igus® 3D e-chains®
robotic and circular movements
**triflex® R | easy triflex® | triflex®**

**Robotic- and 3D-applications**

**robotic e-chains® - triflex® R**
- The first choice for multi-axis-robots
- Available in 4 Versions - from stock
- Torsion ca. ±10° per link possible
- High torsional stability (TRC/TRE)
- Easy shortening and lengthening
- Small bending radius, small pitch
- [www.igus.eu/eu/triflexR](http://www.igus.eu/eu/triflexR)

**For simple 3D-applications - easy triflex®**
- Easy filling from two sides and complex movements
- For reparations or supplements of existing triflex®-Systems
- For simple robotic- and 3D-applications
- Fast cable assembly with “easy”-design
- [www.igus.eu/eu/easytriflex](http://www.igus.eu/eu/easytriflex)

**Enclosed 3D- e-chains® - triflex®**
- 3-axis motions in machinery of all kinds (combined circle- and stroke-movements)
- Completely enclosed - protection against dirt and chips
- For simple 3D-applications
- High tensile strength
- Where rectangular shapes fit better
- [www.igus.eu/eu/triflex](http://www.igus.eu/eu/triflex)

**triflex® R | easy triflex® | triflex®**

**twisterchain® new/classic | twisternet | twisternet e-spool**

**For circular movements and rotary motions in a small spaces**

**Higher loads - twisterchain® new**
- Rotary/Spiral movements up to 540° possible
- Sturdier through intermediate link heavier loads possible
- Highly dynamic and smoother running
  (with a new guide trough)
- Cable-friendly, smooth interior
- Crossbars snap-open along inner radius
- Rotary speeds up to 2 m/s and more
- [www.igus.eu/eu/twisterchain](http://www.igus.eu/eu/twisterchain)

**First generation - twisterchain® classic**
- For new designs we recommend:
  TC32, TC42, TC56 - [from page 1082](#)
- Fast cable change
- Modular design - variable widths
- Crossbars can be opened on both sides
- For circular motions up 540°
  (with special attachments)
- [www.igus.eu/eu/twisterchainClassic](http://www.igus.eu/eu/twisterchainClassic)

**Rotary motions - twisternet**
- Rotary motions in a small spaces up to 7000°
- 4 sizes available
- Rotary speeds up to 360°/s possible
- Compact, modular and lightweight
- Ribbons can be shortened easily
- Minimum installation space
- Can be used in various installation positions
- [www.igus.eu/eu/twisterband](http://www.igus.eu/eu/twisterband)

**e-spool New in this catalog**
- The alternative to the cable drums
- Cable-friendly and guides various media safely
- No tensile stress on the cables
- Different media and diameters in the same drum are feasible
- Energy supply in all directions is possible
- Space-saving, no “chain junction”
- [www.igus.eu/eu/e-spool](http://www.igus.eu/eu/e-spool)
Movements in 3-axes, inter alia, for robots

triflex® R

triflex® R (R for “round”) is the third generation of multi-axis e-chains®. Design features include:
- Approximately ±10° twist per e-chain link
- High tensile strength of the ball-and-socket joint
- Optional fibre rod for spring loading of the triflex® R
- Easy assembly and modification due to single moulded link design
- No support elements e.g. steel cables, spring suspensions etc. are necessary

These design features guide this product to success in the robot industry. A useful range of accessories is available and is constantly being developed.

Available in 4 Versions - from stock:
- TRC - closed design with smooth and robust exterior
- "easy"-design, easy to fill from outside
- TRL - light weight, with "easy"-design
- TRLF - Light-variant with snap lock mechanism

Typical industries and applications
- The first choice for multi-axis robots
- Machine tools
- Handling machines - 6-axis
- Fördertechnik
- Packaging machines
- General mechanical engineering, etc.

triflex® R for a sleek chain guide. With triflex® RS, the multi-dimensionally moving triflex® R is routed parallel to the robot arm, saving space. Integrated spring rods generate the directed pretension so that it does not form loops on the robot hand. Optional: triflex® RS with cover - creates additional installation space on the robot. Video at www.igus.eu/RS_movie

Contents, selection table next page
### trillex® R Contents Selection Table

<table>
<thead>
<tr>
<th>Series</th>
<th>Inner height (mm)</th>
<th>max. cable ø (mm)</th>
<th>Outer width (mm)</th>
<th>Bending radii (mm)</th>
<th>Pitch (mm)</th>
<th>Links perm</th>
<th>Page</th>
</tr>
</thead>
</table>

#### Series “TRL” - 3-chamber system

- **TRL.30** 12,5 11 10 8 43,5 50 13,9 72 1024
- **TRL.40** 15 13 13 11 43 58 13,9 72 1024
- **TRL.60** 22,5 19,5 20,5 17,5 65 87 20,4 49 1024
- **TRL.70** 28 24 26 22 81 110 25,6 39 1024
- **TRL.85** 33 28 31 26 94,5 135 30,6 33 1024
- **TRL.100** 37,5 32,5 35,5 30,5 108 145 34,5 29 1024
- **TRL.125** 43,3 43,3 41 41 135 182 44,6 23 1024

1) For quick and easy insertion/removal of cables using the “easy”-design, we recommend a maximum cable diameter of 70% of the specified value.

2) **TRL.125** - max. cable diameter Ø 41 mm. Max. cable diameter changes to Ø 36 mm only, if shortening/lengthening of a filled trillex® R is required.

#### Series “TRC” - closed design

dirt-resistant, smooth and robust exterior

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- **TRC.30** 12 10 10 8 34,5 50 11,3 89 1024
- **TRC.40** 15 13 13 11 43 58 13,9 72 1024
- **TRC.60** 22,5 19,5 20,5 17,5 65 87 20,4 49 1024
- **TRC.70** 28 24 26 22 81 110 25,6 39 1024
- **TRC.85** 33 28 31 26 94,5 135 30,6 33 1024
- **TRC.100** 37,5 32,5 35,5 30,5 108 145 34,5 29 1024

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2) **TRC.125** - max. cable diameter Ø 41 mm. Max. cable diameter changes to Ø 36 mm only, if shortening/lengthening of a filled trillex® R is required.

#### Series “TRE” - ”easy”-design

Fast installation of cables and hoses, simply press cables in

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<th>Bending radii (mm)</th>
<th>Pitch (mm)</th>
<th>Links perm</th>
<th>Page</th>
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- **TRE.30** 12 10 10 8 34,5 50 11,3 89 1024
- **TRE.40** 15 13 13 11 43 58 13,9 72 1024
- **TRE.60** 22,5 19,5 20,5 17,5 65 87 20,4 49 1024
- **TRE.70** 28 24 26 22 81 110 25,6 39 1024
- **TRE.85** 33 28 31 26 94,5 135 30,6 33 1024
- **TRE.100** 37,5 32,5 35,5 30,5 108 145 34,5 29 1024

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- **TRL.65** New* 24,4 22 70,2 100 23,1 44 1036
- **TRL.85** New* 32,8 30 94,5 135 31 33 1036
- **TRL.100** New* 37,5 35,5 108 145 35,4 29 1036

*New in this catalog
**triflex® R | Series TRC | Introduction**

**3D for robotic applications, closed, chip-resistant**

When to use Series TRC:
- If a secure, closed and chip-resistant energy supply is required for multi-dimensional (3D) movements
- If high torsional stability is required
- If the system has to be shortened or lengthened easily
- If small bending radii are required
- If high tensile strength is important
- If a smooth and robust exterior against interfering edges is required

**When to use a different igus® Series:**
- For circular movements with high loads
  - System twistchain®, new, from page 1082
- When a rugged, easy to fill variant is needed
  - triflex® R - TRE, page 1028
- If a more simple and cost-effective 3D-solution is required
  - triflex® R - TRL, page 1032
- If a light-variant with snap lock mechanism is required
  - triflex® R - TRLF, page 1036

**Order example | Order key and color options**

**Order example for complete e-chain® (1,0 m), color black, with mounting brackets and intermediate links:**

Triflex® R e-chain® (1,0 m)
- Please indicate e-chain® length or number of links: 1,0 m or 72 links
- + Mounting brackets: 1 mounting bracket with strain relief
- + 2 Intermediate links

Order text: 1,0 m TRC.40.058.0 + TR.40.01 + TR.40.02

**Order key**

TRC.40.058.0
- Series / Closed design
- Width index Ø
- Bending index R
- Standard color black
- Triflex® R - Closed, chip-resistant design
- High tensile strength thanks to special ball-and-socket principle
- Able to move multi-dimensionally:
  - Twist up to approx. ±10° per link possible in longitudinal axis
- Impact-resistant, dirt-repelling, rugged and abrasion-resistant
- Easy assembly and dismantling:
  - Injection-molded component
- High stability:
  - Thanks to exterior stop dogs
- Small bending radii and short pitch
- Easy attachment and intelligent accessories onto the robot/machine

**Available from stock. Delivery time® in 24h or today!**

Delivery time means time until shipping of goods (after technical release)

**3D-CAD files, configurators, PDF**

[www.igus.eu/trc](http://www.igus.eu/trc)

**Technical Data**

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<th>Speed / acceleration</th>
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<tr>
<td>Material - permitted temperature °C, igumid NB</td>
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Order text: 1,0 m TRC.40.058.0 + TR.40.01 + TR.40.02

**Order key**

TRC.40.058.0
- Series / Closed design
- Width index Ø
- Bending index R
- Standard color black

**All triflex® R accessories like:**

- Swivel bearings for smooth motion
- Protectors
- Gliding feed-throughs
- Strain relief systems: Quick exchange kit, Pivot bracket, triflex® R connection
- TRE LOCK clips
- Back pull systems: RS triflex® R-Set the universal module and RSP the intelligent retraction system
- Fiber rod module & Installation kit
- Protective jackets

More information [from page1040](http://www.igus.eu)

igus® GmbH Germany | Phone +49 2203 9649-800 Fax -222 | info@igus.de | [www.igus.eu](http://www.igus.eu)
triflex® R | Series TRC | Product range
Robotic applications, closed, chip-resistant

...TRC
Closed design

triflex® R | Series TRC | Closed design, dirt-resistant

<table>
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<tr>
<th>Series TRC</th>
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1) Available as ESD-Version from stock
2) Max. cable diameter Ø 41 mm. Max. cable diameter changes to Ø 36 mm only if shortening/lengthening of a filled triflex® R is required
3) TRC.125: C-version is standard!

Dimensions

triflex® R | Series TRC | Accessories
Standard mounting bracket

With strain relief
Intermediate link
Without strain relief

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</table>

1) Available as ESD-Version from stock

ESD/ATEX 1) permanently conductive e-chains® - TRC several widths with delivery from stock: Outer widths Ba 43 - 135 mm, radii R 058 - 182 mm. Full ESD product range www.igus.eu/ESD

igus® GmbH Germany | Phone +49 2203 9649-800 Fax -222 | info@igus.de | www.igus.eu

1026 3D-CAD files, configurators, PDF www.igus.eu/eu/TRC
**3D for robotic applications, easy filling**

*When to use Series TRE:*
- If an easy to fill energy supply is required for multi-dimensional (3D) movements
- If high torsional stability is required
- If the system has to be shortened or lengthened easily
- If small bending radii are required
- If high tensile strength is important
- If an easy opening mechanism for easy filling with cable and hose packages is needed

*When to use a different igus® Series:*
- For circular movements with high loads: System twist chain® new, from page 1082
- If a fully enclosed solution is required: triflex® R - TRC, page 1024
- If a more simple and cost-effective 3D-solution is required: triflex® R - TRL, page 1032
- If a light-variant with snap lock mechanism is required: triflex® R - TRLF, page 1036

**Order example**

<table>
<thead>
<tr>
<th>Order example for complete e-chain® (1,0 m), color black, with mounting brackets and intermediate links:</th>
</tr>
</thead>
<tbody>
<tr>
<td>e-chain® (1,0 m)</td>
</tr>
<tr>
<td>+ Mounting brackets</td>
</tr>
<tr>
<td>+ 1 Intermediate link</td>
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</table>

**Order text:** 1,0 m TRE.40.058.0 + TR.40.01 + TR.40.02

**Order key**

<table>
<thead>
<tr>
<th>TRE.40.058.0.B</th>
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<tr>
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**Order example**

- **Order example**
  - For complete e-chain® (1,0 m), color black, with mounting brackets and intermediate links:
    - e-chain® (1,0 m)
    - 1,0 m or 72 links
    - 1 mounting bracket with strain relief
    - 1 Intermediate link
  - Order text: 1,0 m TRE.40.058.0 + TR.40.01 + TR.40.02

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**All triflex® R accessories like:**
- Swivel bearings for smooth motion
- Protectors
- Gliding feed-throughs
- Strain relief systems: Quick exchange kit, Pivot bracket, triflex® R connection, TRE LOCK clips
- Back pull systems: RS triflex® R-Set the universal module and RSP the intelligent retraction system
- Fiber rod module & Installation kit
- Protective jackets

**More information**

- www.igus.eu/eu/TRE
B-version | 4 x higher torsion forces

The advanced ball and socket connection now uses an additional arrester for even higher stability. Especially designed for heavy-duty applications and all back pull systems (RS and RSP) with high accelerations and top speeds. Up to 4 times stronger with improved bending radius strength. Able to handle even higher torsion forces. Made of only one single part per e-chain™ link. [www.igus.eu/triflex-R-4version](www.igus.eu/triflex-R-4version)

C-version | Quick assembly, 50% higher forces

Now available with proven bolt connection for even faster assembly and disassembly. Linear pull force capacity increased up to 4,000 N. Up to 4 times stronger and improved bending radius strength. C-version drastically reduces installation time. Stronger lock for torsion limitation. igubal® Spherical Bearing for non-slip traction.
**triflex® R | Series TRL**

**Introduction**

**3D for robotic applications, light and cost-effective**

When to use Series TRL:
- When an easy to fill, economical 3D e-chain® is needed
- When 3D e-chain® for easily manageable operating conditions is needed
- If the system has to be shortened or lengthened easily
- If small bending radii are required
- If an easy opening mechanism for easy filling with cable and hose packages is needed

**Technical Data**

- **Speed / acceleration**: upon request
- **Material - permitted temperature °C**: igumid NB -40° up to +80°C
- **Flammability class, igumid NB**: VDE 0304 IIC UL94-V2

**Order example**

Order example for complete e-chain® (1,0 m), color black, with mounting brackets:
- e-chain® (1,0 m) Please indicate e-chain® length or number of links: 1,0 m or 72 links
- + Light-mounting brackets 1 mounting bracket with strain relief

Order text: 1,0 m TRL.40.058.0 + TL.40.01.Z1

**Order key and color options**

Order example for complete e-chain® (1,0 m), color black, with mounting brackets:
- e-chain® (1,0 m) Please indicate e-chain® length or number of links: 1,0 m or 72 links
- + Light-mounting brackets 1 mounting bracket with strain relief

Order text: 1,0 m TRL.40.058.0 + TL.40.01.Z1

**Order key**

- Series / "easy"-design
- Width index ø
- Bending radius R
- Standard color black

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

- High tensile strength thanks to special ball-and-socket principle
- Able to move multi-dimensionally - Twist up to approx. ±10° per link, possible in longitudinal axis
- Easy opening mechanism for easy filling with cable and hose packages
- Easy assembly and dismantling - injection-molded component
- Extremely light due to one-piece design
- Small bending radii and short pitch
- Economical and light mounting bracket with strain relief or intermediate link

**Order text**: 1,0 m TRL.40.058.0 + TL.40.01.Z1

**Economical and light**

**Available from stock. Delivery time® in 24h or today!**

*Delivery time means time until shipping of goods (after technical release)*

**3D-CAD files, configurators, PDF**

- www.igus.eu/eu/TRL

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igus® GmbH Germany | Phone +49 2203 9649-800 | Fax -222 | info@igus.de | www.igus.eu
triflex® R | Series TRL | Product range
Robotic applications, light and economical

triflex® R | Series TRL | Light alternative with “easy”-design

<table>
<thead>
<tr>
<th>Dimensions</th>
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<tr>
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<th>Part No. with long strain relief</th>
<th>Part No. with short strain relief</th>
<th>Intermediate link</th>
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</tbody>
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---

1) For quick and easy insertion/removal of cables using the “easy”-design, we recommend a maximum cable diameter of 70% of the specified value.

