igus®
solutions for:

● Multi-axis motion
● Vertical motion
● Horizontal motion
● Predictive maintenance, condition monitoring and engineered projects

Solutions for multi-axis motion  ► From page 1006
Solutions for vertical motion  ► From page 1026
Solutions for horizontal motion  ► From page 1038
Predictive maintenance, condition monitoring and engineered projects  ► From page 1080
Multi-axis motion

- Telescopic/retractable applications
- Theatre, stage and lighting technology
- Space-saving alternative to zig-zag solutions

Page 1012

E-spool standard and HD - flexible use
- Telescopic/retractable applications
- Theatre, stage and lighting technology
- Space-saving alternative to zig-zag solutions

Page 1016

E-spool compact - space-saving, spring driven
- Retractable applications - linear or rotary
- Small circular movements

Page 1020

E-spool for manual operation - reliable and space-saving
- Robotic teach pendants
- Workstations
- Assembly lines

Page 1024

E-spool power - motor driven for long extension lengths
- Theatre, stage and lighting technology
- Indoor and outdoors cranes

Page 1028

Telescopic/retractable applications
- Theatre, stage and lighting technology
- Small circular movements

Page 1032

Telescopic/retractable applications
- Theatre, stage and lighting technology
- Small circular movements

Page 1036

Telescopic/retractable applications
- Theatre, stage and lighting technology
- Small circular movements

Page 1040

Telescopic/retractable applications
- Theatre, stage and lighting technology
- Small circular movements

Page 1044

Telescopic/retractable applications
- Theatre, stage and lighting technology
- Small circular movements

Page 1048
The alternative to cable reeling drums - reduce cable wear and reliably guide different media together in one system

**e-spool advantages:**
- Energy supply is possible in all directions (horizontal, vertical, diagonal)
- More versatile and flexible to use than cable reeling drums
- Different media (power, data and fluids) can be routed together in one system
- If travels must be kept free
- If the technical system is to be hidden behind false ceilings/floors
- Very well suited for use in theatre and stage technology

**When to use another system:**
- With very high loads that have to be guided vertically
  - Zig-zag applications, page 123
- For high dynamics with lateral accelerations
  - Guidelok Slimline P, page 1032
The cable reel without a slip ring - igus® e-spool

Routing many different cables in a small space: e-spool uniquely combines two different energy supply systems. The standard e-chain® is guided by a roller and always provides the correct length and tension of the energy supply system through an integrated retaining spring. In the starting position, the e-chain® is rolled up completely to save space. The twisterband connects the roller with the shaft block, which serves as an interface to the supply side. With twisterband no slip ring is needed. This makes data transmission highly reliable, while enabling a high degree of flexibility at the same time. Different media and cable/hose diameters can be carried side by side in one drum (diameters up to 17mm)

- No tensile load on the cables
- Energy supply is possible in all directions (horizontal, vertical, diagonal)
- Space-saving when e-chain® is rolled into the home position, paths remain free
- Cables can be retrospectively added or changed
- Alternative to zig-zag solutions
- Maximum extension and retraction speed: 1m/s
- Large standard product range and special projects available

Typical industries and applications
- Telescopic/retractable applications
- Theatre, stage and lighting technology
- Space-saving alternative to zig-zag solutions

Available from stock. Ready to ship in 5 - 10 days*  
*The delivery times indicated correspond to the average time until the ordered goods are dispatched.

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### e-spool | Selection table

<table>
<thead>
<tr>
<th>Part No. with 1 twisterband</th>
<th>Part No. with 2 twisterbands</th>
<th>Travel length</th>
<th>Drum ø [mm]</th>
<th>Cable length</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>e-spool standard</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>flexible use</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Illustration shows e-spool with 1 twisterband)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SP1.600. SP2.600.</td>
<td>4</td>
<td>600</td>
<td>8.6</td>
<td>1013</td>
<td></td>
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<tr>
<td>SP1.700. SP2.700.</td>
<td>7</td>
<td>700</td>
<td>11.7</td>
<td>1013</td>
<td></td>
</tr>
<tr>
<td>SP1.850. SP2.850.</td>
<td>14</td>
<td>850</td>
<td>19.9</td>
<td>1013</td>
<td></td>
</tr>
<tr>
<td>e-spool HD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>flexible use, with increased retraction force</td>
<td>(Illustration shows e-spool with 1 twisterband HD)</td>
<td></td>
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<tr>
<td>SPHD1.600. SPHD2.600.</td>
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<td>600</td>
<td>8.6</td>
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<td>19.9</td>
<td>1014</td>
<td></td>
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<tr>
<td>e-spool compact</td>
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<td>SP1.240. New</td>
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<td>6.6</td>
<td>1016</td>
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<tr>
<td>e-spool for manual operation</td>
<td>for applications where only one cable or hose is pulled out manually</td>
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<td>300</td>
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<td></td>
</tr>
<tr>
<td>e-spool power</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>motor-driven, for long extension lengths</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>upon request</td>
<td>upon request</td>
<td>1024</td>
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---

More information | www.igus.eu/e-spool
### Technical data

<table>
<thead>
<tr>
<th>Speed</th>
<th>≤ 1.5m/s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acceleration</td>
<td>≤ 2m/s²</td>
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<tr>
<td>Lateral speed</td>
<td>≤ 1m/s</td>
</tr>
<tr>
<td>Lateral acceleration (radial) / (axial)</td>
<td>≤ 1m/s² / ≤ 0.25m/s²</td>
</tr>
</tbody>
</table>

### Order key - e-spool

#### Order key - e-spool standard

- **SP1.600.4000.03.R.0**
  - 1 twisterband
  - Drum diameter ø
  - Max. extension length
  - Version number
  - Extension R / L
  - Standard colour black

  Standard system with a single twisterband with 600mm drum diameter, and 4,000mm maximum extension length, extension right

#### Order key - e-spool compact

- **SP1.240.2000.01.R.0**
  - 1 twisterband
  - Drum diameter ø
  - Max. extension length
  - Version number
  - Extension R / L
  - Standard colour black

  Compact system with a single twisterband with 240mm drum diameter, and 2,000mm maximum extension length, extension right

#### Order key - e-spool HD

- **SPHD2.850.14000.03.R.0**
  - 2 HD twisterbands
  - Drum diameter ø
  - Max. extension length
  - Version number
  - Extension R / L
  - Standard colour black

  HD system with two twisterbands with 850mm drum diameter, and 14,000mm maximum extension length, extension right

#### Order key - e-spool for manual operation

- **SPC1.300.5000.01.R.0**
  - 1 twisterband
  - Drum diameter ø
  - Max. extension length
  - Version number
  - Extension R / L
  - Standard colour black

  System for manual operation with a single twisterband with 300mm drum diameter and 5,000mm maximum extension length, extension right

---

### Guidelines for using e-spool

In view of the special mechanical stress inside an e-spool, we recommend using igus® chainflex® cables. We also recommend that the following guidelines are observed:

1. Only put cables side by side in the linear chain - never stack them!
2. Where possible, cables with a TPE outer jacket should be used for unshielded cables
3. Shielded cables should be chosen from the CFROBOT range
4. The maximum bend radius of the twisterband must be accounted for
5. Where possible, use separators to protect cables against cross-over and abrasion against each other. To save space, install the separators alternately in segments positioned one behind the other
6. Insert cables sorted by diameter and/or bend radius - insert, small ones in the centre then increasingly larger ones towards the outside
7. Apply strain relief to both ends of the cable - when using a cable tie for strain relief, please ensure the head of the cable tie is underneath to avoid cable damage
8. Always install cables in the twisterband close to the axis of rotation with space on the outside
9. Always install cables in the twisterband with a slight gap to the axis of rotation

### Installation instructions

For applications that move horizontally, a smooth surface is required for the e-chain® to travel over.

---

**e-spool - the solution for stage and theatre technology.** Supplying energy, data and fluids without interruption. As shown here, at the Cultural and Congress Centre in Toruń (Poland). A total of ten igus® HD e-spool systems have been installed.
Flexible use - igus®
e-spool standard and HD

With igus® e-spool, cables are wound up in an e-chain® to save space. Various media can be supplied without interruption by the use of the twisterband. Adjustments and extensions of the filling are also possible at any time afterwards.

