



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 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. 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:

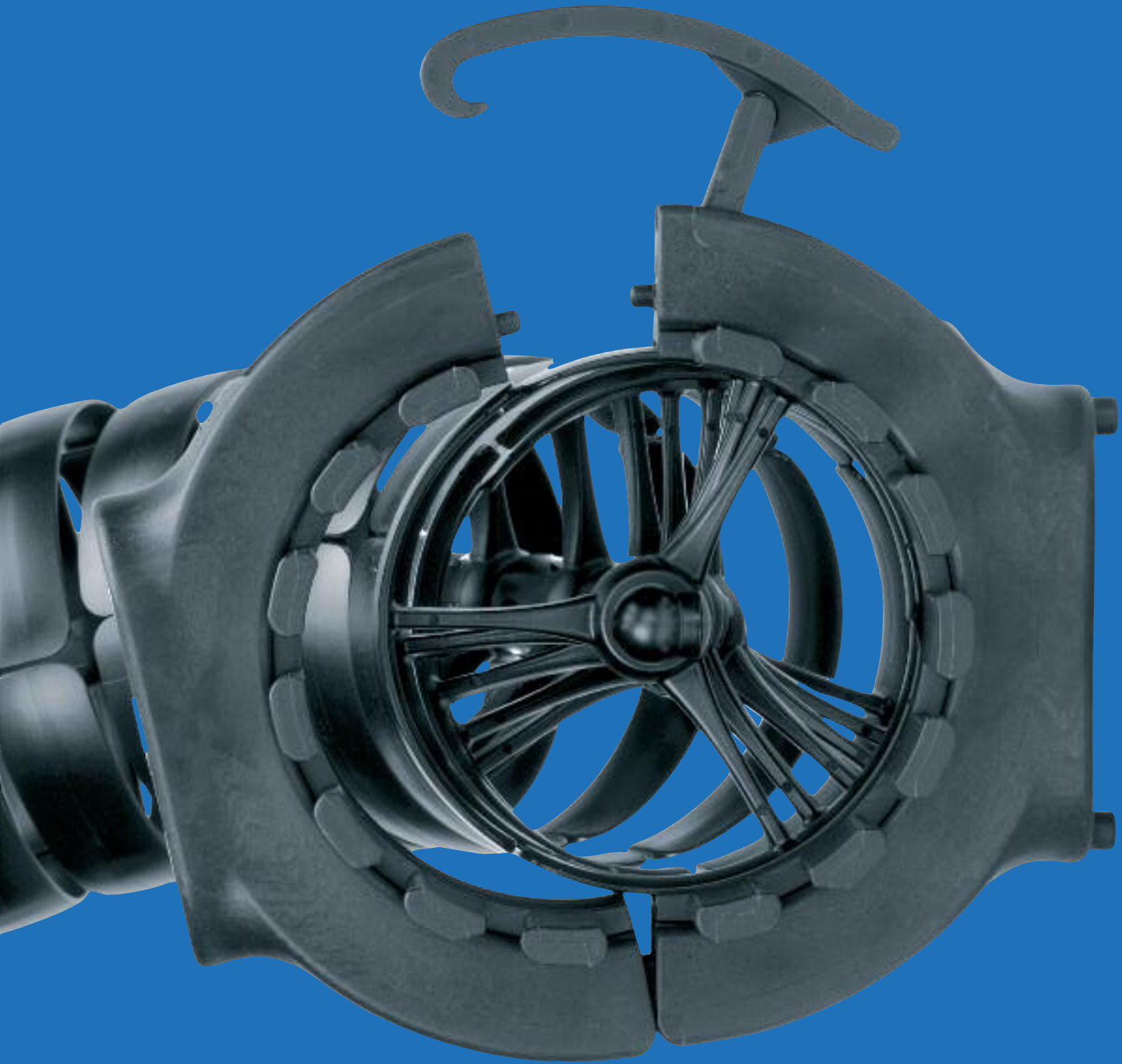
TwisterChain®

- 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:

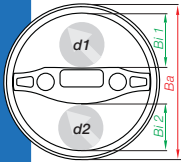
- The first choice for multi-axis-robots
- **Three versions are available:** TRC: Closed design, TRE: "E-Z" design, easy to fill from outside, TRL: The "light" version of the "E-Z" design
- Universal for general machinery
- Multi-axis (3D) movement
- High torsional stability
- Easy shortening and lengthening
- 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	
	<i>Bi 1</i>		<i>d1</i>		<i>Ba</i>		<i>R</i>			
	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)

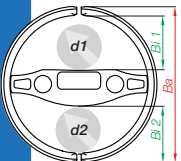
"TRC" - Triflex® R closed design, dirt-resistant

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)



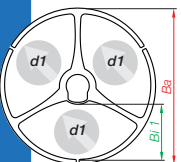
"TRE" - Triflex® R "E-Z" design for fast installation of cables

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)

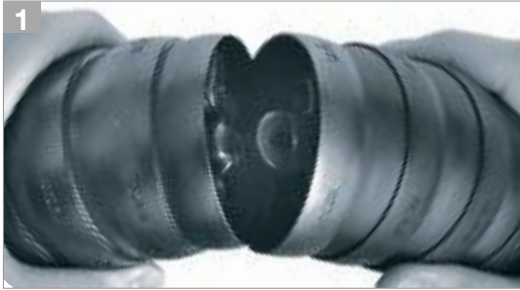


* For quick and easy insertion / removal of cables using the E-Z Chain® principle, we recommend a maximum cable diameter of 70% of the specified value.

** 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

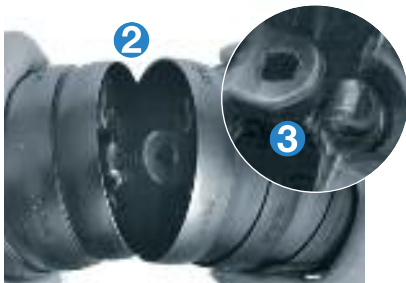


ESD classification:
Electrically conductive
ESD/ATEX version upon request



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®

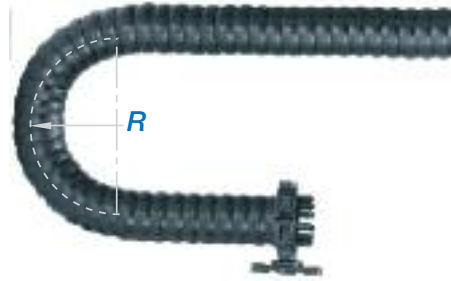
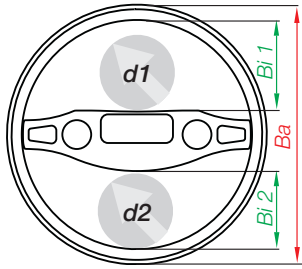
Please indicate chain length or number of links. Example: 6.56 ft (2m) or 144 links

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

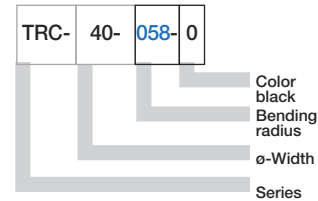
Series	Inner height				max. cable ø				Outer width		Bending radii	
	Bi 1		Bi 2		d1		d2		Ba		R	
	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)
TRC-30-050-0	.47	(12)	.39	(10)	.39	(10)	.31	(8)	1.36	(34.5)	1.97	(50)
TRC-40-058-0	.59	(15)	.51	(13)	.51	(13)	.43	(11)	1.69	(43)	2.28	(58)
TRC-60-087-0	.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.

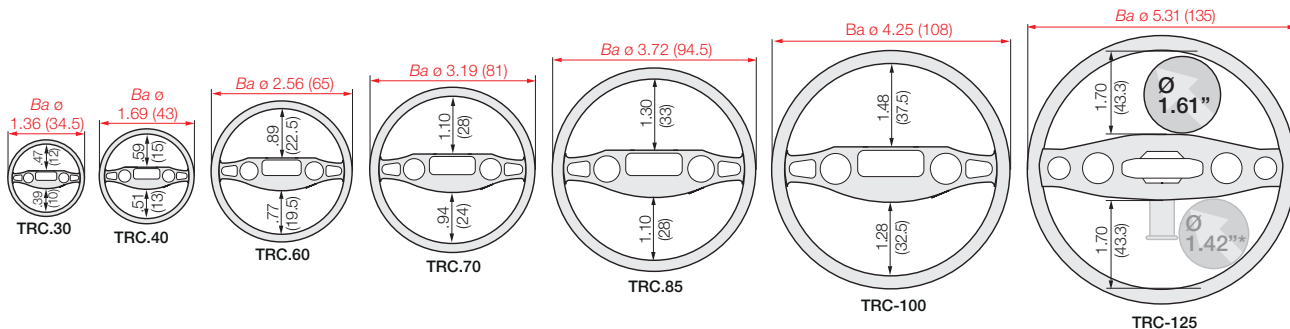
** If shortening/lengthening of a "filled" Triflex® TRC-125 is required, cable diameter changes to Ø 1.42" (36 mm).

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/RFQ: 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



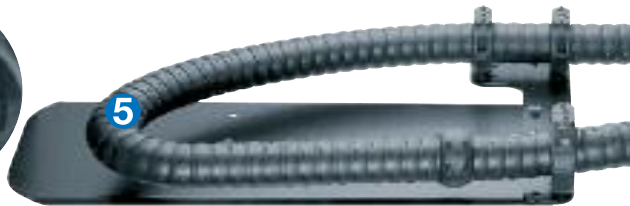
- When an easy to fill 3D Energy Chain® is needed
- If a secure cable guide is required for multi-dimensional 3D-movements
- If high torsional stability is required
- If the system has to be shortened or lengthened easily
- If a small bending radius is required
- If high tensile strength is important



- 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. ± 10° 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

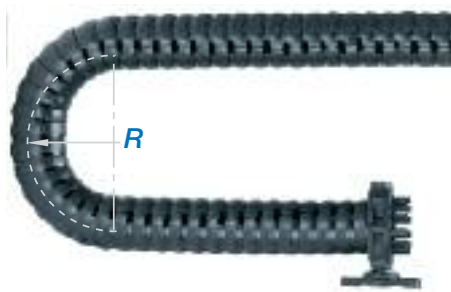
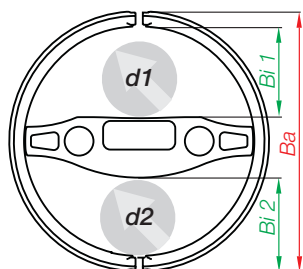


Mounting Bracket

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



Fiber Rods



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

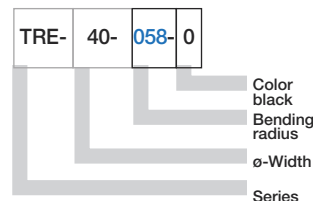
Series	Inner height				max. cable ø				Outer width		Bending radii	
	Bi 1		Bi 2		d1		d2		Ba		R	
	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)
TRE-30-050-0	.47	(12)	.39	(10)	.39	(10*)	.31	(8*)	1.36	(34.5)	1.97	(50)
TRE-40-058-0	.59	(15)	.51	(13)	.51	(13*)	.43	(11*)	1.69	(43)	2.28	(58)
TRE-60-087-0	.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).

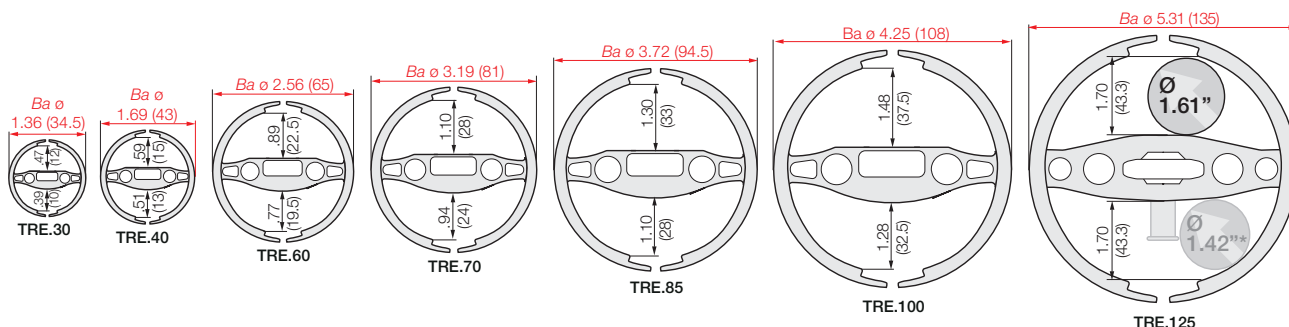
Part No.	Pitch		Weight		Links	
	in.	(mm)	lbs/ft	(kg/m)	links/ft	links/m
TRE-30-	.44	(11.3)	≈ 0.18	≈ 0.27	27.27	(89)
TRE-40-	.55	(13.9)	≈ 0.25	≈ 0.37	21.82	(72)
TRE-60-	.80	(20.4)	≈ 0.57	≈ 0.85	15.00	(49)
TRE-70-	1.01	(25.6)	≈ 0.89	≈ 1.32	11.88	(39)
TRE-85-	1.20	(30.6)	≈ 1.18	≈ 1.75	10.00	(33)
TRE-100-	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



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

Series TRE - Dimensions



Material - permitted temperature
Flammability Class, igumid NB

igumid NB / -40°F (-40°C) up to +176°F (+80° C)
VDE 0304 IIC UL94 V2

Technical Data



Details of material properties

► Chapter 1

Price Index



Series Triflex® TRC

Special Options Available



Cleanroom suitability upon request

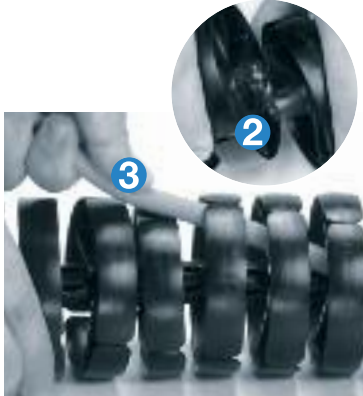


iF-Design Award Winner
Triflex® R Series



Flammability 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. ± 10° 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

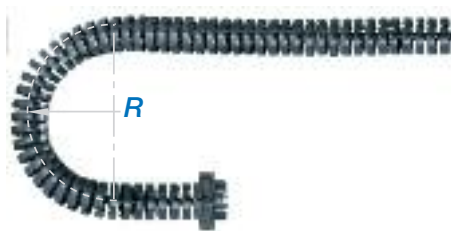
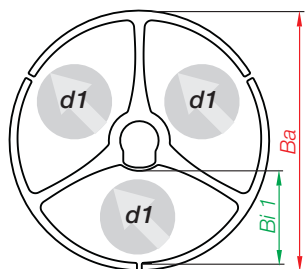


Energy Chain®

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



Mounting Bracket



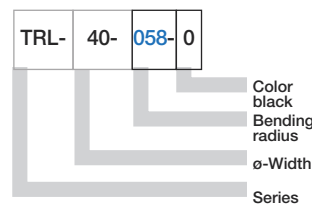
"TRL" - a light and economical alternative with an "E-Z" design

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)

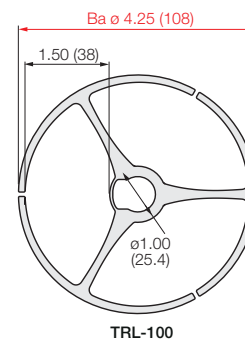
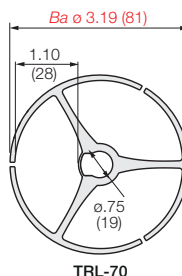
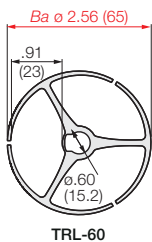
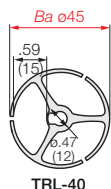
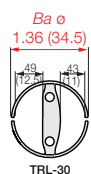
* For quick and easy insertion / removal of cables using the E-Z Chain® principle, we recommend a maximum cable diameter of 70% of the specified value.

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



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





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

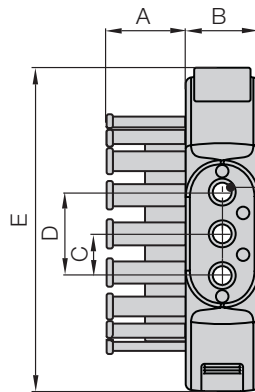


Part No. structure

TR-60-01-M6

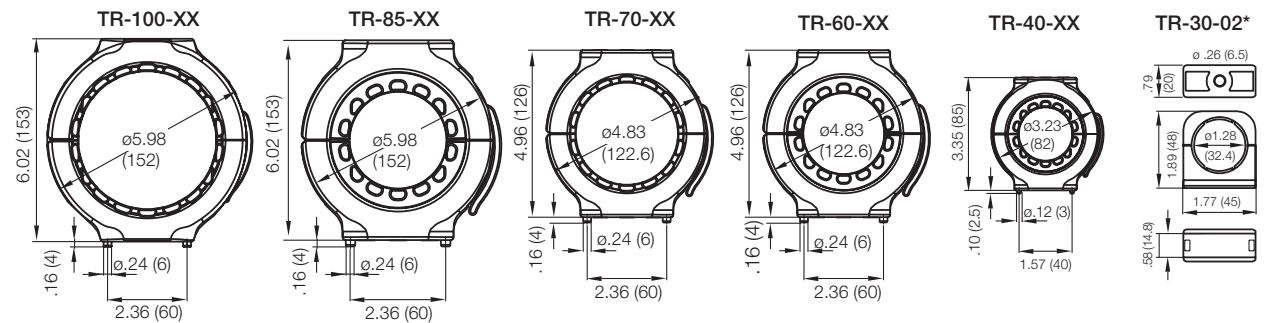
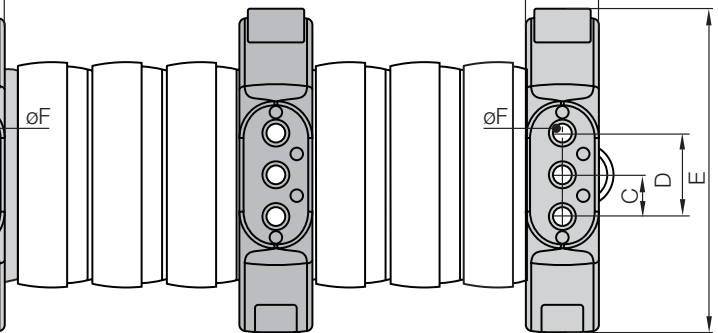
- Option with insert nuts
- With strain relief
- Mounting bracket

Mounting bracket with strain relief TR-XX-01



Mounting bracket without strain relief TR-XX-02

Mounting bracket as intermediate link TR-XX-02



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



Triflex®
R



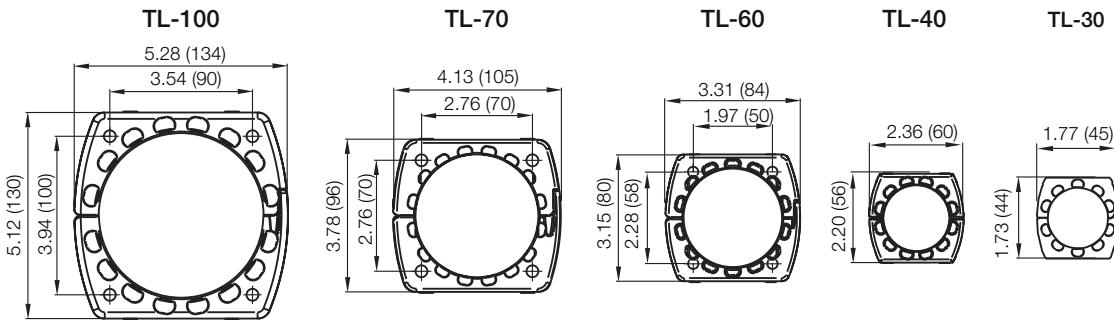
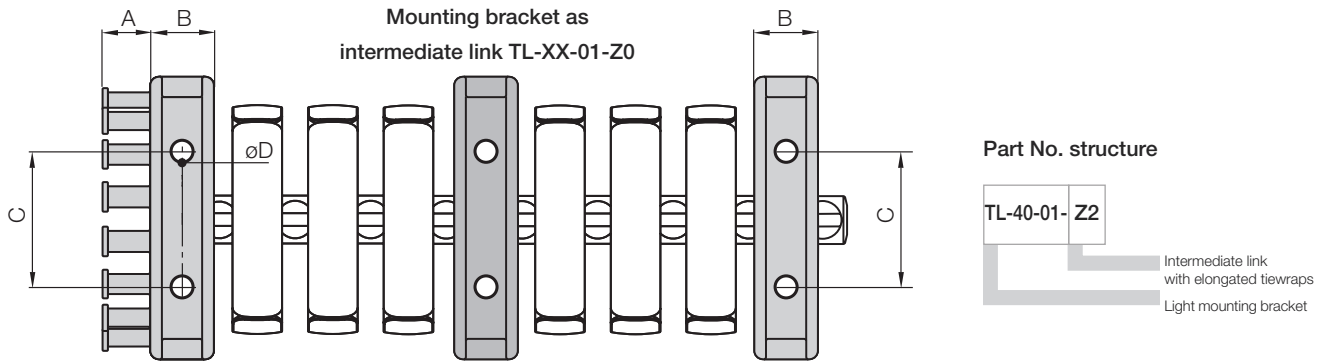
Option 2: Light mounting brackets

- 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



For Series
Style

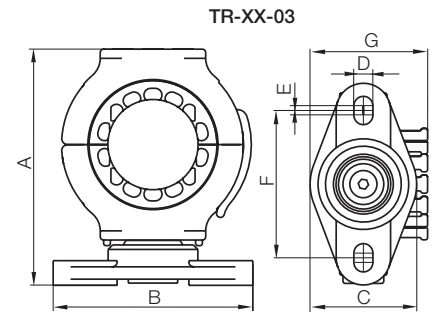
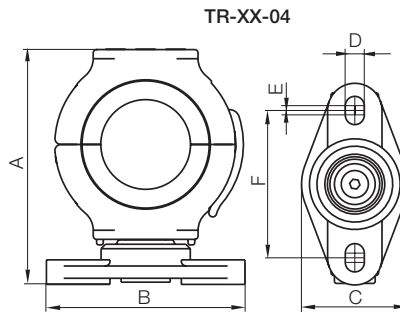
Style	Part No.	A in. (mm)	B in. (mm)	C in. (mm)	D in. (mm)
TRE/TRC/TRL-30 ▶ Without Tiewraps	TL-30-01-Z0	—	.51 (13)	.94 (24)	.18 (4.5)
▶ With Standard Tiewraps	TL-30-01-Z1	.49 (12.5)	.51 (13)	.94 (24)	.18 (4.5)
TRE/TRC/TRL-40 ▶ Without Tiewraps	TL-40-01-Z0	—	.55 (14)	1.42 (36)	.23 (5.8)
▶ With Standard 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/RFQ: 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

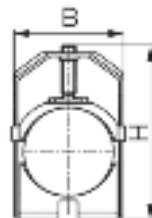


For Series	Swivel bracket with tiewrap plate	Swivel bracket as intermediate link	A in. (mm)	B in. (mm)	C in. (mm)	D in. (mm)	E in. (mm)	F in. (mm)	G* in. (mm)
TRC/TRE/TRL-40	TR-40-03	TR-40-04	4.13 (105)	3.50 (89)	1.85 (47)	.33 (8.4)	.19 (4.1)	2.56 (65)	2.03 (51.8)
TRC/TRE/TRL-60	TR-60-03	TR-60-04	5.98 (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



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-	<input type="text"/>
TRC/TRE-70	➤	TR-70-22-	<input type="text"/>
TRC/TRE-85	➤	TR-85-22-	<input type="text"/>
TRC/TRE-100	➤	TR-100-22-	<input type="text"/>



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

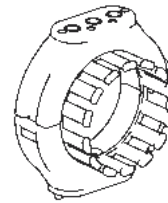


Pillow block available in 30, 32 and 34 mm opening

- 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- <input type="text"/>	TR-60-21-02- <input type="text"/>
TRC/TRE-70	TR-70-21-01- <input type="text"/>	TR-70-21-02- <input type="text"/>
TRC/TRE-85	TR-85-21-01- <input type="text"/>	TR-85-21-02- <input type="text"/>
TRC/TRE-100	TR-100-21-01- <input type="text"/>	TR-100-21-02- <input type="text"/>