2) only with 2-chamber system

---

**Light-mounting bracket**

- Standard for TRL/TRLF, also compatible with TRC/TRE
- Light-mounting bracket with strain relief and available as intermediate link
- Standard mounting bracket also available ➤ page 1027

---

**Accessories**

- Light-mounting bracket
  - Quick and easy fixing onto the robot/machine
  - (Standard mounting brackets ➤ from page 1027)

---

**Dimensions**

- **Bi 1**: [mm]
- **Bi 2**: [mm]
- **Ba**: [mm]

---

**Part No.**

- **TL30.01.Z1**
- **TL30.01.Z2**
- **TL30.01.Z0**
- **TL40.01.Z1**
- **TL40.01.Z2**
- **TL40.01.Z0**
- **TL60.01.Z1**
- **TL60.01.Z2**
- **TL60.01.Z0**
- **TL70.01.Z1**
- **TL70.01.Z2**
- **TL70.01.Z0**
- **TL100.01.Z1**
- **TL100.01.Z2**
- **TL100.01.Z2**

---

**Part No. with short strain relief**

- **TL30.01.Z1**
- **TL30.01.Z2**
- **TL30.01.Z0**
- **TL40.01.Z1**
- **TL40.01.Z2**
- **TL40.01.Z0**
- **TL60.01.Z1**
- **TL60.01.Z2**
- **TL60.01.Z0**
- **TL70.01.Z1**
- **TL70.01.Z2**
- **TL70.01.Z0**
- **TL100.01.Z1**
- **TL100.01.Z2**
- **TL100.01.Z2**

---

**Part No. with long strain relief**

- **TL30.01.Z1**
- **TL30.01.Z2**
- **TL30.01.Z0**
- **TL40.01.Z1**
- **TL40.01.Z2**
- **TL40.01.Z0**
- **TL60.01.Z1**
- **TL60.01.Z2**
- **TL60.01.Z0**
- **TL70.01.Z1**
- **TL70.01.Z2**
- **TL70.01.Z0**
- **TL100.01.Z1**
- **TL100.01.Z2**
- **TL100.01.Z2**

---

**Intermediate link**

- **TL30.01.Z1**
- **TL30.01.Z2**
- **TL30.01.Z0**
- **TL40.01.Z1**
- **TL40.01.Z2**
- **TL40.01.Z0**
- **TL60.01.Z1**
- **TL60.01.Z2**
- **TL60.01.Z0**
- **TL70.01.Z1**
- **TL70.01.Z2**
- **TL70.01.Z0**
- **TL100.01.Z1**
- **TL100.01.Z2**
- **TL100.01.Z2**
triflex® R | Series TRLF | Introduction | New in this catalog

TRLF - light and cost-effective with snap lock mechanism

When to use Series TRLF:
- When an easy to fill, economical 3D e-chain® is needed
- Snap lock mechanism to open by hand or screwdriver
- For thick, stiff hoses and/or many cables
- When 3D e-chain® for easily manageable operating conditions is needed
- If the system has to be shortened or lengthened easily
- If an easy opening mechanism for easy filling with cable and hose packages is needed

When to use a different igus® Series:
- For circular movements with high loads
  - System twistechain® new, from page 1082
- If a fully enclosed solution is required
  - triflex® R - TCR, page 1024
- If a rugged, easy to fill variant is needed
  - triflex® R - TRL, page 1032

Order example for complete e-chain® (1,0 m), color black, with mounting brackets:
- triflex® R (1,0 m), color black, with mounting brackets:
  - e-chain® (1,0 m) Please indicate e-chain® length or number of links: 1,0 m or 29 links
  - +Light-mounting brackets 1 mounting bracket with strain relief

Order text: 1,0 m TRLF.100.145.0 + TL.100.01.Z1

Technical Data

<table>
<thead>
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<th>Speed / acceleration</th>
<th>upon request</th>
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<tbody>
<tr>
<td>Material - permitted temperature °C, igumid G</td>
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<tr>
<td>Flammability class, igumid G</td>
<td>VDE 0304 IIC UL94-HB</td>
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Order key and color options

- Order key
  - TRLF.100.145.0
  - Width index Ø
  - Bending radius R
  - Standard color black

- Light-variant with snap lock mechanism with Bi 37.5 mm inner width and R 145 mm radius, color black = Part No. TRLF.100.145.0

Available from stock. Delivery time* in 24h or today!

*Delivery time means time until shipping of goods after technical release

3D-CAD files, configurators, PDF: www.igus.eu/eu/TRLF

triflex® R TRLF - easy to fill due snap lock mechanism. To open by hand or screwdriver video online: www.igus.eu/eu/TRLF

igus® GmbH Germany | Phone +49 2203 9649-800 Fax -222 | info@igus.de | www.igus.eu

3D for robotic applications, light, snap lock mechanism

- Able to move multi-dimensionally - Twist up to approx. ±10° per link possible in longitudinal axis
- High tensile strength thanks to special ball-and-socket principle
- Simply snap-open for thick, stiff hoses and/or many cables
- Easy assembly and dismantling
- Extremely light due to one-piece design
- 3-chamber principle for interior separation
- Small bending radii and short pitch
- Economical and light mounting bracket with strain relief or intermediate link

Available from stock. Delivery time* in 24h or today!

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triflex® R TRLF - easy to fill due snap lock mechanism. To open by hand or screwdriver video online: www.igus.eu/eu/TRLF

Order example

Order example

Order example for complete e-chain® (1,0 m), color black, with mounting brackets:

- triflex® R (1,0 m) Please indicate e-chain® length or number of links: 1,0 m or 29 links

Order text: 1,0 m TRLF.100.145.0 + TL.100.01.Z1

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Order key and color options

- Order key
  - TRLF.100.145.0
  - Width index Ø
  - Bending radius R
  - Standard color black

- Light-variant with snap lock mechanism with Bi 37.5 mm inner width and R 145 mm radius, color black = Part No. TRLF.100.145.0

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triflex® R TRLF - easy to fill due snap lock mechanism. To open by hand or screwdriver video online: www.igus.eu/eu/TRLF

igus® GmbH Germany | Phone +49 2203 9649-800 Fax -222 | info@igus.de | www.igus.eu
triflex® R | Series TRLF | Light with snap lock mechanism

Quickly filled 3D robot chain, now enclosed. triflex® TRCF

- e-chain® links are easily snapped open to insert large filling diameters
- Enclosed version, also for direct use with dirt and chip exposure
- Torsion of approx. ±10°/chain link possible
- 3 chamber design for ideal cable distribution and media separation
- Can be shortened and extended as needed
- Opened with a screwdriver. More information | www.igus.eu/eu/TRCF

...TRLF Light with snap lock mechanism

triflex® R | Series TRLF | Light-variant with snap lock mechanism

<table>
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<th>Ba [mm]</th>
<th>R [mm]</th>
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Dimensions

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</table>

Light-mounting bracket

- Standard for TRL/TRLF, also compatible with TRC/TRE
- Light-mounting bracket with strain relief and available as intermediate link
- Standard mounting bracket also available | page 1027

**For moving end (ball) suitable only Series TRL/TRLF

*Options with insert nuts, steel, M6/M8

1038 3D-CAD files, configurators, PDF | www.igus.eu/eu/TRLF

igus® GmbH Germany | Phone +49 2203 9649-800 Fax -222 | info@igus.de | www.igus.eu 1039
triflex® R | Series TRC/TRE/TRL/TRLF | Accessories
Swivel bearing, for smooth motion | Protectors

With strain relief TR.XX.04
Without strain relief TR.XX.03

Gentle motion sequence for extreme alternating torsion and bending stress
With extremely sensitive bending radii
Protector bearing with a maintenance-free igubal® ball-and-socket joint

Swivel bearing | Smooth motion for extreme alternating torsion stress | for TRC/TRE/TRL/TRLF

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*only TR.XX.03
**Width 85. not for Series TRL

With strain relief TR.XX.04
Without strain relief TR.XX.03

Swivel bearing | Smooth motion for extreme alternating torsion stress | for TRC/TRE/TRL/TRLF

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</tbody>
</table>

*only TR.XX.03
**Width 85. not for Series TRL

Protectors | High safety under extreme operating conditions | for TRC/TRE

Available in two configurations - with and without swivel bearing
Gliding feed-through for all triflex® R TRC and TRE e-chains
Defined guidance of the triflex® R TRC and TRE on the robot
Optimized motion of the triflex® R e-chain

Gliding feed-throughs, two configurations | With and without swivel bearing

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Gliding feed-throughs | Without swivel bearing | for TRC/TRE

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<td>84</td>
<td>65</td>
<td>87.5</td>
<td>10.5</td>
</tr>
</tbody>
</table>

To achieve long life cycles under heavy loads resulting from impact or friction on the robot's e-chains, optional protectors can be fitted at the contact points. Easy assembly and quick replacement Abrasion-resistant TPU material Shock-resistant Light Easy gliding over edges Free positioning on any e-chain link Protector with quick lock fastener available (Part No. TR.85.30 and TR.70.30)

To order the above, please consult igus® for delivery time!
triflex® R | Series TRC/TRE | Accessories

triflex® R TRE.LOCK clip | for TRE

● The TRE.XX.LOCK clip is used to ensure a secure fit for the mounting bracket on TRE versions
● TRE.XX.LOCK clips are automatically supplied with each mounting bracket - please use the following Part No. for reordering:

<table>
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<th>Width index</th>
<th>Part No.</th>
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</table>

*not for Series TRL/TRLF

Strain relief systems with igus® chainfix clamps | for TRC/TRE

● Secure mounting of large cross sections with igus® chainfix clamps
● Available in 2 options per size
● Multiaxially adjustable, for ideal positioning
● Suits all additional axes: Ø 30 mm, Ø 32 mm, Ø 34 mm

CFX - Single clamp housing, incl. bottom saddles

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Part No.</th>
<th>ø B</th>
<th>H</th>
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</table>

Strain relief e.g. clamps, tie wrap plates, nuggets and plug-in clips are available from stock. The complete chainfix range with order options from page 1148

Quick exchange kit: TR.60/70/85/100/22.XX | for TRC/TRE

● Ideal for triflex® R readychain®
● One-time-only alignment
● No repeat alignment upon exchange of readychain®
● Exchange of all triflex® R unit cables without any tools

<table>
<thead>
<tr>
<th>Width index</th>
<th>Part No.</th>
<th>Quick exchange kit</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
<td>100</td>
<td>TR.100.21.01</td>
<td>30 / 32 / 34</td>
</tr>
</tbody>
</table>

*not for Series TRL/TRLF

Pivot bracket: TR.60/70/85/100/21.XXX | for TRC/TRE

● Available in 2 options per size (with/without strain relief)
● Safe and simple securing of the cables with cable ties
● Possible also without strain relief (Strain relief in the application)

<table>
<thead>
<tr>
<th>Width index</th>
<th>Part No.</th>
<th>Pivot bracket with strain relief</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
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<td>100</td>
<td>TR.100.21.01</td>
<td>30 / 32 / 34</td>
</tr>
</tbody>
</table>

*not for Series TRL/TRLF

Connection TR.60/70/85/100/125/20.XXX | for TRC/TRE

● For cables with large cross section, e.g. welding applications or in heavy hydraulic hoses, rugged strain relief in “heavy-duty” applications
● Double C-profile for igus® CFX clips
● igus® chainfix clamps made of stainless steel or steel can be used (see Table left)

<table>
<thead>
<tr>
<th>Width index</th>
<th>Part No.</th>
<th>triflex® R connection</th>
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<tbody>
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</tr>
<tr>
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<td>TR.85.20</td>
<td>.20 / .30 / .32 / .34</td>
</tr>
<tr>
<td>100</td>
<td>TR.100.20</td>
<td>.20 / .30 / .32 / .34</td>
</tr>
<tr>
<td>125</td>
<td>TR.125.20</td>
<td>.20 / .30 / .34</td>
</tr>
</tbody>
</table>

*not for Series TRL/TRLF

Strain Relief

- Chainfix clamps
- Chainfix clamps made of stainless steel or steel can be used (see Table left)

<table>
<thead>
<tr>
<th>Width</th>
<th>Part No.</th>
<th>Pivot bracket with strain relief</th>
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</thead>
<tbody>
<tr>
<td>60</td>
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<td>30 / 32 / 34</td>
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<td>100</td>
<td>TR.100.21.01</td>
<td>30 / 32 / 34</td>
</tr>
</tbody>
</table>

Accessories

- CFROBOT & CF77.UL.D PUR control cable
- CFROBOT: Available from stock - UL and CSA certified - From 1 m, no minimum requirements - ±180° on 1 m, 3,000,000 cycles tested
triflex® R | Series TRC/TRE | Accessories

RS triflex® R-Set | Universal module | for TRC/TRE

**RS - Universal module for any robotic motion**

triflex® RS is a very compact universal module that can be attached to the fastening points on the robot. Applications in very limited space can be realized, thanks to the small installation height and to the fact that 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.

- Standard-package for all applications for immediate installation
- Integrated spring mechanism
- The first choice for robotic applications with limited space
- Saves space - small installation height and closely routed on the robotic arm
- Outstanding service life
- Universal installation

**Integrated retraction spring prevents loop formations**

**Glide lead-through for a close and parallel guidance on the robotic arm**

**Limit stop dog for a defined free movement**

**Mounting brackets for safe fastening**

**Integrated fiber rod prevents loop formations**

**Glide lead-through for a close and parallel guidance on the robotic arm**

**Limit stop dog for a defined free movement**

**Mounting brackets for safe fastening**

**Further accessories**

- RS 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 RS in applications with extreme movements

**43 Adapter brackets from stock**

- 43 adapter bracket types for many different robots
- For all RS modules
- For assembly to the side or on top
- Free download of 3D CAD files for many brackets

- **www.igus.eu/eu/triflexbrackets**

**triflex® R fixation to 6-axis**

- One axis diameter (Ø30 mm) for all robots
- Easy and fast assembly
- For triflex® R mounting bracket with CFX clamps and tiewrap plates

---

**Dimensions**

**RS triflex® R-Set | Universal module | for TRC/TRE**

<table>
<thead>
<tr>
<th>Width Index</th>
<th>Part No. TRC</th>
<th>Part No. TRE</th>
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<th>B [mm]</th>
<th>C [mm]</th>
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<td>60.</td>
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<td>TRE.RS.100.R</td>
<td>912.5</td>
<td>614</td>
<td>167</td>
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</tbody>
</table>

**triflex® RS - Fastening point, right**

**triflex® RS - Fastening point, right, with cover**

**triflex® RS - Fastening point, left**

**triflex® RS - Fastening point, left, with cover**

---

**igus® GmbH Germany | Phone +49 2203 9649-800 Fax -222 | info@igus.de | www.igus.eu**
RSP - Intelligent retraction system
Prevent creation of loops on robot head - now with continuously adjustable retraction forces: triflex® RSP

Intelligent retraction system for multi-axial robot applications. Expansion lengths of 600 mm enable a secure guidance of the cables and hoses, even with large arm diameters and very complex movements. The retraction forces can be adjusted with the help of a pneumatic cylinder. Whether light or heavy fillings, long or short robot arms - with the igus® RSP retraction system the retraction force can always be adjusted to the individual application.

- Adjustable, variable retraction force with a pressure control valve
- Almost constant forth path over the complete travel, even with heavy fillings
- The end position can be monitored and thereby greater damages can be prevented in case of error
- Greater retraction forces than RS system
- Mounting options for numerous robot types and manufacturers
- 3-6 axis on industrial robots

Double retraction distance in relation to the overall length due to deflection
TRC and TRE e-chains® possible
Open and clear system, slim design
Individual connection possibilities through compact fixation consoles
Continuous adjustable retraction force
Pneumatic standard components used
Travel monitoring option

600 mm retraction distance
**Product range - Fiber rods**

<table>
<thead>
<tr>
<th>Part No. TRC/TRE with mounted fiber rods</th>
<th>Length ca.</th>
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<tbody>
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**Product range - Universal installation kit**

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<th>Width [mm]</th>
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</tr>
<tr>
<td>1.00</td>
<td>TR.100.100</td>
<td>100 110 120 130 140</td>
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</tbody>
</table>

**Universal installation kit for TRC/TRE**

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

**Heat shield protective jacket** | TR.XX.18 | for TRC/TRE/TRLF

- Made from heat resistant, abrasion resistant Kevlar weave
- With aluminum laminate
- With zip-closure
- Velcro fasteners at the beginning and end
- Heavy-duty (thick) design
- Protects from perspiration and metal splatter briefly up to 540°C
- Easy to exchange or retrofit
- Silicone-free
- Asbestos-free
- Standard lengths from stock
- High abrasion resistance
- Very tight
- For heavy-duty environments

**Wear-resistant shield** | TR.XX.19 | for TRC/TRE/TRLF

- Black leather material with zip-closure
- Velcro fasteners at the beginning and end
- Extremely high abrasion resistance
- For use in temperatures from -40°C to +100°C
- Silicone-free
- Asbestos-free
- Standard lengths from stock
- Very flexible
- Easy to exchange or retrofit

**Standard protective jacket** | TR.XX.16 | for TRC/TRE/TRLF

- Temperature up to room temp.
- Base support: Fabric
- Coating: None
- Easy to replace via longitudinally positioned velcro fastenings
- Elastic sealing strips
- Silicon-free
- Standard lengths available ex stock

**Accessories**

- Fiber rod module
- Universal installation kit
- Protective jackets
- Heat shield protective jacket
- Wear-resistant shield

**igus® GmbH Germany | Phone +49 2203 9649-800 Fax -222 | info@igus.de | www.igus.eu 1049**
triflex® R Series TRC/TRE/TRL/TRLF Filling

Interior separation configurator

1. Select cables, hoses and lengths

2. Select e-chain® and size

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

4. Result: Order list, price and drawings

triflex® R interior separations
Configure e-chains® easily

Easy and quick creation of interior separations for the triflex® R systems. After selecting the cables, they can be added by drag & drop to the chain cross section. The shelving configurator creates a parts list of the e-chain® and the cables contained in the configuration. The configurations can be saved and reloaded. The entire configuration can be transferred to the shopping cart by a click.

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

Customer-specific special cable for robotic and torsion applications

Special cables for robotic and torsion applications

- Control, motor, servo, bus and data cables
- Shielded and unshielded
- Outer jacket material: PVC, PUR, TPE
- Special cables from 500 m
- Torsion area according to requirement
- Sections: Robotic and 3D-applications

The service life of cables in torsion applications depends proportionately 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.

chainflex® robotic cables CFROBOT - twistable cables for robots available from stock

The proven CFROBOT cable family that is available from stock is now UL and CSA certified. All deliveries from 05/2011 are manufactured with the approvals.

- From 1 m, no minimum requirements
- ±180° on 1 m
- 3,000,000 cycles tested

More information ↪ www.igus.eu/eu/chainflex

CF77.UL.D - chainflex® PUR control cable, ± 180° twistable

- For twistable load requirements

More information ↪ www.igus.eu/eu/chainflex

triflex® R - readychain® cable packages for robots

High component holding times and low downtimes are of the highest priority in manufacturing plants. With a triflex® R readychain® we design and develop a customized readychain® system for you, consisting of the “construction kits” triflex® R, chainflex® and igus® connectors. An installation can of course be executed by our triflex® R installation engineers on your site.

Your advantages:

- Reduces your storage costs to zero for cables, e-chain® and connectors
- Cuts your running time by half
- Responds flexibly to order variations
- Minimize machine downtimes
- Reduce the number of suppliers and orders by 75%.

igus® GmbH Germany | Phone +49 2203 9649-800 | Fax -222 | info@igus.de | www.igus.eu
easy triflex®
e-chains® for simple 3D-applications
e-chains® for simple 3D-applications - easy triflex®

The easy triflex® Series was developed to realize safe energy supply in the case of multidimensional movements. In doing so the flexibility of a hose was combined with the stability of an e-chain® and its defined radii. With the easy triflex® the installation of cables, wires and hoses is very easy. In case of flexible cross-bars the cables are now simply pushed into the e-chain® from above or below. The unique modular program allows you to follow very complex movements. For example: Combine 1-axis, 2-axis and 3-axis movement links in one e-chain®.

Typical industries and applications
- Machine tools
- Robots
- Handling equipment
- Material handling
- Plastics machinery
- Construction machines
- Vehicles
- Machinery of all kinds
- Medical equipment
- Office furniture

Robots with igus® easy triflex® e-chains® on an assembly line

easy triflex® e-chains® for multi-dimensional movements on a production line

easy triflex® e-chains® also for easy applications - here an aesthetic application for office furniture
### Contents

#### Selection Table

<table>
<thead>
<tr>
<th>Series</th>
<th>Inner height</th>
<th>Inner width</th>
<th>Outer width/ height</th>
<th>Bending radii</th>
<th>Pitch</th>
<th>Page</th>
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</thead>
<tbody>
<tr>
<td>Bi 1/Bl 2</td>
<td>Bi 3</td>
<td>Bl 3</td>
<td>R [mm]</td>
<td>[mm]</td>
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</table>

### Single-axis movement
For 3D-applications, easy filling from 2 sides

### Double-axis movement
For 3D-applications, easy filling from 2 sides

### Triple-axis movement
For 3D-applications, easy filling from 2 sides

---

#### Assembly Instructions

1. Joining is accomplished by simply joining the e-chain® links and clicking the pins in place.
2. Very easy filling. Simply press cable in - to remove the filling ust pull out the cable.
3. Separate easily by levering open the triflex® e-chains® side plate with a screwdriver.
4. Shorten and lengthen at any given point.

---

Available from stock. Delivery time* in 24h or today!

*Delivery time means time until shipping of goods (after technical release)
Easy triflex®
Series E332·E333

Introduction

Split KMA:
Mounting bracket with integrated strain relief

Flexible:
Shorten and lengthen at any given point

Robust:
Patented "push-button-principle"

Simple:
easy filling from 2 sides with "easy"-design

Easy:
Simply press in cable along the inner or outer radius

Customizable:
Different bending radii and directions can be combined

Movable:
3-Axis motions in machinery of all kinds

When to use Series E332/E333:
- If easy filling with "easy"-Design for complex movements is required
- If easy filling from both sides is required
- For repair and supplementation of existing triflex® Systems

Available from stock. Delivery time* in 24h or today!

*Delivery time means time until shipping of goods (after technical release)

Order key and color options

<table>
<thead>
<tr>
<th>Order example for complete e-chain® (1,0 m), color black, with mounting brackets:</th>
</tr>
</thead>
<tbody>
<tr>
<td>e-chain® (1,0 m) Please indicate e-chain® length or number of links: 1,0 m or 27 links</td>
</tr>
<tr>
<td>+ Mounting brackets 1 set mounting bracket with strain relief</td>
</tr>
</tbody>
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Order key and color options

<table>
<thead>
<tr>
<th>Single-axis movement</th>
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</thead>
<tbody>
<tr>
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<table>
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</tbody>
</table>

Technical Data

- Speed / acceleration: upon request
- Material - permitted temperature °C, igumid NB: -40° up to +80°C
- Flammability class, igumid NB: VDE 0304 IIC UL94-V2

Order example

Order key

<table>
<thead>
<tr>
<th>Order key</th>
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Order key

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</table>

Order key

<table>
<thead>
<tr>
<th>Order key</th>
<th>E333.75.200/200.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triple-axis movement</td>
<td></td>
</tr>
<tr>
<td>Series E333 for easy filling from 2 sides with Bi 75 mm inner width and R 200 mm radius, RBR 200 mm, color black = Part No. E333.75.200/200.0</td>
<td></td>
</tr>
</tbody>
</table>

speed / acceleration

Material - permitted temperature °C, igumid NB: -40° up to +80°C

Flammability class, igumid NB: VDE 0304 IIC UL94-V2

Available from stock. Delivery time* in 24h or today!

*Delivery time means time until shipping of goods (after technical release)
### Series E332 | Single-axis movement

<table>
<thead>
<tr>
<th>Chain Length</th>
<th>Links/m</th>
<th>Pitch</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>550</td>
<td>25 mm</td>
<td>14,5 mm/link</td>
<td>2,35 kg/m</td>
</tr>
<tr>
<td>660</td>
<td>28 (1000 mm)</td>
<td>36 mm/link</td>
<td>0,90 kg/m</td>
</tr>
<tr>
<td>740</td>
<td>34 (1020 mm)</td>
<td>40 mm/link</td>
<td>1,40 kg/m</td>
</tr>
<tr>
<td>900</td>
<td>38,5</td>
<td>50 mm</td>
<td>2,35 kg/m</td>
</tr>
<tr>
<td>1060</td>
<td>20 mm</td>
<td>50 mm</td>
<td>0,70 kg/m</td>
</tr>
</tbody>
</table>

### Series E332 | Double-axis movement | With RBR (Reversal Bending Radius)

<table>
<thead>
<tr>
<th>Chain Length</th>
<th>Links/m</th>
<th>Pitch</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>250</td>
<td>28 (1008 mm)</td>
<td>36 mm/link</td>
<td>0,70 kg/m</td>
</tr>
<tr>
<td>300</td>
<td>34 (1020 mm)</td>
<td>40 mm/link</td>
<td>0,90 kg/m</td>
</tr>
<tr>
<td>350</td>
<td>38,5</td>
<td>50 mm</td>
<td>1,40 kg/m</td>
</tr>
<tr>
<td>400</td>
<td>20 mm</td>
<td>50 mm</td>
<td>2,35 kg/m</td>
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<tr>
<td>450</td>
<td>36 mm/link</td>
<td>36 mm/link</td>
<td>0,70 kg/m</td>
</tr>
<tr>
<td>500</td>
<td>28 (1008 mm)</td>
<td>36 mm/link</td>
<td>0,90 kg/m</td>
</tr>
<tr>
<td>600</td>
<td>34 (1020 mm)</td>
<td>40 mm/link</td>
<td>1,40 kg/m</td>
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<tr>
<td>700</td>
<td>20 mm</td>
<td>50 mm</td>
<td>2,35 kg/m</td>
</tr>
</tbody>
</table>

### Dimensions

#### Moving end

- **D**: 25 mm
- **H**: 110 mm
- **Ba**: 10 mm

#### Fixed end

- **D**: 25 mm
- **H**: 100 mm
- **Ba**: 10 mm

---

**Example:** E332.75.2.200/200.0

Supplement Part No. with required radius (R) Examples: E332.75.2.200/200.0

Weight: 2,35 kg/m

Pitch: 14,5 mm/link

Bending radii: 20 mm

For 3D applications, easy filling from 2 sides

---

**Example:** E332.75.2.200/200.0

Supplement Part No. with required radius (R) Examples: E332.75.2.200/200.0

Weight: 0,90 kg/m

Pitch: 14,5 mm/link

Bending radii: 20 mm

For 3D applications, easy filling from 2 sides
easy triflex® | Series E333 | Product range

Triple-axis movement | For 3D-applications, easy filling from 2 sides

Series E333 | Triple-axis movement | With RBR (Reversal Bending Radius)

The bending radii are doubled in the case of the Series E333!