- Flexible energy supply - guidance of different media in one system
- Flexible use - energy supply in any direction is possible
- Cost-effective - twisterband enables rotary movement
- Space-saving - e-chain® retracts into a compact unit
- No tensile load on the cables
- Cables can be retrospectively added or changed

Typical industries and applications
- Telescopic/retractable applications
- Theatre, stage and lighting technology
- Space-saving alternative to zig-zag solutions

### e-spool standard | Series SP1-SP2 | Product range

Reduce cable wear and reliably guide different media together

#### e-spool standard | With e-chain® and 1 or 2 twisterbands

<table>
<thead>
<tr>
<th>Part No. e-spool with 1 twisterband, extension right</th>
<th>Part No. e-spool with 1 twisterband, extension left</th>
<th>B1</th>
<th>h1</th>
<th>Travel length</th>
<th>SP1</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP1.600.4000.03.R.0</td>
<td>SP1.600.4000.03.L.0</td>
<td>75</td>
<td>21</td>
<td>4</td>
<td>33.0</td>
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<tr>
<td>SP1.700.7000.03.R.0</td>
<td>SP1.700.7000.03.L.0</td>
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<td>21</td>
<td>7</td>
<td>38.0</td>
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<tr>
<td>SP1.850.14000.03.R.0</td>
<td>SP1.850.14000.03.L.0</td>
<td>75</td>
<td>21</td>
<td>14</td>
<td>48.0</td>
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</tbody>
</table>

Maximum cable and hose diameters: 17mm

- The max. bend radii of 44mm in the inner radius and 77mm in the outer radius should be observed.

<table>
<thead>
<tr>
<th>Part No. e-spool with 2 twisterbands, extension right</th>
<th>Part No. e-spool with 2 twisterbands, extension left</th>
<th>B1</th>
<th>h1</th>
<th>Travel length</th>
<th>SP2</th>
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<tbody>
<tr>
<td>SP2.600.4000.03.R.0</td>
<td>SP2.600.4000.03.L.0</td>
<td>125</td>
<td>21</td>
<td>4</td>
<td>40.0</td>
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<tr>
<td>SP2.700.7000.03.R.0</td>
<td>SP2.700.7000.03.L.0</td>
<td>125</td>
<td>21</td>
<td>7</td>
<td>45.0</td>
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<tr>
<td>SP2.850.14000.03.R.0</td>
<td>SP2.850.14000.03.L.0</td>
<td>125</td>
<td>21</td>
<td>14</td>
<td>55.0</td>
</tr>
</tbody>
</table>

Maximum cable and hose diameters: 17mm

- The max. bend radii of 44mm in the inner radius and 77mm in the outer radius should be observed.

**Note:** If the e-chain® extension is upwards, igus® recommends the standard e-spool. If the e-chain® extension is vertical or horizontal, the application should be discussed with your igus® engineer. The HD version with greater retraction force may be required.
e-spool HD | Series SPHD1-SPHD2 | Product range
Reduce cable wear and reliably guide different media together

Illustration shows e-spool HD with 1 and 2 twisterbands

**e-spool HD | With e-chain® and 1 or 2 twisterbands**

<table>
<thead>
<tr>
<th>Part No. e-spool HD with 1 twisterband, extension right</th>
<th>Part No. e-spool HD with 1 twisterband, extension left</th>
<th>Bi [mm]</th>
<th>hi [mm]</th>
<th>Travel length [m]</th>
<th>Sp1 [kg]</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPHD1.600.4000.03.R0</td>
<td>SPHD1.600.4000.03.L0</td>
<td>75</td>
<td>21</td>
<td>4</td>
<td>13.0</td>
</tr>
<tr>
<td>SPHD1.700.7000.03.R0</td>
<td>SPHD1.700.7000.03.L0</td>
<td>75</td>
<td>21</td>
<td>7</td>
<td>16.0</td>
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<tr>
<td>SPHD1.850.14000.03.R0</td>
<td>SPHD1.850.14000.03.L0</td>
<td>75</td>
<td>21</td>
<td>14</td>
<td>18.0</td>
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</tbody>
</table>

Maximum cable and hose diameters: 17mm

The max. bend radii of 44mm in the inner radius and 77mm in the outer radius should be observed.

<table>
<thead>
<tr>
<th>Part No. e-spool HD with 2 twisterbands, extension right</th>
<th>Part No. e-spool HD with 2 twisterbands, extension left</th>
<th>Bi [mm]</th>
<th>hi [mm]</th>
<th>Travel length [m]</th>
<th>Sp2 [kg]</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPHD2.600.4000.03.R0</td>
<td>SPHD2.600.4000.03.L0</td>
<td>125</td>
<td>21</td>
<td>4</td>
<td>40.0</td>
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<tr>
<td>SPHD2.700.7000.03.R0</td>
<td>SPHD2.700.7000.03.L0</td>
<td>125</td>
<td>21</td>
<td>7</td>
<td>45.0</td>
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<tr>
<td>SPHD2.850.14000.03.R0</td>
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<td>125</td>
<td>21</td>
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<td>56.0</td>
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</table>

Maximum cable and hose diameters: 17mm

The max. bend radii of 44mm in the inner radius and 77mm in the outer radius should be observed.

**Note:** If the e-chain® extension is upwards, igus® recommends the standard e-spool. If the e-chain® extension is vertical or horizontal, the application should be discussed with your igus® engineer. In most cases, the HD version with increased retraction force is required.

---

**e-spool standard and HD | Accessories**

**Interior separation**

**E2/000 Interior separation** - no lateral gap to side links necessary. Separators are assembled every 5th e-chain® link.

**Interior separation for E2/000 e-chains®**

**Standard separator, wide base**

Separators are delivered unassembled.

Separators are assembled every 4th e-chain® link.

**For even faster installation**

Wide on one side for high holding force, narrow on opposite side for easy cable fitting.

**For small cables**

Separator for a narrow base for a large number of small cables side by side. Saves space in the e-chain®.

**Interior separation for twisterband**

Separators - for installation simply open the e-chain®, insert a cable and press the separator onto the crossbar. Then add more cables. The separators provide a clear, cable-friendly interior separation.
e-spool compact | Series SP1 | Advantages New

The compact e-spool for 2m and 4m extension are optimised for small installation spaces with smaller linear chains and twisterbands for a wide range of applications. As with the larger standard and HD systems, the compact e-spool systems enable trouble-free guidance and flexible filling.

- Compact, space-saving cable reel without slip ring
- Different media (power, air data and fluids) can be routed together in one system
- Energy supply in all directions
- Space-saving and virtually "invisible"
- Very lightweight design (SP1.240 series made from aluminium)
- Extension lengths up to 2 and 4m
- Cables can be retrospectively added or changed

Typical industries and applications
- Small circular movements
- Retractable applications - linear or rotary

Note: The compact e-spool for 2m and 4m extension are optimised for small installation spaces with smaller linear chains and twisterbands for a wide range of applications. As with the larger standard and HD systems, the compact e-spool systems enable trouble-free guidance and flexible filling.

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**Compact, space-saving cable reel without slip ring - e-spool compact**

The compact e-spool for 2m and 4m extension are optimised for small installation spaces with smaller linear chains and twisterbands for a wide range of applications. As with the larger standard and HD systems, the compact e-spool systems enable trouble-free guidance and flexible filling.

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Typical industries and applications
- Small circular movements
- Retractable applications - linear or rotary

---

**e-spool compact | Series SP1 | Product range**

Route various media in a space-saving and flexible way

---

<table>
<thead>
<tr>
<th>Part No. e-spool with 1 twisterband, extension right</th>
<th>Part No. e-spool with 1 twisterband, extension right</th>
<th>BI</th>
<th>h1</th>
<th>Travel length</th>
<th>SP</th>
</tr>
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<tbody>
<tr>
<td>SP1.240.2000.01.R.01</td>
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<td>23</td>
<td>9</td>
<td>2</td>
<td>3.30</td>
</tr>
<tr>
<td>SP1.400.4000.01.R.01</td>
<td>--</td>
<td>44</td>
<td>15</td>
<td>4</td>
<td>13.5</td>
</tr>
</tbody>
</table>

Maximum cable and hose diameters: for SP1.240 = 7mm and for SP1.400 = 12mm

1) The max. bend radii of 24mm in the inner radius and 35mm in the outer radius should be observed
2) The max. bend radii of 34mm in the inner radius and 57mm in the outer radius should be observed
Interior separation for twisterband

Separators - for installation simply open the e-chain®, insert a cable and press the separator onto the crossbar. Then add more cables. The separators provide a clear, cable-friendly interior separation.