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-



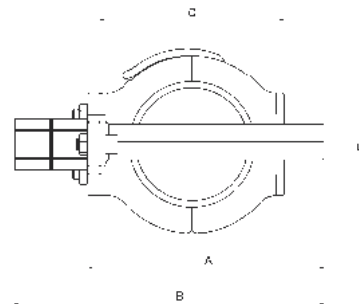
With strain relief



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)

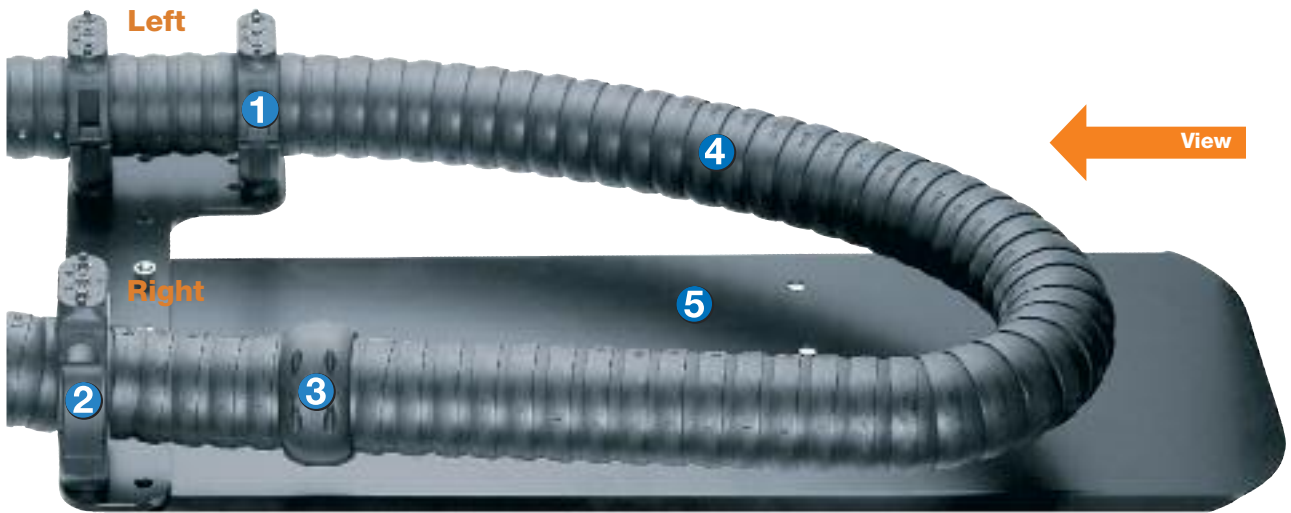


For Series	Part No.	A in. (mm)	B in. (mm)	C in. (mm)	E in. (mm)
TRC/TRE.60	TR-60-20- <input type="text"/>	—	—	—	—
TRC/TRE-70	TR-70-20- <input type="text"/>	6.34 (161)	8.35 (212)	4.96 (126)	4.96 (126)
TRC/TRE-85	TR-85-20- <input type="text"/>	6.34 (161)	8.35 (212)	6.02 (153)	6.10 (155)
TRC/TRE-100	TR-100-20- <input type="text"/>	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/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS





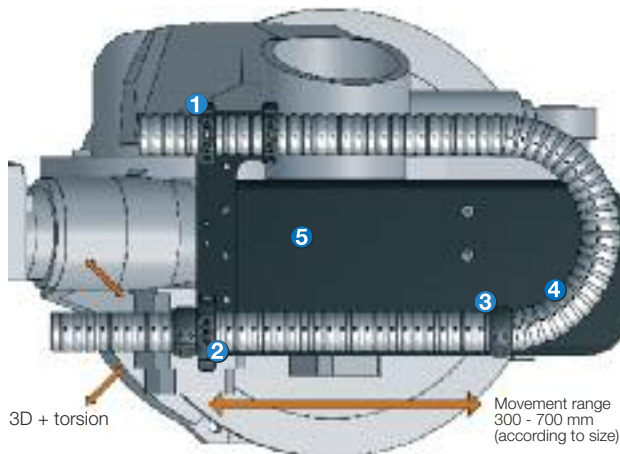
RS Assembly

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



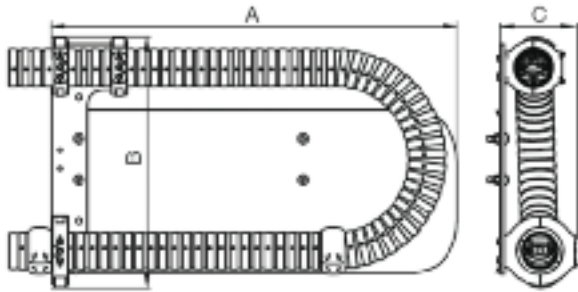
Triflex® RS - Extremely flat design, guides close to the robotic arm



- 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



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



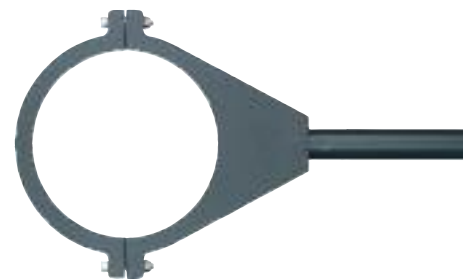
Triflex® R-Set with cover (barrier)

- 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

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



Fiber rod module:

For applications where too much flexibility is not desired.



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

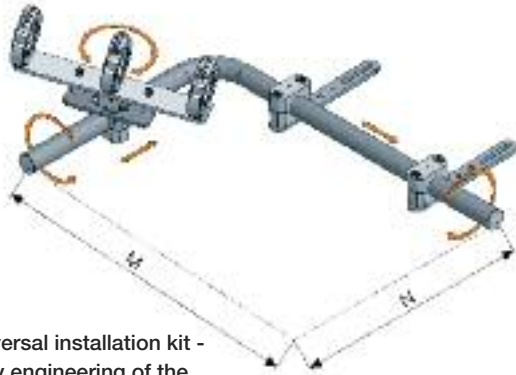


TRC/TRE with mounted fiber rods	Length		Max. Load	
	in.	(mm)	lbs/ft	(kg/m)
Triflex® R 40 Series				
TRCF/TREF-40-1000-1	39.37	(1000)	.26	(0.4)
TRCF/TREF-40-0900-1	35.43	(900)	.33	(0.5)
TRCF/TREF-40-0800-1*	31.50	(800)	.40	(0.6)
TRCF/TREF-40-0700-1	27.56	(700)	.46	(0.7)
TRCF/TREF-40-0600-1	23.62	(600)	.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:

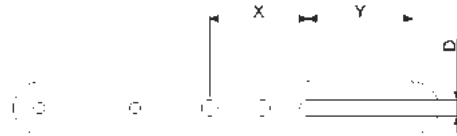
Universal installation kit allows the attachment of fiber rod modules in any given position, relative to the robotic arm.



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

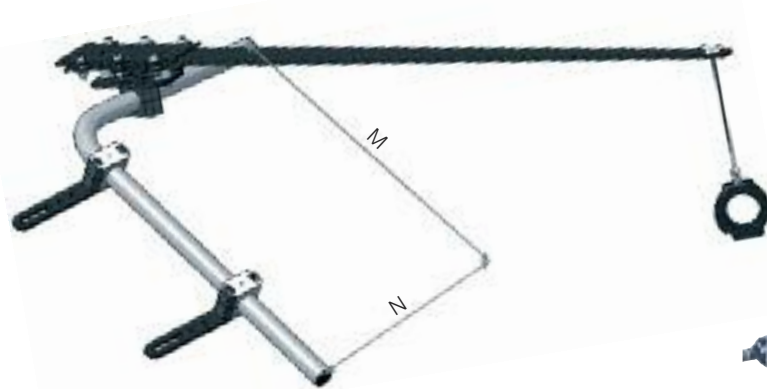
Product range - Universal Installation Kit

FlexBar for Series	Part No.	X in. (mm)	Y in. (mm)	M in. (mm)	N in. (mm)	D 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

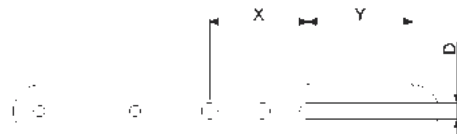


FlexBar - Universal fiber rod module
 for extreme robotic movements (for TRC/TRE)

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

Product range - FlexBar

FlexBar for Series	Part No.	X in. (mm)	Y in. (mm)	M in. (mm)	N in. (mm)	D 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)



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

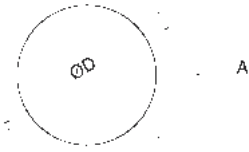


Abrasion Protectors

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		A	
		in. (mm)	mm	in. (mm)	mm
TRC/TRE-40	TR-40-10	2.20 (56)	56	1.06 (27)	27
TRC/TRE-60	TR-60-10	3.31 (84)	84	1.57 (40)	40
TRC/TRE-70	TR-70-10	4.13 (105)	105	1.97 (50)	50
TRC/TRE-85	TR-85-10	4.65 (118)	118	2.32 (59)	59
TRC/TRE-100	TR-100-10	5.24 (133)	133	2.64 (67)	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

For Series	Part No.	in. (mm)		in. (mm)		in. (mm)		in. (mm)	
		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

For Series	Part No.	in. (mm)		in. (mm)		in. (mm)		in. (mm)	
		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)



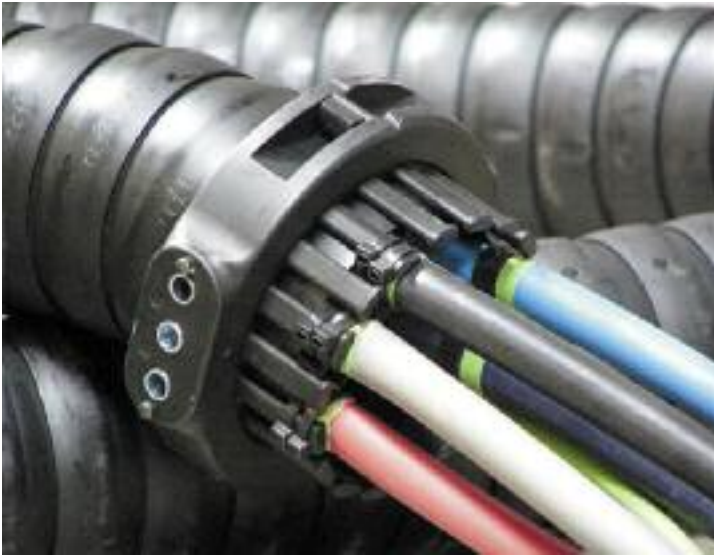
Triflex® R Cover - Light Protective Jacket

- 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

For Series	Part No.	in. (mm)		in. (mm)		in. (mm)		in. (mm)	
		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:

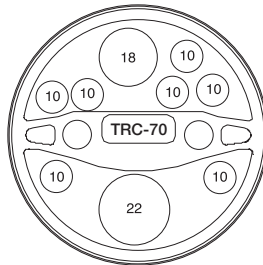
- The total of cable/hose diameters must not exceed 60% of the usable cross section of their Triflex® R component.
- A clearance of at least 10% (min. 1 mm) between any two cables/hoses
- Cables/hoses need to be able to move freely inside the Triflex® R.

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

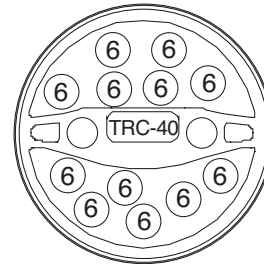
Example:
Cross Section Calculation

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

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

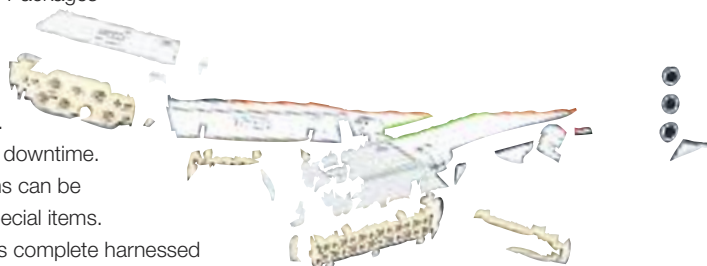
Turnkey harnessed ReadyChain® cable and hose packages, equipped with Chainflex® cables for use on robots. Delivered complete with cables, hoses, connectors and accessories.

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



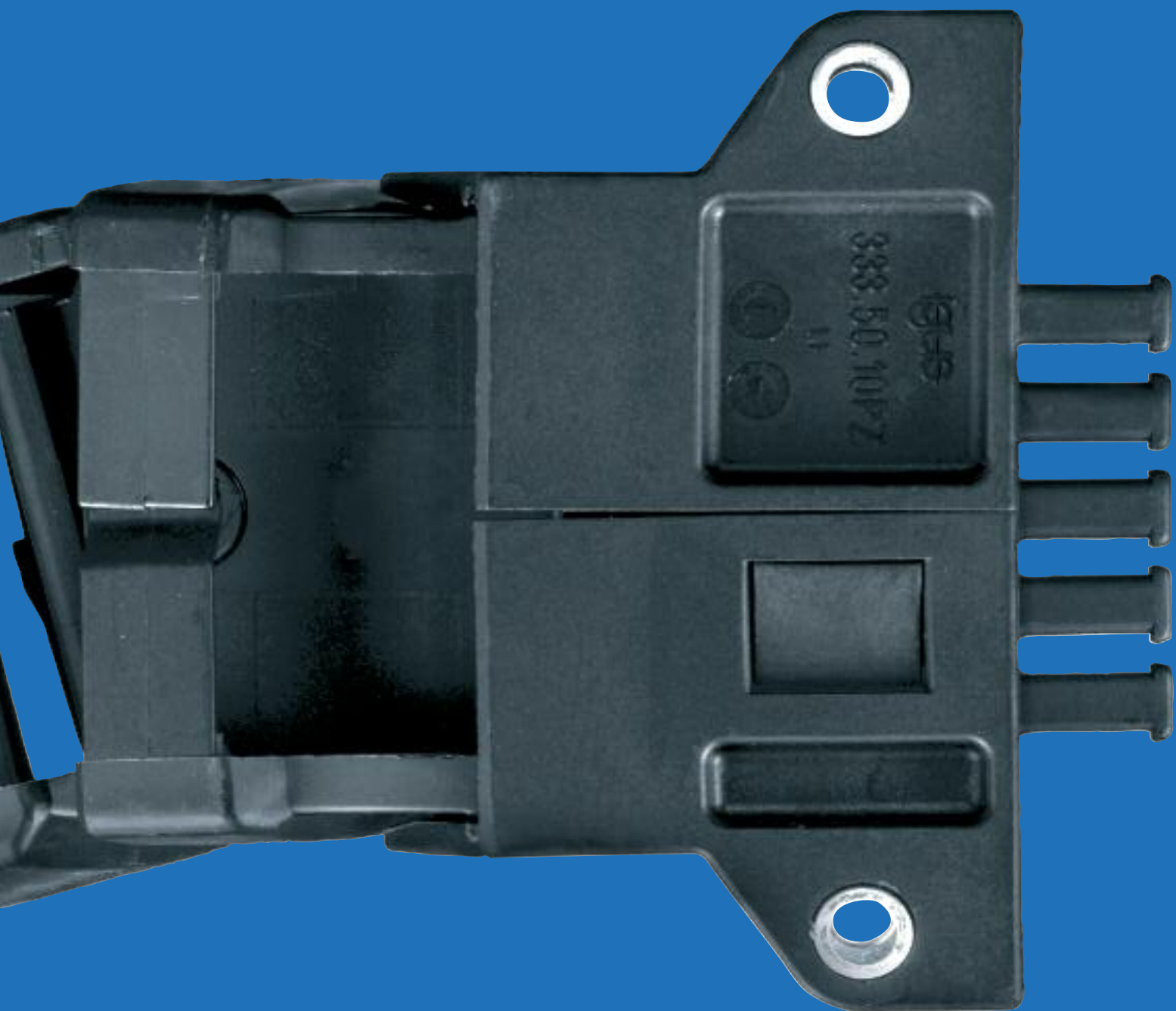
igus® System E6 and Triflex® R TRE in a Y/Z-gantry

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



E-Z Triflex[®]





E-Z Triflex® - for 2D and 3D movements, easy access to cable from both sides

The Triflex® series has been developed to safely guide cables through a 3D movement. With E-Z Triflex®, the installation of cables and hoses is easy. Cables can be inserted into the Energy Chain® from the top or bottom through an opening along the length of the chain. The unique modular design of Triflex® enables very complex movements through all three axes.

Typical industries and applications

- Machine Tools
- Robots
- Material handling
- Plastics machinery
- Construction machines
- Vehicles
- General machinery
- Medical equipment



iF-Design awards for
Easy Triflex®-design

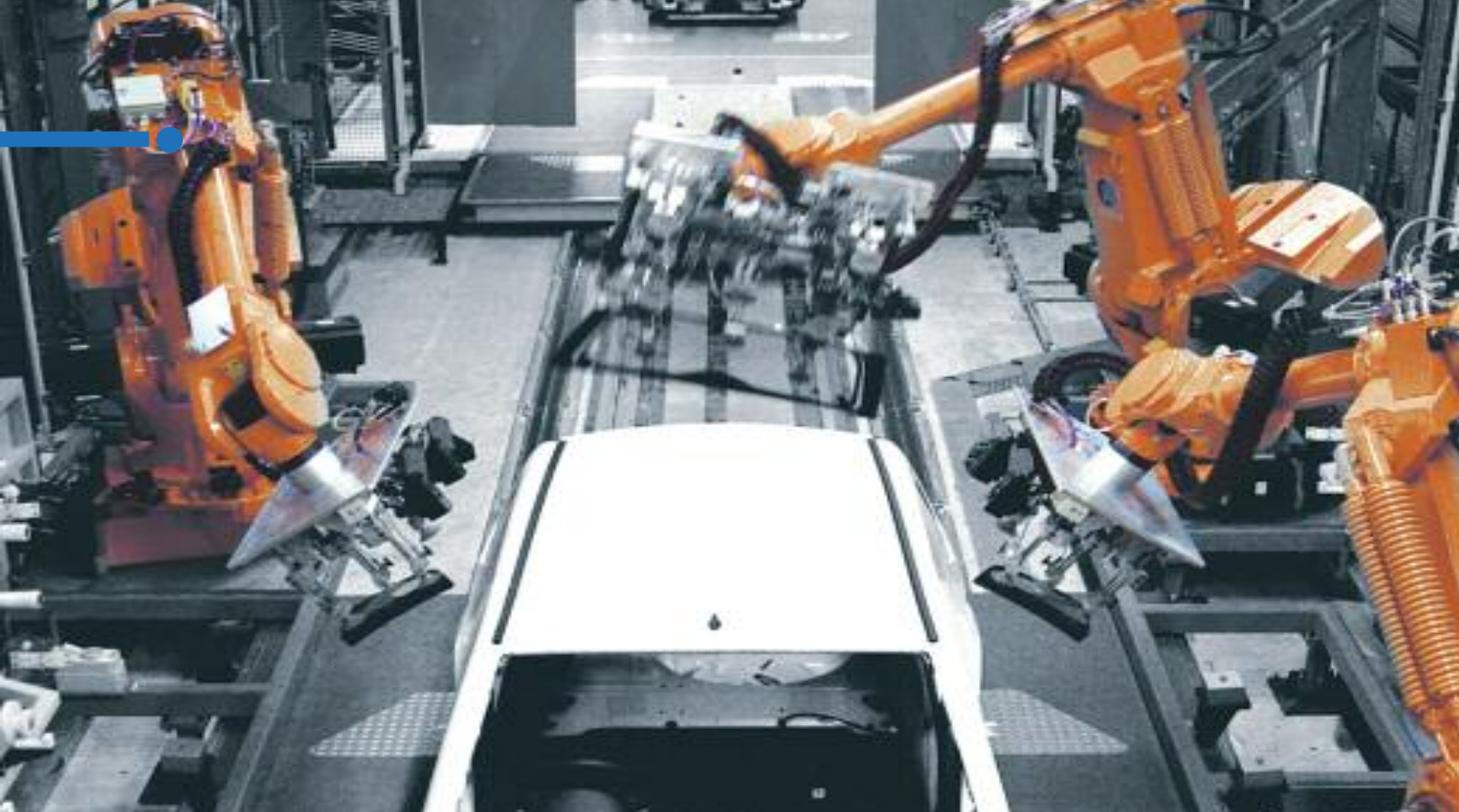


Torsional motion
possible



UL94-V2
classifications





Robots with igus® E-Z Triflex® Energy Chains® on an assembly line



E-Z Triflex® Energy Chains® for multi-dimensional movements on a production line



E-Z Triflex® Energy Chains® also for easy applications - here an aesthetic application

E-Z Triflex® - The Solution for Your Office

Dangling lines are risky and unaesthetic. The new solution: E-Z Triflex® and Triflex® Energy Chains® with special connector elements for your desk. They offer reliable, movable and elegant protection for lines, are quickly installed and are available in many variations. Naturally they can be installed at any time as retrofits. Simply press the lines from two sides. This is possible at any point desired.