Supplement Part No. with required radius (R) Example: E333.75.200/200.0

Dimensions

Moving end

Fixed end

KMA, one side pivoting

Part No. structure

Example:

Part No. full set with strain relief plates

Part No. full set without strain relief plates

Width

Index

Part No. with index

Number of teeth

KMA, one side pivoting

Strain relief e.g. clamps, tie-wrap plates, nuggets and plug-in clips are available from stock. The complete chainfix range with order options from page 1148
**Strain relief**

**e.g. clamps, tiewrap plates, nuggets and plug-in clips are available from stock. The complete chainfix range with order options from page 1148**

---

**Flange steel | pivoting**

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
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<tbody>
<tr>
<td>25.2/25.</td>
<td>330.25.12</td>
<td>44</td>
<td>55</td>
<td>29</td>
<td>55</td>
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<td>10.5</td>
<td>6.5</td>
<td>9</td>
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<tr>
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<td>66</td>
<td>84</td>
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<td>88</td>
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<td>9</td>
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<tr>
<td>50.2/50.</td>
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<td>84</td>
<td>102</td>
<td>62</td>
<td>106</td>
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<td>7</td>
<td>9</td>
</tr>
<tr>
<td>75.2/75.</td>
<td>330.75.12</td>
<td>109</td>
<td>127</td>
<td>90</td>
<td>131</td>
<td>2</td>
<td>25</td>
<td>7</td>
<td>9</td>
</tr>
</tbody>
</table>

**Frontal attachment option in the case of steel flange mounting brackets. For the preassembled mode please add index A.**

---

**Angled steel bracket | pivoting**

<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>25.2/25.</td>
<td>338.25.12</td>
<td>17</td>
<td>6.25</td>
<td>28</td>
<td>6</td>
<td>16</td>
<td>14</td>
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<td>33.8</td>
<td>31</td>
<td>8.5</td>
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<tr>
<td>32.2/32.</td>
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<td>49</td>
<td>45</td>
<td>11</td>
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<td>50.2/50.</td>
<td>338.50.12</td>
<td>42</td>
<td>5.5</td>
<td>77</td>
<td>12</td>
<td>35</td>
<td>24</td>
<td>9</td>
<td>67</td>
<td>62</td>
<td>15</td>
</tr>
<tr>
<td>75.2/75.</td>
<td>338.75.12</td>
<td>65</td>
<td>5.5</td>
<td>77</td>
<td>12</td>
<td>35</td>
<td>24</td>
<td>9</td>
<td>95</td>
<td>90</td>
<td>15</td>
</tr>
</tbody>
</table>

**Part No. structure**

338. 75. 12 A

A… must be indicated on preassembled configurations

Full set = 12

Possible installation conditions for assembled mounting brackets.

For the preassembled mode please add index A1… A4.
enclosed for simple 3D-applications
Enclosed for simple 3D-applications - triflex®

triflex®-e-chain® for 3D-motion. 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 e-chain® and its defined radii. The unique modular program allows you to follow very complex movements. For example: Combine 1-axis, 2-axis and 3-axis movement links in one e-chain®.

Typical industries and applications
- Machine tools
- Robots
- Handling equipment
- Material handling
- Plastics machinery
- Construction machines
- Vehicles
- Machinery of all kinds
- Medical equipment
- Office furniture

TRIFLEX®
- IF product design award
- 1992 igus® Series triflex®
- Torsional motion possible
- UL94-V2 classifications

Various triflex®-e-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
**Contents | Selection Table**

<table>
<thead>
<tr>
<th>Series</th>
<th>Inner width/height</th>
<th>Outer width/height</th>
<th>Bending radii</th>
<th>Pitch</th>
<th>Page</th>
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</thead>
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<tr>
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<td>Bi [mm]</td>
<td>Ba [mm]</td>
<td>R [mm]</td>
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<td></td>
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<tr>
<td>332.16</td>
<td>16</td>
<td>26</td>
<td>038 - 100</td>
<td>13.3</td>
<td>1074</td>
</tr>
<tr>
<td>332.32</td>
<td>32</td>
<td>50</td>
<td>075 - 250</td>
<td>25</td>
<td>1074</td>
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<td>332.50</td>
<td>50</td>
<td>68</td>
<td>100 - 250</td>
<td>30</td>
<td>1074</td>
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<td>332.75</td>
<td>75</td>
<td>96</td>
<td>140 - 300</td>
<td>36</td>
<td>1074</td>
</tr>
<tr>
<td>352.50*</td>
<td>50</td>
<td>68</td>
<td>100 - 250</td>
<td>30</td>
<td>1074</td>
</tr>
</tbody>
</table>

**Single-axis movement**
For 3D-applications,
Series 332 fully enclosed - protection against dirt and chips.
*Series 352 snap-open

**Double-axis movement**
For 3D-applications,
Series 332 fully enclosed - protection against dirt and chips.
*Series 352 snap-open

**Triple-axis movement**
For 3D-applications,
Series 333 fully enclosed - protection against dirt and chips.
*Series 353 snap-open

---

**Available from stock. Delivery time* in 24h or today!**
*Delivery time means time until shipping of goods (after technical release)

---

**triflex® Assembly instructions**

1. **Joining is accomplished by simply joining the e-chain® links and clicking the pins in place**

2. **Separate easily by levering open the triflex® e-chains® side plate with a screwdriver...**

3. ... then twist and remove e-chain®

4. **To open the snap-open 352 and 353 series - insert the screwdriver into the openings and then lever the lid out**

---

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---

**3D-CAD files, configurators, PDF ➤ www.igus.eu/eu/triflex**

---

**Assembly video available online at ➤ www.igus.eu/eu/video**
triflex | Series 332·333·352·353 | Introduction

Universal:
KMA, flanged and angled mounting brackets available

Customizable:
Combinations of varying bending radii and moving axes

Protection:
Completely enclosed - protection against dirt and chips

Modular:
Combination of triple axis fully enclosed Series and snap open series possible

Variation:
Series 352 and 353 snap-open, 50 mm cross-section

Effective:
Cost-effective design for complex movements

Flexible:
Assembling and separating at any given point

Simple 3D-applications, enclosed
When to use Series 332/333/352/353:
- For applications that move within two or three axes (combined rotary and circular movements)
- If chip protection is required
- Where rectangular shapes are in demand

Available from stock. Delivery time* in 24h or today!
*Delivery time means time until shipping of goods (after technical release)

Series 332·333·352·353 | Technical Data | Order example

Technical Data

Speed / acceleration
upon request

Material - permitted temperature °C, igumid G
-40° up to +120°C

Flammability class, igumid G
VDE 0301 IIC UL94-HB

Order example | Order key and color options

Order example for complete e-chain® (1,0 m), color black, with mounting brackets:
e-chain® (1,0 m) Please indicate e-chain® length or number of links: 1,0 m or 28 links
+ Mounting brackets 1 set mounting bracket with strain relief
+ Interior separation with 2 separators assembled every 2nd link

Order text: 1,0 m 333.75.200/200.0 + 333.75.12PZ + 351

Order key

| 332.75.200.0 | Single-axis movement |
| Series 332 fully enclosed |
| with Bi 75 mm inner width and R 200 mm radius, color black |
| = Part No. 332.75.200.0 |

| 352.50.200.0 |
| Series 352 snap-open |
| with Bi 50 mm inner width and R 200 mm radius, color black |
| = Part No. 352.50.200.0 |

Order key

| 332.75.200/200.0 | Double-axis movement |
| Series 332 fully enclosed |
| with Bi 75 mm inner width and R 200 mm radius, |
| RBR 200 mm, color black = Part No. 332.75.200/200.0 |

| 352.75.200/200.0 |
| Series 352 snap-open |
| with Bi 50 mm inner width and R 200 mm radius, |
| RBR 200 mm, color black = Part No. 352.50.200/200.0 |

Order key

| 333.75.200/200.0 | Triple-axis movement |
| Series 333 fully enclosed |
| with Bi 75 mm inner width and R 200 mm radius, |
| RBR 200 mm, color black = Part No. 333.75.200/200.0 |

| 353.75.200/200.0 |
| Series 353 snap-open |
| with Bi 50 mm inner width and R 200 mm radius, |
| RBR 200 mm, color black = Part No. 353.50.200/200.0 |

When to use a different igus® Series:
- If complex robotics applications are required
- triflex® R - TRC, from page 1224
- For circular movements with high loads
- System twisterchain®, from page 1082

When to use Series 332/333/352/353:
- For applications that move within two or three axes (combined rotary and circular movements)
- If chip protection is required
- Where rectangular shapes are in demand

If product design award
1992 igus® Series triflex®

iF product design award

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triflex® | **Series 332-352** | Product range

**Single-axis movement** | **332 fully enclosed** | **352 snap-open**

---

### Series 332 | 352 | Single-axis movement

<table>
<thead>
<tr>
<th>Series 332</th>
<th>352</th>
<th>B</th>
<th>Ba</th>
<th>R</th>
<th>Pitch</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fully enclosed</td>
<td>Snap-open</td>
<td>[mm]</td>
<td>[mm]</td>
<td>[mm]</td>
<td>[mm]</td>
<td>[kg/m]</td>
</tr>
<tr>
<td>332.16 R,0</td>
<td>–</td>
<td>16</td>
<td>26</td>
<td>038</td>
<td>048</td>
<td>075</td>
</tr>
<tr>
<td>332.32 R</td>
<td>–</td>
<td>32</td>
<td>50</td>
<td>075</td>
<td>100</td>
<td>125</td>
</tr>
<tr>
<td>332.50 R,0 352.50 R,0</td>
<td>50</td>
<td>68</td>
<td>100</td>
<td>125</td>
<td>150</td>
<td>200</td>
</tr>
<tr>
<td>332.75 R,0</td>
<td>75</td>
<td>96</td>
<td>140</td>
<td>175</td>
<td>200</td>
<td>250</td>
</tr>
</tbody>
</table>

Supplement Part No. with required radius (R). Example: 332.75.200.0

---

### Dimensions

- **Series 332.16**
  - Pitch: 13.3 mm/link
  - Links/m: 76 (1011 mm)
  - Dim. E: 10 mm
  - Chain length: $\frac{1}{2}$ + K

- **Series 332.32**
  - Pitch: 25 mm/link
  - Links/m: 40 (2000 mm)
  - Dim. E: 20 mm
  - Chain length: $\frac{1}{2}$ + K

- **Series 332.50**
  - Pitch: 36 mm/link
  - Links/m: 28 (1008 mm)
  - Dim. E: 25 mm
  - Chain length: $\frac{1}{2}$ + K

---

### Unsupported applications

**Short travels** - for single axis only!

---

[Full page content]

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## Series 332 | 352 | Double-axis movement | With RBR (Reversal Bending Radius)

### Dimensions

<table>
<thead>
<tr>
<th>Bi [mm]</th>
<th>Ba [mm]</th>
<th>R [Bending radii]</th>
<th>Pitch [mm]</th>
<th>Weight [kg/m]</th>
</tr>
</thead>
<tbody>
<tr>
<td>332.16</td>
<td>-</td>
<td>16</td>
<td>038</td>
<td>048</td>
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<tr>
<td>332.32</td>
<td>-</td>
<td>32</td>
<td>075</td>
<td>100</td>
</tr>
<tr>
<td>332.50/R</td>
<td>352.50/R</td>
<td>50</td>
<td>100</td>
<td>125</td>
</tr>
</tbody>
</table>

Supplement Part No. with required radius (R) Example: 332.75/200.0

## Series 333 | 353 | Triple-axis movement | With RBR (Reversal Bending Radius)

### Dimensions

<table>
<thead>
<tr>
<th>Bi [mm]</th>
<th>Ba [mm]</th>
<th>R [Bending radii]</th>
<th>Pitch [mm]</th>
<th>Weight [kg/m]</th>
</tr>
</thead>
<tbody>
<tr>
<td>333.16/R</td>
<td>0,16</td>
<td>16</td>
<td>038</td>
<td>048</td>
</tr>
<tr>
<td>333.32/R</td>
<td>0,16</td>
<td>32</td>
<td>075</td>
<td>100</td>
</tr>
<tr>
<td>333.50/R</td>
<td>353.50/R</td>
<td>50</td>
<td>100</td>
<td>125</td>
</tr>
</tbody>
</table>

The bending radii are doubled in the case of the Series 333!

Supplement Part No. with required radius (R) Example: 333.75/200.0

---

**triflex** | **Series 332 - 352** | Product range

**Double-axis movement | 332 fully enclosed | 352 snap-open**

**Dimensions**

- **R**
- **Ba**
- **H**
- **D**
- **K**
- **Bi [mm]**
- **Ba [mm]**
- **R [Bending radii]**
- **Pitch [mm]**
- **Weight [kg/m]**

**Supplement Part No. with required radius (R) Example: 332.75/200.0**

**triflex** | **Series 333 - 353** | Product range

**Triple-axis movement | 333 fully enclosed | 353 snap-open**

**Dimensions**

- **R**
- **Ba**
- **H**
- **D**
- **K**
- **Bi [mm]**
- **Ba [mm]**
- **R [Bending radii]**
- **Pitch [mm]**
- **Weight [kg/m]**

**Supplement Part No. with required radius (R) Example: 333.75/200.0**
### KMA, one side pivoting

<table>
<thead>
<tr>
<th>Width Index</th>
<th>Part No. full set with tiewrap plates</th>
<th>Part No. full set without tiewrap plates</th>
<th>Dim A [mm]</th>
<th>Dim B [mm]</th>
<th>Dim C [mm]</th>
<th>Dim D [mm]</th>
<th>Dim E [mm]</th>
<th>Dim K [mm]</th>
<th>Number of teeth</th>
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<tbody>
<tr>
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<td>333.32.12PZB</td>
<td>333.32.12PZ</td>
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<td>46</td>
<td>82</td>
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<td>3</td>
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<tr>
<td>50.</td>
<td>333.50.12PZB</td>
<td>333.50.12PZ</td>
<td>84</td>
<td>15</td>
<td>50</td>
<td>100</td>
<td>6,5</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>75.</td>
<td>333.75.12PZB</td>
<td>333.75.12PZ</td>
<td>109</td>
<td>15</td>
<td>55</td>
<td>125</td>
<td>6,5</td>
<td>15</td>
<td>7</td>
</tr>
</tbody>
</table>

(KMA = Polymer Metal Mounting Bracket)

### Flange steel, pivoting

<table>
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<tr>
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<tbody>
<tr>
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<td>10</td>
<td>4,5</td>
<td>6</td>
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<tr>
<td>32.</td>
<td>330.32.12</td>
<td>66</td>
<td>84</td>
<td>44</td>
<td>88</td>
<td>2</td>
<td>20</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>50.</td>
<td>330.50.12</td>
<td>84</td>
<td>102</td>
<td>62</td>
<td>106</td>
<td>2</td>
<td>25</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>75.</td>
<td>330.75.12</td>
<td>109</td>
<td>127</td>
<td>90</td>
<td>131</td>
<td>2</td>
<td>25</td>
<td>7</td>
<td>9</td>
</tr>
</tbody>
</table>

### Strain relief
- e.g. clamps, tiewrap plates, nuggets and plug-in clips are available from stock. The complete chainfix range with order options from page 1148

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**Angled steel bracket | pivoting**

<table>
<thead>
<tr>
<th>Width Index</th>
<th>Part No. full set</th>
<th>Dim A</th>
<th>Dim B</th>
<th>Dim C</th>
<th>Dim D</th>
<th>Dim E</th>
<th>Dim F</th>
<th>Dim G</th>
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<td>24</td>
<td>9</td>
<td>95</td>
<td>90</td>
<td>15</td>
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</tbody>
</table>

**Possible installation conditions for assembled mounting brackets.**

For the **preassembled** mode please add index A1...A4.