Separator, for TB20.44.18 unassembled TB20.18.2

Space-saving solution for a secure vertical movement. igus® e-spool with 3,500mm extension length in this handling unit. Fitted with igus® chainflex® CF9 control and CF30 motor cables as well as CF.Robot torsion cable and CA.PU pneumatic hose.
For applications where only one cable or hose is pulled out manually - e-spool for manual operation

The manually operated e-spool is designed for applications where only one cable or hose is pulled out by hand. The operator pulls out the cable to the required length for a control pendant or tool and can be retracted again after use. To prevent the cable from being under tension all the time, an inertia reel is fitted. In this way, the extension length can be locked. An extension length of up to 5m can be achieved.

- For applications where only one cable or hose is pulled out manually
- Compact, space-saving cable reel without slip ring
- Integrated locking mechanism against "unwanted" reverse winding (very similar to a vacuum cleaner cable)
- Also suitable for media and air hoses
- Handle with mounting option and strain relief

Typical industries and applications
- Robot teach pendants
- Workstations
- Assembly lines
Interior separation

At Liverpool University (UK), e-spools supply power and data to arrays of height-adjustable speakers. End-to-end cables ensure the best possible transmission reliability and sound quality.

Separator, for TB20.44.18 unassembled TB20.18.2

Interior separation for twisterband
Separators - for installation simply open the e-chain®, insert a cable and press the separator onto the crossbar. Then add more cables. The separators provide a clear, cable-friendly interior separation.

At Liverpool University (UK), e-spools supply power and data to arrays of height-adjustable speakers. End-to-end cables ensure the best possible transmission reliability and sound quality.
Motor-driven for long extension lengths - e-spool power

The e-spool power is a motor-driven e-spool for travels up to 35m. Like all e-spool systems, it can be filled with various cables and hoses and ensures reliable transmission with no breaks or slip rings. An igus® controller, which adapts dynamically to the travel speed, was specially developed for vertically hanging applications in theatres and opera houses and can be ordered as an option.

- Travel distances up to 35m
- Solid tubular steel construction
- Flexible filling with electrical and fibre optic cables, and pneumatic hoses
- Future-proof, additions and upgrades possible
- No tensile load on the cables

Typical industries and applications
- Theatre, stage and lighting technology
- Indoor and outdoor cranes
Solutions for vertical motion

liftband

Cable guidance up to 13m height with limited installation space

Advantages of liftband:
- For high vertical applications that need a compact solution
- Modular, silent, space-saving; vertical guidance for energy, data and media
- Max. extension length 13m
- Available in 2 sizes
- Alternative to zig-zag solutions, but lighter and requires less installation space
- Vertical applications implemented with ease

When to use another system:
- With very high loads that have to be guided vertically
  - Zig-zag applications, page 123
- For high dynamics with lateral accelerations
  - guidelok slimline P, page 1032
Cable guidance up to 13m height with limited installation space - liftband

liftband - modular, silent, space-saving - igus® vertical guidance for energy, data and media. High vertical applications that need a compact solution can be achieved with liftband.

- 2 sizes: inner width 25mm and 32mm
- 2 bend radii: 175mm and 250mm
- Alternative to zig-zag solutions
- Lighter and smaller installation space
- Vertical applications implemented with ease
- Max. extension length 13m

Typical industries and applications
- Theatre and stage technology
- Indoor cranes
- Mobile telescopic antennas

### Advantages
- Robust drive plate: for easy attachment to your application
- Safe and strong: nylon straps for secure guidance and high fill weight
- Tough: even with lateral system movements through "push-button" joint
- Light: lightweight, compact design
- Available in 2 sizes: easy triflex® for easy fitting of cables
- Chamfered basket: for safe operation
- Retracted: safe storage in a solid steel basket
- Optimised for space: compact steel basket for best use of space

### Technical data
- **Speed**: \( \leq 1 \text{m/s} \)
- **Acceleration**: \( \leq 2 \text{m/s}^2 \)
- **Lateral speed**: \( \leq 1 \text{m/s} \)
- **Lateral acceleration**: \( \leq 2 \text{m/s}^2 \)

### Selection table

<table>
<thead>
<tr>
<th>Series</th>
<th>Extension height</th>
<th>Inner height</th>
<th>Inner width</th>
<th>Bend radius</th>
<th>Cable</th>
<th>Page</th>
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<tbody>
<tr>
<td>LB.E332.25</td>
<td>1 - 13</td>
<td>2 x 13</td>
<td>25</td>
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<td>ø 9</td>
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<tr>
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<td>2 x 17</td>
<td>32</td>
<td>250</td>
<td>ø 12</td>
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</tbody>
</table>

1) Simply press cables up to a diameter of 9mm into the e-chain® pull cables up to a diameter of 11mm into the e-chain®
2) Simply press cables up to a diameter of 12mm into the e-chain® pull cables up to a diameter of 15mm into the e-chain®

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

More information | www.igus.eu/liftband 3D-CAD data, configurators, service life calculators and more | www.igus.eu/liftband
### Liftband Series LB.E332.25 | E-chain® with "Easy" Design | Inner Width 25mm

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Extension Height</th>
<th>Bi</th>
<th>Ni</th>
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<th>Cable</th>
</tr>
</thead>
<tbody>
<tr>
<td>LB.E332.25.2.175.01.0</td>
<td>1</td>
<td>25</td>
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<td>175</td>
<td>ø 9</td>
</tr>
<tr>
<td>LB.E332.25.2.175.01.0</td>
<td>2</td>
<td>25</td>
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<td>175</td>
<td>ø 9</td>
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<tr>
<td>LB.E332.25.2.175.01.0</td>
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<td>25</td>
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<td>ø 9</td>
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<tr>
<td>LB.E332.25.2.175.01.0</td>
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<tr>
<td>LB.E332.25.2.175.01.0</td>
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<td>ø 9</td>
</tr>
<tr>
<td>LB.E332.25.2.175.01.0</td>
<td>6</td>
<td>25</td>
<td>2 x 13</td>
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<td>ø 9</td>
</tr>
<tr>
<td>LB.E332.25.2.175.01.0</td>
<td>7</td>
<td>25</td>
<td>2 x 13</td>
<td>175</td>
<td>ø 9</td>
</tr>
<tr>
<td>LB.E332.25.2.175.01.0</td>
<td>8</td>
<td>25</td>
<td>2 x 13</td>
<td>175</td>
<td>ø 9</td>
</tr>
<tr>
<td>LB.E332.25.2.175.01.0</td>
<td>9</td>
<td>25</td>
<td>2 x 13</td>
<td>175</td>
<td>ø 9</td>
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<tr>
<td>LB.E332.25.2.175.01.0</td>
<td>10</td>
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<td>2 x 13</td>
<td>175</td>
<td>ø 9</td>
</tr>
<tr>
<td>LB.E332.25.2.175.01.0</td>
<td>11</td>
<td>25</td>
<td>2 x 13</td>
<td>175</td>
<td>ø 9</td>
</tr>
<tr>
<td>LB.E332.25.2.175.01.0</td>
<td>12</td>
<td>25</td>
<td>2 x 13</td>
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<td>ø 9</td>
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<tr>
<td>LB.E332.25.2.175.01.0</td>
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<td>25</td>
<td>2 x 13</td>
<td>175</td>
<td>ø 9</td>
</tr>
</tbody>
</table>

*Simply press cables up to a diameter of 9mm into the e-chain®/pull cables up to a diameter of 11mm into the e-chain®

### Liftband Series LB.E332.32 | E-chain® with "Easy" Design | Inner Width 32mm

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Extension Height</th>
<th>Bi</th>
<th>Ni</th>
<th>≤ R</th>
<th>Cable</th>
</tr>
</thead>
<tbody>
<tr>
<td>LB.E332.32.2.250.01.0</td>
<td>1</td>
<td>32</td>
<td>2 x 17</td>
<td>250</td>
<td>ø 12</td>
</tr>
<tr>
<td>LB.E332.32.2.250.01.0</td>
<td>2</td>
<td>32</td>
<td>2 x 17</td>
<td>250</td>
<td>ø 12</td>
</tr>
<tr>
<td>LB.E332.32.2.250.01.0</td>
<td>3</td>
<td>32</td>
<td>2 x 17</td>
<td>250</td>
<td>ø 12</td>
</tr>
<tr>
<td>LB.E332.32.2.250.01.0</td>
<td>4</td>
<td>32</td>
<td>2 x 17</td>
<td>250</td>
<td>ø 12</td>
</tr>
<tr>
<td>LB.E332.32.2.250.01.0</td>
<td>5</td>
<td>32</td>
<td>2 x 17</td>
<td>250</td>
<td>ø 12</td>
</tr>
<tr>
<td>LB.E332.32.2.250.01.0</td>
<td>6</td>
<td>32</td>
<td>2 x 17</td>
<td>250</td>
<td>ø 12</td>
</tr>
<tr>
<td>LB.E332.32.2.250.01.0</td>
<td>7</td>
<td>32</td>
<td>2 x 17</td>
<td>250</td>
<td>ø 12</td>
</tr>
<tr>
<td>LB.E332.32.2.250.01.0</td>
<td>8</td>
<td>32</td>
<td>2 x 17</td>
<td>250</td>
<td>ø 12</td>
</tr>
<tr>
<td>LB.E332.32.2.250.01.0</td>
<td>9</td>
<td>32</td>
<td>2 x 17</td>
<td>250</td>
<td>ø 12</td>
</tr>
<tr>
<td>LB.E332.32.2.250.01.0</td>
<td>10</td>
<td>32</td>
<td>2 x 17</td>
<td>250</td>
<td>ø 12</td>
</tr>
<tr>
<td>LB.E332.32.2.250.01.0</td>
<td>11</td>
<td>32</td>
<td>2 x 17</td>
<td>250</td>
<td>ø 12</td>
</tr>
<tr>
<td>LB.E332.32.2.250.01.0</td>
<td>12</td>
<td>32</td>
<td>2 x 17</td>
<td>250</td>
<td>ø 12</td>
</tr>
<tr>
<td>LB.E332.32.2.250.01.0</td>
<td>13</td>
<td>32</td>
<td>2 x 17</td>
<td>250</td>
<td>ø 12</td>
</tr>
</tbody>
</table>

*Simply press cables up to a diameter of 12mm into the e-chain®/pull cables up to a diameter of 15mm into the e-chain®

More information ► [www.igus.eu/liftband](http://www.igus.eu/liftband)
Safe vertical guidance

Advantages of guidelok slimline P:
● Up to 7m/s and 10m/s²
● Up to 80% less trough required, saving costs and weight
● For hanging systems up to 50m
● No swinging of the e-chain®, high reliability due to the lock mechanism and guiding rails
● Faster and easier installation
● Reduced noise
● Easy access for servicing
● Energy, data and all kinds of media can be safely guided

When to use another system:
● With very high loads that have to be guided vertically
  ► Zig-zag applications, page 123
● For high vertical applications with limited space
  ► Liftband, page 1026
**guidelok slimline P | Introduction | Advantages**

<table>
<thead>
<tr>
<th>Safe vertical guidance: even for high travel speeds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quick assembly: lightweight glass-fibre reinforced plastic profiles ensure easy and quick installation</td>
</tr>
<tr>
<td>Long travels: travels up to 50m in 1.5m or 2m channel section length possible</td>
</tr>
<tr>
<td>No swinging of the e-chain®: guidelok safety catches the e-chain® even under high lateral accelerations</td>
</tr>
</tbody>
</table>

**Safe vertical guidance - guidelok slimline P**

In highly dynamic storage and retrieval systems a horizontal movement speed exceeding 7m/s is not uncommon. The advanced igus® guidelok slimline guides e-chains® even at the fastest speeds. Note: Systems of this type should be designed with our engineering team. We can provide a quotation quickly - please contact us.

- Up to 7m/s and 10m/s²
- Up to 80% less trough required, saving costs and weight
- For hanging systems up to 50m
- No swinging of the e-chain®, high reliability due to the lock mechanism and guiding rails
- Faster and easier installation
- Reduced noise
- Easy access for servicing
- Low weight due to plastic construction
- Energy and data and all kinds of media can be safely guided

**Typical industries and applications**

- Storage and retrieval units
- Lifts
- Elevators
- Construction and crane lifts
- Hoists
- Automatic miniload warehouses

**guidelok slimline P | Selection table**

<table>
<thead>
<tr>
<th>Series</th>
<th>For e-chains® series</th>
<th>Inner height $h_I$ [mm]</th>
<th>Inner width $B_I$ [mm]</th>
<th>Bend radius $R$ [mm]</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>GLSL.P.255.10</td>
<td>255</td>
<td>24</td>
<td>100</td>
<td>150 - 250</td>
<td>1034</td>
</tr>
<tr>
<td>GLSL.P.2700.10</td>
<td>2700</td>
<td>35</td>
<td>100</td>
<td>150 - 250</td>
<td>1034</td>
</tr>
</tbody>
</table>

Special versions with different widths, radii and channel section lengths possible. Please consult igus® for delivery time.

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

- Find a video online »www.igus.eu/glslp-movie

**Made completely from plastic, cost-effective, light and easy to assemble - guidelok slimline P.S**

- Significant savings in costs and weight
- Fast, safe and easy assembly with clip-on guide rails
- Reduced noise
- Easy access for servicing
- Energy, data and all kinds of media can be safely guided
- For hanging systems up to 50m
- Speed up to 7m/s and acceleration up to 10m/s²

More information »www.igus.eu/glsl-ps
guidelok slimline P | Series GLSL.P | Product range

<table>
<thead>
<tr>
<th>Part No.</th>
<th>For series</th>
<th>Bi [mm]</th>
<th>R [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>GLSL.P.255. 10./R.LLLL/FFFF</td>
<td>255</td>
<td>103</td>
<td>150, 175, 200, 225, 250</td>
</tr>
<tr>
<td>GLSL.P.2700.10./R.LLLL/FFFF</td>
<td>2700</td>
<td>100</td>
<td>150, 175, 200 – 250</td>
</tr>
</tbody>
</table>

LLL – Total length, FFFF – Channel section length.
Special versions with different widths, radii and channel section lengths possible. Please consult igus® for delivery time.
Complete Part No. with required radius (R) and required value for total length and channel section length
Example: GLSL.P.2700.10.150.9000/1500

Installation dimensions

More information >> www.igus.eu/glslp

guidelok slimline P | Series GLSL.P | Technical data

Technical data

- Speed vertical ≤ 7m/s
- Acceleration ≤ 10m/s²

Cable guidance for vertical applications: lighter, low-noise, easier - lower costs - guidelite GLV - New
- The “guidelite vertical” (GLV) guide trough guides e-chains® and cables for vertical applications such as high bay warehouse safely in one system
- Segmental design and lightweight components reduce weight and noise
- Open design and self-locking screws facilitate easy assembly
- Significant savings in costs and weight when compared with a complete housing
- Easy access for servicing
More information >> www.igus.eu/GLV

Guidelok slimline P in a high-bay warehouse

More information >> www.igus.eu/glslp
Solutions for horizontal motion

guidelok horizontal

Upper run guide for long travels, unsupported in swarf areas

Advantages of guidelok horizontal:

- Swarf cannot get stuck between upper and lower run
- Modular system with few parts (also possible without lateral trough)
- Lower cost than most steel chains or gliding systems
- Open guide trough design, swarf can fall through

When to use another system:

- For a cost-effective and fully enclosed complete solution
  → basic flizz®, Page 1044
- For a compact, quiet and cost-effective complete system as a maintenance-free alternative to a busbar
  → micro flizz®, page 1052
guidelok horizontal | Introduction | Advantages

Upper run guide for long travels, unsupported in swarf areas - guidelok horizontal

Especially for long travels on machine tools, when the e-chain® would normally need to glide but metallic swarf is a problem, guidelok horizontal is a cost-effective solution.