Energy Chain System® E-Z Triflex® Series



E-Z Chain®
principle -
simply press
cables in

Material
igumid NB -
UL94-V2
classification

Select this modular Energy Chain System® for:

- 3-axis motions in all kinds of machinery
- Some robotics applications
- Very fast cable assembly with "E-Z" principle
- Simple filling from two sides
- Where rectangular shapes fit better
- Combination of different bending radii and movement directions
- Lengthen and shorten anywhere
- KMA mounting brackets with integrated strain relief
- You can find more technical data about the material, chemical resistance, temperatures ► **Design, Chapter 1**

Selection table

Single-axis and double-axis movement:

Series	Inner Height		Inner Width		Outer height/Outer Width		Bending Radii	
	<i>Bi 1/Bi 2</i>		<i>Bi 3</i>		<i>Ba</i>		<i>R</i>	
	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)
E331-25	.51	(13)	.98	(25)	1.34	(34)	1.89 - 7.87	(048 - 200)
E331-32	.69	(17.5)	1.26	(32)	1.97	(50)	2.95 - 9.84	(075 - 250)
E331-50	1.02	(26)	1.97	(50)	2.68	(68)	3.94 - 9.84	(100 - 250)
E331-75	1.52	(38.5)	2.95	(75)	3.78	(96)	5.51 - 11.81	(140 - 300)

Single-axis and double-axis movement:

Series	Inner Height		Inner Width		Outer height/Outer Width		Bending Radii	
	<i>Bi 1/Bi 2</i>		<i>Bi 3</i>		<i>Ba</i>		<i>R</i>	
	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)
E332-25	.51	(13)	.98	(25)	1.34	(34)	1.89 - 7.87	(048 - 200)
E332-32	.69	(17.5)	1.26	(32)	1.97	(50)	2.95 - 9.84	(075 - 250)
E332-50	1.02	(26)	1.97	(50)	2.68	(68)	3.94 - 9.84	(100 - 250)
E332-75	1.52	(38.5)	2.95	(75)	3.78	(96)	5.51 - 11.81	(140 - 300)

Triple-axis movement

Series	Inner Height		Inner Width		Outer height/Outer Width		Bending Radii	
	<i>Bi 1/Bi 2</i>		<i>Bi 3</i>		<i>Ba</i>		<i>R</i>	
	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)
E333-25	.51	(13)	.98	(25)	1.34	(34)	1.89 - 7.87	(048 - 200)
E333-32	.69	(17.5)	1.26	(32)	1.97	(50)	2.95 - 9.84	(075 - 250)
E333-50	1.02	(26)	1.97	(50)	2.68	(68)	3.94 - 9.84	(100 - 250)
E333-75	1.52	(38.5)	2.95	(75)	3.78	(96)	5.51 - 11.81	(140 - 300)

Energy Chain System® E-Z Triflex® Series

E-Z Triflex® Series - Assembling



1
Twist and snap in



2
Shorten and lengthen
at any given point

E-Z Triflex® Series - Separating



1
Lever the E-Z Triflex®
side link with screwdriver



2
Twist and separate - For Series E333
you have to separate the "middle" pin

E-Z Triflex® Series - Filling



1
Easy to fill - simply press cables in...



2
...and easy to take the cables out

Price Index



Series E332/E333

Special Options Available



Flammability Class
VDE 0304 IIC UL94 V2



Torsion motion possible



iF-Design Award Winner

Assembly Tips



Easy to fill - simply press cables in

Usage Guidelines



- If simple cable installation is required with complex movements
- If simple cable installation from both sides with complex movements is required
- For repair and supplementation of existing Triflex® Systems



- For circular movements with high loads
 - TwisterChain® System, from **Chapter 8**
- If chip protection is necessary
 - Triflex® System, from **Chapter 8**

Features & Benefits

- 1 KMA split-open mounting bracket with integrated strain relief
- 2 Patented "push-button-principle"
- 3 iF-Design Award Winner
- 4 Different bending radii and directions can be combined
- 5 Robotics applications possible
- 6 Shorten and lengthen at any given point
- 7 3-Axis motions in machinery of all kinds
- 8 Simple filling from 2 sides "E-Z Chain®"-principle - simply press in cable along the inner radius or the outer radius



Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

6.56 ft (2 m) E333-50-100/100-0



Energy Chain®

1 Set 333-50-12PZ



Mounting Bracket

Technical Data



Details of material properties

➤ Chapter 1

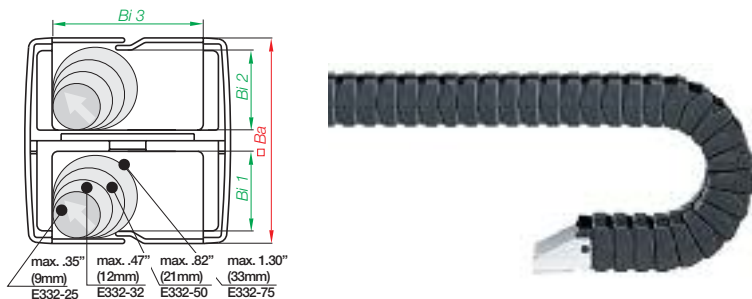
Material - permitted temperature

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

Flammability Class, igumid NB

VDE 0304 IIC UL94 V2

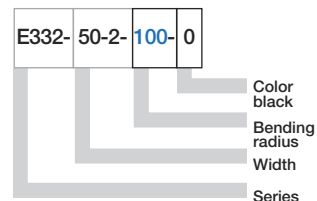
Single Axis Movement, Series E331



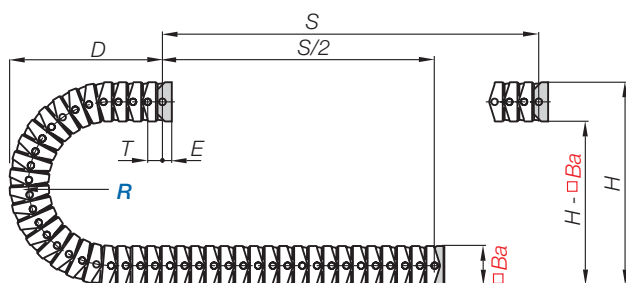
Part No.	Bi 1	Bi 2	Bi 3	Ba
E331-25-2- <input type="text"/> -0	.51 (13)	.51 (13)	.98 (25)	1.34 (34)
E331-32-2- <input type="text"/> -0	.69 (17.5)	.69 (17.5)	1.26 (32)	1.97 (50)
E331-50-2- <input type="text"/> -0	1.02 (26)	1.02 (26)	1.97 (50)	2.68 (68)
E331-75-2- <input type="text"/> -0	1.52 (38.5)	1.52 (38.5)	2.95 (75)	3.78 (96)

Supplement part number with required radius from below
for example E331-50-2--0

Part No. structure



Installation dimensions for single-axis movement



For center mount applications:
Chain length = $\frac{S}{2} + K$

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{"safety buffer"}$

Series E331-25-2--0

R	1.89 (048)	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)
H	5.12 (130)	7.28 (185)	9.25 (235)	11.22 (285)	13.19 (335)	15.15 (385)	17.13 (435)
D	3.74 (95)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	8.86 (225)	9.84 (250)
K	7.68 (195)	11.02 (280)	14.17 (360)	17.32 (440)	20.28 (515)	23.43 (595)	26.57 (675)

Pitch = .57 (14.5 mm)
Links/ft (m) = 21.03 (69)
Dimensions E = .39 (10 mm)
Ba = 1.34 (34 mm)

Series E331-32-2--0

R	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	7.87 (200)	9.84 (250)
H	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)	17.72 (450)	21.65 (550)
D	5.12 (130)	6.10 (155)	7.09 (180)	8.07 (205)	10.04 (255)	12.01 (305)
K	12.01 (305)	15.15 (385)	18.30 (465)	21.46 (545)	27.56 (700)	34.06 (865)

Pitch = .98 (25 mm)
Links/ft (m) = 12.24 (40)
Dimensions E = .79 (20 mm)
Ba = 1.97 (50 mm)

Series E331-50-2--0

R	3.94 (100)	4.92 (125)	5.91 (150)	7.87 (200)	9.84 (250)
H	10.63 (270)	12.60 (320)	14.76 (375)	18.50 (470)	22.44 (570)
D	7.68 (195)	8.66 (220)	9.65 (245)	11.61 (295)	13.58 (345)
K	17.13 (435)	20.47 (520)	23.23 (590)	29.53 (750)	35.83 (910)

Pitch = 1.18 (30 mm)
Links/ft (m) = 10.17 (34)
Dimensions E = .98 (25 mm)
Ba = 2.68 (68 mm)

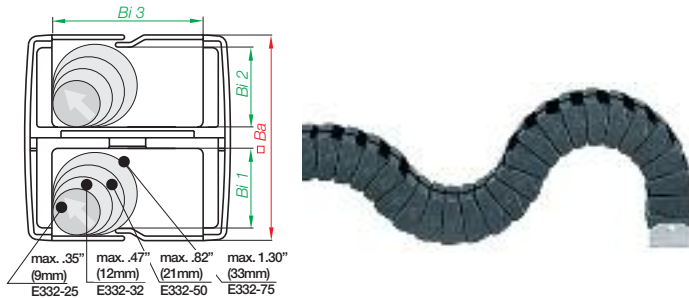
Series E331-75-2--0

R	5.51 (140)	6.89 (175)	7.87 (200)	9.84 (250)	11.81 (300)
H	14.96 (380)	17.71 (450)	19.69 (500)	23.62 (600)	27.56 (700)
D	9.45 (240)	10.83 (275)	11.81 (300)	13.78 (350)	15.75 (400)
K	21.65 (550)	25.98 (660)	29.13 (740)	35.43 (900)	41.73 (1060)

Pitch = 1.42 (36 mm)
Links/ft (m) = 8.45 (28)
Dimensions E = .98 (25 mm)
Ba = 3.78 (96 mm)



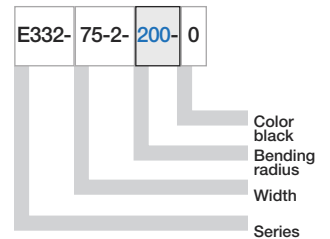
Double Axis Movement, Series E332



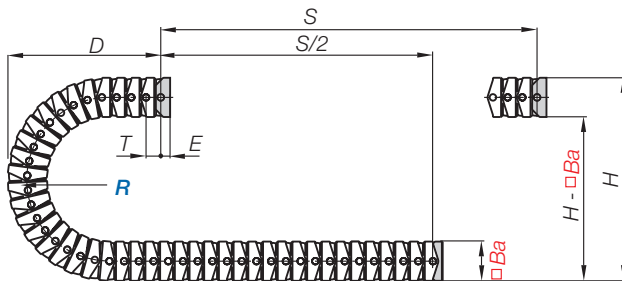
Part No.	Bi 1	Bi 2	Bi 3	Ba
E332-25-2- <input type="text"/> -0	.51 (13)	.51 (13)	.98 (25)	1.34 (34)
E332-32-2- <input type="text"/> -0	.69 (17.5)	.69 (17.5)	1.26 (32)	1.97 (50)
E332-50-2- <input type="text"/> -0	1.02 (26)	1.02 (26)	1.97 (50)	2.68 (68)
E332-75-2- <input type="text"/> -0	1.52 (38.5)	1.52 (38.5)	2.95 (75)	3.78 (96)

Supplement part number with required radius from below
for example, E332-75-2--0

Part No. structure



Installation dimensions for double-axis movement



For center mount applications:
Chain length = $S/2 + K$

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{"safety buffer"}$

Series E332-25-2--0

R	1.89 (048)	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)
H	5.12 (130)	7.28 (185)	9.25 (235)	11.22 (285)	13.19 (335)	15.15 (385)	17.13 (435)
D	3.74 (95)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	8.86 (225)	9.84 (250)
K	7.68 (195)	11.02 (280)	14.17 (360)	17.32 (440)	20.28 (515)	23.43 (595)	26.57 (675)

Pitch = .57 (14.5 mm)
Links/ft (m) = 21.03 (69)
Dimensions E = .39 (10 mm)
Ba = 1.34 (34 mm)

Series E332-32-2--0

R	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	7.87 (200)	9.84 (250)
H	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)	17.72 (450)	21.65 (550)
D	5.12 (130)	6.10 (155)	7.09 (180)	8.07 (205)	10.04 (255)	12.01 (305)
K	12.01 (305)	15.15 (385)	18.30 (465)	21.46 (545)	27.56 (700)	34.06 (865)

Pitch = .98 (25 mm)
Links/ft (m) = 12.24 (40)
Dimensions E = .79 (20 mm)
Ba = 1.97 (50 mm)

Series E332-50-2--0

R	3.94 (100)	4.92 (125)	5.91 (150)	7.87 (200)	9.84 (250)
H	10.63 (270)	12.60 (320)	14.76 (375)	18.50 (470)	22.44 (570)
D	7.68 (195)	8.66 (220)	9.65 (245)	11.61 (295)	13.58 (345)
K	17.13 (435)	20.47 (520)	23.23 (590)	29.53 (750)	35.83 (910)

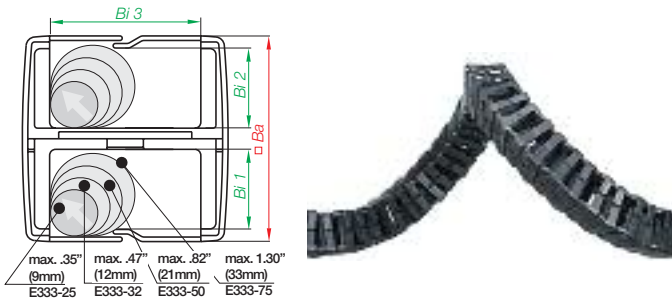
Pitch = 1.18 (30 mm)
Links/ft (m) = 10.17 (34)
Dimensions E = .98 (25 mm)
Ba = 2.68 (68 mm)

Series E332-75-2--0

R	5.51 (140)	6.89 (175)	7.87 (200)	9.84 (250)	11.81 (300)
H	14.96 (380)	17.71 (450)	19.69 (500)	23.62 (600)	27.56 (700)
D	9.45 (240)	10.83 (275)	11.81 (300)	13.78 (350)	15.75 (400)
K	21.65 (550)	25.98 (660)	29.13 (740)	35.43 (900)	41.73 (1060)

Pitch = 1.42 (36 mm)
Links/ft (m) = 8.45 (28)
Dimensions E = .98 (25 mm)
Ba = 3.78 (96 mm)

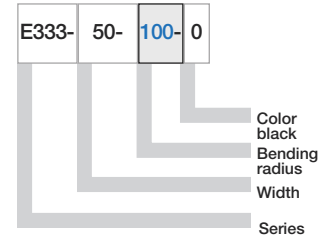
Triple Axis Movement, Series E333



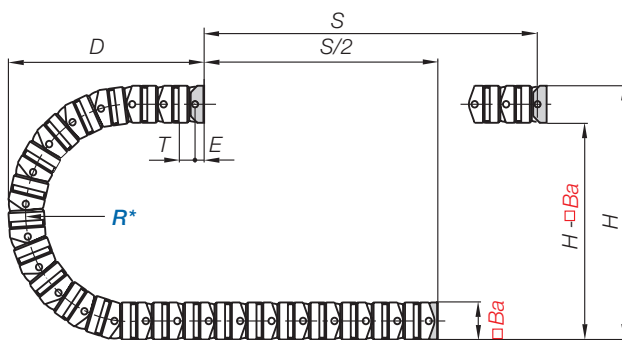
Part No.	Bi 1	Bi 2	Bi 3	Ba
E333-25-□-0	.51 (13)	.51 (13)	.98 (25)	1.34 (34)
E333-32-□-0	.69 (17.5)	.69 (17.5)	1.26 (32)	1.97 (50)
E333-50-□-0	1.02 (26)	1.02 (26)	1.97 (50)	2.68 (68)
E333-75-□-0	1.52 (38.5)	1.52 (38.5)	2.95 (75)	3.78 (96)

Supplement part number with required radius from above
for example, E333-32-**100**-0

Part No. structure



Installation dimensions for triple-axis movement



For center mount applications:
Chain length = $\frac{S}{2} + K$

* The bending radii are doubled in the case of the Series E333 Energy Chain®

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{"safety buffer"}$

Series E333-25-**XXX**-0

R	3.78 (096)	5.91 (150)	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)
H	9.06 (230)	13.19 (335)	17.13 (435)	21.06 (535)	25.00 (635)	28.94 (735)	32.87 (835)
D	5.71 (145)	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)	17.72 (450)
K	13.78 (350)	20.28 (515)	26.57 (675)	32.68 (830)	38.98 (990)	45.28 (1150)	51.18 (1300)

Pitch = .57 (14.5 mm)
Links/ft (m) = 21.03 (69)
Dimensions E = .39 (10 mm)
Ba = 1.34 (34 mm)

Series E333-32-**XXX**-0

R	5.91 (150)	7.87 (200)	9.84 (250)	11.81 (300)	15.75 (400)	19.69 (500)
H	13.78 (350)	17.72 (450)	21.65 (550)	25.59 (650)	33.46 (850)	41.33 (1050)
D	8.07 (205)	10.04 (255)	12.01 (305)	13.98 (355)	17.91 (455)	21.85 (555)
K	21.46 (545)	27.56 (700)	33.86 (860)	40.16 (1020)	51.18 (1300)	63.19 (1605)

Pitch = .98 (25 mm)
Links/ft (m) = 12.24 (40)
Dimensions E = .79 (20 mm)
Ba = 1.97 (50 mm)

Series E333-50-**XXX**-0

R	7.87 (200)	9.84 (250)	11.81 (300)	15.75 (400)	19.69 (500)
H	18.50 (470)	22.44 (570)	26.38 (670)	34.25 (870)	42.13 (1070)
D	11.61 (295)	13.58 (345)	15.55 (395)	19.49 (495)	23.42 (595)
K	29.53 (750)	35.83 (910)	42.13 (1070)	54.33 (1380)	66.54 (1690)

Pitch = 1.18 (30 mm)
Links/ft (m) = 10.17 (34)
Dimensions E = .98 (25 mm)
Ba = 2.68 (68 mm)

Series E333-75-**XXX**-0

R	11.02 (280)	13.78 (350)	15.75 (400)	19.69 (500)	23.62 (600)
H	25.98 (660)	31.50 (800)	35.43 (900)	43.31 (1100)	51.18 (1300)
D	14.96 (380)	17.72 (450)	19.69 (500)	23.62 (600)	27.56 (700)
K	38.98 (990)	47.64 (1210)	55.12 (1400)	66.93 (1700)	78.74 (2000)

Pitch = 1.42 (36 mm)
Links/ft (m) = 8.45 (28)
Dimensions E = .98 (25 mm)
Ba = 3.78 (96 mm)

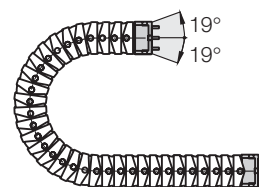
PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Mounting Brackets

Option 1: KMA

- Corrosion resistant
- Strain relief with tiwrap plate

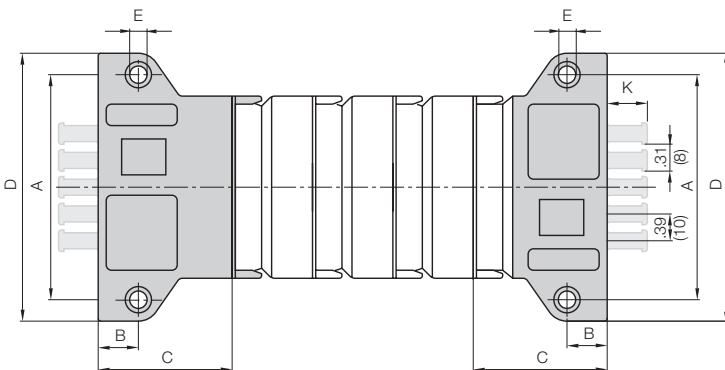


333-50-1PZ
Moving end

333-50-2PZB
Fixed end
(with tiwrap plate
333-50-ZB)

333-50-1PZ

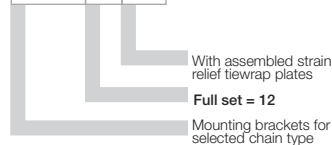
333-50-2PZB



For high loads we recommend screwing the mounting brackets to the chain. If you have any questions, please give us a call.

Part No. structure

333-32-12 PZB



Full set, for both ends:

333-32-12 PZB +tiwrap plate

Single-part order:

333-32-1 PZB +tiwrap plate

Mounting bracket with bore

333-32-2 PZB +tiwrap plate

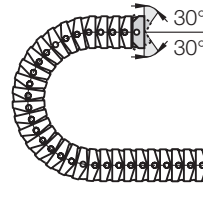
Mounting bracket with pin

Series	Part No.	A	B	C	D	E	K	N No. of Teeth
E331-25/E332-25-2/E333-25	333-25-12PZ	1.69 (43)	.28 (7)	.87 (22)	2.04 (52)	.18 (4.5)	—	—
E331-32/E332-32-2/E333-32	333-32-12PZ	2.60 (66)	.59 (15)	1.81 (46)	3.23 (82)	.26 (6.5)	.59 (15)	3
E331-50/E332-50-2/E333-50	333-50-12PZ	3.31 (84)	.59 (15)	1.97 (50)	3.94 (100)	.26 (6.5)	.59 (15)	5
E331-75/E332-75-2/E333-75	333-75-12PZ	4.29 (109)	.59 (15)	2.17 (55)	4.92 (125)	.26 (6.5)	.59 (15)	7

Mounting Brackets

Option 2: flange

- Galvanized steel
- Electrically conductive
- Flush mounting

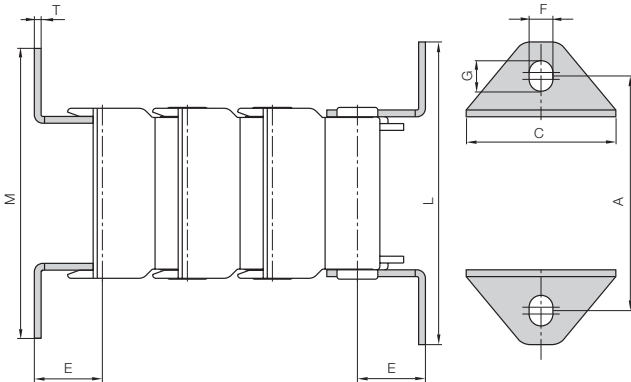


330-25-1 – 330-75-1
Moving end

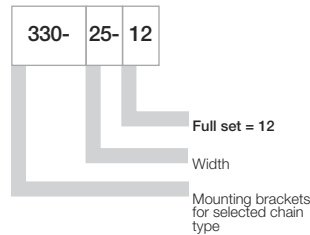
330-25-2 – 330-75-2
Fixed end

330-25-2 – 330-75-2

330-25-1 – 330-75-1



Part No. structure



Full set, 4 parts

2 with pin / 2 with bore:

330- 25- 12

Single-part order:

330- 25- 1

Mounting bracket with bore

330- 25- 2

Mounting bracket with pin

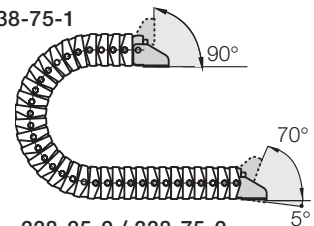
Series	Part No.	A	M	C	L	T	E	F	G
E331-25/E332-25-2/E333-25	330-25-12	1.73 (44)	2.17 (55)	1.14 (29)	2.17 (55)	.06 (1.5)	.41 (10.5)	.26 (6.5)	.35 (9)
E331-32/E332-32-2/E333-32	330-32-12	2.60 (66)	3.31 (84)	1.73 (44)	3.46 (88)	.08 (2)	.79 (20)	.28 (7)	.35 (9)
E332-50/E332-50-2/E333-50	330-50-12	3.31 (84)	4.02 (102)	2.44 (62)	4.17 (106)	.08 (2)	.98 (25)	.28 (7)	.35 (9)
E331-75/E332-75-2/E333-75	330-75-12	4.29 (109)	5.00 (127)	3.54 (90)	5.16 (131)	.08 (2)	.98 (25)	.28 (7)	.35 (9)

Option 3: angle

- Galvanized steel
- Electrically conductive
- Can be attached to top or bottom of the machine



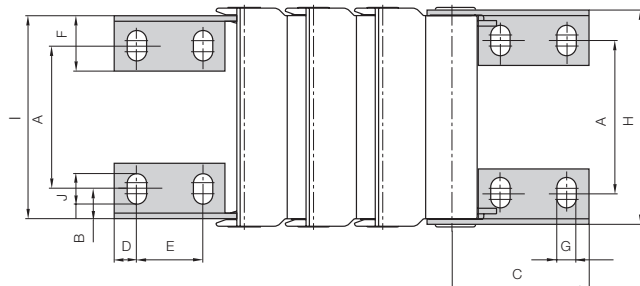
338-25-1/ 338-75-1
Moving end



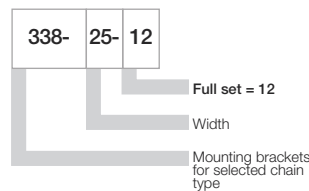
338-25-2 / 338-75-2
Fixed end

338-25-2 / 338-75-2

338-25-1 / 338-75-1



Part No. structure



Full set, 4 parts

2 with pin / 2 with bore:

338- 25- 12

Single-part order:

