficient clearance needs to be provided for all electric cables, pneumatic and media hoses, in order to compensate for forces from relative motion between the cables and hoses.

As a rule of thumb, the following values apply:

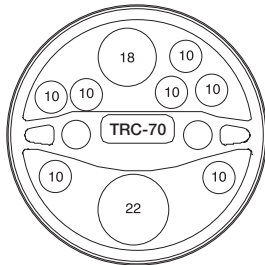
- The total of cable/hose diameters must not exceed 60% of the usable cross section of their Triflex® R component.
- A clearance of at least 10% (min. 1 mm) between any two cables/hoses
- Cables/hoses need to be able to move freely inside the Triflex® R.

Please refer to the chart on this page for an overview of available cross sections for Triflex® R.

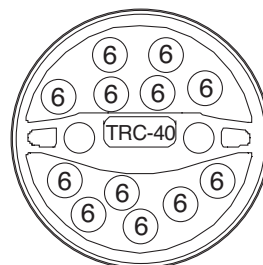
Example: Cross Section Calculation

$A_{\text{conduit}} = \frac{d^2 \times \pi}{4}$					
Examples:					
$A_1 = 10 \text{ mm} \times 10 \text{ mm} \times \pi/4$					
$= 78.5 \text{ mm}^2 \times 7$ (number of conduits)					
$= 549.50 \text{ mm}^2$					
$A_2 = 18 \text{ mm} \times 18 \text{ mm} \times \pi/4$					
$= 254.34 \text{ mm}^2$					
$A_3 = 22 \text{ mm} \times 22 \text{ mm} \times \pi/4$					
$= 379.94 \text{ mm}^2$					
$A_{\text{conduit}} = A_1 + A_2 + A_3 = 1183.7 \text{ mm}^2$					

Filling Example: TRC-70



Filling Example: TRC-40



The smaller the relation between usable cross section and the total of cable/hose diameters, the less the stress of the cables.

Series	Usable Cross Section
TRC/TRE-30	.48 inch ² (313.0 mm ²)
TRC/TRE-40	.78 inch ² (508.0 mm ²)
TRC/TRE-60	1.77 inch ² (1144.6 mm ²)
TRC/TRE-70	2.77 inch ² (1788.0 mm ²)
TRC/TRE-85	3.77 inch ² (2431.0 mm ²)
TRC/TRE-100	4.92 inch ² (3177.0 mm ²)

Customer-specific special cable for robotic and torsion applications

- Control, motor, servo, bus and data cables
- Shielded and unshielded
- Outer jacket material: PVC, PUR, TPE
- Torsion area according to requirement
- Sectors: Robotic and 3D applications

The service life of cables in torsion applications depend disproportionately on the exact progression of the angle of torsion and the cable length of the exact application. As a single test facility is often insufficient, Chainflex® cables are tested on various constructional systems. Your torsion cables are tested as realistic as possible for your application. For this purpose, igus® uses up to 8 different test facilities in the in-house laboratory.

Torsionable Chainflex® robotic cables for +/-180° angle of twist per meter length


Chainflex® CFROBOT9 - PUR-Hybrid cable, torsionable



Chainflex® CFROBOT8 - PUR-Bus cable, torsionable



Chainflex® CFROBOT6 - PUR-Motor cable, torsionable



Chainflex® CFROBOT7 - PUR-Motor cable, torsionable, shielded



Chainflex® CFROBOT5 - TPE-Fiber optic cable, torsionable



Chainflex® CFROBOT - Single-core TPE robotic cable

Triflex® R - Tests in the igus® lab

Testing facility at the igus® laboratory



Torsion test of CF-ROBOT

Triflex® R - Chainflex® Robot Cable Package

Robot cables and other conduits are delivered as harnessed kits.

Triflex® R - ReadyChain® - Chainflex® cable/hose Packages

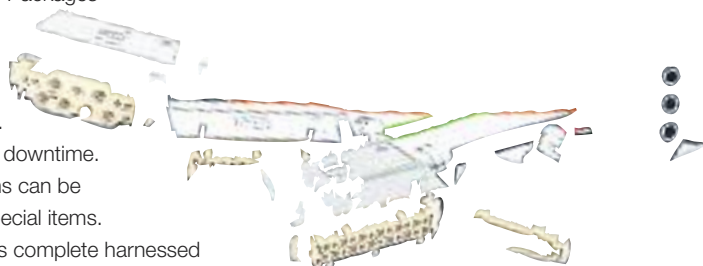
Turnkey harnessed ReadyChain® cable and hose packages, equipped with Chainflex® cables for use on robots. Delivered complete with cables, hoses, connectors and accessories.

ReadyChain® minimizes setup time and reduces downtime.

Cable and hose packages for robotic applications can be customized with Chainflex® products or other special items.

Robot cables and other conduits are delivered as complete harnessed systems.

Under the igus® CFRobot range, control, data, servo- and motor cables are available.





TRC-100-145-0 with cable handling package



Handling robot for the glass industry



Laser cutting machine



Triflex® R in the pharmaceutical industry



igus® E2 Energy Tube and Triflex® R in a processing machine



igus® System E6 and Triflex® R TRE in a Y/Z-gantry

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RfQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS

