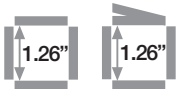


2828  
2928  
R7728



# Energy Chain System® E4/4 Series 2828/2928/R7728



### Price Index



Series 2828

Series 2928

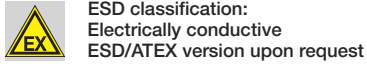


Series R7728

### Special Features / Options



Side-mounted - unsupported



ESD classification:  
Electrically conductive  
ESD/ATEX version upon request



High torsional rigidity

### Assembly Tips



Opening Energy Chains®: Remove crossbars and clips - Insert screwdriver into the slot, push down, release by lever action



Remove lids/bottoms (Energy Tubes) - Insert screwdriver into the slot, release by lever action

### Other Installation Methods

Vertical, hanging ≤ 230 ft (70 m)

Vertical, standing ≤ 16.4 ft (5 m)

Side-mounted, un\_supp. ≤ 6.56 ft (2 m)

Rotary requires further calculation

### Usage Guidelines



- If subject to high torsional or shearing forces
- If a side-mounted chain/tube with long unsupported lengths is required
- If subject to very damp environments consistently



- If a quieter version is required  
➤ Series 280/290/R770

### Features & Benefits

- 1 KMA mounting brackets with attachment points on all sides
- 2 Crossbars on Energy Chains® are removable along both radii
- 3 Hinged snap-open removable lids along outer radius of Energy Tube
- 4 Lateral glide surfaces for side-mounted operation
- 5 High side-mount stability due to undercut
- 6 Locking or pivoting mounting brackets available
- 7 Closed and open styles can be combined
- 8 High torsional rigidity
- 9 Removable lids along inner radius
- 10 Wide, rounded plastic crossbars - cable friendly
- 11 Energy Chain® also available with reverse bending radii



RoI E-Chain® Series  
2828R/7728R available  
upon request

### Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

energy chain® configurator ▶

9.84 ft (3 m) 2828-30-300-0

Energy Chain®

With 2 separators 281 assembled every 2nd link

Interior Separation

1 Set 282800-30-12P

Mounting Bracket

# Energy Chain System® E4/4 Series 2828/2928/R7728 Installation Dimensions

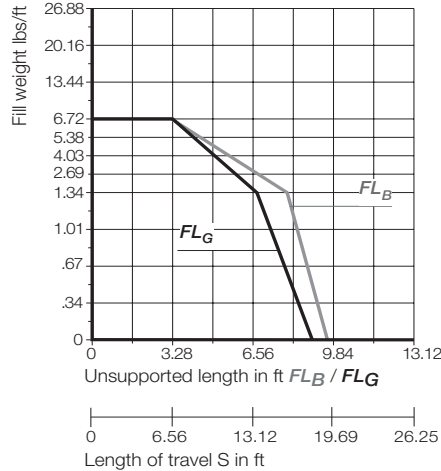
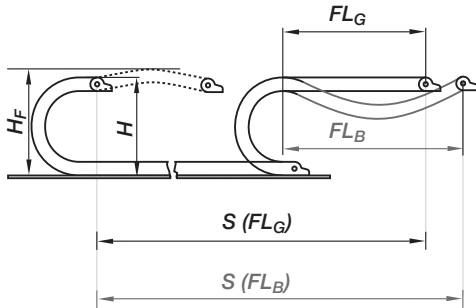
energy chain® configurator



2828  
2928  
R7728

## Short travel, unsupported length

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



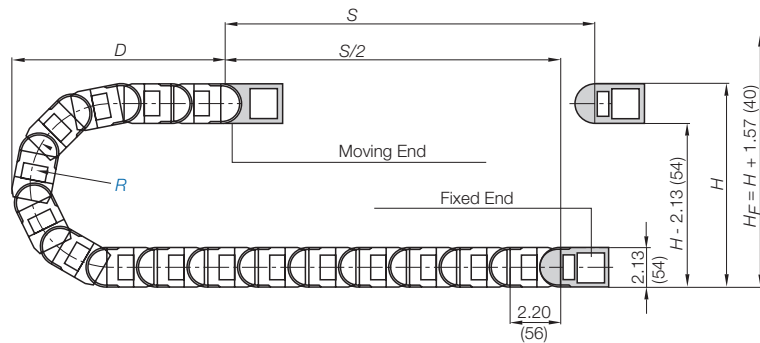
## Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