338- 25- 1

Mounting bracket with bore

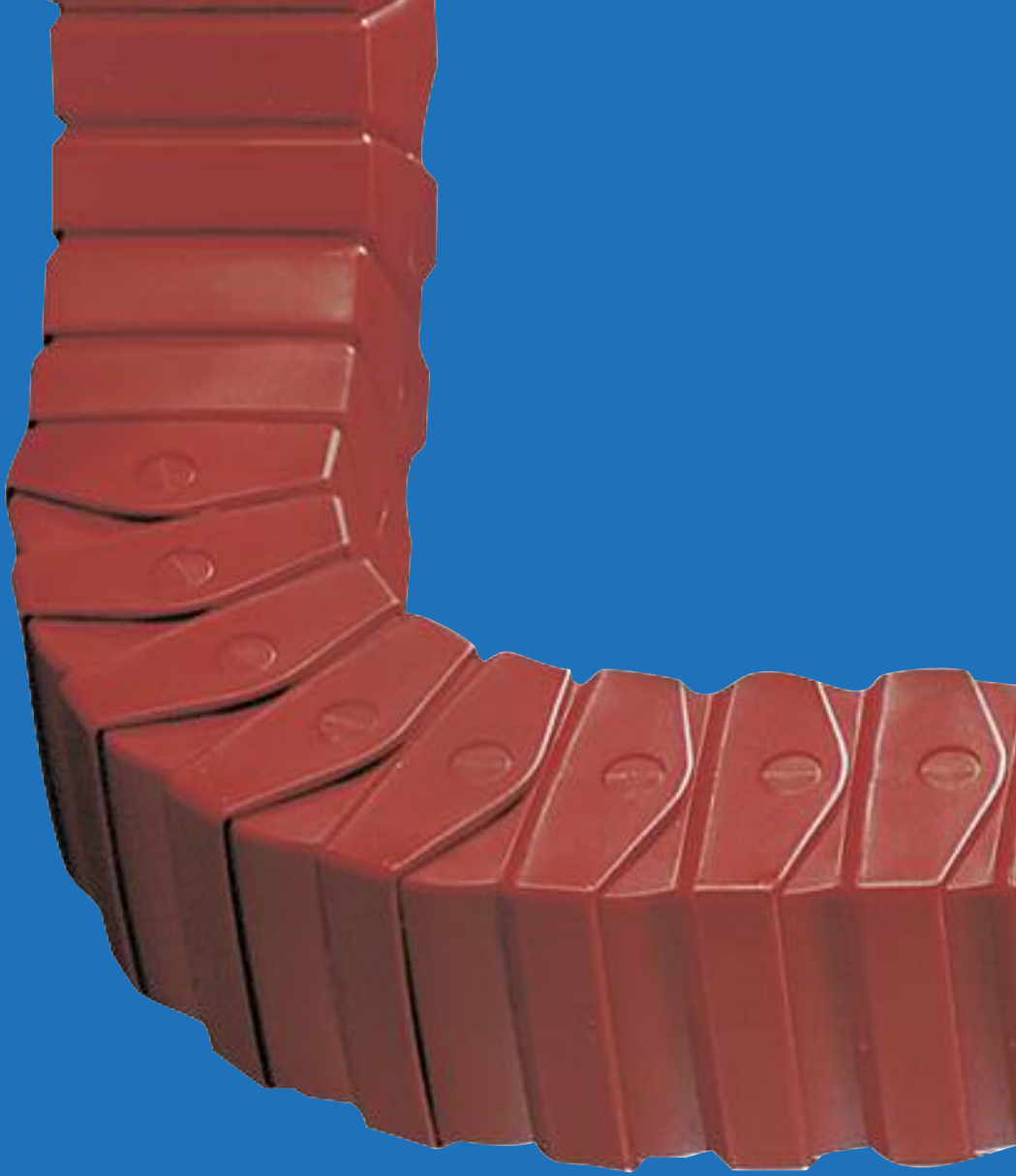
338- 25- 2

Mounting bracket with pin

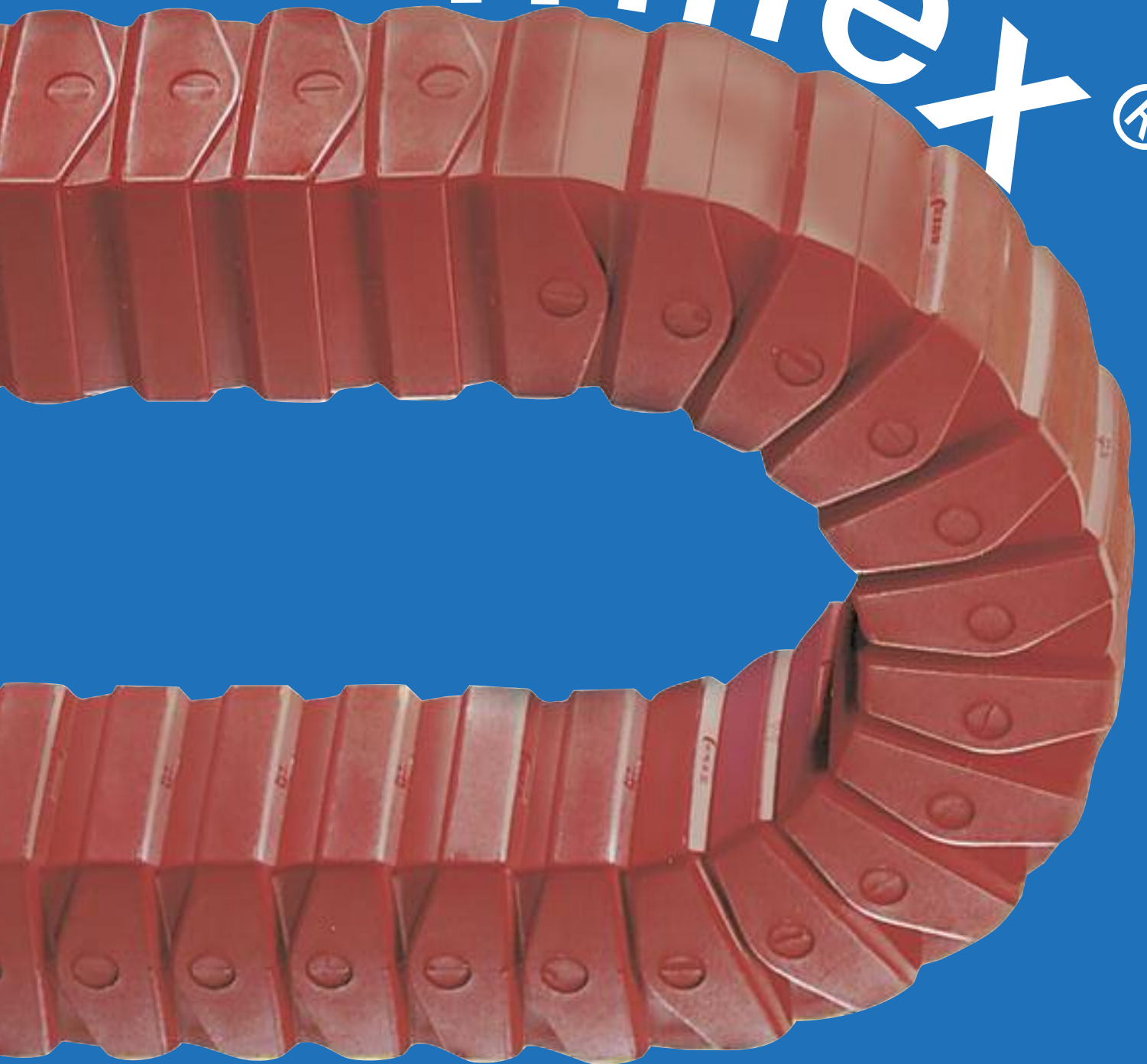
Series	Part No.	A	B	C	D	E	F	G	H	I	J
E331-25/E332-25-2/E333-25	338-25-12	.67 (17)	.25 (6.25)	1.10 (28)	.24 (6)	.63 (16)	.55 (14)	.22 (5.5)	1.33 (33.8)	1.22 (31)	.33 (8.5)
E331-25/E332-32-2/E333-32	338-32-12	.94 (24)	.22 (5.5)	1.85 (47)	.31 (8)	.94 (24)	.79 (20)	.28 (7)	1.93 (49)	1.77 (45)	.43 (11)
E331-25/E332-50-2/E333-50	338-50-12	1.65 (42)	.22 (5.5)	3.03 (77)	.47 (12)	1.38 (35)	.94 (24)	.35 (9)	2.64 (67)	2.44 (62)	.59 (15)
E331-25/E332-75-2/E333-75	338-75-12	2.56 (65)	.22 (5.5)	3.03 (77)	.47 (12)	1.38 (35)	.94 (24)	.35 (9)	3.74 (95)	3.54 (90)	.59 (15)

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





Triflex®



Triflex® - fully enclosed, for 2D and 3D applications

The Triflex® series has been developed to safely guide cables during a 3D movement. In this case, the flexibility of a hose is combined with the stability of an Energy Chain® with a fixed, defined radius. This unique modular range enables very complex movements. As example: Combination of chain links moving in single, double and triple axes in an Energy Chain®.

Typical industries and applications

- Machine tools
- Robots
- Handling equipment
- Material handling
- Plastics machinery
- Construction machines
- Vehicles
- Machinery of all kinds
- Medical equipment



iF-Design awards for
Easy Triflex®-design

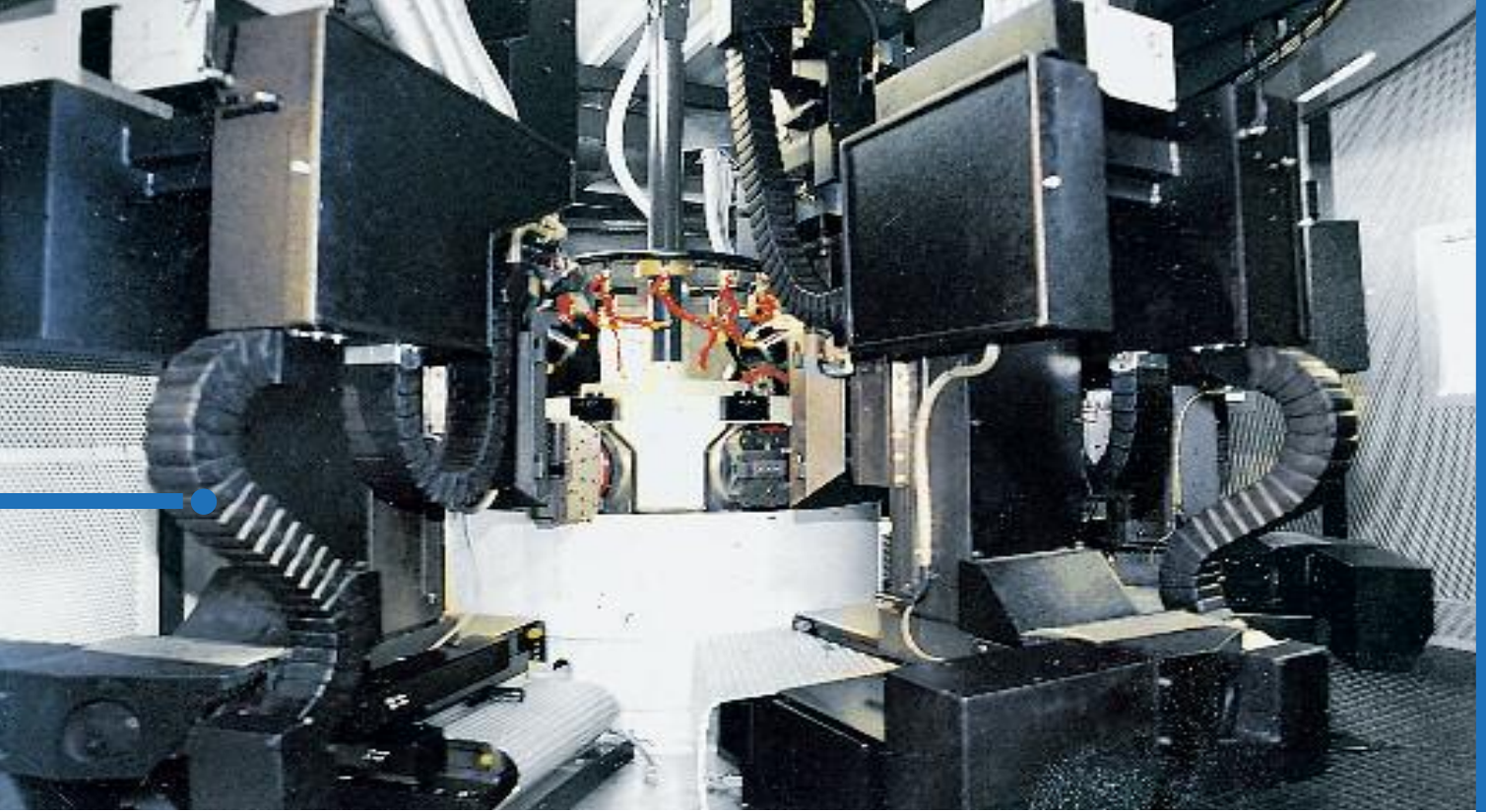


Torsional motion
possible



UL94-V2
classifications





Various Triflex® tubes on the inside of a machining center



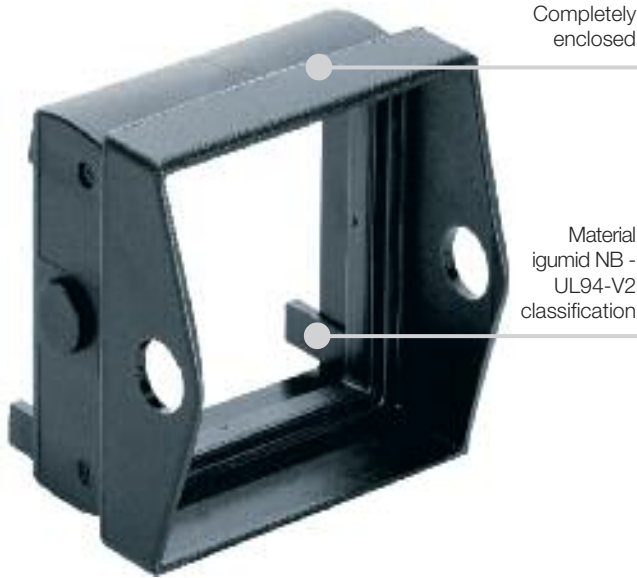
Triflex® for 3 movement directions combined with Triflex® for 1 movement direction



Triflex® 332 as unsupported link from machines to control desk

Energy Chain System® Triflex® Series Selection Guide

energy chain® configurator 



Select this modular, robust, Energy chain system® for:

- 3-axis motions in machinery of all kinds
- Dirty environments
- High tensile strength
- Where rectangular shapes fit better
- Side-mounted unsupported
- Completely enclosed - protection against dirt and chips
- Combinations of varying bending radii and moving axes
- Connecting and separating possible at every link
- Flanged mounting brackets or mounting brackets angle, galvanized steel
- Series 352 and 353 snap-open
- Combination Series 353/333 possible
- Cost-effective design for complex movements
- You can find more technical data about the material, chemical resistance, temperatures ► **Design, Chapter 1**

Selection table

Single-axis movement:

Series	Inner height/Inner width □ Bi		Outer width/Outer height □ Ba		Bending radii R	
	in.	(mm)	in.	(mm)	in.	(mm)
331-16	.63	(16)	1.02	(26)	1.50 - 3.94	(038 - 100)
331-32	1.26	(32)	1.97	(50)	2.95 - 9.84	(075 - 250)
331-50	1.97	(50)	2.68	(68)	3.94 - 9.84	(100 - 250)
331-75	2.95	(75)	3.78	(96)	5.51 - 11.81	(140 - 300)

Double-axis movement:

Series	Inner height/Inner width □ Bi		Outer width/Outer height □ Ba		Bending radii R	
	in.	(mm)	in.	(mm)	in.	(mm)
332-16	.63	(16)	1.02	(26)	1.50 - 3.94	(038 - 100)
332-32	1.26	(32)	1.97	(50)	2.95 - 9.84	(075 - 250)
332-50	1.97	(50)	2.68	(68)	3.94 - 9.84	(100 - 250)
332-75	2.95	(75)	3.78	(96)	5.51 - 11.81	(140 - 300)

Triple-axis movement:

Series	Inner height/Inner width □ Bi		Outer width/Outer height □ Ba		Bending radii R	
	in.	(mm)	in.	(mm)	in.	(mm)
333-16	.63	(16)	1.02	(26)	1.50 - 3.94	(038 - 100)
333-32	1.26	(32)	1.97	(50)	2.95 - 9.84	(075 - 250)
333-50	1.97	(50)	2.68	(68)	3.94 - 9.84	(100 - 250)
333-75	2.95	(75)	3.78	(96)	5.51 - 11.81	(140 - 300)

Snap-open Series:

Series	Inner height/Inner width □ Bi		Outer width/Outer height □ Ba		Bending radii R	
	in.	(mm)	in.	(mm)	in.	(mm)
351-50 Single	1.97	(50)	2.68	(68)	3.94 - 9.84	(100 - 250)
352-50 Double	1.97	(50)	2.68	(68)	3.94 - 9.84	(100 - 250)
353-50 Triple	1.97	(50)	2.68	(68)	3.94 - 9.84	(100 - 250)

Energy Chain System® Triflex® Series Assembly Instructions

Triflex® Series - Assembling



Twist and snap in



Snap in pin "push-button-principle"

Triflex® Series - Separating



Release side link



Twist and separate

Triflex® Series 352 and 353 - Filling



To open Series 352 and Series 353 only - Insert screwdriver into slot on top of lid and push down

Price Index

Series 332/333 **Series 352/353**
Special Options Available

Flammability Class
 VDE 0304 IIC UL94 V2

Torsion motion possible

iF-Design Award Winner
Assembly Tips


Release side link, twist and separate


 To open Series 352 and Series 353 only
 - Insert screwdriver into slot on top of lid and push down

Usage Guidelines


- For applications that move within two or three axes (combined rotary and circular movements)
- If chip protection is required



- If every link must open on both sides

▶ TwisterChain® system,

Chapter 8

- For gliding applications
 - ▶ System E4, **Chapter 6**
- For rotary movements only
 - ▶ TwisterChain® system, **Chapter 8**

8.49
Features & Benefits

- 1 KMA, flanged and angled mounting brackets available
- 2 Combinations of varying bending radii and moving axes
- 3 Completely enclosed
- 4 Combination of Series 353 and Series 333 possible
- 5 Series 352 and 353 snap-open
- 6 Protection against dirt and chips
- 7 High tensile strength
- 8 Cost-effective design for complex movements
- 9 Assembling and separating at any given point


Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

[energy chain® configurator](#) ▶

 6.56 ft (2 m) **332-50-100/100-0**
Energy Chain®

 With 2 separators **351** assembled every 2nd link

 Interior Separation

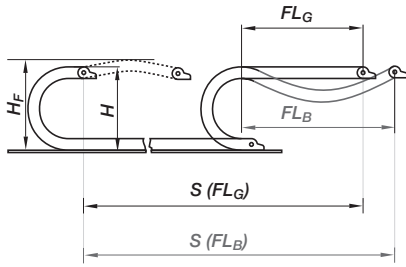
 1 Set **338-50-12**
Mounting Bracket

Energy Chain System® Triflex® Series
Series 331/332/333
Series 351/352/353 (Snap-Open)

energy chain® configurator ▶



Triflex®



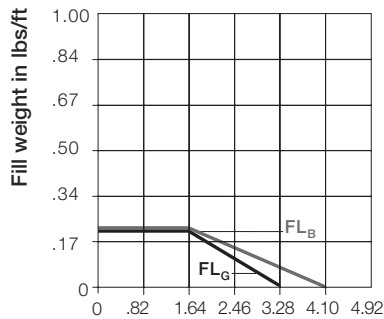
Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information ▶ Design, Chapter 1

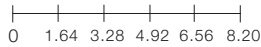
Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{"safety buffer"}$
- H_F = Required clearance height

Unsupported length 331/332-16

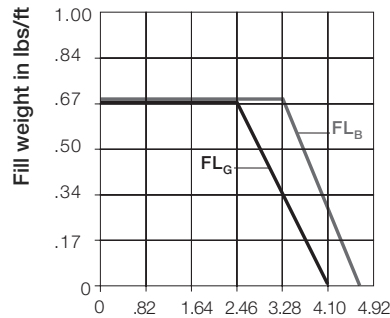


Unsupported length in ft FL_B/FL_G

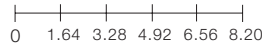


Total Length of travel S in ft

Unsupported length 331/332-32

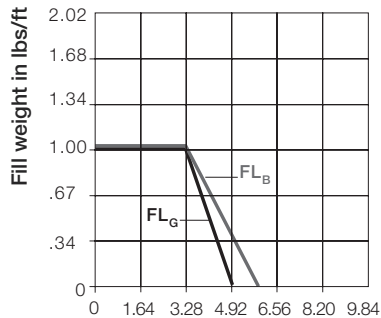


Unsupported length in ft FL_B/FL_G

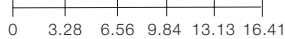


Total Length of travel S in ft

Unsupported length 331/332-50

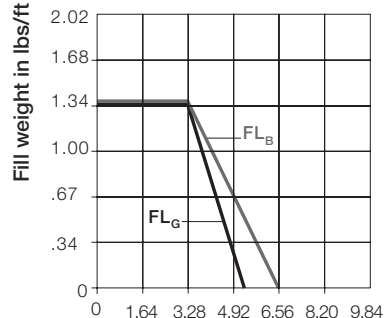


Unsupported length in ft FL_B/FL_G

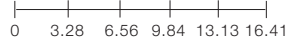


Total Length of travel S in ft

Unsupported length 331/332-75



Unsupported length in ft FL_B/FL_G



Total Length of travel S in ft

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



Technical Data

Material - permitted temperature

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

Flammability Class, igumid NB

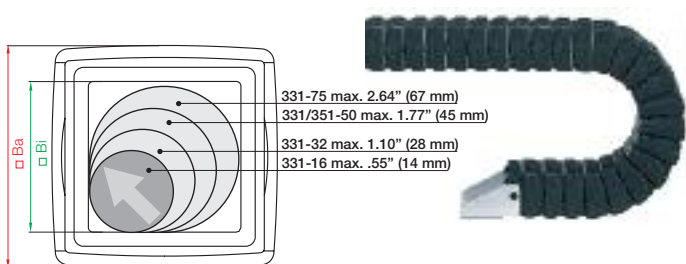
VDE 0304 IIC UL94 V2



Details of material properties

▶ Chapter 1

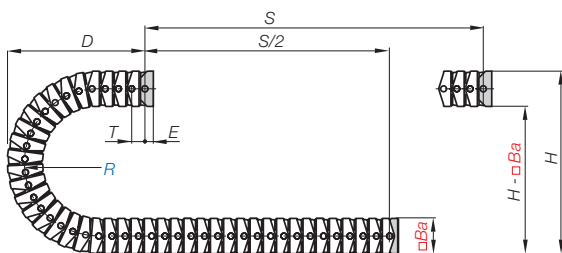
Single Axis Movement, Series 331/351



Part No.	Bi	Ba	Weight
	in. (mm)	in. (mm)	lbs/ft (kg/m)
331-16-	.63 (16)	1.02 (26)	≈ 0.22 (.33)
331-32-	1.26 (32)	1.97 (50)	≈ 0.60 (.90)
331-50-	1.97 (50)	2.68 (68)	≈ 0.94 (1.40)
331-75-	2.95 (75)	3.78 (96)	≈ 1.58 (2.35)
Snap-open			
351-50-	1.97 (50)	2.68 (68)	≈ 0.94 (1.40)

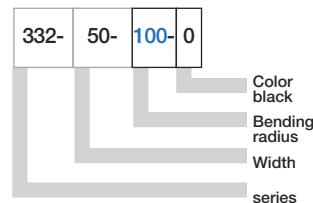
Supplement part number with required radius from below.
for example 331-50-100-0

Installation dimensions for single-axis movement



For center mount applications:
Tube length = $\frac{S}{2} + K$

Part No. structure



Series 331-16

R	1.50 (038)	1.89 (048)	2.95 (075)	3.94 (100)
H	4.13 (105)	4.92 (125)	7.09 (180)	9.06 (230)
D	2.76 (70)	3.15 (80)	4.13 (105)	5.12 (130)
K	7.87 (200)	9.06 (230)	12.40 (315)	15.75 (400)

Pitch = .52 (13.3 mm)
Links/ft (m) = 23.08 (76)
Dimensions E = .39 (10 mm)
Ba = 1.02 (26 mm)

Series 331-32

R	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	7.87 (200)	9.84 (250)
H	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)	17.72 (450)	21.65 (550)
D	5.12 (130)	6.10 (155)	7.09 (180)	8.07 (205)	10.04 (255)	12.01 (305)
K	12.01 (305)	15.15 (385)	18.30 (465)	21.46 (545)	27.56 (700)	34.06 (865)

Pitch = .98 (25 mm)
Links/ft (m) = 12.24 (40)
Dimensions E = .79 (20 mm)
Ba = 1.97 (50 mm)

Series 331-50

R	3.94 (100)	4.92 (125)	5.91 (150)	7.87 (200)	9.84 (250)
H	10.63 (270)	12.60 (320)	14.76 (375)	18.50 (470)	22.44 (570)
D	7.68 (195)	8.66 (220)	9.65 (245)	11.61 (295)	13.58 (345)
K	17.13 (435)	20.47 (520)	23.23 (590)	29.53 (750)	35.83 (910)

Pitch = 1.18 (30 mm)
Links/ft (m) = 10.17 (34)
Dimensions E = .98 (25 mm)
Ba = 2.68 (68 mm)

Series 331-75

R	5.51 (140)	6.89 (175)	7.87 (200)	9.84 (250)	11.81 (300)
H	14.96 (380)	17.71 (450)	19.69 (500)	23.62 (600)	27.56 (700)
D	9.45 (240)	10.83 (275)	11.81 (300)	13.78 (350)	15.75 (400)
K	21.65 (550)	25.98 (660)	29.13 (740)	35.43 (900)	41.73 (1060)

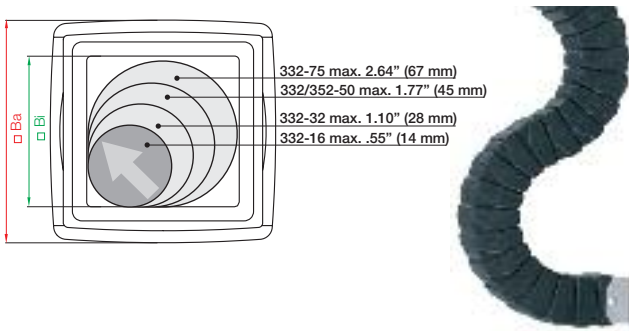
Pitch = 1.42 (36 mm)
Links/ft (m) = 8.45 (28)
Dimensions E = .98 (25 mm)
Ba = 3.78 (96 mm)