**Vertical Separators**

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

**Strain relief**

E.g. clamps, tiewrap plates, nuggets and plug-in clips are available from stock. The complete chainfix range with order options is from page 1148.

---

1081 | www.igus.eu | 1080 | www.igus.eu | igus® GmbH Germany | Phone +49 2203 9649-800 | Fax -222 | info@igus.de | www.igus.eu
New generation twisterchain®

Rugged, quieter for higher loads. Circular and spiral movements up to 540°
Rugged, quieter, for higher loads. Circular and spiral movements up to 540°-twisterchain® new

Higher loads and smoother running
igus® new generation of twisterchain® new circular e-chains® significantly improved smoothness, stability and strength. The twisterchain® new has a modular construction for width, height and radius and therefore provides very flexible use in applications where rotating movements up to 540° are required.

- Sturdier through intermediate link - more additional load possible
- 25% less weight than existing twisterchain®
- Rotary speeds up to 1 m/s and more
- Rotary/Spiral movements up to 540°
- Highly dynamic and smoother running (with a new guide trough)
- Cable-friendly, smooth interior
- Crossbars snap-open along inner radius
- Over 1 million cycles tested successfully in the igus® laboratory (03/2010)

Typical industries and applications
- Robots, handling machines
- Packaging machines
- Glass machines
- General mechanical engineering etc.

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

UL94-V0 classifications upon request

New guide trough system available

100% more additional loads with the new generation of igus® twisterchain® new

The cable-optimized intermediate link increases the stability of twisterchain® new several times. It also serves as interior separation and divides the filling space into two chambers.
Contents

Selection Table

twisterchain® new

for circular movements up to 540°, crossbars snap-open along inner radius

<table>
<thead>
<tr>
<th>Series</th>
<th>Inner height</th>
<th>Inner width</th>
<th>Outer width</th>
<th>Outer height</th>
<th>Circular radii</th>
<th>Page</th>
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</thead>
<tbody>
<tr>
<td>TC32</td>
<td>32</td>
<td>87.5 - 150</td>
<td>108.5 - 171</td>
<td>54</td>
<td>100 - 250</td>
<td>400 - 600</td>
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<td>TC42</td>
<td>42</td>
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<td>56</td>
<td>125 - 200</td>
<td>155 - 230</td>
<td>84</td>
<td>150 - 400</td>
<td>650 - 850</td>
</tr>
</tbody>
</table>

Quickly generate complete twisterchain® models with guide trough and accessories

› www.igus.eu/twisterconfigurator

- Preparing of 3D-models only with input of chosen e-chain® radii and installation area
- Free positioning of the e-chain® moving end along the travel lengths
- Generation of twisterchain® optionally as single part or with guide trough and base support
- Fast download of the CAD files without registration
- CAD models in 11 different 3D CAD formats and 8 different 2D CAD formats

Available from stock. Delivery time* in 24h or today!

*Delivery time means time until shipping of goods (after technical release)

Technical Data - System twisterchain® new

- Speed / acceleration ► see page 1091
- Material - permitted temperature °C, igumid G -40° up to +120° C
- Flammability class, igumid G VDE 0304 IIC UL94-HB

Part No. of e-chain® links as single parts - System twisterchain® new

<table>
<thead>
<tr>
<th>Series</th>
<th>Crossbar e-chain® 1)</th>
<th>Side parts AR</th>
<th>Side parts AR</th>
<th>Side parts AR</th>
<th>Side parts IR</th>
<th>Intermediate link</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC32</td>
<td>385.Bi</td>
<td>E4.32.01</td>
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<td>E4.56.01</td>
<td>TC56.02.R.AR</td>
<td>4008.03</td>
<td>TC56.04</td>
<td></td>
</tr>
</tbody>
</table>

No linking possible in combination with QuickLock crossbars!

1) Supplement Part No. of crossbar with required width index (Bi) e.g. 450.15
2) Outer side link - fit for each radius (only for outer radius AR)
3) Inner side link - supplement Part No. with required radius (R) e.g. TC56.02.100.AR (only for outer radius AR)

Assembly video available online at › www.igus.eu/circleload
New design, higher loads, circular movements up to 540°

When to use the System twisterchain®:
- If a robust, low-noise system is required, appropriate for high loads
- Rotatory speeds up to 1 m/s and more
- At rotatory/spiral movements up to 540°
- If a variable interior separation is desired
- If two-sided opening is desired

When to use a different igus® Series:
- For larger rotations
- igus® RBR-solutions, Design, page 118
- For rotation angles higher than 360°, please consult igus®

Available from stock. Delivery time* in 24h or today!
*Delivery time means time until shipping of goods (after technical release)

3D-CAD files, configurators, PDF ► www.igus.eu/eu/twisterchain
Example: Guidance on the interpretation of twisterchain®

If you would like 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 e-chain® width - Example of client data:
   - Available construction space outer radius = 592 mm
   - Inner radius = 311 mm
   - Installation height = 466 mm
   - Max. Ø cable of client = 22 mm
   - Estimation of the e-chain® by means of the internal separation with filling and select the series, or verify the max. cable diameter and select the series using the next larger permissible Ø. (For the inner height, we recommend the consideration of a cable clearance of approximately 20% of the chain’s inner height and width.)
   - Max. Ø cable twisterchain®:
     - TC32 = 25 mm
     - TC42 = 39 mm
     - TC56 = 53 mm

Example: Max. Ø cable of client: 22 mm => Series TC32 (next larger)

2. Specify the outer radius AR
   - Select the next smaller X₂ of the e-chain® from the available installation space of the outer radius.
   - From the dimension X₂ please subtract 80 mm, which results in the necessary outer radius AR.
   - Selection of the chain outer radii, see table; dimension X₂ of the corresponding series
   - Formula: AR = X₂ - 80 mm

Example: AR = 580 mm

3. Specify the inner radius IR
   - Add the allowance of 25 mm to the available installation space of the inner radius and select the next larger X₁ of the e-chain®. The maximum width Bi results from the selected value.
   - Selection from the table of the corresponding series
   - Formula: IR = X₁ + 25 mm

Example: IR = 311 mm

4. Specify the bending radius R
   - Basically, the chain’s bending radius R is determined by the smallest bending radius of the cables.
   - Selection from the table of the corresponding series
   - Example: R = 165 mm

5. Specify the required installation height H
   - An allowance of 170 mm is added to twice the value of the selected chain’s bending radius R.
   - Example: H = 520 mm

6. Calculate the required number of links
   - Formula: \( n = \frac{1 \times AR \times X₂ + K}{360 \times T} \)
   - Please note: 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 higher odd number! Definition: In the case of machine elements which both move to the left and to the right following a circular path, the rotation angle can be determined by adding the two angles!

Example: Preparation of 3D-models only with input of chosen e-chain® radii and installation area
   - Free positioning of the e-chain® moving end along the travel lengths
   - Generation of twisterchain® optionally as single part or with guide trough and base support
   - Fast download of the CAD files without registration
   - CAD models in 11 different 3D CAD formats and 8 different 2D CAD formats

For the rapid generation of complete twisterchain® Systems please use our

www.igus.eu/twisterconfigurator
**Series TC32** | Snap-open along inner radius from both sides

<table>
<thead>
<tr>
<th>AR [mm]</th>
<th>Bi [mm]</th>
<th>Ba [mm]</th>
<th>X₂ [mm]</th>
<th>X₁ [mm]</th>
<th>R [mm]</th>
<th>R 100 [mm]</th>
<th>R 125 [mm]</th>
<th>R 150 [mm]</th>
<th>R 175 [mm]</th>
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<td>150,200/600</td>
<td>150,250/600</td>
<td>≈2,21</td>
<td></td>
</tr>
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</table>

**Pitch T** = 56 mm/link

**Links/m** = 18 (1008 mm)

**Order key**

**TC32.10.150/400.0**

**Standard color black**

**Outer radius AR**

**Bending radius R**

**Width index (depends on Bi)**

**Inner height**

**Series**

**Dimension A1 depending on outer radius AR**

<table>
<thead>
<tr>
<th>AR [mm]</th>
<th>R 100 [mm]</th>
<th>R 125 [mm]</th>
<th>R 150 [mm]</th>
<th>R 175 [mm]</th>
<th>R 200 [mm]</th>
<th>R 250 [mm]</th>
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<td>81</td>
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<td>85</td>
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</table>

**Note:** Outer radius AR (see drawing) determines dimension A1.

**Dimensioning**

**TC32.10.150/400.0 = e-chain® snap-open along inner radius from both sides**

**Bi** 100 mm inner width, **R** 150 mm bending radius / **AR** 400 mm outer radius, color black

**Series TC32** | Interior separation | **Standard**

For this Series the interior separation elements of **Series E4.32** may be used (except side-plates) ►from page 652

**AR** = Outer radius

**Bi** = Outer width

**Ba** = Inner machine construction space

**K** = Nominal clearance height

**R** = Bending radius

**H** = Add-on for bending radius

**A1** = Distance intermediate link

**T** = Pitch

**Available from stock. Delivery time* in 24h or today!**

*Delivery time means time until shipping of goods (after technical release)
### Series TC42 | Snap-open along inner radius from both sides

<table>
<thead>
<tr>
<th>AR  [mm]</th>
<th>Bi</th>
<th>Ba</th>
<th>X1  [mm]</th>
<th>X2  [mm]</th>
<th>R 100 [mm]</th>
<th>R 125 [mm]</th>
<th>R 150 [mm]</th>
<th>R 175 [mm]</th>
<th>R 200 [mm]</th>
<th>R 250 [mm]</th>
<th>Weight  [kg/m]</th>
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<td>87.5</td>
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<td>0.871,250</td>
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<td>0.870,000</td>
<td>±0.197</td>
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<td>1.500,000</td>
<td>±0.216</td>
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### Dimension A1 depending on outer radius AR

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<th>R 100</th>
<th>R 125</th>
<th>R 150</th>
<th>R 175</th>
<th>R 200</th>
<th>R 250</th>
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</thead>
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<td>500</td>
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<td>0.66</td>
<td>0.67</td>
<td>0.68</td>
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<tr>
<td>600</td>
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<td>1.17</td>
<td>1.17</td>
<td>1.18</td>
<td>1.18</td>
</tr>
</tbody>
</table>

### Series TC42 | Interior separation Standard

For this Series the interior separation elements of Series E4.42 may be used (except side-plates) - [from page 668](#).

**Order key**

- **Bi 100 mm inner width, R 250 mm bending radius / AR 400 mm outer radius, color black**

**Dimensioning**

**Standard color black**
- **Outer radius AR**
- **Bending radius R**
- **Width index (depends on Bi)**
- **Inner height Series**

**TC42...400.0**
- e-chain™ snap-open along inner radius from both sides

**TC42...10.250/400.0**

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

**Available from stock. Delivery time** in 24h or today!

*Delivery time means time until shipping of goods (after technical release)*

igus® GmbH Germany | Phone +49 2203 9649-800 Fax -222 | info@igus.de | www.igus.eu
**Series TC56 | Snap-open along inner radius from both sides**

<table>
<thead>
<tr>
<th>AR [mm]</th>
<th>Bi [mm]</th>
<th>Ba [mm]</th>
<th>X₂ [mm]</th>
<th>X₁ [mm]</th>
<th>R 150 [mm] TC56..</th>
<th>R 200 [mm] TC56..</th>
<th>R 250 [mm] TC56..</th>
<th>R 300 [mm] TC56..</th>
<th>R 400 [mm] TC56..</th>
<th>Weight [kg/m]</th>
</tr>
</thead>
<tbody>
<tr>
<td>650</td>
<td>150</td>
<td>180</td>
<td>730</td>
<td>450</td>
<td>-</td>
<td>15. 250/650</td>
<td>15. 300/650</td>
<td>15. 400/650</td>
<td>-</td>
<td>~ 3,62</td>
</tr>
<tr>
<td>650</td>
<td>175</td>
<td>205</td>
<td>730</td>
<td>430</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>~ 3,78</td>
</tr>
<tr>
<td>650</td>
<td>187,5</td>
<td>218</td>
<td>730</td>
<td>420</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>18. 300/650</td>
<td>18. 400/650</td>
<td>~ 3,87</td>
</tr>
<tr>
<td>650</td>
<td>200</td>
<td>230</td>
<td>730</td>
<td>400</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>20. 400/650</td>
<td>~ 3,95</td>
</tr>
<tr>
<td>750</td>
<td>150</td>
<td>180</td>
<td>830</td>
<td>550</td>
<td>-</td>
<td>15. 250/750</td>
<td>15. 300/750</td>
<td>15. 400/750</td>
<td>-</td>
<td>~ 3,62</td>
</tr>
<tr>
<td>750</td>
<td>162,5</td>
<td>193</td>
<td>830</td>
<td>540</td>
<td>-</td>
<td>16. 250/750</td>
<td>16. 300/750</td>
<td>16. 400/750</td>
<td>-</td>
<td>~ 3,7</td>
</tr>
<tr>
<td>750</td>
<td>175</td>
<td>205</td>
<td>830</td>
<td>530</td>
<td>-</td>
<td>17. 250/750</td>
<td>17. 300/750</td>
<td>17. 400/750</td>
<td>-</td>
<td>~ 3,78</td>
</tr>
<tr>
<td>750</td>
<td>187,5</td>
<td>218</td>
<td>830</td>
<td>520</td>
<td>-</td>
<td>18. 250/750</td>
<td>18. 300/750</td>
<td>18. 400/750</td>
<td>-</td>
<td>~ 3,87</td>
</tr>
<tr>
<td>750</td>
<td>200</td>
<td>230</td>
<td>830</td>
<td>500</td>
<td>-</td>
<td>20. 250/750</td>
<td>20. 300/750</td>
<td>20. 400/750</td>
<td>-</td>
<td>~ 3,95</td>
</tr>
<tr>
<td>850</td>
<td>150</td>
<td>180</td>
<td>930</td>
<td>650</td>
<td>15. 150/850</td>
<td>15. 200/850</td>
<td>15. 250/850</td>
<td>15. 300/850</td>
<td>15. 400/850</td>
<td>~ 3,62</td>
</tr>
<tr>
<td>850</td>
<td>175</td>
<td>205</td>
<td>930</td>
<td>630</td>
<td>17. 150/850</td>
<td>17. 200/850</td>
<td>17. 250/850</td>
<td>17. 300/850</td>
<td>17. 400/850</td>
<td>~ 3,78</td>
</tr>
</tbody>
</table>