## Legend

- S = Length of travel
  - R = Bending radius
  - H = Nominal clearance height
  - D = Overlength Energy Chain® radius in final position
  - $K = \pi \cdot R + \text{safety buffer}$
  - $H_F$  = Required clearance height
  - $H_{RI}$  = Trough inner height
  - $H_2$  = \*Mounting height
  - $D_2$  = Overlength - long travels, gliding
  - $K_2$  = \*Add-on
- \*If the mounting bracket location is set lower



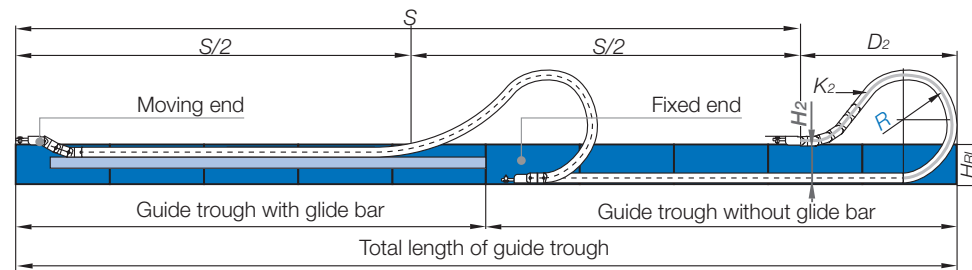
Pitch per link: = 2.20" (56 mm)  
Links per ft (m): = 5.48 (18)  
For center mount applications:  
Chain length =  $S/2 + K$

The required clearance height:  $H_F = H + 1.57$  in. (40 mm) (with 1.34 lbs/ft (2 kg/m) fill weight). Please consult igus® if space is particularly restricted.

R	2.48 (063)	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	8.66 (220)	9.84 (250)	11.81 (300)
$H_{+20}$	7.09 (180)	8.07 (205)	10.04 (255)	12.01 (305)	13.98 (355)	15.94 (405)	17.91 (455)	19.49 (495)	21.85 (555)	25.79 (655)
D	5.12 (130)	5.91 (150)	6.89 (175)	7.87 (200)	8.86 (225)	9.84 (250)	10.83 (275)	11.61 (295)	12.80 (325)	14.76 (375)
K	13.39 (340)	14.96 (380)	18.31(465)	21.65 (550)	24.41 (620)	27.56 (700)	30.70 (780)	33.46 (850)	37.01 (940)	43.70 (1110)

## For long travels with lowered mounting height

Long travel lengths from 32.8 ft.(10m) to max. 656 ft. (200m)



For center mount applications:  
Chain length =  $S/2 + K_2$

## Long Travels - Gliding



If the unsupported length is exceeded, the Energy Chain®/Tube must glide on itself. This requires a guide trough.

Design, Chapter 1

R	2.48 (063)	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	8.66 (220)	9.84 (250)	11.81 (300)
$H_2$	-	-	6.54 (166)	6.54 (166)	6.54 (166)	6.54 (166)	6.54 (166)	6.54 (166)	6.54 (166)	6.54 (166)
$D_2 +20$	-	-	14.57 (370)	17.52 (445)	24.61 (625)	25.79 (655)	30.31 (770)	34.25 (870)	36.61 (930)	48.82 (1240)
$K_2$	-	-	24.25 (616)	30.87 (784)	39.68 (1008)	41.89 (1064)	50.71 (1288)	57.32 (1456)	61.73 (1568)	77.17 (1960)



For support of the lower run, see Chapter 9 for the Support Tray tool kit

## Technical Data



Details of material properties

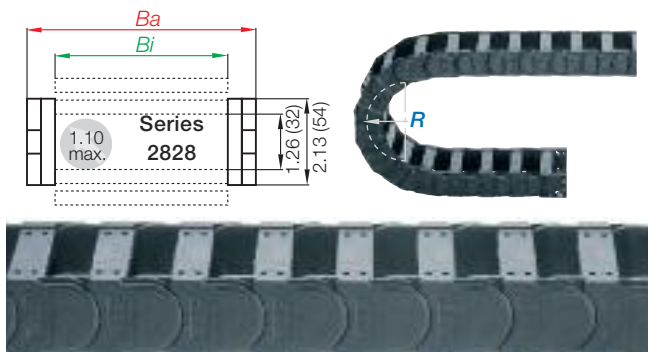
Chapter 1

Speed / acceleration $FL_G$	max. 65.6 ft/s (20 m/s) / max. 656 ft/s <sup>2</sup> (200 m/s <sup>2</sup> )
Speed / acceleration $FL_B$	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s <sup>2</sup> (6 m/s <sup>2</sup> )
Gliding speed / acceleration (maximum)	max. 32.8 ft/s (10 m/s) / max. 164 ft/s <sup>2</sup> (50 m/s <sup>2</sup> )
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB

PDF: [www.igus.com/e-chain-pdfs](http://www.igus.com/e-chain-pdfs)  
Specs/CAD/RFQ: [www.igus.com/e-chains](http://www.igus.com/e-chains)  
RoHS info: [www.igus.com/RoHS](http://www.igus.com/RoHS)

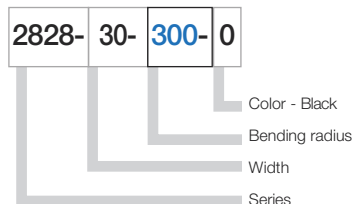


### Series 2828 - Energy Chain® with crossbars every link

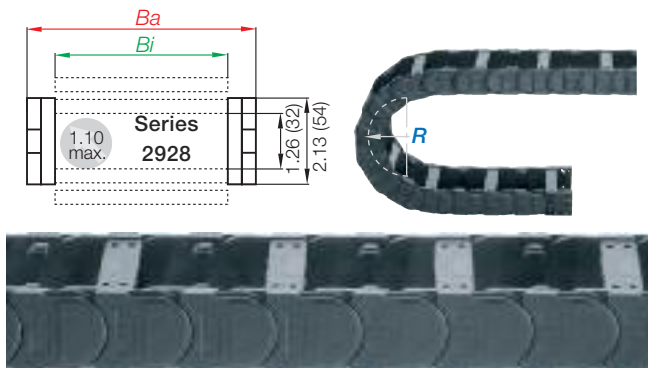


- Crossbars every link
- For use with rigid hydraulic hoses
- For particularly demanding applications
- Can be opened from both sides

#### Part Number Structure

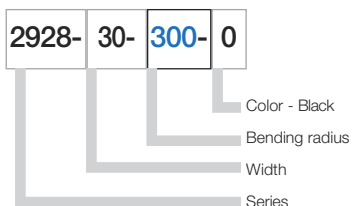


### Series 2928 - Energy Chain® with crossbars every other link

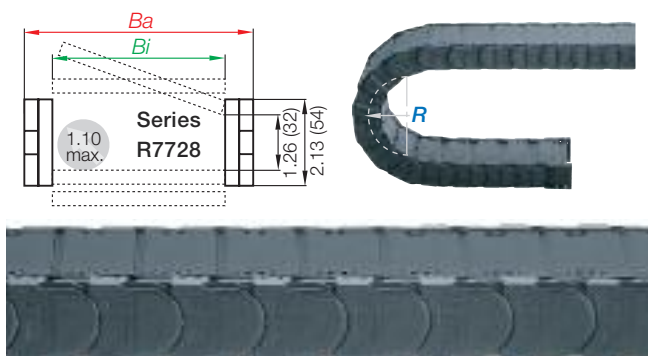


- Crossbars every other link
- Standard configuration
- For nearly every situation
- Can be opened from both sides
- Easy assembly
- Stable
- Cost-effective