- Unsupported travels up to 50m are possible
- Swarf cannot get stuck between upper and lower run
- Modular system with few parts (also possible without lateral trough)
- Enormous increase of unsupported lengths for e-chains®
- Lower push/pull forces (smaller e-chains®, unsupported and rollers = energy-efficient)
- Lower cost than most steel chains or gliding systems
- Open guide trough design, swarf can fall through

Typical industries and applications
- Machine tools
- Heavy swarf environments
- Wherever a gliding application is not advisable

guidelok horizontal | Selection table | Technical data

Series | Part No. | For e-chain® series | For bend radii from - up to | Material: galvanised steel
---|---|---|---|---
Guidelok horizontal - upper run guide for long travels, 2 options (depending on the bend radius)

| Speed horizontal | ≤ 1m/s |
| Acceleration | ≤ 5m/s² |

Available from stock. Ready to ship in 24 - 48hrs. *

* The delivery times indicated correspond to the average time until the ordered goods are dispatched.
guidelok horizontal | Product range | Installation dimensions

### Product range | Series 907.645 | For bend radii up to 300mm

<table>
<thead>
<tr>
<th>Part No.</th>
<th>For E4.1 series</th>
<th>( B_i )</th>
<th>( R )</th>
<th>Available bend radii</th>
</tr>
</thead>
<tbody>
<tr>
<td>guidelok</td>
<td>E4.56</td>
<td>50 - 600</td>
<td>150</td>
<td>175 200 250 300</td>
</tr>
<tr>
<td>guidelok</td>
<td>E4.80</td>
<td>50 - 600</td>
<td>150</td>
<td>175 200 250 300</td>
</tr>
<tr>
<td>guidelok</td>
<td>E4.112</td>
<td>50 - 600</td>
<td>–</td>
<td>– 200 250 300</td>
</tr>
<tr>
<td>guidelok</td>
<td>R4.56</td>
<td>75 - 462</td>
<td>150</td>
<td>175 200 250 300</td>
</tr>
<tr>
<td>guidelok</td>
<td>R4.80</td>
<td>150 - 462</td>
<td>–</td>
<td>– 200 250 300</td>
</tr>
<tr>
<td>guidelok</td>
<td>R4.112</td>
<td>200 - 500</td>
<td>–</td>
<td>– 250 300</td>
</tr>
</tbody>
</table>

More series and radii upon request. Please consult igus® for delivery time.

LLLL = Total length FFFF = Channel section length

Complete Part No. with required value for total length and channel section length. Example: 907.645.200.300.20000/2000.0

### Product range | Series 907.837 | For bend radii from 350 up to 500mm

<table>
<thead>
<tr>
<th>Part No.</th>
<th>For E4.1 series</th>
<th>( B_i )</th>
<th>( R )</th>
<th>Available bend radii</th>
</tr>
</thead>
<tbody>
<tr>
<td>guidelok</td>
<td>E4.56</td>
<td>50 - 600</td>
<td>350</td>
<td>400 450 500</td>
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<tr>
<td>guidelok</td>
<td>E4.80</td>
<td>50 - 600</td>
<td>350</td>
<td>400 450 500</td>
</tr>
<tr>
<td>guidelok</td>
<td>E4.112</td>
<td>50 - 600</td>
<td>350</td>
<td>400 450 500</td>
</tr>
<tr>
<td>guidelok</td>
<td>R4.56</td>
<td>75 - 462</td>
<td>350</td>
<td>400 450 500</td>
</tr>
<tr>
<td>guidelok</td>
<td>R4.80</td>
<td>150 - 462</td>
<td>350</td>
<td>400 450 500</td>
</tr>
<tr>
<td>guidelok</td>
<td>R4.112</td>
<td>200 - 500</td>
<td>350</td>
<td>400 450 500</td>
</tr>
</tbody>
</table>

More series and radii upon request. Please consult igus® for delivery time.

LLLL = Total length FFFF = Channel section length

Complete Part No. with required value for total length and channel section length. Example: 907.837.200.300.20000/2000.0

### Installation dimensions

Principle sketch - guidelok horizontal - LLLL = Total Length FFFF = Channel section length

Lateral supports with pivoting rollers for the upper run support of the e-chain®

Find a video online

www.igus.eu/glhr-movie

3D-CAD data, configurators, service life calculators and more

www.igus.eu/guidelok-HR

More information ▶ www.igus.eu/guidelok-HR
Cost-effective, enclosed solution for long travels, e.g. waste-water treatment plants

Advantages of basic flizz®:
● Protection against weather and dirt exposure
● Low-maintenance system
● Cost-effective and fully enclosed complete system
● Standardised and modular design
● Easy wall, floor or ceiling mounting options
● Cables or hoses can be easily retrofitted
● Reduce power costs - directly driven by the scraper. No additional drives needed (as is the case on cable reels)

When to use another system:
● For an upper run guide for long travels, unsupported in swarf areas
  ► guidelok horizontal, Page 1038
● For a compact, quiet and cost-effective complete system as a maintenance-free alternative to a busbar
  ► micro flizz®, page 1052
basic flizz®

<table>
<thead>
<tr>
<th>Selection table</th>
</tr>
</thead>
<tbody>
<tr>
<td>Series</td>
</tr>
<tr>
<td>------------------</td>
</tr>
<tr>
<td>Part No.</td>
</tr>
<tr>
<td>basic flizz® 2500 v2 and basic flizz® 2500 HD</td>
</tr>
<tr>
<td>2500 HD</td>
</tr>
<tr>
<td>HD version for even higher push/pull forces</td>
</tr>
<tr>
<td>Appropriate e-chain® must be ordered separately.</td>
</tr>
</tbody>
</table>

HD version for even higher push/pull forces

Appropriate e-chain® must be ordered separately.

*Available upon request. Please consult igus® for delivery time.

Available from stock. Ready to ship in 24 - 48hrs.*

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

QuickCad - 3D CAD configurator for basic flizz®

- Generate basic flizz® as a 3D model quickly and easily
- Fast download of the CAD files without registration
- Select installation version, lled and operating direction
- Parts list generation and PDF data sheet of the application

More information: www.igus.eu/basic-flizz

1046 More information: www.igus.eu/basicflizz

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Cost-effective, enclosed solution for long travels, e.g. waste water treatment plants - basic flizz®

- Low-maintenance system for travels up to 100m
- Protection against weather and dirt exposure
- Cost-effective and fully enclosed complete system
- Standardised and modular design
- Easy installation using a bracket with different mounting options
- Cable lengths up to 50% shorter than festoons, low-profile installation
- Cables are guided with a defined bend radius so tensile forces are absorbed by the e-chain®
- Cables cannot tangle or get damaged
- No slip ring contact (as with cable reels)
- Cables or hoses can be easily retrofitted
- Reduce power costs - directly driven by the scraper. No additional drives needed (as is the case on cable reels)
- Optionally available moving end arm (e.g. as mechanical connection for scraper trolley)
- Available in 2 sizes, each also available in HD version for even higher push/pull forces
- 3500 v2 and 3500 HD optionally available as rol e-chain® for travels up to 200 m and more

Typical industries and applications

- Wastewater and sewage treatment works (longitudinal scrapers, sand/grease traps)
- Electroplating facilities
- Cranes
- Plant construction
- River locks

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More information: www.igus.eu/basicflizz

1047 3D-CAD data, configurators, service life calculators and more: www.igus.eu/basicflizz
**basic flizz® product range | Series 2500 v2 | Series 2500 HD**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Part No. basic flizz®</th>
<th>Part No. basic flizz®</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trough module without glide bar</td>
<td>IE31.3134.E</td>
<td>IE31.3134.E</td>
</tr>
<tr>
<td>Trough module fixed end at the joint</td>
<td>IE31.3135.E</td>
<td>IE31.3220.E</td>
</tr>
<tr>
<td>Trough module fixed end at the centre</td>
<td>IE31.3136.E</td>
<td>IE31.3222.E</td>
</tr>
<tr>
<td>Trough module with glide bar</td>
<td>IE31.3137.E</td>
<td>IE31.3137.E</td>
</tr>
<tr>
<td>Trough module with glide bar and tie-wrap plate</td>
<td>IE31.3217.E</td>
<td>IE31.3217.E</td>
</tr>
<tr>
<td>Installation set v2</td>
<td>IE31.3138.E</td>
<td>IE31.3138.E</td>
</tr>
<tr>
<td>Floating moving end</td>
<td>IE20.2500.05.ST.05.E</td>
<td>IE20.2500.05.ST.05.E</td>
</tr>
<tr>
<td>Moving arm</td>
<td>IE31.2316.E</td>
<td>IE31.2316.E</td>
</tr>
</tbody>
</table>

*Available upon request. Please consult igus® for delivery time.