**Pitch T**

\[ T = 91 \text{ mm/link} \]

**Links/m**

\[ \text{Links/m} = 11 \text{ (1001 mm)} \]

---

**Order key**

**TC56.12.250/650.0**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>650</td>
<td>83</td>
<td>85</td>
<td>88</td>
<td>90</td>
<td>97</td>
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<tr>
<td>750</td>
<td>98</td>
<td>101</td>
<td>102</td>
<td>103</td>
<td>110</td>
</tr>
<tr>
<td>850</td>
<td>113</td>
<td>116</td>
<td>117</td>
<td>118</td>
<td>124</td>
</tr>
</tbody>
</table>

**Weight**

\[ \text{Weight} = \text{kg/m} \]

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

**Dimensioning**

**Order key**

**TC56.12.250/650.0** = e-chain® snap-open along inner radius from both sides

Bi 125 mm inner width, R 250 mm bending radius / AR 650 mm outer radius, color black

**Series TC56 | Interior separation | Standard**

For this Series the interior separation elements of Series E4.56 may be used (except side-plates) ➤ from page 684

**Information**

- **AR** = Outer radius
- **X₂** = Inner machine construction space
- **Ba** = Outer width
- **H** = Nominal clearance height
- **K** = Add-on for bending radius
- **T** = Pitch
- **A1** = Distance intermediate link

**Available from stock. Delivery time* in 24h or today!**

*Delivery time means time until shipping of goods (after technical release)

---

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1096 3D-CAD files, configurators, PDF ➤ www.igus.eu/eu/TC56
Steel, one-piece | Recommended for unsupported and rotary applications

The guide trough must be mounted at the fixed point of the twisterchain®. The following bolted connections are permitted:

- Bore Hole: 4 x Ø 6.6 - 7 mm
- Mounting only with bolts: 4 x bolts M6

Other connection dimensions for mounting the guide trough Type 01 from page 1100:

<table>
<thead>
<tr>
<th>Part No. structure</th>
<th>Part No. position 1</th>
<th>Part No. position 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC32</td>
<td>TC3200.34.V.S.E</td>
<td>TC3200.40.V.S.E</td>
</tr>
<tr>
<td>TC42</td>
<td>TC4200.34.V.S.E</td>
<td>TC4200.40.V.S.E</td>
</tr>
<tr>
<td>TC56</td>
<td>TC5600.34.V.S.E</td>
<td>TC5600.40.V.S.E</td>
</tr>
</tbody>
</table>

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

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

New guide trough system - Type 01 from page 1100

With the new twisterchain® trough, the previously complex adjustment work is clearly minimized. Assembly time is reduced from 6h to 2h. While reducing noise levels, travel speed and service life can be increased, thanks to an almost all-plastic design www.igus.eu/eu/TCtroughnew

Guide trough Type 02 - continues to be available for special applications. Product range page 1126 or at www.igus.eu/eu/TCtroughclassic

igus® GmbH Germany | Phone +49 2203 9649-800 | Fax -222 | info@igus.de | www.igus.eu
New generation of twisterchain® guide troughs -
Save assembly time and costs - increase cycle life!

With the new twisterchain® trough type 01, the previously complex adjustment work is clearly minimized. Assembly time is reduced from 6 h to 2 h. While reducing noise levels, travel speed and service life can be increased, thanks to an almost all-plastic design. Available for all twisterchain® of the new and previous range.

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

Available from stock. Delivery time* in 24h or today!

*Delivery time means time until shipping of goods (after technical release)

Guide trough Type 02 - continues to be available for special applications.
Product range on page 1126 or at www.igus.eu/eu/TCtroughclassic

igus® GmbH Germany | Phone +49 2203 9649-800 | Fax -222 | info@igus.de | www.igus.eu
Guide trough machine construction space: $X_1 = \text{inner} / X_2 = \text{outer}$

<table>
<thead>
<tr>
<th>AR [mm]</th>
<th>X1 [mm] depending on BI [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC32</td>
<td>87,5 100 108 125 137,5 150</td>
</tr>
<tr>
<td>400</td>
<td>480 270 250 250 220 210 200</td>
</tr>
<tr>
<td>500</td>
<td>580 – 350 350 320 310 300</td>
</tr>
<tr>
<td>600</td>
<td>680 – – 450 420 410 400</td>
</tr>
<tr>
<td>TC42</td>
<td>87,5 100 108 125 137,5 150</td>
</tr>
<tr>
<td>400</td>
<td>480 270 250 250 220 210 200</td>
</tr>
<tr>
<td>500</td>
<td>580 – 350 350 320 310 300</td>
</tr>
<tr>
<td>600</td>
<td>680 – – 450 420 410 400</td>
</tr>
<tr>
<td>TC56</td>
<td>– – – – – – – –</td>
</tr>
<tr>
<td>400</td>
<td>480 – – – – – – – –</td>
</tr>
<tr>
<td>500</td>
<td>580 – – – – – – – –</td>
</tr>
<tr>
<td>600</td>
<td>680 – – – – – – – –</td>
</tr>
<tr>
<td>TC56</td>
<td>– – – – – – – – –</td>
</tr>
<tr>
<td>2808</td>
<td>50 68 75 87,5 100 108 125 137,5 150</td>
</tr>
<tr>
<td>400</td>
<td>480 290 280 270 270 250 250 220 210 200</td>
</tr>
<tr>
<td>500</td>
<td>580 390 380 370 370 350 350 320 310 300</td>
</tr>
<tr>
<td>600</td>
<td>680 490 480 470 470 450 450 450 420 420 410 400</td>
</tr>
<tr>
<td>4008</td>
<td>50 65 75 87,5 100 108 125 137,5 150</td>
</tr>
<tr>
<td>400</td>
<td>480 290 280 270 270 250 250 220 210 200</td>
</tr>
<tr>
<td>500</td>
<td>580 390 380 370 370 350 350 320 310 300</td>
</tr>
<tr>
<td>600</td>
<td>680 490 480 470 470 450 450 450 420 420 410 400</td>
</tr>
<tr>
<td>750</td>
<td>750 800 800 800 800 800 800 800 800 800</td>
</tr>
<tr>
<td>850</td>
<td>900 – – – – – – – –</td>
</tr>
<tr>
<td>950</td>
<td>900 – – – – – – – –</td>
</tr>
<tr>
<td>2808</td>
<td>50 68 75 87,5 100 108 125 137,5 150</td>
</tr>
<tr>
<td>400</td>
<td>480 290 280 270 270 250 250 220 210 200</td>
</tr>
<tr>
<td>500</td>
<td>580 390 380 370 370 350 350 320 310 300</td>
</tr>
<tr>
<td>600</td>
<td>680 490 480 470 470 450 450 450 420 420 410 400</td>
</tr>
<tr>
<td>750</td>
<td>750 800 800 800 800 800 800 800 800 800</td>
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<tr>
<td>850</td>
<td>900 – – – – – – – –</td>
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<tr>
<td>950</td>
<td>900 – – – – – – – –</td>
</tr>
<tr>
<td>2808</td>
<td>50 68 75 87,5 100 108 125 137,5 150</td>
</tr>
<tr>
<td>400</td>
<td>480 290 280 270 270 250 250 220 210 200</td>
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<td>580 390 380 370 370 350 350 320 310 300</td>
</tr>
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<td>600</td>
<td>680 490 480 470 470 450 450 450 420 420 410 400</td>
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<tr>
<td>750</td>
<td>750 800 800 800 800 800 800 800 800 800</td>
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<tr>
<td>850</td>
<td>900 – – – – – – – –</td>
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<tr>
<td>950</td>
<td>900 – – – – – – – –</td>
</tr>
<tr>
<td>2808</td>
<td>50 68 75 87,5 100 108 125 137,5 150</td>
</tr>
<tr>
<td>400</td>
<td>480 290 280 270 270 250 250 220 210 200</td>
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<td>580 390 380 370 370 350 350 320 310 300</td>
</tr>
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<td>600</td>
<td>680 490 480 470 470 450 450 450 420 420 410 400</td>
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<td>750</td>
<td>750 800 800 800 800 800 800 800 800 800</td>
</tr>
<tr>
<td>850</td>
<td>900 – – – – – – – –</td>
</tr>
<tr>
<td>950</td>
<td>900 – – – – – – – –</td>
</tr>
<tr>
<td>2808</td>
<td>50 68 75 87,5 100 108 125 137,5 150</td>
</tr>
</tbody>
</table>
twisterchain® | Guide Troughs Type 01 | Accessories

**twisterchain® guide trough options**

9XXX.31
Complete troughs
(with base support, height adjustment and attachment angles)

9XXX.32
Upper and lower run trough
(without base support and height adjustment)

9XXX.30
Lower run trough
(with attachment angles)

Special variant: Customer builds base support

**Product range | twisterchain® guide troughs Type 01**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Outer radius AR (mm)</th>
<th>Rotation angle from-up to α (°)</th>
<th>9TC32.31.180.600/12.250</th>
</tr>
</thead>
<tbody>
<tr>
<td>400</td>
<td>0 - 90°</td>
<td>90° - 180°</td>
<td>90° - 270°</td>
</tr>
<tr>
<td>500</td>
<td>0 - 90°</td>
<td>90° - 180°</td>
<td>90° - 270°</td>
</tr>
<tr>
<td>600</td>
<td>0 - 90°</td>
<td>90° - 180°</td>
<td>90° - 270°</td>
</tr>
<tr>
<td>650</td>
<td>0 - 90°</td>
<td>90° - 180°</td>
<td>90° - 270°</td>
</tr>
<tr>
<td>750</td>
<td>0 - 90°</td>
<td>90° - 180°</td>
<td>90° - 270°</td>
</tr>
<tr>
<td>850</td>
<td>0 - 90°</td>
<td>90° - 180°</td>
<td>90° - 270°</td>
</tr>
</tbody>
</table>

**More order examples**

- Complete trough: Part No. 94008.31.180.600/12.250
- Lower run trough only: Part No. 94008.30.180.600/12.250
- Upper and lower run trough without base support: Part No. 94008.32.180.600/12.250

Supplement Part No. 9XXX with required Series (TC32, TC42, TC56, 2808, 3808, 4008).

value Bi and required bending radius R: 9XXX.31.180.600/06.250
This calculation sheet should help you to select the right igus® twisterchain® System for your application. 

**Rotation angle**

Please sketch the cable and hose layout within the e-chain®. Note: To find the correct Series, refer to the thickest cable diameter, plus cable clearance of approx. 20% of the e-chain® interior.

**twisterchain® Series**

<table>
<thead>
<tr>
<th>TC32</th>
<th>TC42</th>
<th>TC56</th>
</tr>
</thead>
</table>

**Existing installation space**

<table>
<thead>
<tr>
<th>X1 max</th>
<th>X2 max</th>
<th>HF max</th>
</tr>
</thead>
</table>

**e-chain® data**

Outer radius AR 
Inner radius IR 
Bending radius R 
Rotation angle [°] 
Guide trough

<table>
<thead>
<tr>
<th>yes</th>
<th>no</th>
</tr>
</thead>
</table>

**Part No. trough Type 01 9TC...**

Order example 9TC32.31.180.600/06.250

**Supporting structure**

<table>
<thead>
<tr>
<th>yes</th>
<th>no</th>
</tr>
</thead>
</table>

The guide trough part number includes all the necessary elements for proper operation. The rotation angle 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 installation!

---

**Filling - twisterchain® new**

<table>
<thead>
<tr>
<th>Number</th>
<th>Type</th>
<th>Ø [mm]</th>
<th>Weight [kg/m]</th>
<th>Permitted bending radius R [mm]</th>
</tr>
</thead>
</table>

**Dimensions**

<table>
<thead>
<tr>
<th>X1 [mm]</th>
<th>X2 [mm]</th>
<th>HF [mm]</th>
<th>Rotation angle α [°]</th>
</tr>
</thead>
</table>

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

**Operating data**

- Rotations/day
- Days/year
- Speed [°/s]
- Acceleration [°/s²]

**Environment**

- Temperature [°C]
- Moisture

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.

<table>
<thead>
<tr>
<th>Individual components</th>
</tr>
</thead>
<tbody>
<tr>
<td>twisterchain® new</td>
</tr>
<tr>
<td>chairflex® high-flex cables</td>
</tr>
<tr>
<td>Guide trough</td>
</tr>
<tr>
<td>Preassembled</td>
</tr>
</tbody>
</table>

**Please copy, complete and fax it or online at** [www.igus.eu/eu/twisterchain](http://www.igus.eu/eu/twisterchain)
First generation

Circular and spiral movements up to 540°
Circular and spiral movements - twisterchain® classic

The first generation of twisterchain® classic have proven themselves worldwide for years in many applications. They safely supply their robots in the rotary axis with energy and air. For new designs we recommend twisterchain® new from page 1082.