Series 351-50 (Snap-Open)

R	3.94 (100)	4.92 (125)	5.91 (150)	7.87 (200)	9.84 (250)
H	10.63 (270)	12.60 (320)	14.76 (375)	18.50 (470)	22.44 (570)
D	7.68 (195)	8.66 (220)	9.65 (245)	11.61 (295)	13.58 (345)
K	17.13 (435)	20.47 (520)	23.23 (590)	29.53 (750)	35.83 (910)

Pitch = 1.18 (30 mm)
Links/ft (m) = 10.17 (34)
Dimensions E = .98 (25 mm)
Ba = 2.68 (68 mm)

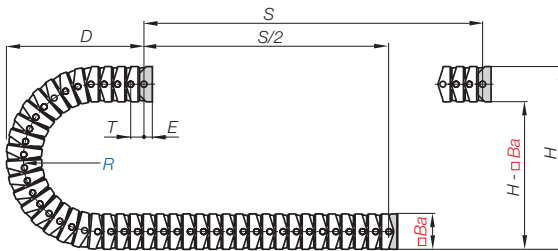
Double Axis Movement, Series 332/352



Part No.	Bi	Ba	Weight
	in. (mm)	in. (mm)	lbs/ft (kg/m)
332-16-	.63 (16)	1.02 (26)	≈ 0.22 (.33)
332-32-	1.26 (32)	1.97 (50)	≈ 0.60 (.90)
332-50-	1.97 (50)	2.68 (68)	≈ 0.94 (1.40)
332-75-	2.95 (75)	3.78 (96)	≈ 1.58 (2.35)
Snap-open			
352-50-	1.97 (50)	2.68 (68)	≈ 0.94 (1.40)

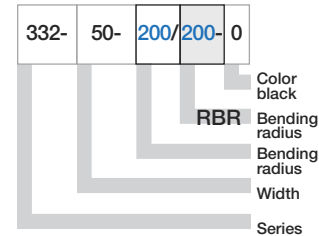
Supplement part number with required radius from below
for example, 332-75-2-200-0

Installation dimensions for double-axis movement



For center mount applications:
Tube length = $\frac{S}{2} + K$

Part No. structure



Series 332-16

R	1.50 (038)	1.89 (048)	2.95 (075)	3.94 (100)
H	4.13 (105)	4.92 (125)	7.09 (180)	9.06 (230)
D	2.76 (70)	3.15 (80)	4.13 (105)	5.12 (130)
K	7.87 (200)	9.06 (230)	12.40 (315)	15.75 (400)

Pitch = .52 (13.3 mm)
Links/ft (m) = 23.08 (76)
Dimensions E = .39 (10 mm)
Ba = 1.02 (26 mm)

Series 332-32

R	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	7.87 (200)	9.84 (250)
H	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)	17.72 (450)	21.65 (550)
D	5.12 (130)	6.10 (155)	7.09 (180)	8.07 (205)	10.04 (255)	12.01 (305)
K	12.01 (305)	15.15 (385)	18.30 (465)	21.46 (545)	27.56 (700)	34.06 (865)

Pitch = .98 (25 mm)
Links/ft (m) = 12.24 (40)
Dimensions E = .79 (20 mm)
Ba = 1.97 (50 mm)

Series 332-50

R	3.94 (100)	4.92 (125)	5.91 (150)	7.87 (200)	9.84 (250)
H	10.63 (270)	12.60 (320)	14.76 (375)	18.50 (470)	22.44 (570)
D	7.68 (195)	8.66 (220)	9.65 (245)	11.61 (295)	13.58 (345)
K	17.13 (435)	20.47 (520)	23.23 (590)	29.53 (750)	35.83 (910)

Pitch = 1.18 (30 mm)
Links/ft (m) = 10.17 (34)
Dimensions E = .98 (25 mm)
Ba = 2.68 (68 mm)

Series 332-75

R	5.51 (140)	6.89 (175)	7.87 (200)	9.84 (250)	11.81 (300)
H	14.96 (380)	17.71 (450)	19.69 (500)	23.62 (600)	27.56 (700)
D	9.45 (240)	10.83 (275)	11.81 (300)	13.78 (350)	15.75 (400)
K	21.65 (550)	25.98 (660)	29.13 (740)	35.43 (900)	41.73 (1060)

Pitch = 1.42 (36 mm)
Links/ft (m) = 8.45 (28)
Dimensions E = .98 (25 mm)
Ba = 3.78 (96 mm)

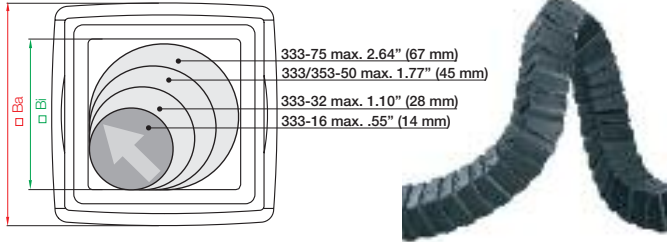
Series 352-50 (Snap-Open)

R	3.94 (100)	4.92 (125)	5.91 (150)	7.87 (200)	9.84 (250)
H	14.96 (380)	12.60 (320)	14.76 (375)	18.50 (470)	22.44 (570)
D	9.45 (240)	8.66 (220)	9.65 (245)	11.61 (295)	13.58 (345)
K	21.65 (550)	20.47 (520)	23.23 (590)	29.53 (750)	35.83 (910)

Pitch = 1.18 (30 mm)
Links/ft (m) = 10.17 (34)
Dimensions E = .98 (25 mm)
Ba = 2.68 (68 mm)



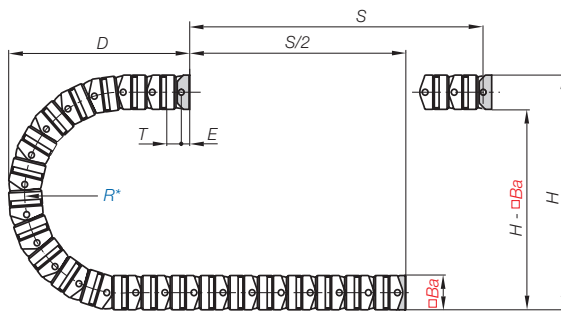
Triple Axis Movement, Series 333/353 (Snap-Open)



Part No.	Bi in. (mm)	Ba in. (mm)	Weight lbs/ft (kg/m)
333-16-	.63 (16)	1.02 (26)	≈ 0.22 (.33)
333-32-	1.26 (32)	1.97 (50)	≈ 0.60 (.90)
333-50-	1.97 (50)	2.68 (68)	≈ 0.94 (1.40)
333-75-	2.95 (75)	3.78 (96)	≈ 1.58 (2.35)
Snap-open			
353-50-	1.97 (50)	2.68 (68)	≈ 0.94 (1.40)

Supplement part number with required radius from above
for example, 333-32-100-0

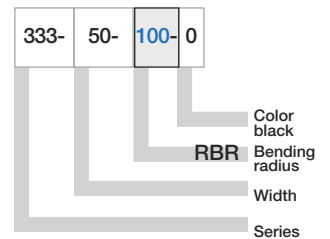
Installation dimensions for triple-axis movement



For center mount applications:
Tube length = $\frac{S}{2} + K$

* The bending radii are doubled in the case of the Series 333 Energy Chain®

Part No. structure



Series 333-16

R	(076)	3.78 (096)	5.91 (150)	7.87 (200)
H	7.09 (180)	8.66 (220)	12.99 (330)	16.93 (430)
D	4.13 (105)	4.92 (125)	7.09 (180)	9.06 (230)
K	12.60 (320)	14.96 (380)	21.65 (550)	27.95 (710)

Pitch = .52 (13.3 mm)
Links/ft (m) = 23.08 (76)
Dimensions E = .39 (10 mm)
Ba = 1.02 (26 mm)

Series 333-32

R	5.91 (150)	7.87 (200)	9.84 (250)	11.81 (300)	15.75 (400)	19.69 (500)
H	13.78 (350)	17.72 (450)	21.65 (550)	25.59 (650)	33.46 (850)	41.33 (1050)
D	8.07 (205)	10.04 (255)	12.01 (305)	13.98 (355)	17.91 (455)	21.85 (555)
K	21.46 (545)	27.56 (700)	33.86 (860)	40.16 (1020)	51.18 (1300)	63.19 (1605)

Pitch = .98 (25 mm)
Links/ft (m) = 12.24 (40)
Dimensions E = .79 (20 mm)
Ba = 1.97 (50 mm)

Series 333-50

R	7.87 (200)	9.84 (250)	11.81 (300)	15.75 (400)	19.69 (500)
H	18.50 (470)	22.44 (570)	26.38 (670)	34.25 (870)	42.13 (1070)
D	11.61 (295)	13.58 (345)	15.55 (395)	19.49 (495)	23.43 (595)
K	29.53 (750)	35.83 (910)	42.13 (1070)	54.33 (1380)	66.54 (1690)

Pitch = 1.18 (30 mm)
Links/ft (m) = 10.17 (34)
Dimensions E = .98 (25 mm)
Ba = 2.68 (68 mm)

Series 333-75

R	11.02 (280)	13.78 (350)	15.75 (400)	19.69 (500)	23.62 (600)
H	25.98 (660)	31.50 (800)	35.43 (900)	43.31 (1100)	51.18 (1300)
D	14.96 (380)	17.72 (450)	19.69 (500)	23.62 (600)	27.56 (700)
K	38.98 (990)	47.64 (1210)	55.12 (1400)	66.93 (1700)	78.74 (2000)

Pitch = 1.42 (36 mm)
Links/ft (m) = 8.45 (28)
Dimensions E = .98 (25 mm)
Ba = 3.78 (96 mm)

Series 353-50 (Snap-Open)

R	7.87 (200)	9.84 (250)	11.81 (300)	15.75 (400)	19.69 (500)
H	18.50 (470)	22.44 (570)	26.38 (670)	34.25 (870)	42.13 (1070)
D	11.61 (295)	13.58 (345)	15.55 (395)	19.49 (495)	23.43 (595)
K	29.53 (750)	35.83 (910)	42.13 (1070)	54.33 (1380)	66.54 (1690)

Pitch = 1.18 (30 mm)
Links/ft (m) = 10.17 (34)
Dimensions E = .98 (25 mm)
Ba = 2.68 (68 mm)

Interior Separation

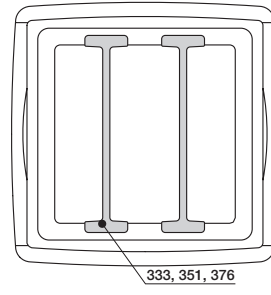
Modular separators are available as interior shelving for the igus® Triflex® System. They can be used for both vertical and horizontal sub-division. If the separators are assembled every other link and turned 90°, the tube can be sub-divided into four segments. We recommend ordering the tube pre-assembled, as subsequent assembly of separators is only possible after dismantling the tube. Please note that assembled separators have a different part number than unassembled separators.



Horizontal sub-division

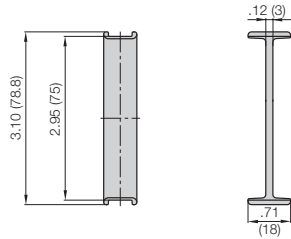


Vertical sub-division



333, 351, 376

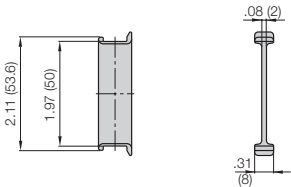
331/332/333-75



Separator

Unassembled	Part No. 375
Assembled	Part No. 376

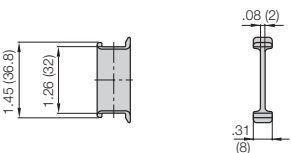
331/332/333-50 351/352/353-50



Separator

Unassembled	Part No. 350
Assembled	Part No. 351

331/332/333-32



Separator

Unassembled	Part No. 332
Assembled	Part No. 333

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

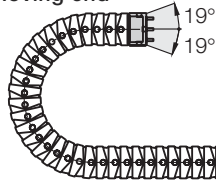




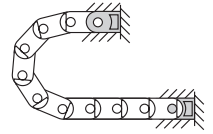
Standard

Option 1: KMA

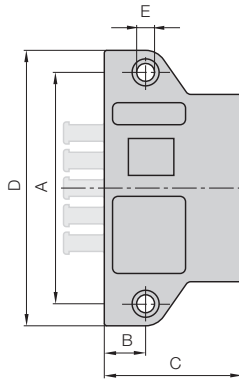
- Corrosion resistant
- Strain relief with tiwrap plate

333-50-1PZ
Moving end333-50-2PZB
Fixed end

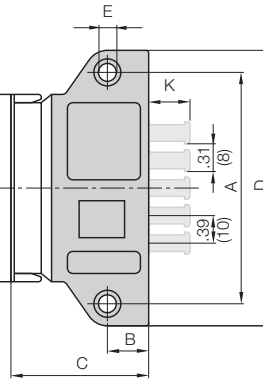
(with tiwrap plate 333-50-ZB)

Possible installation
configurations -

333...1PZ(B)



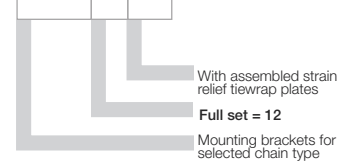
333...2PZ(B)



For high loads we recommend screwing the mounting brackets to the chain. If you have any questions, please give us a call.

Part No. structure

333-32-12-PZB



Full set, for both ends:

333- 32- 12 PZB +tiwrap plate

Single-part order:

333- 32- 1 PZB +tiwrap plate

Mounting bracket with bore

333- 32- 2 PZB +tiwrap plate

Mounting bracket with pin

Series	Part No. Full Set with tiwrap plate	Part No. Full Set without tiwrap plate	A	B	C	D	E	K	N
			in. (mm)	in. (mm)	in. (mm)	in. (mm)	in. (mm)	in. (mm)	No. of Teeth
331/332/333-32	333-32-12PZB	333-32-12-PZ	2.60 (66)	.59 (15)	1.81 (46)	3.23 (82)	.26 (6.5)	.59 (15)	3
331/332/333-50	333-50-12PZB	333-50-12-PZ	3.31 (84)	.59 (15)	1.97 (50)	3.94 (100)	.26 (6.5)	.59 (15)	5
331/332/333-75	333-75-12PZB	333-75-12-PZ	4.29 (109)	.59 (15)	2.17 (55)	4.92 (125)	.26 (6.5)	.59 (15)	7
Snap-open series									
351/352/353-50	333-50-12PZB	333-50-12-PZ	3.31 (84)	.59 (15)	1.97 (50)	3.94 (100)	.26 (6.5)	.59 (15)	5

Tiwrap plate as individual part

Special tiwrap plates for Triflex® Energy Chains®

- Single-piece for installation inside switch cabinets or machine assembly
- Accessory for igus® Energy Chain Systems®
- Easy to assemble, no need for screws

Part No.	Width	Number	For Series
Tiwrap plate	in. (mm)	of teeth	
333-32-ZB	1.57 (40)	3	331/332/333-32
333-50-ZB	2.28 (58)	5	331/332/333-50 351/352/353-50
333-75-ZB	3.27 (83)	7	331/332/333-75

Energy Chain System® Triflex® Series Mounting Brackets

energy chain® configurator ▶



Triflex®

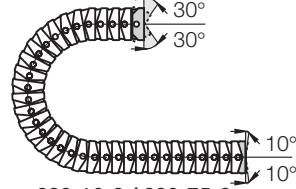


Option 2: pivoting steel flange

- Galvanized steel
- Electrically conductive
- Flush mounting

330-16-1 / 330-75-1

Moving end



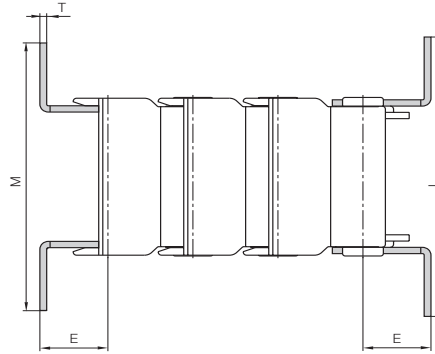
330-16-2 / 330-75-2

Fixed end

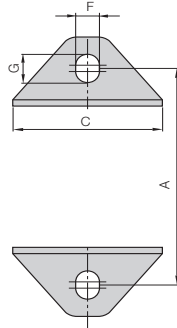


Possible installation configurations -

330-26-2 / 330-75-2



330-16-1 / 330-75-1



Part No. structure

330-	32-	12
------	-----	----

Full set = 12
Width
Mounting brackets for selected chain type

Full set, 4 parts

2 with pin / 2 with bore:

330- 32-12

Single-part order:

330- 32-1

Mounting bracket with bore

330- 32-2

Mounting bracket with pin

Series	Part No.	A	M	C	L	T	E	F	G
331/332/333-16	330-16-12	1.38 (35)	2.09 (53)	.83 (21)	2.24 (57)	.04 (1)	.39 (10)	.18 (4.5)	.24 (6)
331/332/333-32	330-32-12	2.60 (66)	3.31 (84)	1.73 (44)	3.46 (88)	.08 (2)	.79 (20)	.28 (7)	.35 (9)
331/332/333-50	330-50-12	3.31 (84)	4.02 (102)	2.44 (62)	4.17 (106)	.08 (2)	.98 (25)	.28 (7)	.35 (9)
331/332/333-75	330-75-12	4.29 (109)	5.00 (127)	3.54 (90)	5.16(131)	.08 (2)	.98 (25)	.28 (7)	.35 (9)

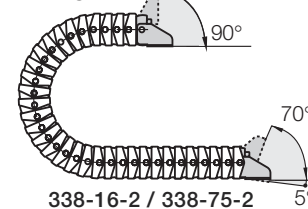


Option 3: angle

- Galvanized steel
- Electrically conductive
- Can be attached to top or bottom of the machine

338-16-1/ 338-75-1

Moving end



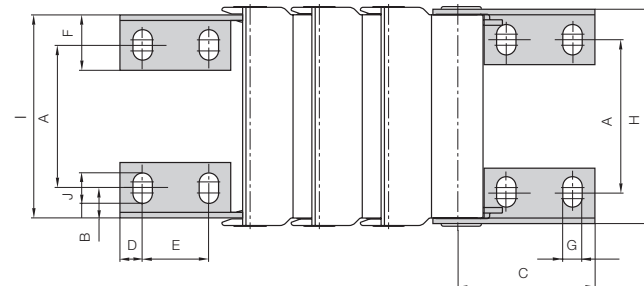
338-16-2 / 338-75-2

Fixed end



Possible installation configurations -

338-16-2 / 338-75-2



338-16-1 / 338-75-1

Part No. structure

338-	32-	12
------	-----	----

Full set = 12
Width
Mounting brackets for selected chain type

Full set, 4 parts

2 with pin / 2 with bore:

338- 32-12

Single-part order:

338- 32-1

Mounting bracket with bore

338- 32-2

Mounting bracket with pin

Series	Part No.	A	B	C	D	E	F	G	H	I	J
331/332/333-16	338-16-12	.47 (12)	.12 (3)	.98 (25)	.20 (5)	.39 (10)	.43 (11)	18 (4,5)	.98 (25)	.91 (23)	.24 (6)
331/332/333-32	338-32-12	.94 (24)	.22 (5.5)	1.85 (47)	.31 (8)	.94 (24)	.79 (20)	.28 (7)	1.93 (49)	1.77 (45)	.43 (11)
331/332/333-50	338-50-12	1.65 (42)	.22 (5.5)	3.03 (77)	.47 (12)	1.38 (35)	.94 (24)	.35 (9)	2.64 (67)	2.44 (62)	.59 (15)
331/332/333-75	338-75-12	2.56 (65)	.22 (5.5)	3.03 (77)	.47 (12)	1.38 (35)	.94 (24)	.35 (9)	3.74 (95)	3.54 (90)	.59 (15)
Snap-open											
351/352/353-50	338-50-12	1.65 (42)	.22 (5.5)	3.03 (77)	.47 (12)	1.38 (35)	.94 (24)	.35 (9)	2.64 (67)	2.44 (62)	.59 (15)

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







TwisterChain®

TwisterChain® - Circular and spiral movements

TwisterChain® are modular and rugged Energy Chains® for circular and spiral movements. They safely supply robots on the rotary axis with energy and media.

- Circular, spiral motions up to 540°
- Fast cable replacement
- Modular, rugged design - variable widths
- Cable-friendly interior
- Crossbars snap open on both sides
- New guide troughs Type 01 and Type 02 (up to 360° motion)
- Variable interior separation
- Applicable in rotational speeds of up to 13.12 ft/s (4 m/s)
- With steel mounting brackets (electrically conductive)

Typical industries and applications

- Robots
- Handling machines
- Packaging machines
- Glass machines
- General mechanical engineering



Circular movements up to 540° possible (with special attachments)



UL94-V2 classifications upon request



Two different types of Guide Trough Systems available





Combined spiral and rotary movement - igus® Series TwisterChain®



TwisterChain® for continuous industrial operation on a buckling arm robot (for welding applications, rotary movement 420°)



The robust link design allows also safety work in a dirty environment

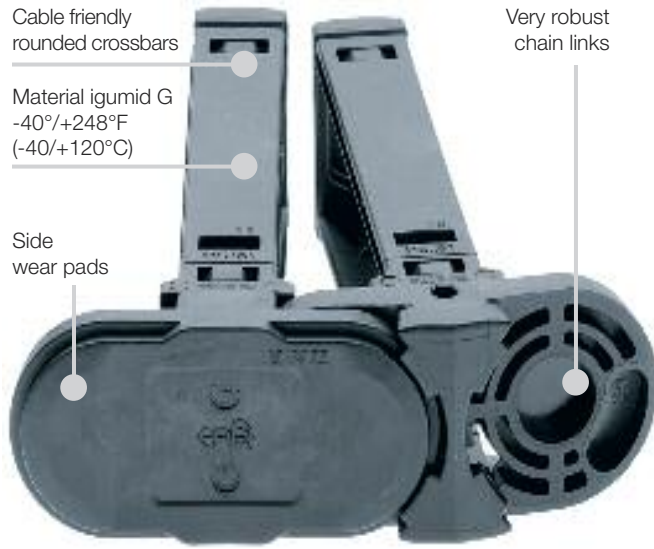
Save assembly time and costs - Better guidance for circular motion - increase cycle life!

With the new TwisterChain® trough, complex adjustment work is eliminated and assembly time is reduced from six hours to just two hours. Thanks to its almost all-plastic design, noise levels are reduced while travel speed and service life are increased. Now available for widths and radii on TwisterChain® models series 2808, 3808 and 4008. Please call igus® for more information.



New guide trough system - Type 01

Energy Chain System® TwisterChain® Series



Cable friendly rounded crossbars

Material igumid G
-40°/+248°F
(-40/+120°C)

Side wear pads

Very robust chain links

Select this modular "spiral" Energy Chain® for:

- igus® TwisterChain® for circular motions up to 540° (with special attachments)
- Fast cable change
- Modular design - variable widths
- Cable-friendly interior
- Crossbars can be opened on both sides
- New Guide Troughs Type 01 and Type 02 (circular motions up to 360°)
- Variable interior separation
- For rotational speeds of up to 13.12 ft/s (4 m/s)
- With steel (electrically conductive) mounting brackets
- You can find more technical data about the material, chemical resistance, temperatures ► **Design, chapter 1**

Selection table

Series	Inner height	Inner width	Outer width	Outer height	Bending radius	Circular Radii	
	<i>hi</i> in. (mm)	<i>Bi</i> in. (mm)	<i>Ba</i> in. (mm)	<i>ha</i> in. (mm)	<i>R</i> in. (mm)	<i>AR</i> in. (mm)	
2208-	1.10 (28)	2.07-4.43 (52.5-112.5)	3.15-5.51 (80-140)	1.65 (42)	2.17-5.91 (055 - 150)	11.81	(300)
2808-	1.26 (32)	1.97-5.91 (50-150)	3.19-7.13 (81-181)	2.13 (54)	3.94-9.84 (100 - 250)	15.75-23.62	(400 - 600)
3808-	1.65 (42)	1.97-7.87 (50-200)	3.35-9.25 (85-235)	2.52 (64)	3.94-9.84 (100 - 250)	15.75-23.62	(400 - 600)
4008-	2.20 (56)	1.97-7.87 (50-200)	3.66-9.57 (93-243)	3.31 (84)	5.91-15.75 (150 - 400)	25.59-33.46	(650 - 850)



Guide Trough Type 01 - Save assembly time and costs -
Better guidance for circular motion - increase cycle life! ▶ See page 8.73



Guide Trough Type 02 - continues to be available for special applications ▶ See page 8.77

2208
2808
3808
4008



Energy Chain System® TwisterChain® Series



Price Index



Special Options Available



Circular movements up to 540° possible (with special attachments)



UL94-V2 classifications upon request



Two different types of Guide Trough Systems available

Assembly Tips



Opening - push a screwdriver down vertically into the opening crossbar's groove. Using the screwdriver as a lever, loosen the opening crossbar

Usage Guidelines



- If you require variable interior separation
- If cable/hose accessibility on both sides is required
- If rotational speeds up to 90°/s are required
- For spiral motion up to 540° possible with special attachments



- If very small or large diameters are required
➤ **Design, Chapter 1**
- For applications using rotation angles over 400° please consult igus

Features & Benefits

- 1 Dirt-repellent exterior
- 2 Modular design - variable widths
- 3 Spiral chain for rotary motion up to 540° (with special attachments)
- 4 Crossbars which can be opened on both sides
- 5 Interior separation possible
- 6 Cable-friendly interior
- 7 Standard guide troughs available from stock



Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

6.56 ft (2 m) 2808-087-175/500-0

With 2 separators 282 assembled every 2nd link

1 Set 28080-34



Energy Chain®



Interior Separation



Mounting Bracket

Energy Chain System® TwisterChain® Series Selecting the correct TwisterChain®



2208
2808
3808
4008

If you would like us to design your TwisterChain® application, simply supply us with your requirements. Please use the igus® system design form at the end of this chapter. If you would like to specify the chain and the guide trough yourself, please work through the following points and enter the results on the calculation sheet at the end of the chapter.