**basic flizz® installation dimensions | Series 2500 v2 | Series 2500 HD**

- Mounting brackets for e-chain® 2500 basic flizz® series 2500 v2: Part No. 2500.34PZB.A2
- Mounting brackets for e-chain® E4.28 basic flizz® series 2500 HD: Part No. 916.809.1.052.VS.E.A2

**basic flizz® product range | Series 3500 v2 | Series 3500 HD**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Part No. basic flizz®</th>
<th>Part No. basic flizz®</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trough module without glide bar</td>
<td>IE31.3946.E*</td>
<td>IE31.3946.E*</td>
</tr>
<tr>
<td>Trough module fixed end at the joint</td>
<td>IE31.3947.E*</td>
<td>IE31.3947.E*</td>
</tr>
<tr>
<td>Trough module fixed end at the centre</td>
<td>IE31.3948.E*</td>
<td>IE31.3948.E*</td>
</tr>
<tr>
<td>Trough module with glide bar</td>
<td>IE31.3949.E*</td>
<td>IE31.3949.E*</td>
</tr>
<tr>
<td>Trough module with glide bar and tie-wrap plate</td>
<td>IE31.3951.E*</td>
<td>IE31.3951.E*</td>
</tr>
<tr>
<td>Installation set v2</td>
<td>IE31.3950.E*</td>
<td>IE31.3950.E*</td>
</tr>
<tr>
<td>Floating moving end</td>
<td>IE20.3500.115.ST.01.E*</td>
<td>IE20.3500.115.ST.01.E*</td>
</tr>
</tbody>
</table>

*Available upon request. Please consult igus® for delivery time.

**basic flizz® installation dimensions | Series 3500 v2 | Series 3500 HD**

- Mounting brackets for e-chain® 3500 basic flizz® series 3500 v2 - upon request
- Mounting brackets for e-chain® E4.42 basic flizz® series 3500 HD - upon request

Standard material: AISI 304 stainless steel, material 1.4301 (AISI 304). Option: galvanised steel or AISI 316L stainless steel, material 1.4404 (AISI 316L).
In addition to the floating moving end of the basic flizz® 2500 v2 and 2500 HD, igus® offers a modular and adjustable moving end arm for easy installation onto the existing structure.

Application examples:

- **basic flizz® fully enclosed complete solution**
- **Sand trap with telescopic igus® moving end arm - travel 19m**
- **Longitudinal scraper, mounted in the basin, sewage treatment plant in Plauen, Germany - travel 53m**
- **Sewage treatment plant in Volmetal, Germany - travel 26m**
- **Sand traps, sewage plant in Bamberg (Germany) - travel 26m**
Solutions for horizontal motion

micro flizz®

A system for the safe guidance of energy, data and air

Advantages of micro flizz®:
- Compact, quiet, cost-effective complete system as a maintenance-free alternative to a busbar
- e-chain® is guided in special slots, no gliding
- Smooth running due to ball bearings in the guide carriages
- Fast assembly due to pre-configured, modular system
- Less space required
- Also available as pre-assembled system
- Control option via stationary switch cabinet

When to use another system:
- For an upper run guide for long travels, unsupported in swarf areas
  ➤ guidelok horizontal, Page 1038
- For a cost-effective and fully enclosed complete solution
  ➤ basic flizz®, Page 1044
**micro flizz®** - compact system for a secure guidance of power, data and air as a maintenance-free alternative to a busbar.

- Smooth running due to ball bearings in the guide carriages
- e-chain® is guided in special slots, no gliding
- Accelerations up to 50m/s², speeds up to 6m/s and data rates up to 10Gbit/s
- Fast assembly due to pre-configured, modular system
- Less space required
- Also available as pre-assembled system
- Also available with an ESD e-chain® material version (upon request)
- 3 sizes available: cable/hose diameters MF06: max. Ø 8.0mm, MF08: max. Ø 9.5mm, MF10: max. Ø 16mm
- Control option via stationary switch cabinet

**Typical industries and applications**
- Storage and retrieval equipment
- Indoor cranes
- Industrial gates
- Workstations
- Wastewater and sewage treatment plants
- Camera systems
- Sliding doors
- Operator panels
- Measure systems
- Studio equipment
- Material handling equipment

Find a video online ► [www.igus.eu/MF-movie](http://www.igus.eu/MF-movie)

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**micro flizz®** MF06
 unsupported e-chain® in an aluminium profile

<table>
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<th>10</th>
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**micro flizz®** MF08
 unsupported e-chain® in an aluminium profile

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**micro flizz®** MF10
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<th>075</th>
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**Available from stock. Ready to ship in 24 - 48hrs.**

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

**Technical data, dynamic values**

<table>
<thead>
<tr>
<th>Series</th>
<th>Speed [m/s]</th>
<th>Acceleration [m/s²]</th>
<th>Data transmission rate [Gbit/s]</th>
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<tr>
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</tr>
<tr>
<td>MF.10.50.075</td>
<td>6</td>
<td>50</td>
<td>10</td>
</tr>
</tbody>
</table>
**micro flizz® | Features**

**Separated upper and lower run. Running through the radius, integrated winglets fold in. The e-chain® glides freely**

**Plastic spring dampens the rolling noise of the e-chain® in the flizz® channel**

**Sparcific feature of the micro flizz® design**

---

**micro flizz® | How it works**

1. The upper run and lower run of the flizz® e-chain® are separated from each other, which means less friction and less energy used when the e-chain® moves.
2. Winglets hold the e-chain® securely in the guidance channel.
3. Plastic spring causes the e-chain® to roll along gently in the flizz® channel, as a result noise is significantly reduced.
4. Integrated strain relief in the guide carriage for secure fixation of the cables.
5. Universal connection possible due to T-slots.
6. Attachment of the e-chain® by roller carriage on the moving end.
7. Opposing travel: double filling or two independent travels possible.

**chainflex® special cables for micro flizz®**

For the micro flizz® system, igus® has many suitable, highly-flexible special chainflex® cables for dynamic applications, available from stock! More information ► www.igus.eu/chainflex

**Before**: Moving lower run, gliding mode. Long travels need larger, stronger e-chains®

**Today micro flizz®**: Small e-chains® self-guiding in the guide channel. Compared to the conventional system, friction has been reduced by a factor of 3
**Micro flizz® | MF06 | Product range | Installation dimensions**

**Part No.**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Bi [mm]</th>
<th>Ba [mm]</th>
<th>hi [mm]</th>
<th>ha [mm]</th>
<th>R Bend radius [mm]</th>
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</thead>
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<td>10</td>
<td>19</td>
<td>11</td>
<td>17</td>
<td>018</td>
</tr>
</tbody>
</table>

**Installation dimensions**

**Series MF06 - Part No. MF.06.10.018**

- **Installation height complete system**: 108.48 mm
- **Installation width complete system**: 29.5 mm
- **Recommended length channel pieces (die-cast aluminium material)**: 2.0 m / 3.0 m / 6.0 m
- **Cable/hose diameters**: Max. Ø 8 mm

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**Micro flizz® | MF08 | Product range | Installation dimensions**

**Part No.**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Bi [mm]</th>
<th>Ba [mm]</th>
<th>hi [mm]</th>
<th>ha [mm]</th>
<th>R Bend radius [mm]</th>
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<tbody>
<tr>
<td>MF.08.18.035</td>
<td>18</td>
<td>29</td>
<td>13</td>
<td>21</td>
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</tbody>
</table>