- 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) available from stock
- Variable interior separation
- Applicable in rotational speeds of up to 4 m/s
- With steel mounting brackets (electrically conductive)

Typical industries and applications
- Robots
- Handling machines
- Packaging machines
- Glass machines
- General mechanical engineering, etc

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

UL94-V0 classifications upon request

Two different types of guide trough systems available
**Contents**

For new designs we recommend: TC32, TC42, TC56

---

**twisterchain® classic**

for circular movements, can be opened from both sides

---

**Technical Data - e-chain® links as single parts**

- **Speed / acceleration**
  - see page 1116

- **Material - permitted temperature °C, igumid G**
  - -40° up to +120° C

- **Flammability class, igumid G**
  - VDE 0304 IIC UL94-HB

---

**Technical Data - System twisterchain® classic**

- **Material - permitted temperature °C, igumid G**
  - -40° up to +120° C

---

**Part No. of e-chain® links as single parts - System twisterchain® classic**

**Available from stock. Delivery time* in 24h or today!**

*Delivery time means time until shipping of goods (after technical release)

---

**Quickly generate complete twisterchain® models**

with guide trough and accessories

► [www.igus.eu/twisterconfigurator](http://www.igus.eu/twisterconfigurator)

- Preparing of 3D-models only with input of chosen e-chain® radii and installation area
- Free positioning of the e-chain® moving end along the travel lengths
- Generation of twisterchain® optionally as single part or with guide trough and base support
- Fast download of the CAD files without registration
- CAD models in 11 different 3D CAD formats and 8 different 2D CAD formats

---

**Assembly video available online at ▶ [www.igus.eu/twister_assembly](http://www.igus.eu/twister_assembly)**
**Circular movements up to 540°**

**When to use the System twisterchain® classic:**
- As replacement for existing twisterchain® classic applications
- If you require an interior separation
- If you require cable access on both sides
- For rotational speeds up to 90°/s
- For circular motion up to 540° (with special attachments)

**When to use a different igus® Series:**
- If a robust, low-noise system is required, appropriate for high loads.
- In case of very small or very large diameters
- For applications using rotation angles over 400° please consult igus®

**Available from stock. Delivery time in 24h or today!**

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---

**Circular movements up to 540°**

**When to use the System twisterchain® classic:**
- As replacement for existing twisterchain® classic applications
- If you require an interior separation
- If you require cable access on both sides
- For rotational speeds up to 90°/s
- For circular motion up to 540° (with special attachments)

**When to use a different igus® Series:**
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- For applications using rotation angles over 400° please consult igus®

**Available from stock. Delivery time in 24h or today!**

+ Delivery time means time until shipping of goods (after technical release)
**Tips on design:**
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 e-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 e-chain® width**
Specify which cables you would like to use for the e-chain®. The type of cables and the largest cable diameter determine the Series and e-chain® width selection. We recommend that you allow for a cable clearance of approx. 20% of the e-chain®s internal height and width.

2. **Specify the outer and inner radius**
Determine the construction space available to you (dim. \(X_1\) and \(X_2\)).

   **Examples:** \(\alpha = 220° / \text{max. cable diameter 24 mm} \Rightarrow \text{Series 2208}\)
   \(X_2 = 580 \text{ mm} \Rightarrow AR = 500 \text{ mm}\)
   \(X_1 = 310 \text{ mm} \Rightarrow IR_{\text{min}} = 390 \text{ mm} \Rightarrow \text{selection table} \Rightarrow 392 \text{ mm}\)

3. **Specify the bending radius \(R\)**
   \(H_y = 460 \text{ mm} \Rightarrow H \leq 410 \text{ mm} \Rightarrow R = \frac{H - ha}{2} = 178 \text{ mm} \Rightarrow R_{175} \) (next smallest radius)

4. **Calculate the required number of links**
   Number of links: \(n = \frac{2 \times AR \times \alpha + K}{360° \times T} \)

   **Note:** 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 higher odd number!

**twisterchain® classic definition:**
In the case of machine elements which move both to the left and to the right following a circular path, the angle of rotation can be determined by adding the two angles!

The following clearances are absolutely essential for proper design function:
\(IR_{\text{min}} = X_1 + 80 \text{ mm}\)
\(X_2_{\text{min}} = AR + 80 \text{ mm}\)
\(H_y = H + 50 \text{ mm}\)

**Recommendations for design without additional components:**

<table>
<thead>
<tr>
<th>Series</th>
<th>(FZ_{\text{max}})</th>
<th>(FZ_{\text{max}})</th>
<th>(\alpha)</th>
<th>(a)</th>
<th>(R)</th>
<th>(AR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2208</td>
<td>1,5</td>
<td>1</td>
<td>0.3 - 1</td>
<td>2</td>
<td>100</td>
<td>300</td>
</tr>
<tr>
<td>2808</td>
<td>2</td>
<td>1</td>
<td>0.3 - 1</td>
<td>2</td>
<td>150</td>
<td>450 - 550</td>
</tr>
<tr>
<td>3808</td>
<td>3</td>
<td>1,8</td>
<td>0.3 - 1</td>
<td>2</td>
<td>200</td>
<td>450 - 550</td>
</tr>
<tr>
<td>4008</td>
<td>4</td>
<td>2,5</td>
<td>0.3 - 1</td>
<td>2</td>
<td>250</td>
<td>600 - 700</td>
</tr>
</tbody>
</table>

If your calculations exceed our recommendations, please talk to us. We offer special solutions and many additional components.

For the rapid generation of complete twisterchain® Systems please use our
[www.igus.eu/twisterconfigurator](http://www.igus.eu/twisterconfigurator)
Series 2808 | snap-open along inner and outer radius

<table>
<thead>
<tr>
<th>R 100</th>
<th>R 125</th>
<th>R 150</th>
<th>R 175</th>
<th>R 200</th>
<th>R 250</th>
<th>Bi</th>
<th>Ba</th>
<th>AR</th>
<th>IR</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>[mm]</td>
<td>[mm]</td>
<td>[mm]</td>
<td>[mm]</td>
<td>[mm]</td>
<td>[mm]</td>
<td>[mm]</td>
<td>[mm]</td>
<td>[mm]</td>
<td>[mm]</td>
<td>[kg/m]</td>
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<tr>
<td>05</td>
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<td>05</td>
<td>05</td>
<td>05</td>
<td>05</td>
<td>05</td>
<td>05</td>
<td>05</td>
<td>329.5</td>
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<tr>
<td>06</td>
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<td>06</td>
<td>06</td>
<td>06</td>
<td>06</td>
<td>06</td>
<td>06</td>
<td>06</td>
<td>311.5</td>
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<tr>
<td>12</td>
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<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>302</td>
</tr>
<tr>
<td>07</td>
<td>10</td>
<td>10</td>
<td>10</td>
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<td>10</td>
<td>10</td>
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<td>10</td>
<td>297.5</td>
</tr>
<tr>
<td>08</td>
<td>08</td>
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<td>08</td>
<td>08</td>
<td>08</td>
<td>08</td>
<td>08</td>
<td>08</td>
<td>271.5</td>
</tr>
</tbody>
</table>

**Order key**

**2808.15/150/600.0**

- **Standard color black**
- **Outer radius AR**
- **Bending radius R**
- **Width index (depends on Bi)**
- **Series**

**For this Series the interior separation elements of Series E4.32 may be used (except side-plates) from page 652**

**Available from stock. Delivery time* in 24h or today!**

*Delivery time means time until shipping of goods (after technical release)
twisterchain® classic | Series 3808 | Product range

For new designs we recommend: TC42 ▶ from page 1094

### Series 3808 | snap-open along inner and outer radius

<table>
<thead>
<tr>
<th>R 100 [mm]</th>
<th>R 125 [mm]</th>
<th>R 150 [mm]</th>
<th>R 200 [mm]</th>
<th>R 250 [mm]</th>
<th>Bi [mm]</th>
<th>Ba [mm]</th>
<th>AR [mm]</th>
<th>IR [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>3808...0.05</td>
<td>100/400.0</td>
<td>0.15</td>
<td>150/400.0</td>
<td>0.05</td>
<td>200/400.0</td>
<td>0.05</td>
<td>250/400.0</td>
<td>50</td>
</tr>
<tr>
<td>3808...0.06</td>
<td>100/400.0</td>
<td>0.15</td>
<td>150/400.0</td>
<td>0.06</td>
<td>200/400.0</td>
<td>0.06</td>
<td>250/400.0</td>
<td>50</td>
</tr>
<tr>
<td>3808...0.07</td>
<td>100/400.0</td>
<td>0.15</td>
<td>150/400.0</td>
<td>0.07</td>
<td>200/400.0</td>
<td>0.07</td>
<td>250/400.0</td>
<td>50</td>
</tr>
<tr>
<td>3808...0.08</td>
<td>100/400.0</td>
<td>0.15</td>
<td>150/400.0</td>
<td>0.08</td>
<td>200/400.0</td>
<td>0.08</td>
<td>250/400.0</td>
<td>50</td>
</tr>
<tr>
<td>3808...1.0</td>
<td>100/400.0</td>
<td>1.10</td>
<td>150/400.0</td>
<td>1.10</td>
<td>200/400.0</td>
<td>1.10</td>
<td>250/400.0</td>
<td>100</td>
</tr>
<tr>
<td>3808...1.1</td>
<td>110/400.0</td>
<td>1.15</td>
<td>150/400.0</td>
<td>1.15</td>
<td>200/400.0</td>
<td>1.15</td>
<td>250/400.0</td>
<td>100</td>
</tr>
<tr>
<td>3808...1.2</td>
<td>120/400.0</td>
<td>1.20</td>
<td>150/400.0</td>
<td>1.20</td>
<td>200/400.0</td>
<td>1.20</td>
<td>250/400.0</td>
<td>125</td>
</tr>
</tbody>
</table>

\[
\begin{align*}
\text{Pitch } T &= 67 \text{ mm/link} \\
\text{Links/m} &= 15 \text{ (1005 mm)}
\end{align*}
\]

Available from stock. Delivery time* in 24h or today!

**Order key**

<table>
<thead>
<tr>
<th>Ba</th>
<th>R</th>
<th>AR</th>
</tr>
</thead>
<tbody>
<tr>
<td>200/600.0</td>
<td>200/600.0</td>
<td>200/600.0</td>
</tr>
<tr>
<td>200/500.0</td>
<td>200/500.0</td>
<td>200/500.0</td>
</tr>
<tr>
<td>200/400.0</td>
<td>200/400.0</td>
<td>200/400.0</td>
</tr>
<tr>
<td>200/300.0</td>
<td>200/300.0</td>
<td>200/300.0</td>
</tr>
<tr>
<td>200/200.0</td>
<td>200/200.0</td>
<td>200/200.0</td>
</tr>
<tr>
<td>200/100.0</td>
<td>200/100.0</td>
<td>200/100.0</td>
</tr>
</tbody>
</table>

For this Series the interior separation elements of Series 4.42 may be used (except side-plates) ▶ from page 668

**Available from stock. Delivery time* in 24h or today!**

*Delivery time means time until shipping of goods (after technical release)

<table>
<thead>
<tr>
<th>AR</th>
<th>Ba</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outer radius, e-chain</td>
<td>Outer width, e-chain</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bi</th>
<th>AR</th>
<th></th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inner radius, e-chain</td>
<td>Outer radius, e-chain</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Standard color black**
## twisterchain® classic | Series 4008 | Product range

For new designs we recommend: TC56 from page 1096

### Series 4008 | snap-open along inner and outer radius

<table>
<thead>
<tr>
<th>R 150</th>
<th>R 200</th>
<th>R 250</th>
<th>R 300</th>
<th>R 400</th>
<th>Bi</th>
<th>Ba</th>
<th>AR</th>
<th>IR</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>[mm]</td>
<td>[mm]</td>
<td>[mm]</td>
<td>[mm]</td>
<td>[mm]</td>
<td>[mm]</td>
<td>[mm]</td>
<td>[mm]</td>
<td>[mm]</td>
<td>[kg/m]</td>
</tr>
</tbody>
</table>

### Order key

<table>
<thead>
<tr>
<th>4008.20.250/850.0</th>
</tr>
</thead>
</table>

#### Dimensioning

- **Bi**: Inner width, e-chain®
- **AR**: Outer radius, e-chain®
- **R**: Bending radius, e-chain®

**Note:** Width index depends on (Bi)

### Series 4008 | Interior separation

For this Series the interior separation elements of Series E4.56 may be used (except side-plates) ➤ from page 684

### Available from stock. Delivery time in 24h or today!

*Delivery time means time until shipping of goods (after technical release)*

#### Available for ADD-ON ORDER

- **Bi**: Inner width, e-chain®
- **AR**: Outer radius, e-chain®
- **R**: Bending radius, e-chain®
- **K**: Add-on for bending radius

**Note:** Delivery time means time until shipping of goods (after technical release)
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:

- Bore Hole: 4 x Ø 6.6 - 7 mm
- Mounting only with bolts: 4 x bolts M6

Other connection dimensions for mounting the guide trough Type 02 ▶ from page 1126

- One part for all e-chain® widths
- Electrically conductive
- Universal use
- Material: Stainless steel: 1.4301

Single-part order
Position 1
22080.30.VS.E
Position 2
22080.40.VS.E

With the new twisterchain® trough, the previously complex adjustment work is clearly minimized. Assembly time is reduced from 6h to 2h. While reducing noise levels, travel speed and service life can be increased, thanks to an almost all-plastic design ◀ www.igus.eu/eu/TCtroughnew
Guide trough Type 02 for twisterchain® classic

- Guidance of the e-chain®
- Minimal wear on the e-chain®
- Optimal running smoothness
- Rotation angle up to 400°

The modular design of the guide trough makes it possible to connect a large number of e-chains®, circle and bending radii by using the same trough sections. If the e-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 numbers include the complete trough system. In all cases, you should select the twisterchain® type when ordering. For new designs we recommend:

New guide trough system - Type 01 from page 1100

<table>
<thead>
<tr>
<th>Product range</th>
<th>twisterchain® classic guide trough Type 02</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Part No. Series</strong></td>
<td>**Outer radius **</td>
</tr>
<tr>
<td><strong>2208</strong></td>
<td>300</td>
</tr>
<tr>
<td></td>
<td>300</td>
</tr>
<tr>
<td></td>
<td>300</td>
</tr>
<tr>
<td></td>
<td>300</td>
</tr>
<tr>
<td></td>
<td>450</td>
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<tr>
<td></td>
<td>450</td>
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<td></td>
<td>450</td>
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<tr>
<td></td>
<td>450</td>
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<tr>
<td></td>
<td>450-550</td>
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<td></td>
<td>450-550</td>
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<td></td>
<td>450-550</td>
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<td>450-550</td>
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<tr>
<td></td>
<td>550-650</td>
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<tr>
<td></td>
<td>550-650</td>
</tr>
<tr>
<td></td>
<td>550-650</td>
</tr>
<tr>
<td></td>
<td>550-650</td>
</tr>
<tr>
<td></td>
<td>&gt;650</td>
</tr>
</tbody>
</table>
| **Note:** Portions with bold are required for the upper run. * These troughs feature one support for the upper run / ** these troughs feature two supports for the upper run.

**Order key Guide trough Type 02**

- R - Bending radius, please add appropriate value
- Bi - widths index, please add appropriate value
- Outer radius e-chain®,
- Trough angle (Standard 180°, 135°, 90°, 45°)
- Trough version (5. with and 4. without bottom support)
- Guide trough - selected Series (2208, 2808, 3808, 4008)

### Installation Dimensions | twisterchain® classic guide trough Type 02

**Series**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>R [mm]</th>
<th>H1 [mm]</th>
<th>H2 [mm]</th>
<th>Number for Bending radius R</th>
<th>Part No. Guide trough</th>
</tr>
</thead>
<tbody>
<tr>
<td>2208...300</td>
<td>265</td>
<td>130</td>
<td>195</td>
<td>211</td>
<td>235</td>
</tr>
<tr>
<td>2208...400</td>
<td>360</td>
<td>146</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3808...300</td>
<td>360</td>
<td>156</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3808...500</td>
<td>460</td>
<td>146</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3808...500</td>
<td>460</td>
<td>146</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4008...600</td>
<td>560</td>
<td>146</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4008...750</td>
<td>710</td>
<td>176</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

### Supplement Part No. 9 XXXX with required Series (2208, 2808, 3808 or 4008), the value Bi and the corresponding value of the required bending radius R = 9 4008.5.180.600/06.250

* These troughs feature one support for the upper run / ** these troughs feature two supports for the upper run.