1. Determine the series and chain width

Specify which cables you would like to use for the chain. The type of cable(s) and the largest cable diameter determine the series and chain width selection. We recommend that you allow for a cable clearance of approx 20% of the chain's inner height and width. For instance, you must choose Series 3808 for a cable diameter of 1.18 (30 mm).

2. Specify the outer and inner radius

Determine the construction space available to you (dimensions X_1 and X_2)

Example: $\alpha = 220^\circ$ /max. cable diameter .94" (24 mm) → Series 2808

$X_2 = 22.83$ (580 mm) → $AR = 19.69$ (500 mm)

$X_1 = 12.20$ (310 mm) → $IR_{min} = 15.35$ (390 mm) → selection table → 15.43 (392 mm)

3. Specify the bending radius

$H_F = 18.11$ (460 mm) → $H \leq 16.14$ (410 mm) → $R = \frac{H-ha}{2} = 7.00$ (178 mm) → R175*

*(next smallest radius)

► Result: Series 2808, Part No. 2808-087-175/500

4. Calculate the required number of links

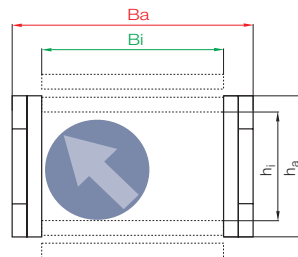
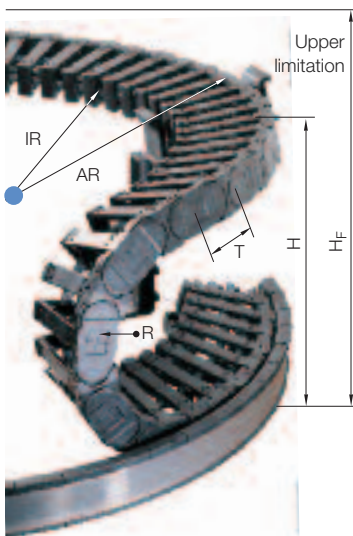
$$\text{Number of links} = \frac{\pi \times AR \times \alpha}{360^\circ \times T} + \frac{K}{T}$$

- The resulting number of links must always be rounded up!
- The mounting brackets may be attached only to the outside plates of the TwisterChain®. Consequently, the number of links **must always be rounded up to the next highest odd number!**

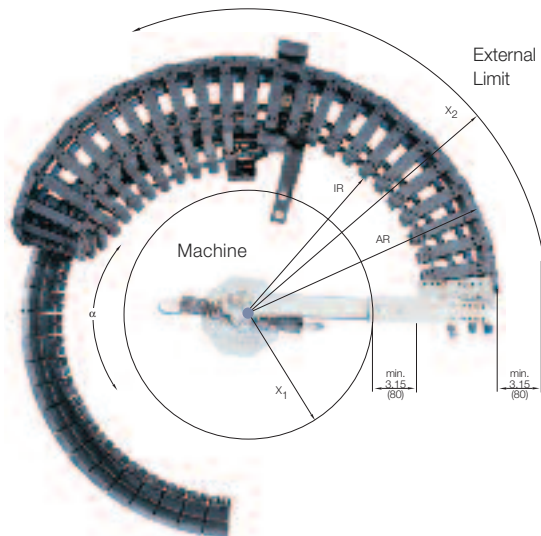
Recommendations for design without additional components

Series	$FZ_{max.}$ $\alpha 180^\circ$		$FZ_{max.}$ $\alpha 360^\circ$		v an AR permitted		a an AR max.		R max.		AR permitted	
	lbs/ft	(kg/m)	lbs/ft	(kg/m)	ft/s	(m/s)	ft/s ²	(m/s ²)	in.	(mm)	in.	(mm)
2208-	1.01	(1.5)	.67	(1)	.98-3.28	(0.3-1)	6.56	(2)	3.94	(100)	11.81	(300)
2808-	1.34	(2)	.67	(1)	.98-3.28	(0.3-1)	6.56	(2)	5.91	(150)	17.72-21.65	(450 - 550)
3808-	2.02	(3)	1.21	(1.8)	.98-3.28	(0.3-1)	6.56	(2)	7.87	(200)	17.72-21.65	(450 - 550)
4008-	2.69	(4)	1.68	(2.5)	.98-3.28	(0.3-1)	6.56	(2)	9.84	(250)	23.62-27.56	(600 - 700)

If your calculations exceed our recommendations, please contact igus® We offer special solutions and many additional components!



See Legend at upper right for drawing definitions.



Legend

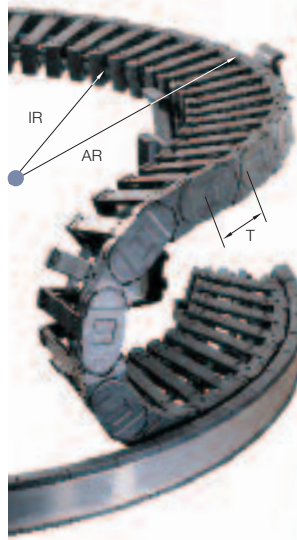
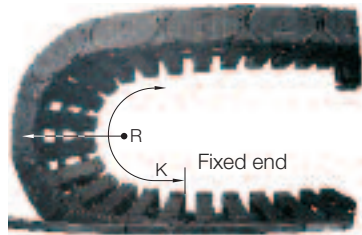
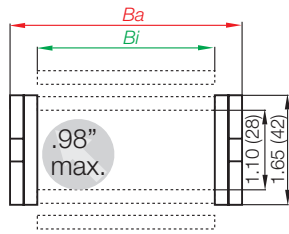
- a = Acceleration
- α = Angle of rotation
- AR = Outer E-Chain radius
- Ba = Outer E-Chain width
- Bi = Inner width
- FZ_{max} = Max. additional load
- H = Nominal clearance height
- ha = Outer E-Chain height
- hi = Inner E-Chain height
- H_F = Required clearance height incl. 1.97" (50 mm) clearance
- IR = Inner radius
- K = Series-dependent add-on for bending radius
- n = Number of links
- R = E-Chain Bending radius
- T = Pitch
- v = Speed
- X_1 = Inner machine construction space
- X_2 = Outer radius, incl. clearance
- R_{LK} = Distance pivot point/ outer mounting holes

The following clearances are absolutely essential for proper design function:
 $IR_{min} = X_1 + 3.15"$ (80 mm)
 $X_2_{min} = AR + 3.15"$ (80 mm)
 $H_F = H + 1.97"$ (50 mm)
 Chain height including clearance

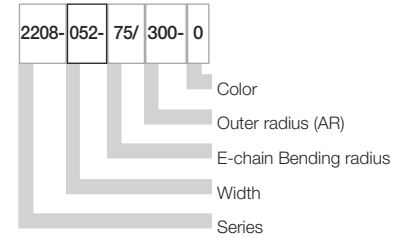
PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



Series 2208 (snap-open along inner and outer radius)



Part No. structure



Legend

- AR = Outer radius
- IR = Inner radius
- R = E-Chain Bending radius
- T = Pitch
- K = Series-dependent add-on for bending radius

R	2.17 (55)	2.48 (63)	2.95 (75)	3.94 (100)	4.92 (125)	5.91 (150)
K	10.43 (265)	11.42 (290)	12.99 (330)	16.14 (410)	19.09 (485)	22.24 (565)
T	1.73 (44)	1.73 (44)	1.73 (44)	1.73 (44)	1.73 (44)	1.73 (44)

Bi	Ba	AR	IR	R	R	R	R	R	R	Weight
in. (mm)	in. (mm)	in. (mm)	in. (mm)	2.16 (55) 2208-...	2.48 (63) 2208-...	2.95 (75) 2208-...	3.94 (100) 2208-...	4.92 (125) 2208-...	5.91 (150) 2208-...	lbs/ft (kg/m)
2.07 (52.5)	3.15 (80)	11.81 (300)	8.94 (227)	-052-55/300	-052-63/300	-052-75/300	-052-100/300	-052-125/300	-052-150/300	.81 (1.20)
2.46 (62.5)	3.54 (90)	11.81 (300)	8.54 (217)	—	—	-062-75/300	-062-100/300	-062-125/300	-062-150/300	.83 (1.24)
2.93 (74.5)	4.02 (102)	11.81 (300)	8.07 (205)	—	—	—	-074-100/300	-074-125/300	-074-150/300	.87 (1.29)
3.44 (87.5)	4.53 (115)	11.81 (300)	7.56 (192)	—	—	—	-087-100/300	-087-125/300	-087-150/300	.91 (1.35)
4.43 (112.5)	5.51 (140)	11.81 (300)	6.57 (167)	—	—	—	—	-112-125/300	-112-150/300	.98 (1.46)

Example Part No. 2208-112-150/300

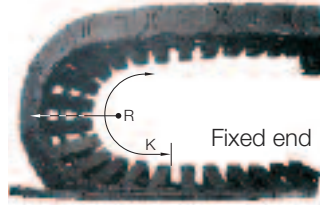
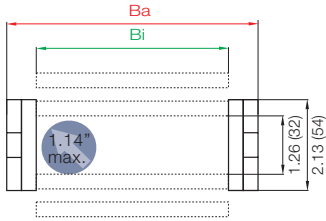
Interior Separation: Series 2208 TwisterChain



All interior elements of the E4/100 Series 220 Energy Chain® may be used with the Series 2208 TwisterChain, Chapter 6.

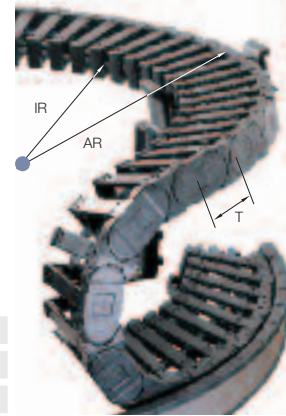


Series 2808 (can be opened along the inner and outer radius)



Legend

- AR = Outer radius
- IR = Inner radius
- R = E-Chain Bending radius
- T = Pitch
- K = Series-dependent add-on for bending radius



R	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	9.84 (250)
K	18.30 (465)	21.65 (550)	24.40 (620)	27.56 (700)	30.71 (780)	37.01 (940)
T	2.20 (56)	2.20 (56)	2.20 (56)	2.20 (56)	2.20 (56)	2.20 (56)


Bi in. (mm)	Ba in. (mm)	AR in. (mm)	IR in. (mm)	R 3.94 (100) 2808-...	R 4.92 (125) 2808-...	R 5.91 (150) 2808-...	R 6.89 (175) 2808-...	R 7.87 (200) 2808-...	R 9.84 (250) 2808-...	Weight lbs/ft (kg/m)
1.97 (50)	3.19 (81)	15.75 (400)	12.95 (329.5)	-05-100/400	-05-125/400	-05-150/400	-05-175/400	-05-200/400	-05-250/400	1.18 (1.76)
2.68 (68)	3.90 (99)	15.75 (400)	12.36 (311.5)	-06-100/400	-06-125/400	-06-150/400	-06-175/400	-06-200/400	-06-250/400	1.26 (1.87)
2.95 (75)	4.17 (106)	15.75 (400)	11.99 (304.5)	-07-100/400	-07-125/400	-07-150/400	-07-175/400	-07-200/400	-07-250/400	1.29 (1.92)
3.44 (87.5)	4.67 (118.5)	15.75 (400)	11.50 (292)	-087-100/400	-087-125/400	-087-150/400	-087-175/400	-087-200/400	-087-250/400	1.34 (1.99)
3.94 (100)	5.16 (131)	15.75 (400)	11.00 (279.5)	—	—	-10-150/400	-10-175/400	-10-200/400	-10-250/400	1.39 (2.07)
4.25 (108)	5.47 (139)	15.75 (400)	10.69 (271.5)	—	—	—	-11-175/400	-11-200/400	-11-250/400	1.42 (2.12)
4.92 (125)	6.14 (156)	15.75 (400)	10.02 (254.5)	—	—	—	-12-175/400	-12-200/400	-12-250/400	1.49 (2.22)
5.41 (137.5)	6.63 (168.5)	15.75 (400)	9.53 (242)	—	—	—	—	—	-137-250/400	1.55 (2.30)
5.91 (150)	7.13 (181)	15.75 (400)	9.04 (229.5)	—	—	—	—	—	-15-250/400	1.60 (2.38)

1.97 (50)	3.19 (81)	19.69 (500)	16.91 (429.5)	-05-100/500	-05-125/500	-05-150/500	-05-175/500	-05-200/500	-05-250/500	1.18 (1.76)
2.68 (68)	3.90 (99)	19.69 (500)	16.20 (411.5)	-06-100/500	-06-125/500	-06-150/500	-06-175/500	-06-200/500	-06-250/500	1.26 (1.87)
2.95 (75)	4.17 (106)	19.69 (500)	15.93 (404.5)	-07-100/500	-07-125/500	-07-150/500	-07-175/500	-07-200/500	-07-250/500	1.29 (1.92)
3.44 (87.5)	4.67 (118.5)	19.69 (500)	15.43 (392)	-087-100/500	-087-125/500	-087-150/500	-087-175/500	-087-200/500	-087-250/500	1.34 (1.99)
3.94 (100)	5.16 (131)	19.69 (500)	14.94 (379.5)	-10-100/500	-10-125/500	-10-150/500	-10-175/500	-10-200/500	-10-250/500	1.39 (2.07)
4.25 (108)	5.47 (139)	19.69 (500)	14.63 (371.5)	—	-11-125/500	-11-150/500	-11-175/500	-11-200/500	-11-250/500	1.42 (2.12)
4.92 (125)	6.14 (156)	19.69 (500)	13.96 (354.5)	—	-12-125/500	-12-150/500	-12-175/500	-12-200/500	-12-250/500	1.49 (2.22)
5.41 (137.5)	6.63 (168.5)	19.69 (500)	13.46 (342)	—	—	-137-150/500	-137-175/500	-137-200/500	-137-250/500	1.55 (2.30)
5.91 (150)	7.13 (181)	19.69 (500)	12.97 (329.5)	—	—	-15-150/500	-15-175/500	-15-200/500	-15-250/500	1.60 (2.38)

1.97 (50)	3.19 (81)	23.62 (600)	20.85 (529.5)	-05-100/600	-05-125/600	-05-150/600	-05-175/600	-05-200/600	-05-250/600	1.18 (1.76)
2.68 (68)	3.90 (99)	23.62 (600)	20.13 (511.5)	-06-100/600	-06-125/600	-06-150/600	-06-175/600	-06-200/600	-06-250/600	1.26 (1.87)
2.95 (75)	4.17 (106)	23.62 (600)	19.86 (504.5)	-07-100/600	-07-125/600	-07-150/600	-07-175/600	-07-200/600	-07-250/600	1.29 (1.92)
3.44 (87.5)	4.67 (118.5)	23.62 (600)	19.37 (492)	-087-100/600	-087-125/600	-087-150/600	-087-175/600	-087-200/600	-087-250/600	1.34 (1.99)
3.94 (100)	5.16 (131)	23.62 (600)	18.88 (479.5)	-10-100/600	-10-125/600	-10-150/600	-10-175/600	-10-200/600	-10-250/600	1.39 (2.07)
4.25 (108)	5.47 (139)	23.62 (600)	18.56 (471.5)	-11-100/600	-11-125/600	-11-150/600	-11-175/600	-11-200/600	-11-250/600	1.42 (2.12)
4.92 (125)	6.14 (156)	23.62 (600)	17.89 (454.5)	—	-12-125/600	-12-150/600	-12-175/600	-12-200/600	-12-250/600	1.49 (2.22)
5.41 (137.5)	6.63 (168.5)	23.62 (600)	17.40 (442)	—	-137-125/600	-137-150/600	-137-175/600	-137-200/600	-137-250/600	1.55 (2.30)
5.91 (150)	7.13 (181)	23.62 (600)	16.91 (429.5)	—	—	-15-150/600	-15-175/600	-15-200/600	-15-250/600	1.60 (2.38)

Example: Part Number 2808-15-150/600

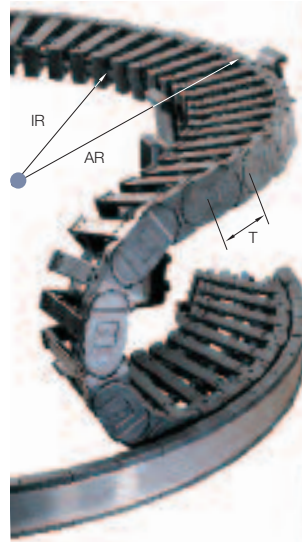
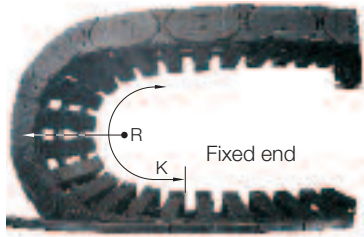
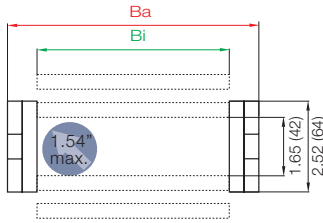
Interior Separation: Series 2808 TwisterChain

▶  All interior elements of the E4/100 Series 280 Energy Chain® may be used with the Series 2808 TwisterChain, Chapter 6.



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



Series 3808 (can be opened along the inner and outer radius)

Part No. structure

3808-	20-	200/	600-	0
				Color
				Outer radius (AR)
				E-Chain Bending radius
				Width
				Series

Legend


- AR** = Outer radius
IR = Inner radius
R = E-Chain Bending radius
T = Pitch
K = Series-dependent add-on for bending radius

R	3.94	(100)	4.92	(125)	5.91	(150)	7.87	(200)	9.84	(250)
K	19.69	(500)	25.59	(650)	28.54	(725)	34.45	(875)	41.34	(1050)
T	2.64	(67)	2.64	(67)	2.64	(67)	2.64	(67)	2.64	(67)

Bi in. (mm)	Ba in. (mm)	AR in. (mm)	IR in. (mm)	R 3.94 (100) 3808-...	R 4.92 (125) 3808-...	R 5.91 (150) 3808-...	R 7.87 (200) 3808-...	R 9.84 (250) 3808-...	Weight lbs/ft (kg/m)
1.97 (50)	3.35 (85)	15.75 (400)	12.89 (327.5)	-05-100/400	-05-125/400	-05-150/400	-05-200/400	-05-250/400	1.49 (2.21)
2.68 (68)	4.06 (103)	15.75 (400)	12.19 (309.5)	-06-100/400	-06-125/400	-06-150/400	-06-200/400	-06-250/400	1.55 (2.30)
2.95 (75)	4.33 (110)	15.75 (400)	11.91 (302.5)	-07-100/400	-07-125/400	-07-150/400	-07-200/400	-07-250/400	1.57 (2.33)
3.44 (87.5)	4.82 (122.5)	15.75 (400)	11.42 (290)	-087-100/400	-087-125/400	-087-150/400	-087-200/400	-087-250/400	1.61 (2.40)
3.94 (100)	5.31 (135)	15.75 (400)	10.93 (277.5)	-10-100/400	-10-125/400	-10-150/400	-10-200/400	-10-250/400	1.65 (2.46)
4.25 (108)	5.63 (143)	15.75 (400)	10.61 (269.5)	—	-11-125/400	-11-150/400	-11-200/400	-11-250/400	1.68 (2.50)
4.92 (125)	6.30 (160)	15.75 (400)	9.94 (252.5)	—	-12-125/400	-12-150/400	-12-200/400	-12-250/400	1.74 (2.59)
5.41 (137.5)	6.79 (172.5)	15.75 (400)	9.45 (240)	—	-137-125/400	-137-150/400	-137-200/400	-137-250/400	1.78 (2.65)
5.91 (150)	7.28 (185)	15.75 (400)	8.96 (227.5)	—	—	—	-15-200/400	-15-250/400	1.83 (2.72)
6.40 (162.5)	7.78 (197.5)	15.75 (400)	8.46 (215)	—	—	—	-162-200/400	-162-250/400	1.87 (2.78)
6.61 (168)	7.99 (203)	15.75 (400)	8.25 (209.5)	—	—	—	—	-17-250/400	1.89 (2.81)
6.89 (175)	8.27 (210)	15.75 (400)	7.97 (202.5)	—	—	—	—	-18-250/400	1.91 (2.84)
1.97 (50)	3.35 (85)	19.69 (500)	16.83 (427.5)	-05-100/500	-05-125/500	-05-150/500	-05-200/500	-05-250/500	1.49 (2.21)
2.68 (68)	4.06 (103)	19.69 (500)	16.12 (409.5)	-06-100/500	-06-125/500	-06-150/500	-06-200/500	-06-250/500	1.55 (2.30)
2.95 (75)	4.33 (110)	19.69 (500)	15.85 (402.5)	-07-100/500	-07-125/500	-07-150/500	-07-200/500	-07-250/500	1.57 (2.33)
3.44 (87.5)	4.82 (122.5)	19.69 (500)	15.35 (390)	-087-100/500	-087-125/500	-087-150/500	-087-200/500	-087-250/500	1.61 (2.40)
3.94 (100)	5.31 (135)	19.69 (500)	14.86 (377.5)	-10-100/500	-10-125/500	-10-150/500	-10-200/500	-10-250/500	1.65 (2.46)
4.25 (108)	5.62 (143)	19.69 (500)	14.55 (369.5)	—	-11-125/500	-11-150/500	-11-200/500	-11-250/500	1.68 (2.50)
4.92 (125)	6.30 (160)	19.69 (500)	13.78 (352.5)	—	-12-125/500	-12-150/500	-12-200/500	-12-250/500	1.74 (2.59)
5.41 (137.5)	6.79 (172.5)	19.69 (500)	13.38 (340)	—	—	-137-150/500	-137-200/500	-137-250/500	1.78 (2.65)
5.91 (150)	7.28 (185)	19.69 (500)	12.89 (327.5)	—	—	-15-150/500	-15-200/500	-15-250/500	1.83 (2.72)
6.40 (162.5)	7.76 (197.5)	19.69 (500)	12.40 (315)	—	—	—	-162-200/500	-162-250/500	1.87 (2.78)
6.61 (168)	7.99 (203)	19.69 (500)	12.19 (309.5)	—	—	—	-17-200/500	-17-250/500	1.89 (2.81)
6.89 (175)	8.27 (210)	19.69 (500)	11.91 (302.5)	—	—	—	-18-200/500	-18-250/500	1.91 (2.84)
7.38 (187.5)	8.76(222.5)	19.69 (500)	11.42 (290)	—	—	—	-187-200/500	-187-250/500	1.96 (2.91)
7.87 (200)	9.25 (235)	19.69 (500)	10.93 (277.5)	—	—	—	-20-200/500	-20-250/500	2.00 (2.97)
1.97 (50)	3.35 (85)	23.62 (600)	20.76 (527.5)	-05-100/600	-05-125/600	-05-150/600	-05-200/600	-05-250/600	1.49 (2.21)
2.68 (68)	4.06 (103)	23.62 (600)	20.06 (509.5)	-06-100/600	-06-125/600	-06-150/600	-06-200/600	-06-250/600	1.55 (2.30)
2.95 (75)	4.33 (110)	23.62 (600)	19.78 (502.5)	-07-100/600	-07-125/600	-07-150/600	-07-200/600	-07-250/600	1.57 (2.33)
3.44 (87.5)	4.82 (122.5)	23.62 (600)	19.29 (490)	-087-100/600	-087-125/600	-087-150/600	-087-200/600	-087-250/600	1.61 (2.40)
3.94 (100)	5.31 (135)	23.62 (600)	18.80 (477.5)	-10-100/600	-10-125/600	-10-150/600	-10-200/600	-10-250/600	1.65 (2.46)
4.25 (108)	5.63 (143)	23.62 (600)	18.48 (469.5)	-11-100/600	-11-125/600	-11-150/600	-11-200/600	-11-250/600	1.68 (2.50)
4.92 (125)	6.30 (160)	23.62 (600)	17.81 (452.5)	-12-100/600	-12-125/600	-12-150/600	-12-200/600	-12-250/600	1.74 (2.59)
5.41 (137.5)	6.79 (172.5)	23.62 (600)	17.32 (440)	-137-100/600	-137-125/600	-137-150/600	-137-200/600	-137-250/600	1.78 (2.65)
5.91 (150)	7.28 (185)	23.62 (600)	16.83 (427.5)	-15-100/600	-15-125/600	-15-150/600	-15-200/600	-15-250/600	1.83 (2.72)
6.40 (162.5)	7.76 (197.5)	23.62 (600)	16.34 (415)	—	—	—	-162-200/600	-162-250/600	1.87 (2.78)
6.61 (168)	7.99 (203)	23.62 (600)	16.12 (409.5)	—	—	—	-17-200/600	-17-250/600	1.89 (2.81)
6.89 (175)	8.27 (210)	23.62 (600)	15.85 (402.5)	—	—	—	-18-200/600	-18-250/600	1.91 (2.84)
7.38 (187.5)	8.76 (222.5)	23.62 (600)	15.35 (390)	—	—	—	-187-200/600	-187-250/600	1.96 (2.91)
7.87 (200)	9.25 (235)	23.62 (600)	14.86 (377.5)	—	—	—	-20-200/600	-20-250/600	2.00 (2.97)

Example: Part Number 3808-20-150/600

Interior Separation: Series 3808 TwisterChain

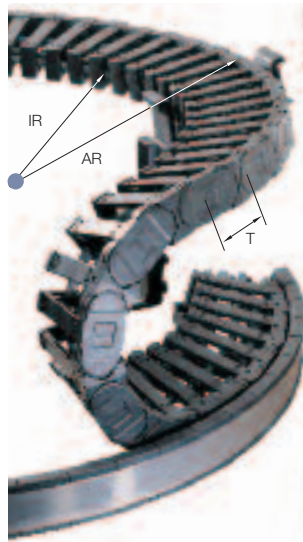
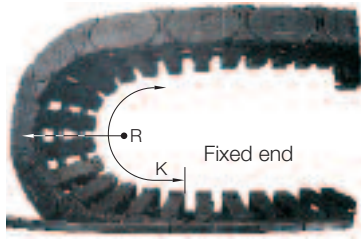
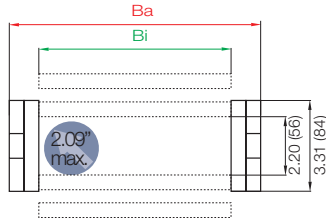
▶  All interior elements of the E4/100 Series 380 Energy Chain® may be used with the Series 3808 TwisterChain, Chapter 6.