#### Part Number Structure

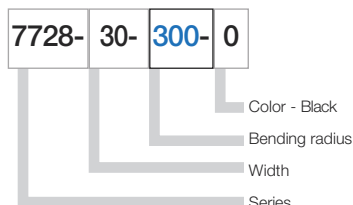


### Series R7728 - fully enclosed Energy Tube

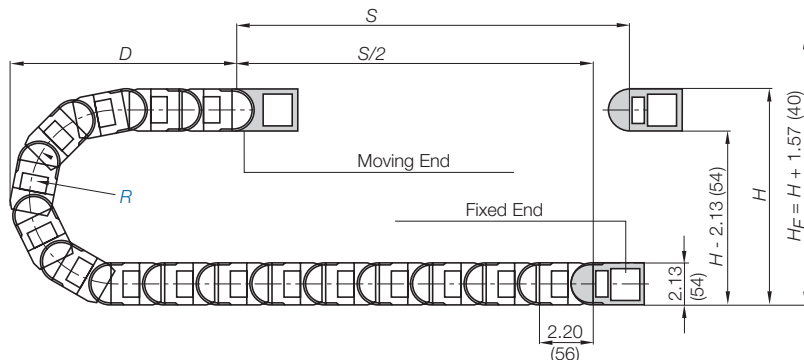
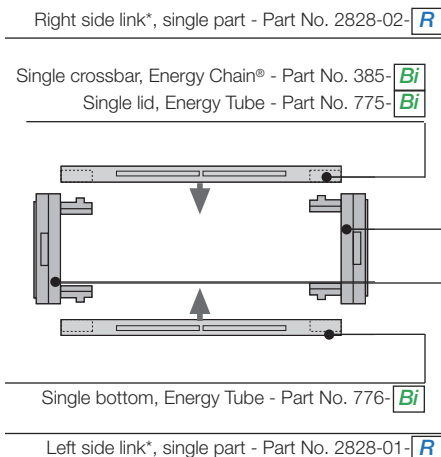


- Fully enclosed
- Excellent cable and hose protection against dirt
- Protection against hot chips up to 1652°F (900°C)
- Lids along inner radius are completely removable
- Lids along the outer radius are single-sided, snap open, hinged on one side as well as completely removable

#### Part Number Structure



### Energy Chain® as separate parts, links and side plates



\*View from the fixed point of the Energy Chain®/Energy Tube

# Energy Chain System® E4/4

## Series 2828/2928/R7728

energy chain® configurator 



2828  
2928  
R7728

Supplement part number with required radius. Example: 2828-30--0  
Pitch: 2.20 in. (56mm) per link links/ft(m) = 5.49 (18)