The guide trough and bottom support (see figure) is required only if the support for the upper run cannot be mounted on the machine (rotation angle > 180°).

Support for the upper run of twisterchain® classic (as of 180° rotation angle)

Lower edge (moving end)
This calculation sheet should help you to select the right igus® twisterchain® System for your application.

### Rotation angle
Please sketch the cable and hose layout within the e-chain®. **Note:** To find the correct Series, refer to the thickest cable diameter, plus cable clearance of approx. 20% of the e-chain® interior.

<table>
<thead>
<tr>
<th>twisterchain® Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>2208</td>
</tr>
</tbody>
</table>

### Existing installation space

| X<sub>1</sub> max | X<sub>2</sub> max | H<sub>1</sub> max |

### e-chain® data

- **Outer radius** (AR)
- **Inner radius** (IR)
- **Bending radius** (R)
- **Rotation angle** (°)

### Guide trough

- **Yes**
- **No**

### Part No. trough Type 02 9. …… / ……

**Order example** (9.4008.5.180.600/06.250)

### Supporting structure

- **Yes**
- **No**

The guide trough part number includes all the necessary elements for proper operation. The rotation angle 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 installation!

### Individual components

- twisterchain®
- chainflex® high-flex cables
- Guide trough
- Preassembled

### Filling - twisterchain® classic

| Number | Type | Ø [mm] | Weight (kg/m) | Permitted bending radius R [mm] |

### Dimensions

| X<sub>1</sub> [mm] | X<sub>2</sub> [mm] | H<sub>1</sub> [mm] | Rotation angle α [°] |

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

### Operating data

- **Rotations/day**
- **Days/year**
- **Speed [°/s]**
- **Acceleration [°/s²]**

### Environment

- **Temperature [°C]**
- **Moisture**

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.

**Date:**

**Phone:** +49 2203 9649-800

**Fax:** +49 2203 9649-222

**From:**

**To:**

igus® GmbH - Technical Sales

e-chainsystems®

Spicher Str. 1a

51147 Cologne (Porz-Lind)

Please copy, complete and fax it or online at www.igus.eu/eu/twisterchainClassic
igus®

twisterband

Rotary movements in small space - 20 times around its own axis
Compact, modular and cost-effective -
twisterband

Rotary movements in minimum space - 20 times around its own axis. With the very compact igus® twisterband rotations can be implemented economically and with low wear and low maintenance in a confined space. Energy (in the process), data and media are kept secure.

- 4 sizes available
- Rotary movements up to 7000° (Installation position, vertical: up to 3.000°, horizontal: 7.000° and more possible)
- Rotary speeds up to 360°/s possible
- Compact, modular and lightweight
- Ribbons can be shortened easily
- Minimum installation space, builds very close around the rotary axis
- Can be reliably used in various installation positions (horizontal or vertical)
- Cost-effective
- Easy filling
- Limited length compensation possible in combination with igus® chainflex® cables in very limited spaces

Typical industries and applications
- Cable reels
- Robots (robot arms, 3/6 axis, scara robots)
- Tooling machines
- Leisure rides
- Medical equipment
- Radar and telescope equipment
- Aerospace, test, measurement, handling, lifting and installation equipment
- Wind turbines (e.g. blade adjustment)
- Wherever rotary unions are used

In the Netherlands the twisterband will be used at the musical "Soldaat van Oranje" ensuring that a special platform can turn during the show

**twisterband Features**

- Compact, modular, economical - up to 7.000° rotary** motions in smallest spaces
- Can be reliably used in various installation positions. Limited length compensation possible
- igus® twisterband: Minimum installation space, builds very close around the rotary axis
- Max. rotation angle: As a rule of thumb: Each section gives 180° = 360° more rotation
- Film hinge: Easy access and quick filling with cables and hoses
- An axis is to be centrally installed for angles of rotation from 1500° rotating and horizontal
- 360°... 3000°
**twisterband | Contents | Selection Table**

**twisterband**
Rotary movements in minimum space - 20 times around its own axis
Installation position, vertical: up to 3.000°,
horizontal: 7.000° and more possible

---

**Contents Selection Table**

<table>
<thead>
<tr>
<th>Series</th>
<th>Inner height h [mm]</th>
<th>Inner width BI [mm]</th>
<th>(X_1) [mm]</th>
<th>(X_2) [mm]</th>
<th>R min. [mm]</th>
<th>R max. [mm]</th>
<th>Interior separation</th>
<th>Opening principle</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>TB12.23.09.X01.0</td>
<td>9</td>
<td>23</td>
<td>40</td>
<td>140</td>
<td>24</td>
<td>35</td>
<td>–</td>
<td>“easy”-design</td>
<td>1136</td>
</tr>
<tr>
<td>TB20.44.12.X01.0</td>
<td>12</td>
<td>44</td>
<td>50</td>
<td>220</td>
<td>34</td>
<td>57</td>
<td>–</td>
<td>“easy”-design</td>
<td>1136</td>
</tr>
<tr>
<td>TB20.44.18.X01.0</td>
<td>18</td>
<td>44</td>
<td>50</td>
<td>220</td>
<td>34</td>
<td>57</td>
<td>yes</td>
<td>film-hinge</td>
<td>1136</td>
</tr>
<tr>
<td>TB30.75.22.X01.0</td>
<td>22</td>
<td>75</td>
<td>90</td>
<td>330</td>
<td>44</td>
<td>77</td>
<td>yes</td>
<td>film-hinge</td>
<td>1136</td>
</tr>
</tbody>
</table>

*More sizes available upon request!* \(X_1\) = Inner machine construction space \(X_2\) = Outer machine construction space

---

**Assembly instructions**

**TB20.44.12. / TB30.75.22. | Snap-open along outer radius with film-hinge**

1. Easy opening and filling of twisterband with a click
2. Please open lock...
3. Insert the cable...
4. Close film-hinge with a click ...ready!

**TB12.23.09. / TB20.44.12. | “easy”-design - simply press cables in**

1. Easy opening and filling of twisterband due to the “easy”-design
2. Please lift e-chain® clamp slightly and simply insert cable

---

**Available from stock. Delivery time* in 24h or today!**

*Delivery time means time until shipping of goods (after technical release)

---

**Assembly video available online at** | www.igus.eu/eu/twisterband
**t**wisterband | *Series TB12-TB20-TB30* | **Introduction**

**Rotary motions in smallest spaces**

When to use the twisterband:
- Rotary movements up to 7000°
- Installation position, vertical up to 3000°, horizontal: 7000° and more possible
- For smallest spaces
- Rotary speeds up to 360°/s possible
- 4 sizes available
- Some parts available with interior separation
- Easy to fill with film-hinge or to be opened with “easy”-design (depending on Series)
- Limited length adjustment possible

When to use a different igus® Series:
- For higher fill weights
  - System twisterchain® new, page 1082
- For 3D-movements
  - triflex® R, page 1018
- RBR-versions for additional fill weights
  - Design, page 118
- If a smear-and maintenance-free polymer slewing bearing for “endless” turning movements is required
  - iglidur® polymer slewing bearing, www.igus.eu/eu/PRT
- Use of shielded cables
- Please ask for support

**t**wisterband | *Series TB12-TB20-TB30* | **Product range**

**t**wisterband | Snap-open with film-hinge or to be opened with “easy”-design

**Calculation**

Number of ribbons depending on rotation angle

(please always round up number of ribbons)

<table>
<thead>
<tr>
<th>Twisterband</th>
<th>Inner width Bi [mm]</th>
<th>Inner height Ni [mm]</th>
<th>X1 [mm]</th>
<th>X2 [mm]</th>
<th>R min. [mm]</th>
<th>R max. [mm]</th>
<th>Opening principle</th>
<th>d1 [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>TB12.23.09. X01.0 23</td>
<td>9</td>
<td>40</td>
<td>140</td>
<td>24</td>
<td>35</td>
<td>7</td>
<td>&quot;easy&quot;-design</td>
<td>7</td>
</tr>
<tr>
<td>TB12.44.12. X01.0 44</td>
<td>12</td>
<td>50</td>
<td>220</td>
<td>34</td>
<td>57</td>
<td>9</td>
<td>&quot;easy&quot;-design</td>
<td>9</td>
</tr>
<tr>
<td>TB20.44.12. X01.0 44</td>
<td>18</td>
<td>50</td>
<td>220</td>
<td>34</td>
<td>57</td>
<td>9</td>
<td>Film-hinge</td>
<td>14</td>
</tr>
<tr>
<td>TB30.75.22. X01.0 75</td>
<td>22</td>
<td>90</td>
<td>330</td>
<td>44</td>
<td>77</td>
<td>17</td>
<td>Film-hinge</td>
<td>17</td>
</tr>
</tbody>
</table>

**Additional loads depending on the rotation angle**

**t**wisterband | Snap-open with film-hinge or to be opened with “easy”-design

**Product range**

**t**wisterband | *Series TB12-TB20-TB30*
Woodworking machine - the twisterband is used for rotational movements in minimum space. It provides the energy supply of the gimbal working head. E2/000 e-chains® are installed for the other axes.

Easy opening and filling of the twisterbandes with a click or with the “easy”-design. Simply push separators on and add more cables. The separators provide a clear, cable-friendly interior separation.

Separators
For Series TB20 with an inner height of 18 mm and Series TB30 (inner height: 22 mm). For installation simply open the e-chain®, insert a cable and push the separator onto the crossbar. Then add more cables. The separators provide a clear, cable-friendly interior separation.

Separator for TB20.44.18 unassembled
Separator for TB20.18.2 unassembled
Separator for TB30.75.22 unassembled
Separator for TB30.22.2 unassembled

Dimensions - ground / base plate made of steel with strain relief for the following Series:

- TB12.23.09
- TB20.44.12 / TB20.44.18
- TB30.75.22

Ground plate and base plate are delivered by standard. They are part of the twisterband-module!

Separators are delivered unassembled. Simply push them onto the crossbar!

Ground- and base plate made of steel with strain relief for the following Series:

- TB12.23.09
- TB20.44.12 / TB20.44.18
- TB30.75.22

Ground plate and base plate are delivered by standard. They are part of the twisterband-module!

Separators are delivered unassembled. Simply push them onto the crossbar!

Separators are delivered unassembled. Simply push them onto the crossbar!
### igus® twisterband TB30 for rotational movement of 360° and E2 mini as well as E2/000 e-chains in this loading and unloading unit

### Endurance test of a twisterband module in the igus® test laboratory

### Customer application with twisterband TB20.44.18 - consuming and expensive rotary joints could be replaced here

### Suitable igus® chainflex® cables for smallest bending radii at [www.igus.eu/eu/chainflex](http://www.igus.eu/eu/chainflex)

### igus® twisterband TB12·TB20·TB30 Tests and applications

### igus® chainflex® cables for smallest bending radii at [www.igus.eu/eu/chainflex](http://www.igus.eu/eu/chainflex)

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### Suitable igus® chainflex® cables for smallest bending radii at [www.igus.eu/eu/chainflex](http://www.igus.eu/eu/chainflex)

### igus® twisterband TB12·TB20·TB30 Designing-Fax

### Date: | Phone: +49 2203 9649-800
| Fax: +49 2203 9649-222

### From: | To: igus® GmbH - Technical Sales e-chainsystems®
| Phone: | Fax: Spicher Str. 1a
| | 51147 Cologne (Porz-Lind)

### Short description of application

Which task should be performed

Solution at the moment

Rotating angle [°]

min. service life [cycles]

Frequency [°/s]

Continuous rotation

Stop & Go

### Cable specification

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Type (control, data, servo, hoses, etc.)</th>
<th>Outer diameter [ø mm]</th>
<th>min. bending radius [mm]</th>
</tr>
</thead>
</table>

### Environment

Ambient temperature [°C]

ATEX/ESD

Cleanroom

### Your data

Company

Name

Address

Phone/Fax

E-mail

Please copy, complete and fax it or online at [www.igus.eu/eu/twisterband](http://www.igus.eu/eu/twisterband)
e-spool
The alternative to cable drum. Protect cables and conduct various media safely.
The alternative to cable drum - igus® e-spool

Protect cables and conduct various media safely

Route many different cables in very narrow spaces. e-spool uniquely combines two different energy supply systems: one standard e-chain® is guided by one roller and always provides the precisely correct length and tension of the energy supply system through an integrated retaining spring. In the starting position, the e-chain® is entirely rolled up to save space. The twisterband connects the roller with the shaft block, which serves as an interface with the permanently laid cables.

- No tensile load of the cables
- Different media and diameters in one drum possible
- Energy supply in all possible directions (horizontal, vertical, diagonal)
- Space-saving, no "chain junction"
- No lower run is left behind, the paths remain free
- Cable diameters up to 16 mm

Typical industries and applications

- Telescopic applications
- Light / Stage equipment
- Space-saving alternative to zigzag applications

New in this catalog

Contents, selection table next page
**Introduction**

New in this catalog

The alternative to cable drum

When to use the e-spool series:

- If an uncomplicated, simple solution is desired as a cable drum
- When different media (electricity, air, liquids) should be routed together in a single system

When not to use it:

- Where it must be routed vertically at very high loads
- Zigzag applications

**Product range**

<table>
<thead>
<tr>
<th>Part No. e-spool with 1 twisterband</th>
<th>Part No. e-spool with 2 twisterbands</th>
<th>Maximum extension length [mm]</th>
<th>ø Drum diameter [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP1.600.4000.01.0</td>
<td>SP2.600.4000.01.0</td>
<td>4000</td>
<td>600</td>
</tr>
<tr>
<td>SP1.700.7000.01.0</td>
<td>SP2.700.7000.01.0</td>
<td>7000</td>
<td>700</td>
</tr>
<tr>
<td>SP1.850.14000.01.0</td>
<td>SP2.850.14000.01.0</td>
<td>14000</td>
<td>850</td>
</tr>
</tbody>
</table>

**System with a single twisterband**

With 600 mm drum diameter, and 4000 mm maximum extension length

**System with two twisterbands**

With 600 mm drum diameter, and 4000 mm maximum extension length

**Order key**

- SP1.600.4000.01.0
- SP2.600.4000.01.0

Figure shows the top view of the e-spool system.