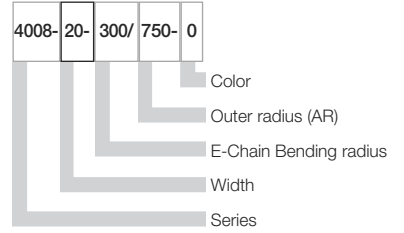
PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Series 4008 (snap-open along the inner and outer radius)



Part No. structure



Legend

- AR** = Outer radius
- IR** = Inner radius
- R** = E-Chain Bending radius
- T** = Pitch
- K** = Series-dependent add-on for bending radius

R	5.91	(150)	7.87	(200)	9.84	(250)	11.81	(300)	15.75	(400)
K	29.53	(750)	35.43	(900)	41.34	(1050)	48.23	(1225)	57.09	(1450)
T	3.58	(91)	3.58	(91)	3.58	(91)	3.58	(91)	3.58	(91)


Bi in. (mm)	Ba in. (mm)	AR in. (mm)	IR in. (mm)	R 5.91 (150) 4008-...	R 7.87 (200) 4008-...	R 9.84 (250) 4008-...	R 11.81 (300) 4008-...	R 15.75 (400) 4008-...	Weight lbs/ft (kg/m)
1.97 (50)	3.66 (93)	25.59 (650)	22.52 (572)	-05-150/650	-05-200/650	-05-250/650	-05-300/650	-05-400/650	2.20 (3.28)
2.56 (65)	4.25 (108)	25.59 (650)	21.93 (557)	-06-150/650	-06-200/650	-06-250/650	-06-300/650	-06-400/650	2.27 (3.38)
2.95 (75)	4.65 (118)	25.59 (650)	21.54 (547)	-07-150/650	-07-200/650	-07-250/650	-07-300/650	-07-400/650	2.31 (3.44)
3.94 (100)	5.63 (143)	25.59 (650)	20.55 (522)	—	-10-200/650	-10-250/650	-10-300/650	-10-400/650	2.43 (3.61)
4.41 (112)	6.10 (155)	25.59 (650)	20.08 (510)	—	-11-200/650	-11-250/650	-11-300/650	-11-400/650	2.48 (3.69)
4.92 (125)	6.61 (168)	25.59 (650)	19.57 (497)	—	-12-200/650	-12-250/650	-12-300/650	-12-400/650	2.53 (3.77)
5.41 (137.5)	7.11 (180.5)	25.59 (650)	19.07 (484.5)	—	—	-13-250/650	-13-300/650	-13-400/650	2.59 (3.86)
5.91 (150)	7.60 (193)	25.59 (650)	18.58 (472)	—	—	-15-250/650	-15-300/650	-15-400/650	2.65 (3.94)
6.40 (162.5)	8.09 (205.5)	25.59 (650)	18.09 (459.5)	—	—	-16-250/650	-16-300/650	-16-400/650	2.70 (4.02)
6.89 (175)	8.58 (218)	25.59 (650)	17.60 (447)	—	—	—	-17-300/650	-17-400/650	2.76 (4.10)
7.38 (187.5)	9.07 (230.5)	25.59 (650)	17.11 (434.5)	—	—	—	-18-300/650	-18-400/650	2.82 (4.19)

1.97 (50)	3.66 (93)	29.53 (750)	26.46 (672)	-05-150/750	-05-200/750	-05-250/750	-05-300/750	-05-400/750	2.20 (3.28)
2.56 (65)	4.25 (108)	29.53 (750)	25.87 (657)	-06-150/750	-06-200/750	-06-250/750	-06-300/750	-06-400/750	2.27 (3.38)
2.95 (75)	4.65 (118)	29.53 (750)	25.47 (647)	-07-150/750	-07-200/750	-07-250/750	-07-300/750	-07-400/750	2.31 (3.44)
3.94 (100)	5.63 (143)	29.53 (750)	24.49 (622)	-10-150/750	-10-200/750	-10-250/750	-10-300/750	-10-400/750	2.43 (3.61)
4.41 (112)	6.10 (155)	29.53 (750)	24.02 (610)	-11-150/750	-11-200/750	-11-250/750	-11-300/750	-11-400/750	2.48 (3.69)
4.92 (125)	6.61 (168)	29.53 (750)	23.50 (597)	—	-12-200/750	-12-250/750	-12-300/750	-12-400/750	2.53 (3.77)
5.41 (137.5)	7.11 (180.5)	29.53 (750)	23.01 (584.5)	—	-13-200/750	-13-250/750	-13-300/750	-13-400/750	2.59 (3.86)
5.91 (150)	7.60 (193)	29.53 (750)	22.52 (572)	—	-15-200/750	-15-250/750	-15-300/750	-15-400/750	2.65 (3.94)
6.40 (162.5)	8.09 (205.5)	29.53 (750)	22.03 (559.5)	—	-16-200/750	-16-250/750	-16-300/750	-16-400/750	2.70 (4.02)
6.89 (175)	8.58 (218)	29.53 (750)	21.54 (547)	—	—	-17-250/750	-17-300/750	-17-400/750	2.76 (4.10)
7.38 (187.5)	9.07 (230.5)	29.53 (750)	21.04 (534.5)	—	—	-18-250/750	-18-300/750	-18-400/750	2.82 (4.19)
7.87 (200)	9.57 (243)	29.53 (750)	20.55 (522)	—	—	-20-250/750	-20-300/750	-20-400/750	2.87 (4.27)

1.97 (50)	3.66 (93)	33.46 (850)	30.39 (772)	-05-150/850	-05-200/850	-05-250/850	-05-300/850	-05-400/850	2.20 (3.28)
2.56 (65)	4.25 (108)	33.46 (850)	29.80 (757)	-06-150/850	-06-200/850	-06-250/850	-06-300/850	-06-400/850	2.27 (3.38)
2.95 (75)	4.65 (118)	33.46 (850)	29.41 (747)	-07-150/850	-07-200/850	-07-250/850	-07-300/850	-07-400/850	2.31 (3.44)
3.94 (100)	5.63 (143)	33.46 (850)	28.43 (722)	-10-150/850	-10-200/850	-10-250/850	-10-300/850	-10-400/850	2.43 (3.61)
4.41 (112)	6.10 (155)	33.46 (850)	27.95 (710)	-11-150/850	-11-200/850	-11-250/850	-11-300/850	-11-400/850	2.48 (3.69)
4.92 (125)	6.61 (168)	33.46 (850)	27.44 (697)	-12-150/850	-12-200/850	-12-250/850	-12-300/850	-12-400/850	2.53 (3.77)
5.41 (137.5)	7.11 (180.5)	33.46 (850)	26.95 (684.5)	—	-13-200/850	-13-250/850	-13-300/850	-13-400/850	2.59 (3.86)
5.91 (150)	7.60 (193)	33.46 (850)	26.46 (672)	—	-15-200/850	-15-250/850	-15-300/850	-15-400/850	2.65 (3.94)
6.40 (162.5)	8.09 (205.5)	33.46 (850)	25.96 (659.5)	—	-16-200/850	-16-250/850	-16-300/850	-16-400/850	2.70 (4.02)
6.89 (175)	8.58 (218)	33.46 (850)	25.47 (647)	—	-17-200/850	-17-250/850	-17-300/850	-17-400/850	2.76 (4.10)
7.38 (187.5)	9.07 (230.5)	33.46 (850)	24.98 (634.5)	—	-18-200/850	-18-250/850	-18-300/850	-18-400/850	2.82 (4.19)
7.87 (200)	9.57 (243)	33.46 (850)	24.49 (622)	—	—	-20-250/850	-20-300/850	-20-400/850	2.87 (4.27)

Example: Part Number 4008-20-50/850

Interior Separation: Series 4008 TwisterChain

►  All interior elements of the **E4/100 Series 400 Energy Chain®** may be used with the Series 4008 TwisterChain, Chapter 6.



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



2208
2808
3808
4008

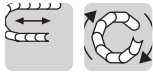


Energy Chain System® TwisterChain® Series Mounting Bracket

igus® Energy Chain System®

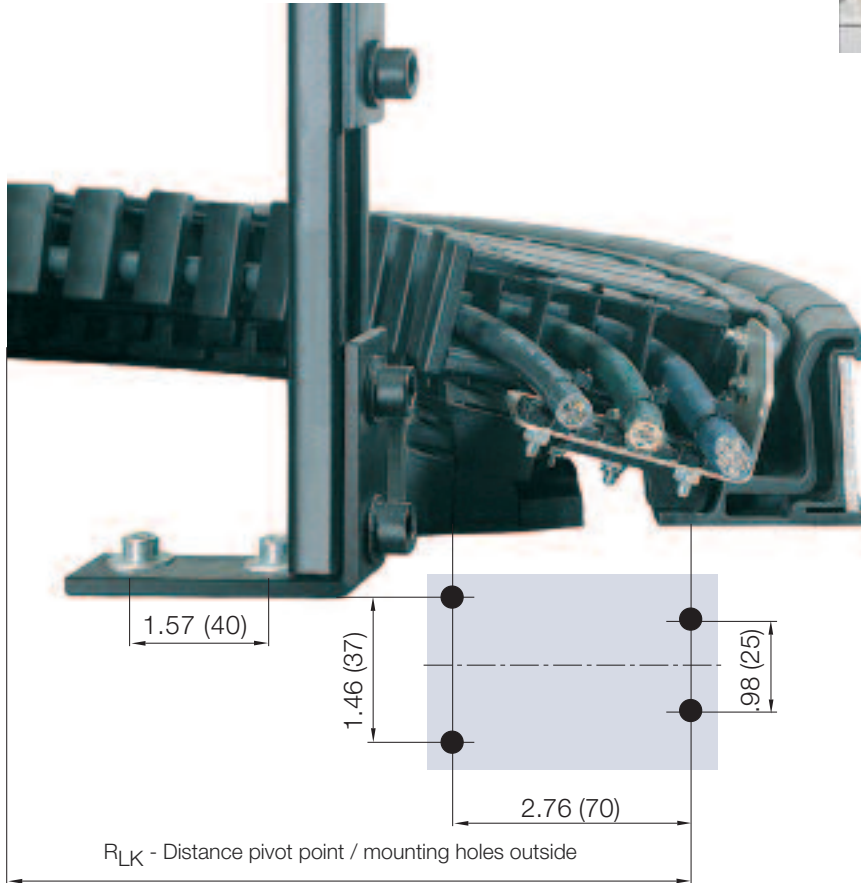
Telephone 1-800-521-2747
Fax 1-401-438-7270

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec/RFQ: <http://www.igus.com/quickspec>



Steel mounting bracket

- Electrically conductive
- Universal use
- One component for all chain widths



Part No. structure

22080- 34- E



Full set, for both ends

22080- 34

Single-part order - Part 1:

22080- 3

Single-part order - Part 2:

22080- 4

Chain Type	Part Number Full Set	Part Number Item 1	Part Number Item 2
2208	22080-34	22080-3	22080-4
2808	28080-34	28080-3	28080-4
3808	38080-34	38080-3	38080-4
4008	40080-34	40080-3	40080-4

Other connection dimensions for mounting the guide trough, ► See Page 8.74

The guide trough must be mounted at the fixed point of the TwisterChain® as shown by the drilling template in the illustration. The following bolted connections are permitted:

- Through-hole: 4 x Ø .26 - .28" (6.6 - 7 mm)
- Mounting only with bolts: 4 x M6 bolts



TwisterChain® for continuous industrial use on a buckling arm robot (for welding applications, rotary movement 420°)



TwisterChain® in a guide trough for rotary movements on an articulated robot

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



2208
2808
3808
4008



Energy Chain System®
TwisterChain® Series
Guide Trough - Type 01

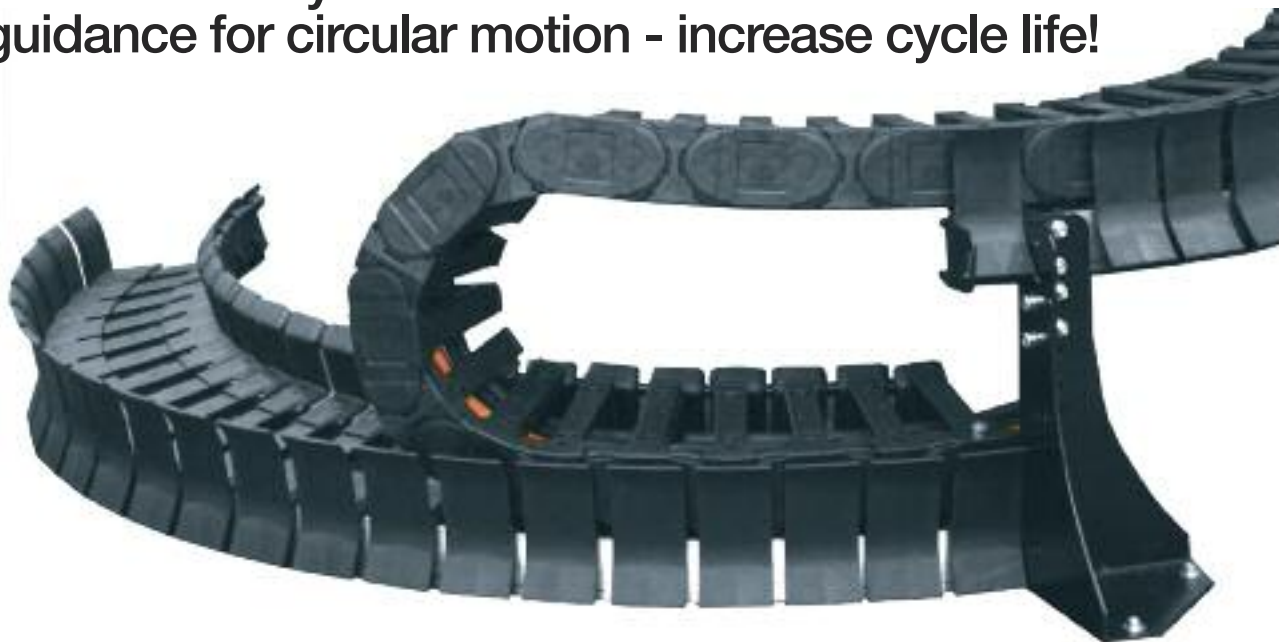
igus® Energy Chain System®

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Fax 1-401-438-7270

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email: sales@igus.com
QuickSpec/RFQ: <http://www.igus.com/quickspec>

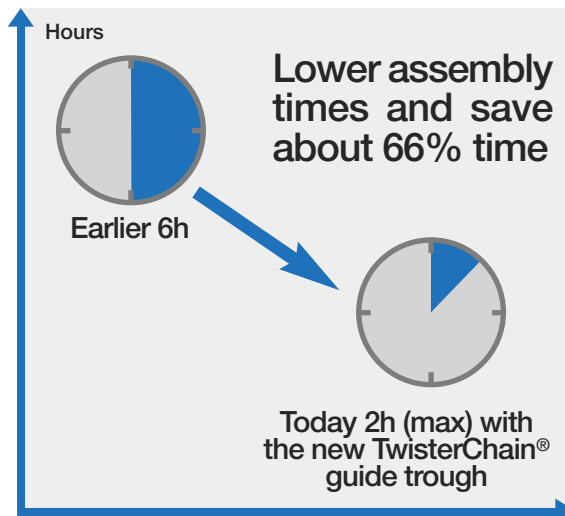
8.73

Save assembly time and costs - Better guidance for circular motion - increase cycle life!



With the new TwisterChain® trough, complex adjustment work is eliminated and assembly time is reduced from six hours to just two hours. Thanks to its almost all-plastic design, noise levels are reduced while travel speed and service life are increased. Now available for widths and radii on TwisterChain® models series 2808, 3808 and 4008. Please call igus® for more information.

- Much smoother and quieter motion of the TwisterChain® in the trough due to continuous guidance of upper run
- Preassembled delivery possible
- Easy adjustment and alignment and handling
- Assembly time reduced from 6 hours to 2 hours



With the new Twister trough, the previously complex adjustment work is clearly minimized



Easy adjustment and alignment on the robot, due to the pre-defined angles and pre-drilled mounting holes



Less parts, easier handling - Illustration shows a 180° application

Energy Chain System® TwisterChain® Series Guide Trough - Type 01

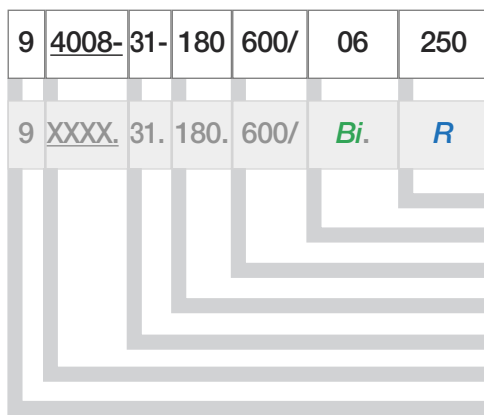


2208
2808
3808
4008

For Series	Outer radius AR [mm]	Angle of rotation α [°]	Trough Type 01 complete
2808 / 3808	15.75" (400 mm)	0 - 90°	9 [XXXX] -31-90 -400/- [Bi] [R]
		90° - 180°	9 [XXXX] -31-180-400/- [Bi] [R]
		180° - 270°	9 [XXXX] -31-270-400/- [Bi] [R]
		270° - 360°	9 [XXXX] -31-360-400/- [Bi] [R]
	19.69" (500 mm)	0 - 90°	9 [XXXX] -31-90 -500/- [Bi] [R]
		90° - 180°	9 [XXXX] -31-180-500/- [Bi] [R]
		180° - 270°	9 [XXXX] -31-270-500/- [Bi] [R]
		270° - 360°	9 [XXXX] -31-360-500/- [Bi] [R]
	23.62" (600 mm)	0 - 90°	9 [XXXX] -31-90 -600/- [Bi] [R]
		90° - 180°	9 [XXXX] -31-180-600/- [Bi] [R]
		180° - 270°	9 [XXXX] -31-270-600/- [Bi] [R]
		270° - 360°	9 [XXXX] -31-360-600/- [Bi] [R]
4008	25.59" (650 mm)	0 - 90°	9 [4008] -31-90 -650/- [Bi] [R]
		90° - 180°	9 [4008] -31-180-650/- [Bi] [R]
		180° - 270°	9 [4008] -31-270-650/- [Bi] [R]
		270° - 360°	9 [4008] -31-360-650/- [Bi] [R]
	29.53" (750 mm)	0 - 90°	9 [4008] -31-90 -750/- [Bi] [R]
		90° - 180°	9 [4008] -31-180-750/- [Bi] [R]
		180° - 270°	9 [4008] -31-270-750/- [Bi] [R]
		270° - 360°	9 [4008] -31-360-750/- [Bi] [R]
	33.46" (850 mm)	0 - 90°	9 [4008] -31-90 -850/- [Bi] [R]
		90° - 180°	9 [4008] -31-180-850/- [Bi] [R]
		180° - 270°	9 [4008] -31-270-850/- [Bi] [R]
		270° - 360°	9 [4008] -31-360-850/- [Bi] [R]

Supplement Part No. with required Series (2808, 3808 or 4008), the value *Bi*

and the corresponding value of the required Energy Chain® bending radius *R* ▶ 9 [4008] -31-180-600/ [06] - [250]



Part No. structure - guide trough
94008-31-180-600/06-250

- Energy Chain® bending radius, please add appropriate value
- Bi* - widths index, please add appropriate value
- Outer radius (AR)
- Trough angle (90°, 180°, 270°, 360°)
- Trough version - See below
- Selected Series (2808, 3808 or 4008)
- Guide trough

More order examples

- Complete system
(Energy Chain®, mounting bracket and trough)
- Complete trough
- Only lower run trough
- Upper and lower run trough without base support