**Installation dimensions**

**Series MF08 - Part No. MF.08.18.035**

- **Installation height complete system**: 161 mm
- **Installation width complete system**: 40.5 mm
- **Recommended length channel pieces (die-cast aluminium material)**: 2.0 m / 3.0 m / 6.0 m
- **Cable/hose diameters**: Max. Ø 9.5 mm

---

3D-CAD data, configurators, service life calculators and more: [www.igus.eu/microflizz](http://www.igus.eu/microflizz)
**micro flizz® | Series MF010 | Product range**

<table>
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<tr>
<th>Part No.</th>
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<th>$B_h$</th>
<th>$h_i$</th>
<th>$h_a$</th>
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<td>50</td>
<td>63</td>
<td>20</td>
<td>27.5</td>
<td>075</td>
</tr>
</tbody>
</table>

**Installation dimensions**

Series MF10 - Part No. MF.10.50.075

- **Installation height complete system**: 275mm
- **Installation width complete system**: 107.6
- **Recommended length channel pieces (die-cast aluminium material)**: 2.0m / 3.0m / 6.0m
- **Cable/hose diameters**: Max. ø 16mm

**Application examples**

- **Up to 10GBit/s at a speed of 6m/s - together with the power supply in the micro flizz® MF10**
- **micro flizz® in the food sector**
- **micro flizz® connecting a set of movable scales**
- **Igus® micro flizz® in a sewage plant**
- **Aisle movements over distances of up to 100m at speeds up to 6m/s**
- **Guidance of 4 single cores up to 35mm² and FOC cables with data rates of more than 10Gbit/s**

More information: [www.igus.eu/microflizz](http://www.igus.eu/microflizz)
micro flizz® as an end infeed version with a total length of 5,000mm, consisting of two 2,000mm channels and 1 channel with a residual length of 1,000mm

Calculate the number of channel sections needed \( n \). Then round off the result.

\[
N = \left\lfloor \frac{L}{F} \right\rfloor
\]

- \( B_i = \text{e-chain® inner width} \)
- \( R = \text{Bend radius [mm]} \)
- \( n = \text{Number of channel pieces} \)
- \( S = \text{Travel (L - 300 [mm])} \)
- \( F = \text{Channel section length [mm]} \)
- \( L = \text{Total length [mm]} \)
- \( X = \text{Residual length [mm]} \)

F = Recommended channel lengths: 2,000, 3,000, 6,000mm

\( B_i = \text{Series 06: 10mm} / \text{Series 08: 18mm} / \text{Series 10: 50mm} \)

\( B_i = \text{Series 06: 11mm} / \text{Series 08: 13mm} / \text{Series 10: 20mm} \)

micro flizz® mounted with 2 opposing carriages. Total length 10,000mm, consisting of two 3,000mm channels, the infeed module (200mm) and two channels each with a residual length of 1,900mm

Calculate the number of channel sections needed \( n \). Then round off the result.

\[
N = \left\lfloor \frac{L}{F} \right\rfloor - 200
\]

- \( B_i = \text{e-chain® inner width} \)
- \( R = \text{Bend radius [mm]} \)
- \( n = \text{Number of channel pieces} \)
- \( S = \text{Travel (L - 300 [mm])} \)
- \( F = \text{Channel section length [mm]} \)
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\( B_i = \text{Series 06: 10mm} / \text{Series 08: 18mm} / \text{Series 10: 50mm} \)

\( B_i = \text{Series 06: 11mm} / \text{Series 08: 13mm} / \text{Series 10: 20mm} \)
Make maintenance and repair of your machines more efficient and cost-effective with smart plastics.
- Smart plastics reduce failures.
- Intelligent products predict the maintenance date in good time and can be integrated into your processes and systems.
- Wherever predictive maintenance is required.

Solutions for predictive maintenance

I sense smart plastics

For greater plant availability
Moving energy made smart - smart plastics make smart factories - igus® isense

As a manufacturer and supplier of plastic components such as energy chains, cables and bearings, igus® is also going through a digital development process and is increasingly orienting its products towards use in smart factories. The aim is to make the maintenance and repair of its plastics more efficient and cost-effective. Thanks to the newly developed igus® isense products, maintenance and repair are not only being focused on more in industrial production; they also benefit from digitisation and its advantages.

- Reduce maintenance costs
- Eliminate unplanned downtime
- Increase service life
- Increase equipment efficiency
- Save time - faster detection of faults
- Reduce energy consumption

Typical industries and applications
- Wherever predictive maintenance is required
- Harbour installations
- Cranes
- Car plants
- Gantry

Making maintenance and repair of machines and systems more efficient and cost-effective

Many new sensors and monitoring systems have been developed for the isense product family, making igus® plastic solutions into intelligent products. The result is that igus® components do not simply develop a defect unexpectedly but predict the defect and indicate the need for maintenance in advance. With this new development, igus® has added predictive maintenance - intelligent production meets equally intelligent maintenance.
igus® isense modules, which use sensors to collect data from energy chains, cables, linear guides or slewing ring bearings, are equipped with an interface and can be easily integrated into a control cabinet. A data logger allows values to be stored on an SD card. The data measured by the various isense modules is then sent wirelessly to the icom module, summarised and processed.

**EC.M - e-chain® cycle monitoring / EC.W - e-chain® wear monitoring**
Always moving - EC.M sensor / wear detection - EC.W sensor

The EC.M sensor is mounted on the moving end of the e-chain® in order to record the application data. It detects values such as acceleration, velocity, temperature and number of cycles, and determines the distances completed as well as the remaining service life of the system.

The EC.W sensor measures the wear on the crossbar, on the pin/bore connection or on the liners depending on the product and sends a signal when the limit is reached.

**EC.I - integrated**
Non-contact wear measurement

For rol e-chains®, e.g. series P4.1, the pin/bore connection is the mechanically most stressed component. Directly integrated in the e-chain® link, the EC.I sensor contactlessly measures the wear in the pin/bore connection for maintenance planning.

**EC.P - Push/Pull force monitoring**
When forces are critical: EC.P sensor measures push/pull forces

Use of the EC.P sensor saves maintenance personnel from having to inspect long travel distances - information is always available and can automatically be passed on to the isense system.

**EC.B - e-chains® breakage detection**
Detect e-chain® breakages automatically with the EC.B sensor

The EC.B break detection sensor reduces the amount of work of maintenance technicians responsible for looking after crane installations and gantries. The EC.B sensor can detect breakage of a chain link caused by parts or debris falling into the system. In the past, this problem played a part in the failure of a crane, as breakage of an e-chain® link automatically leads to overloading and failure of the opposite side.

**EC.RC - run control**
Monitoring the operating status of the e-chains®, especially in guide troughs

Sensors measure and check the position of the e-chain®. In this way, the machine is prevented from continuing to operate if mechanical faults occur; meaning that total loss of the e-chain® or an electrical shutdown due to cable damage are avoided.
CF.Q - chainflex® cable service life
Detect hidden cable damage early

The CF.Q sensor indicates changes in the electrical properties; and allows detection of impending cable failure in advance. The engineer then decides what priority the replacement of a cable has and what the consequences of a defect might be.

CF.P - Push/Pull force monitoring
Prolong cable life

Tensile forces acting on the cables of an e-chain system® can significantly reduce the service life. The CF.P system measures the forces directly at the strain relief and indicates the need for action.

DLT.W - drylin® T wear monitoring
Monitor wear status of drylin® linear units

Used to detect when the wear of a drylin® linear guide has reached a level normally associated with the end of the guide’s service life. A plastic element that has an integrated sensor and can be retrofitted, signals the need for replacement in good time.

PRT.W - iglidur® PRT wear monitoring
Monitor wear status of iglidur® slewing ring bearings

To determine the wear limit of iglidur® slewing ring bearings. Mounted in a milled slot below the sliding elements of the PRT, the PRT.W sensor measures the abrasion and can indicate the required replacement promptly via the icom communication module before a failure.

icom - data concentrator
Data collection and transmission

These sensors become even more useful when linked to the icom module - a data concentrator - that can transfer the measured values to an isense system. How the sensor data can be further processed depends on the respective system chosen. igus® currently offers four different variants.
A choice of four different isense smart plastics concepts makes integration into existing infrastructure seamless.