Part Number			Bi in. (mm)	Ba in. (mm)	Weight		
Crossbars Every Link	Crossbars Every Other	Tube Version			2828 lbs/ft (kg/m)	2928 lbs/ft (kg/m)	R7728 lbs/ft (kg/m)
2828-05-	2928-05-	*7728-05- <input type="text" value="0"/> -0	1.97 (50)	2.91 (74)	≈ 1.16 (1.73)	≈ 1.10 (1.64)	≈ 1.76 (2.63)
2828-06-	2928-06-	<input type="text" value="0"/> -0	2.68 (68)	3.62 (92)	≈ 1.20 (1.79)	≈ 1.12 (1.67)	-
2828-07-	2928-07-	7728-07- <input type="text" value="0"/> -0	2.95 (75)	3.90 (99)	≈ 1.24 (1.84)	≈ 1.14 (1.69)	≈ 1.84 (2.75)
2828-087-	2928-087-	<input type="text" value="0"/> -0	3.43 (87)	4.37 (111)	≈ 1.30 (1.93)	≈ 1.16 (1.73)	-
2828-10-	2928-10-	7728-10- <input type="text" value="0"/> -0	3.94 (100)	4.88 (124)	≈ 1.36 (2.02)	≈ 1.20 (1.78)	≈ 1.90 (2.83)
2828-11-	2928-11-	7728-11- <input type="text" value="0"/> -0	4.25 (108)	5.20 (132)	≈ 1.40 (2.08)	≈ 1.22 (1.81)	≈ 1.98 (2.94)
2828-112-	2928-112-	<input type="text" value="0"/> -0	4.41 (112)	5.39 (137)	≈ 1.44 (2.15)	≈ 1.24 (1.84)	-
2828-12-	2928-12-	7728-12- <input type="text" value="0"/> -0	4.92 (125)	5.87 (149)	≈ 1.48 (2.20)	≈ 1.26 (1.87)	≈ 2.04 (3.03)
2828-137-	2928-137-	<input type="text" value="0"/> -0	5.39 (137)	6.38 (162)	≈ 1.54 (2.29)	≈ 1.28 (1.91)	-
2828-15-	2928-15-	7728-15- <input type="text" value="0"/> -0	5.91 (150)	6.85 (174)	≈ 1.60 (2.38)	≈ 1.32 (1.96)	≈ 2.14 (3.19)
2828-162-	2928-162-	<input type="text" value="0"/> -0	6.38 (162)	7.36 (187)	≈ 1.64 (2.44)	≈ 1.34 (1.99)	-
2828-17-	2928-17-	7728-17- <input type="text" value="0"/> -0	6.61 (168)	7.56 (192)	≈ 1.69 (2.51)	≈ 1.36 (2.02)	≈ 2.28 (3.39)
2828-18-	2928-18-	<input type="text" value="0"/> -0	6.89 (175)	7.83 (199)	≈ 1.72 (2.56)	≈ 1.38 (2.05)	-
2828-187-	2928-187-	<input type="text" value="0"/> -0	7.36 (187)	8.35 (212)	≈ 1.78 (2.65)	≈ 1.40 (2.09)	-
2828-20-	2928-20-	7728-20- <input type="text" value="0"/> -0	7.87 (200)	8.82 (224)	≈ 1.84 (2.74)	≈ 1.44 (2.14)	≈ 2.41 (3.59)
2828-212-	2928-212-	<input type="text" value="0"/> -0	8.35 (212)	9.33 (237)	≈ 1.93 (2.87)	≈ 1.48 (2.20)	-
2828-23-	2928-23-	<input type="text" value="0"/> -0	8.86 (225)	9.80 (249)	≈ 1.96 (2.92)	≈ 1.49 (2.22)	-
2828-237-	2928-237-	<input type="text" value="0"/> -0	9.33 (237)	10.31 (262)	≈ 2.05 (3.05)	≈ 1.54 (2.29)	-
2828-25-	2928-25-	7728-25- <input type="text" value="0"/> -0	9.84 (250)	10.79 (274)	≈ 2.08 (3.10)	≈ 1.56 (2.32)	≈ 2.72 (4.04)
2828-262-	2928-262-	<input type="text" value="0"/> -0	10.31 (262)	11.26 (286)	≈ 2.14 (3.19)	≈ 1.59 (2.36)	-
2828-28	2928-28-	<input type="text" value="0"/> -0	10.83 (275)	11.77 (299)	≈ 2.20 (3.28)	≈ 1.62 (2.41)	-
2828-29-	2928-29-	<input type="text" value="0"/> -0	11.30 (287)	12.28 (312)	≈ 2.26 (3.37)	≈ 1.65 (2.45)	-
2828-30-	2928-30-	7728-30- <input type="text" value="0"/> -0	11.81 (300)	12.76 (324)	≈ 2.33 (3.46)	≈ 1.68 (2.50)	≈ 2.98 (4.43)
2828-312-	2928-312-	<input type="text" value="0"/> -0	12.28 (312)	13.27 (337)	≈ 3.86 (3.59)	≈ 1.72 (2.56)	-
2828-325-	2928-325-	<input type="text" value="0"/> -0	12.79 (325)	13.74 (349)	≈ 2.47 (3.68)	≈ 1.75 (2.60)	-
2828-337-	2928-337-	<input type="text" value="0"/> -0	13.27 (337)	14.25 (362)	≈ 2.53 (3.77)	≈ 1.78 (2.65)	-
2828-350-	2928-350-	<input type="text" value="0"/> -0	13.78 (350)	14.72 (374)	≈ 2.59 (3.86)	≈ 1.81 (2.69)	-
2828-362-	2928-362-	<input type="text" value="0"/> -0	14.25 (362)	15.24 (387)	≈ 2.65 (3.95)	≈ 1.84 (2.74)	-
2828-375-	2928-375-	<input type="text" value="0"/> -0	14.76 (375)	15.71 (399)	≈ 2.72 (4.04)	≈ 1.88 (2.79)	-
2828-387-	2928-387-	<input type="text" value="0"/> -0	15.24 (387)	16.22 (412)	≈ 2.76 (4.11)	≈ 1.90 (2.82)	-
2828-400	2928-400-	<input type="text" value="0"/> -0	15.75 (400)	16.69 (424)	≈ 2.81 (4.18)	≈ 1.92 (2.86)	-