= Part. No. 9 [4008] -180-600/ [06] - [250] -0

= Part. No. 9 [4008] -31-180-600/ [06] - [250] -0

= Part. No. 9 [4008] -30-180-600/ [06] - [250] -0

= Part. No. 9 [4008] -32-180-600/ [06] - [250] -0

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



2208
2808
3808
4008



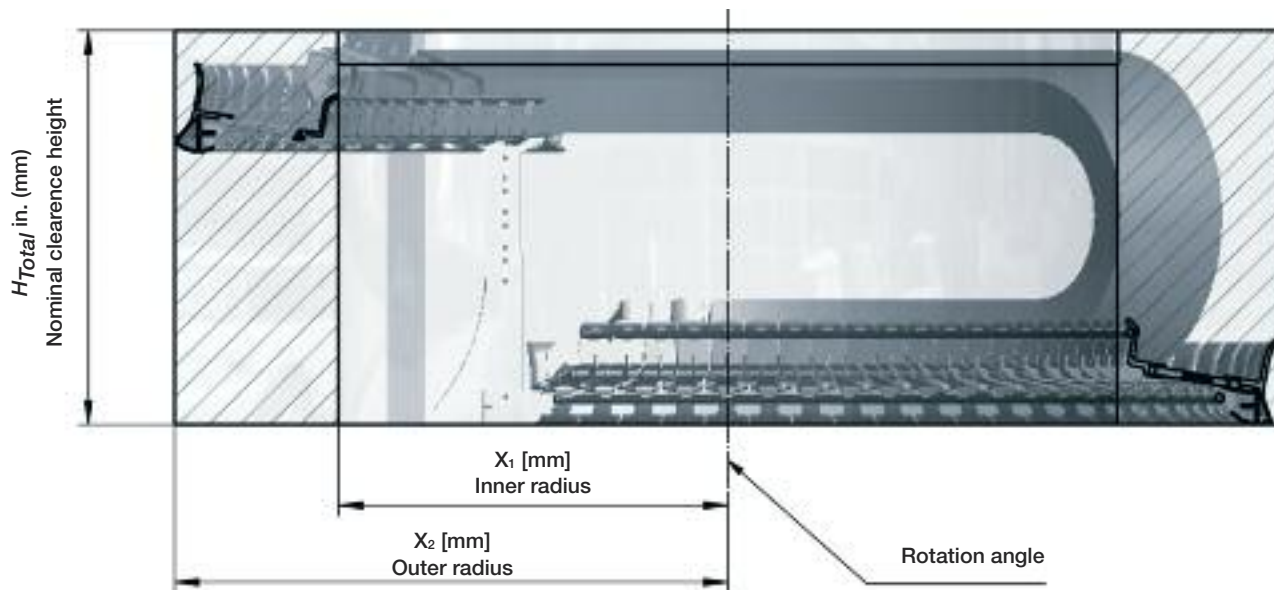
Energy Chain System®
TwisterChain® Series
Guide Trough - Type 01

igus® Energy Chain System®

Telephone 1-800-521-2747
Fax 1-401-438-7270

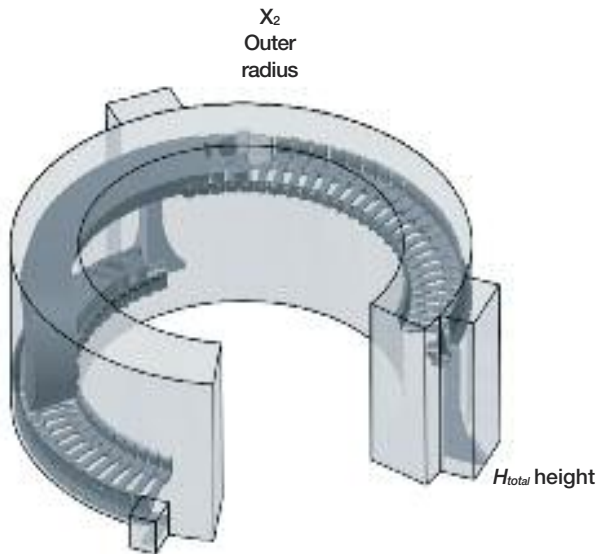
Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec/RFQ: <http://www.igus.com/quickspec>

8.75

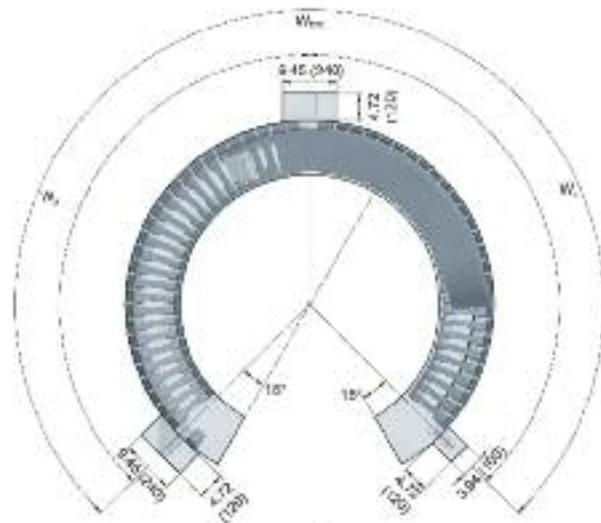


Installation Dimensions - X₁ / X₂

AR	X ₂	X ₁ Inner radius												
		Bi = 50	Bi = 65	Bi = 75	Bi = 100	Bi = 112	Bi = 125	Bi = 137	Bi = 150	Bi = 162	Bi = 175	Bi = 187	Bi = 200	
in. (mm)	Outer radius	in. (mm)	in. (mm)	in. (mm)	in. (mm)	in. (mm)	in. (mm)	in. (mm)	in. (mm)	in. (mm)	in. (mm)	in. (mm)	in. (mm)	in. (mm)
15.75 (400)	18.90 (480)	11.42 (290)	11.02 (280)	10.63 (270)	9.84 (250)	9.45 (240)	8.66 (220)	8.27 (210)	7.87 (200)	7.48 (190)	7.09 (180)	6.69 (170)	5.91 (150)	
19.69 (500)	22.83 (580)	15.35 (390)	14.96 (380)	14.57 (370)	13.78 (350)	13.39 (340)	12.60 (320)	12.20 (310)	11.81 (300)	11.42 (290)	11.02 (280)	10.63 (270)	9.84 (250)	
23.62 (600)	26.77 (680)	19.29 (490)	18.90 (480)	18.50 (470)	17.72 (450)	17.32 (440)	16.54 (420)	16.14 (410)	15.75 (400)	15.35 (390)	14.96 (380)	14.57 (370)	13.78 (350)	
25.59 (650)	28.74 (730)	21.26 (540)	20.87 (530)	20.47 (520)	19.69 (500)	19.29 (490)	18.50 (470)	18.11 (460)	17.72 (450)	17.32 (440)	16.93 (430)	16.54 (420)	15.75 (400)	
29.53 (750)	32.68 (830)	25.20 (640)	24.80 (630)	24.41 (620)	23.62 (600)	23.23 (590)	22.44 (570)	22.05 (560)	21.65 (550)	21.26 (540)	20.87 (530)	20.47 (520)	19.69 (500)	
33.46 (850)	36.61 (930)	29.13 (740)	28.74 (730)	28.35 (720)	27.56 (700)	27.16 (690)	26.38 (670)	25.98 (660)	25.59 (650)	25.20 (640)	24.80 (630)	24.41 (620)	23.62 (600)	



The required clearance height of the TwisterChain® trough system



Rotation angle - W₁ / W₂ / W_{total}

W _{total} Machine angle of rotation (°)	W ₁ angle Lower run trough (°)	W ₂ angle Upper run trough (°)
90°	45°	-
180°	90°	90°
270°	135°	135°
360°	180°	180°

Nominal clearance height - H_{total}

For Series	R 100 [mm]	R 125 in. (mm)	R 150 in. (mm)	R 175 in. (mm)	R 200 in. (mm)	R 250 in. (mm)	R 400 in. (mm)
2808	14.57 (370)	16.54 (420)	18.50 (470)	20.47 (520)	22.44 (570)	26.38 (670)	38.19 (970)
3808	14.96 (380)	16.93 (430)	18.90 (480)	20.87 (530)	22.83 (580)	26.77 (680)	38.58 (980)
4008	15.75 (400)	17.72 (450)	19.69 (500)	21.65 (550)	23.62 (600)	27.56 (700)	39.37 (1000)



TwisterChain® in the new igus® guide trough for rotary movements in a buckling arm robot -
Durable and rugged: Prototype successfully tested in over 1,000,000 cycles

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



2208
2808
3808
4008



Energy Chain System® TwisterChain® Series Guide Trough - Type 02

igus® Energy Chain System®

Telephone 1-800-521-2747
Fax 1-401-438-7270

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec/RFQ: <http://www.igus.com/quickspec>

The delivery of an igus® TwisterChain® includes the guide trough, which affords certain advantages:

- Guidance of the chain
- Minimized wear on the chain
- Optimal running smoothness
- Rotational angle up to 400°

The modular design of the guide trough makes it possible to connect a large number of chain, circle and bending radii by using the same trough sections. If the chain radius changes, the trough can simply be adapted without purchasing a completely new trough. The table below will assist you in selecting the right guide trough system. The specified part number includes the complete trough system. In all cases, you should state the TwisterChain® series when ordering.



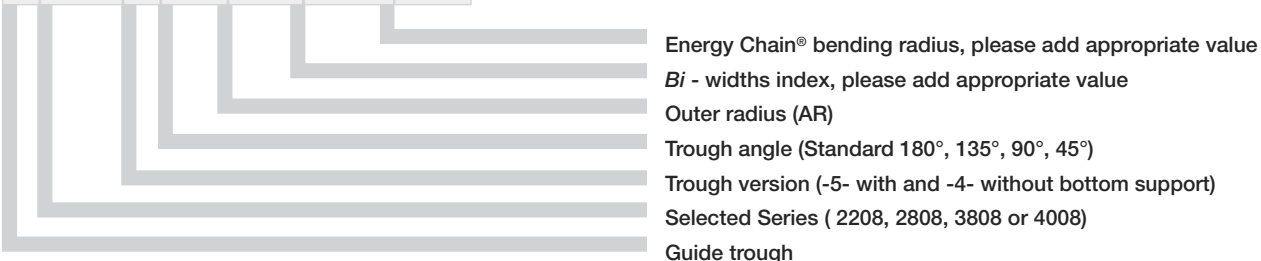
This bottom stanchion (pictured above in red) is required only if the support for the upper run (from a 180° rotation angle) cannot be mounted on the machine.

Order Example

9	4008-	5-	180-	600/	06-	250
---	-------	----	------	------	-----	-----

9	XXXX-	5-	180-	600/	Bi -	R
---	-------	----	------	------	------	---

Part No. structure - guide trough
94008-5-180-600/06-250



Part No. Series	Outer radius AR	Rotation angle α [°]	Trough assembly		Number of support
			Standard	Trough assembly with bottom support	
2208	11.81" (300 mm)	45 - 100	9 <input type="text" value="2208"/> -4-45-300/ <input type="text" value="Bi"/> - <input type="text" value="R"/>	Not necessary	
		>100 - 180	9 <input type="text" value="2208"/> -4-90-300/ <input type="text" value="Bi"/> - <input type="text" value="R"/>	Not necessary	
		>180 - 270	9 <input type="text" value="2208"/> -4-135-300/ <input type="text" value="Bi"/> - <input type="text" value="R"/> *	9 <input type="text" value="2208"/> -5-135-300/ <input type="text" value="Bi"/> - <input type="text" value="R"/>	1
		>270 - 360	9 <input type="text" value="2208"/> -4-180-300/ <input type="text" value="Bi"/> - <input type="text" value="R"/> **	9 <input type="text" value="2208"/> -5-180-300/ <input type="text" value="Bi"/> - <input type="text" value="R"/>	2
2808 / 3808 / 4008	17.72" (450 mm)	45 - 100	9 <input type="text" value="XXXX"/> -4-45-400/ <input type="text" value="Bi"/> - <input type="text" value="R"/>	Not necessary	
		>100 - 180	9 <input type="text" value="XXXX"/> -4-90-400/ <input type="text" value="Bi"/> - <input type="text" value="R"/>	Not necessary	
		>180 - 270	9 <input type="text" value="XXXX"/> -4-135-400/ <input type="text" value="Bi"/> - <input type="text" value="R"/> *	9 <input type="text" value="XXXX"/> -5-135-400/ <input type="text" value="Bi"/> - <input type="text" value="R"/>	1
		>270 - 360	9 <input type="text" value="XXXX"/> -4-180-400/ <input type="text" value="Bi"/> - <input type="text" value="R"/> **	9 <input type="text" value="XXXX"/> -5-180-400/ <input type="text" value="Bi"/> - <input type="text" value="R"/>	2
	17.72" - 21.65" (450 - 550 mm)	45 - 100	9 <input type="text" value="XXXX"/> -4-45-500/ <input type="text" value="Bi"/> - <input type="text" value="R"/>	Not necessary	
		>100 - 180	9 <input type="text" value="XXXX"/> -4-90-500/ <input type="text" value="Bi"/> - <input type="text" value="R"/>	Not necessary	
		>180 - 270	9 <input type="text" value="XXXX"/> -4-135-500/ <input type="text" value="Bi"/> - <input type="text" value="R"/> *	9 <input type="text" value="XXXX"/> -5-135-500/ <input type="text" value="Bi"/> - <input type="text" value="R"/>	1
		>270 - 360	9 <input type="text" value="XXXX"/> -4-180-500/ <input type="text" value="Bi"/> - <input type="text" value="R"/> **	9 <input type="text" value="XXXX"/> -5-180-500/ <input type="text" value="Bi"/> - <input type="text" value="R"/>	2
21.65" - 23.62" (550 - 650 mm)	45 - 100	9 <input type="text" value="XXXX"/> -4-45-600/ <input type="text" value="Bi"/> - <input type="text" value="R"/>	Not necessary		
	>100 - 180	9 <input type="text" value="XXXX"/> -4-90-600/ <input type="text" value="Bi"/> - <input type="text" value="R"/>	Not necessary		
	>180 - 270	9 <input type="text" value="XXXX"/> -4-135-600/ <input type="text" value="Bi"/> - <input type="text" value="R"/> *	9 <input type="text" value="XXXX"/> -5-135-600/ <input type="text" value="Bi"/> - <input type="text" value="R"/>	1	
	>270 - 360	9 <input type="text" value="XXXX"/> -4-180-600/ <input type="text" value="Bi"/> - <input type="text" value="R"/> **	9 <input type="text" value="XXXX"/> -5-180-600/ <input type="text" value="Bi"/> - <input type="text" value="R"/>	2	
>23.62" (650 mm)	>360	Ask us we will be happy to assist you			

Supplement Part No. with required Series (2208, 2808, 3808 oder 4008), value **Bi**,

and appropriate value of the required Energy Chain® radius **R** ► 9 -5-180-600/ -

* These troughs feature **one support** for the upper run, without bottom stanchion (See red portion of above photo)

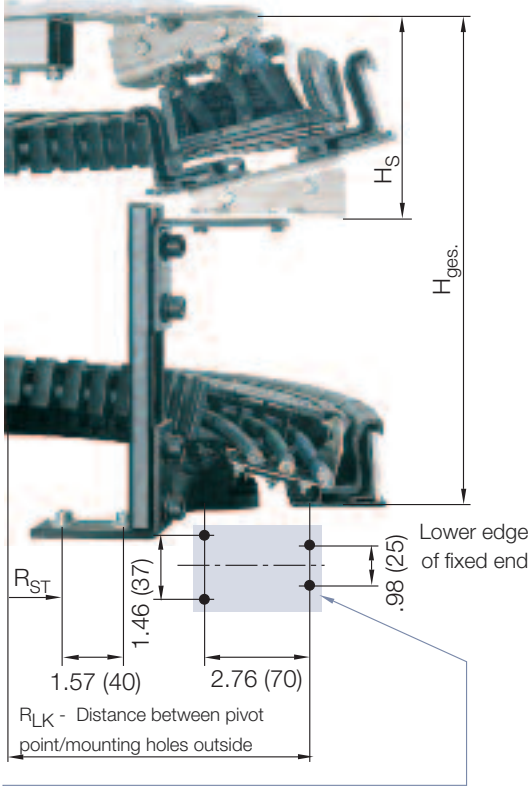
** These troughs feature **two supports** for the upper run, without bottom stanchion (See red portion of above photo)

Energy Chain System® TwisterChain® Series Guide Trough - Type 02

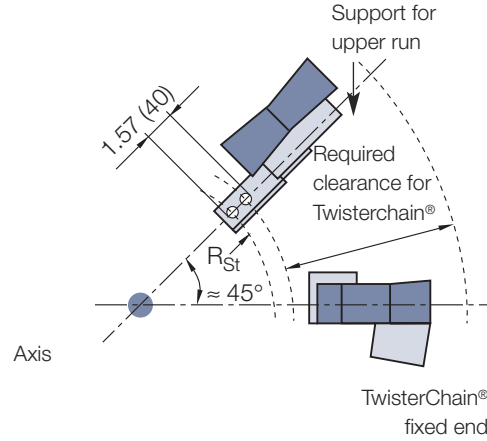


2208
2808
3808
4008

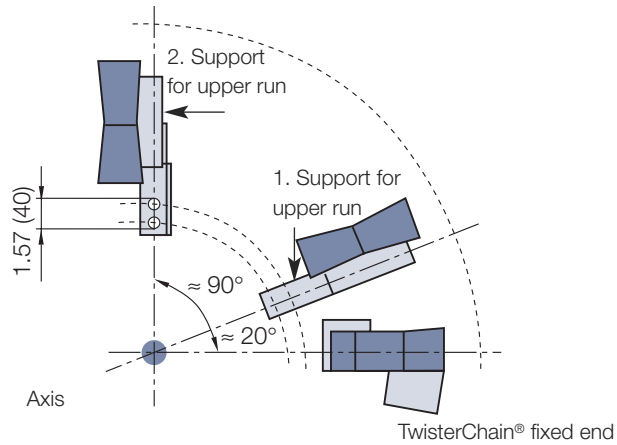
Support for the upper run (from a 180° rotational angle)
Lower edge of the carrier



Mounting position for one support



Mounting position for two supports



The guide trough must be mounted at the fixed end of the TwisterChain®, as shown by the drilling template. The following bolted connections are permitted.

- Through-hole: 4 x Ø .26" - .28" (6.6 - 7 mm)
- Mounting only with bolts: 4 x M6 bolts

Installation dimensions

Series	R _{LK}	H _S	H _{tot.} for E-Chain Bending Radius						Part No. Guide Trough	R _{ST}
			2.16 (55)	2.48 (63)	2.95 (75)	3.94 (100)	4.92 (125)	5.91 (150)		
2208...300	10.43 (265)	5.12 (130)	7.68 (195)	8.31 (211)	9.25 (235)	11.22 (285)	13.19 (335)	15.16 (385)	92208...300	in. mm 5.71 (145)

Series	R _{LK}	H _S	H _{tot.} for E-Chain Bending Radius								Part No. Guide Trough	R _{ST}	
			3.93 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	8.86 (225)	9.84 (250)	11.81 (300)			15.75 (400)
2808...400	14.17 (360)	5.75 (146)	11.42 (290)	13.39 (340)	15.85 (390)	17.32 (440)	19.29 (490)	21.26 (540)	23.23 (590)	-	-	92808...400	7.58 (192.5)
3808...400	14.17 (360)	6.14 (156)	11.81 (300)	13.78 (350)	15.75 (400)	17.72 (450)	19.69 (500)	21.65 (550)	23.62 (600)	-	-	93808...400	7.58 (192.5)
2808...500	18.11 (460)	5.75 (146)	11.81 (300)	13.78 (350)	15.75 (400)	17.72 (450)	19.69 (500)	21.65 (550)	23.62 (600)	-	-	92808...500	11.52 (292.5)
3808...500	18.11 (460)	6.14 (156)	12.20 (310)	14.17 (360)	16.14 (410)	18.11 (460)	20.01 (510)	22.05 (560)	24.02 (610)	-	-	93808...500	11.52 (292.5)
2808...600	22.05 (560)	5.75 (146)	12.01 (305)	13.98 (355)	15.94 (405)	17.91 (455)	19.88 (505)	21.85 (555)	23.82 (605)	-	-	92808...600	15.43 (392.5)
3808...600	22.05 (560)	6.14 (156)	12.40 (315)	14.37 (365)	16.34 (415)	18.31 (465)	20.28 (515)	22.24 (565)	24.21 (615)	-	-	93808...600	15.43 (392.5)
4008...650	24.02 (610)	6.93 (176)	-	-	17.01 (432)	-	20.94 (532)	-	24.88 (632)	28.82 (732)	36.69 (932)	94008...650	17.42 (442.5)
4008...750	27.95 (710)	6.93 (176)	-	-	17.01 (432)	-	20.94 (532)	-	24.88 (632)	28.82 (732)	36.69 (932)	94008...750	21.36 (542.5)

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



2208
2808
3808
4008



**Energy Chain System®
TwisterChain® Series
System Analysis**

**igus® Energy Chain
System®**

**Telephone 1-800-521-2747
Fax 1-401-438-7270**

**Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec/RFQ: <http://www.igus.com/quickspec>**

Date:	Telephone: 401-438-2200 or 800-521-2747 Fax: 401-438-7270
From:	To: igus,inc. Technical Sales Energy Chain Systems® P.O. Box 14349 East Providence, RI 02914
Telephone:	
Fax:	

Please supply us with your application data. We will then send you a full analysis with cable/layout suggestion and a quotation immediately. Please consult igus® should you have any questions.

Individual components:

- TwisterChain®
- Chainflex® high-flex cables
- Guide trough
- Pre-assembled

Cable and Hose package for igus® TwisterChain®

Number	Type	Ø	Weight (lbs/ft)	Permitted Bending Radius

Dimensions

X₁ in mm
 X₂ in mm
 H_F in mm
 Angle of rotation α* in °

* On machine elements which move to the left and to the right following a circular path, the angle of rotation can be determined by adding the two angles.

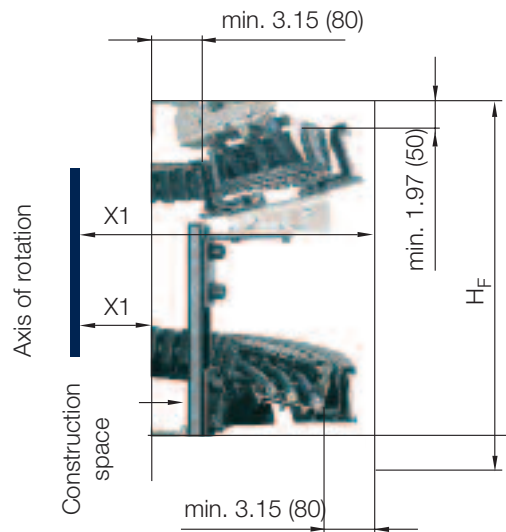
Operating data

Rotations/day
 Days/year
 Speed in ft/s
 Acceleration in ft/s²

Environment

Temperature in °F
 Moisture yes no

Remarks:



**Please copy,
fill in, and fax
this page.**

Thank you!

Calculation assistance

This calculation sheet should help you to select the right igus® TwisterChain® system for your application. Please consult igus® if you have any questions.

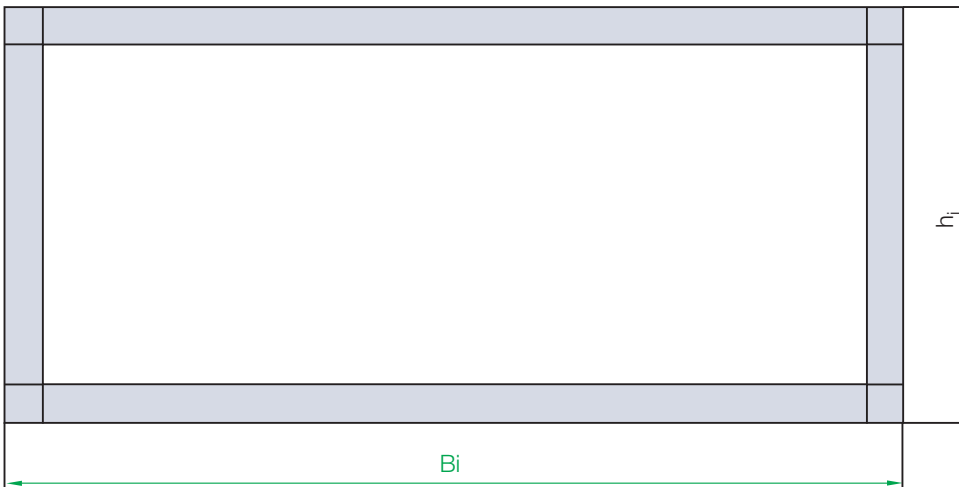
Angle of rotation in °

Cable and hose layout

Please sketch the cable and hose layout within the chain.

Note:

To find the correct series, refer to the thickest cable diameter, plus cable clearance of approx. 20% of the chain interior.



TwisterChain® Series

2208 2808 3808 4008

Existing installation space

X_1 max.:
 X_2 max.:
 H_F max.:

Chain data

Outer radius AR:
Inner radius IR:
Bending radius R:

Guide trough

yes no

Trough part number

9.....-.....-.....-.....

Supporting structure necessary

yes no

The guide trough part number includes all the necessary elements for proper operation. The angle of rotation is dependent upon support for the upper run and should be assembled on-site. If on-site assembly is not possible, we will deliver a supporting structure which can be assembled on the floor and is based on the height of the lower trough run. If necessary, we will design a supporting structure specially adapted to your application.

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