The icom module sends the data gathered by the sensors to a PC or integrates it via a computer into the existing software environment or IT infrastructure. In addition, connection to the igus® Data Centre is possible. By comparing live data with data collected from many existing test applications conducted at the igus® 2,750m² test facility using machine learning techniques and AI algorithms, maintenance recommendations can be provided.

Due to the numerous test findings that are fed into the online service life calculators, igus® is able to predict precisely how long an e-chain® will work reliably in a particular application. The isense modules provide live service life updates of the system, improving overall safety. This is because it includes the current ambient conditions of the actual application. Predictive maintenance ensures that repair or replace tasks are planned only when it is really necessary. This saves time and maintenance cost.

When the isense online system is used, the time shown until the next maintenance is based on the algorithms of the service life calculators for e-chain® systems® and chainflex® cables, which have been available on the Internet for many years: The service life calculator combines the results of many thousands of tests and applications in the field into a predicted life in double strokes or kilometres. In the isense system, the starting values are compared with the real application and a constant comparison takes place with the online models based on AI and machine learning algorithms.

Through numerous tests, the results of which are incorporated into the online service life calculator, igus® can predict very accurately how long an e-chain® will reliably work in the respective application.

More information on isense online, integration, standalone, and offline can be found on www.igus.eu/lifetime.
**Isense online benefits at a glance**

- The best method to plan maintenance and minimise inspection work
- Efficient maintenance organisation according to priority and, thanks to integration into the ERP, with appropriate replacement parts from stock provided after the sensor alert
- Predictive and plannable maintenance due to early information on necessary service or replacement
- Data from the igus® laboratory is processed on a server with anonymised customer data and also with open data from other customer applications in order to create a full data model
- Service life predictions from the protected customer area are regularly compared with the data model
- Benefits from all of the test data in the igus® database and keeps learning every day

**Isense integration benefits at a glance**

- Wide variety of protocols and standards (Profinet, Ethernet, EtherCat, CC-Link IE Field), OPC-UA, MQTT
- Integration into the existing software environment and the IT infrastructure
- Integration into the customer’s production visualisation software
- Operating states of different igus® components visible at a click of the mouse
- Ordering of replacement parts via a connected ERP system
- Connection to control software via customer’s infrastructure (Ethernet, Profinet, CC-Link IE Field etc.)
- Machine shutdown or acoustic / visual warnings
**isense standalone benefits at a glance**

- Easily integrated by a machine programmer
- Sensors (EC.B - break, CF.Q - cable monitoring) on e-chains® and cables gather the measured values
- The machinery can be switched off in two ways: directly by means of the normally closed (NC) contact switch or through evaluation via an I/O interface on the customer’s PLC
- The data can be sent to the maintenance team via a serial interface (RS232/UART) to allow in-house evaluation of the data

**isense offline benefits at a glance**

- An additional industrial PC is required to display all messages via the customer’s IT infrastructure.
- No connection to the Internet therefore no comparison of the maintenance recommendations with an online database
- Manual update of service life information through comparison with the igus® database is necessary
- Good overview on the Industrial PC: all impending failures in the production environment are displayed
- Ideal for production managers and shift supervisors who are interested in facilitating smooth day-to-day work in component manufacturing or service provision and want to efficiently deploy their maintenance technicians
- Quickly and easily installed lean software solution
- All messages are displayed on an additional industrial PC
Online condition monitoring from anywhere in the world - daily maintenance recommendations

In addition to the maintenance recommendation alerts, all measured sensor values can be displayed with history on a detailed page. In this way, exceptional operating conditions or creeping mechanical changes can be detected early on and corresponding measures initiated in good time.
Solutions for predictive maintenance

PPDS
Push/Pull force monitoring

- Easy installation, non-interchangeable connectors
- Easy programming using the keypad directly at the device
- Compact housing, corrosion-resistant and with EMC protection
- The force limit is programmed in tensile and compression directions
- The plant shuts down when the force is exceeded
- Custom programmable
- Event logging in the data memory
- igus® smart plastics - intelligent products forecast maintenance date in good time # Page 1064
Push-pull force monitoring - Push-Pull Force Detection System - PPDS

The PPDS system is an electronic diagnostics tool that performs online monitoring of push/pull forces on e-chains® in order to avoid system damage and stoppages. Excessive dirt, ice, and snow and foreign objects that fall into the e-chain® can block the system, causing the e-chain® to break. The PPDS system measures the forces on the e-chain® several times per second, and compares the information with the calculated specification. If a difference is found, a signal is triggered. How the signal is used can be freely selected (e.g. immediate stop, slow down, acoustic signal, light signal)

- 3 PPDS system options are available
- Easy installation by means of non-interchangeable connectors
- Easy programming using the keypad directly at the device
- Compact housing, corrosion-resistant and with EMC protection
- The force limit is programmed in tensile and compression directions
- The plant shuts down when the force is exceeded
- Custom programmable and event logging in the data memory

Typical industries and applications

- Installations and systems that are susceptible to disruption such as conveyors in power plants
- Waste incineration plants
- Chemical plants
- and cranes
- In general, for long travels where a high degree of reliability is required
- For long travels when push/pull force monitoring is needed

PPDS basic - standard

So far the realisation of Condition Monitoring Systems was limited to large-scale e-chain® projects, e.g. ship-to-shore cranes. PPDS basic now makes this technology available for all standard industrial applications. Simple force measurement at the mounting bracket of the e-chain® enables monitoring at a reasonable price, even in the case of e-chains® with travels of considerably less than 100m.

- Cost-effective system protection
- Signal or alarm in the event of system overloading
- Very space-saving
- New floating moving end now available for PPDS basic

More information ▶️ www.igus.eu/PPDSbasic

PPDS advanced - for long travels

The system for very long gliding applications with an igus® floating moving end (used to compensate lateral movements). The force sensor is integrated in the floating moving end and works in connection with the PPDS evaluation unit.

More information ▶️ www.igus.eu/PPDSadvanced

PPDS pro - when the requirements for operational reliability are extremely high

The system for long travels when extreme operational reliability is essential. The PPDS pro analysis unit can analyse force thresholds by position. Here as well, a load cell is installed in the floating moving end.

More information ▶️ www.igus.eu/PPDSpro

Floating moving end as an individual part

- Compensates parallel errors - compensates lateral offset tolerances between moving end and e-chain® system
  (horizontal ± 25mm)
- Easy assembly, small, light, and cost-effective
- Compatible with PPDS basic
- Max. 2m/s² acceleration (the speed depends on the e-chain® type)

More information ▶️ www.igus.eu/FTAbasic

Product range

<table>
<thead>
<tr>
<th>Part No. floating moving end as separate component</th>
<th>For series</th>
<th>For system</th>
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More series available upon request. Please consult igus® for delivery time.

Complete Part No. with the required e-chain® width index Bi.
Example: FTA.B.01.2500.05

When planning integration of these products, please consult igus®.

Available from stock. Ready to ship in 24 - 48hrs.*

*The delivery times indicated correspond to the average time until the ordered goods are dispatched.
Modular projects
Special solutions from stock

- Faster quotations, faster project planning
- Detailed service manuals and documentation
- Time and cost savings
- Absolute functional reliability
- System guarantee available upon request and depending on the application
- PPDS moving end - electronic Push/Pull Detection System
- Fixed end modules for easy attachment of the e-chain® inside the guide trough, with no drilling required
- Extreme gliding - gliding elements for even longer service life of e-chains® where long travels are involved
- HD trough systems with different installation set designs, matching the respective application and duty levels
Special solutions from stock - modular projects

The igus® project kit system - tested project solutions proven in numerous applications are now available as standard modular kits.
- Faster quotations, faster project planning
- Detailed service manuals and documentation
- Time and cost savings
- Absolute functional reliability
- System guarantee available upon request and depending on the application
- PPDS moving end - electronic Push/Pull Detection System
- Fixed end modules for easy attachment of the e-chain® inside the guide trough, with no drilling required
- Extreme gliding - gliding elements for even longer service life of e-chains® where long travels are involved
- HD trough systems with different installation set designs, matching the respective application and duty levels

Typical industries and applications
- Cranes
- Offshore
- and many other industries

Find a video online
- www.igus.eu/System-Project

Available from stock. Ready to ship in 24 - 48hrs.*

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

More information ➾ www.igus.eu/projects