Choose from the radii below for all of the above sizes

Radius (mm) Example: 2828-30--0

	063**	075**	100**	125	150	175	200	220	250	300
R	2.48 (063)	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	8.66 (220)	9.84 (250)	11.81 (300)
H* $\frac{D}{20}$	7.09 (180)	8.07 (205)	10.04 (255)	12.01 (305)	13.98 (355)	15.94 (405)	17.91 (455)	19.49 (495)	21.85 (555)	25.79 (655)
D	5.12 (130)	5.91 (150)	6.89 (175)	7.87 (200)	8.86 (225)	9.84 (250)	10.83 (275)	11.61 (295)	12.80 (325)	14.76 (375)
K	13.39 (340)	14.96 (380)	18.31(465)	21.65 (550)	24.41 (620)	27.56 (700)	30.70 (780)	33.46 (850)	37.01 (940)	43.70 (1110)

\*\* This radius is not available for the R7728 Series

\*Removable lid only, no hinged option

0=Standard color black. For other colors see Chapter 1

For wider chains see page 6.13. For large diameter hoses see page 6.13

PDF: [www.igus.com/e-chain-pdfs](http://www.igus.com/e-chain-pdfs)  
Specs/CAD/RFQ: [www.igus.com/e-chains](http://www.igus.com/e-chains)  
RoHS info: [www.igus.com/RoHS](http://www.igus.com/RoHS)



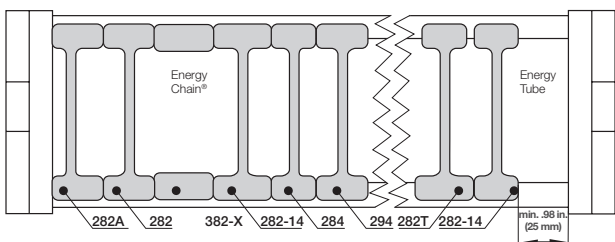




**Option 1: Vertical separators and spacers**

Vertical separators are used if a vertical subdivision of the Energy Chain® interior is required. By standard, vertical separators are assembled every other Energy Chain® link.

**NOTE:** Observe a lateral spacing of at least .98 in. (25mm) for Energy Tubes



<b>STANDARD Vertical separator 280</b>		<b>Separator (chain/tube)</b> Unassembled <b>Part No. 280</b> Assembled <b>Part No. 281</b>
<b>Vertical separator 280 -14</b>		<b>Separator (chain/tube)</b> Unassembled <b>Part No. 280-14</b> Assembled <b>Part No. 281-14</b>
<b>Vertical separator 283</b>		<b>Separator (chain only)</b> Unassembled <b>Part No. 283</b> Assembled <b>Part No. 284</b>
<b>Locking separator 293</b>		<b>Locking Separator (chain only)</b> Unassembled <b>Part No. 293</b> Assembled <b>Part No. 294</b>
<b>Vertical separator 281T</b>		<b>Vertical Separator (tubes only)</b> Unassembled <b>Part No. 281T</b> Assembled <b>Part No. 282T</b>
<b>Asymmetric separator 281A</b>		<b>Asymmetric separator (chain only)</b> Unassembled <b>Part No. 280A</b> Assembled <b>Part No. 281A</b>
<b>Spacers 381-XX</b>		<b>Spacer (chain only)</b> Unassembled <b>Part No. 381-XX</b> Assembled <b>Part No. 382-XX</b> XX = width of the spacer

- **Standard separator 280 for Energy Chains® and Energy Tubes**  
This separator offers safe stability due to its wide base design, also when used with thick cables or hoses.
- **Vertical separator 280-14 for Energy Chains® and Energy Tubes**  
This separator offers safe stability due to its broad base design when used with thick cables or hoses.
- **Vertical separator 283 for Energy Chains®**  
This separator features a narrow base for use in applications where a large number of small cables need to be individually separated.
- **Locking separator 293 for Energy Chains®**  
This separator is used in applications with very high relative humidity. It features increased retention force which is produced by asymmetrical retention "clamps" attached to the chain's crossbar. Please ensure that they are properly aligned.
- **Vertical separator 281T for Energy Tubes**  
It clamps to the fixed radius and remains free along the other radius to facilitate lid removal.
- **Asymmetrical separator 281A for Energy Chains®**  
This separator features a (12mm) base. It can be used in combination with spacers of different widths and vertical separators in side mounted applications.
- **NOTE ON SPACERS**  
Vertical separators are adjustable, but can be fixed in position by means of a spacer. Spacers are most often necessary for side mounted applications. The available inner height is reduced by .08" (2mm) **per spacer** (for example if one spacer is placed on either side of the separator, the overall inner height is reduced by .16" (4mm). To avoid this, place the spacers on the **outside** of the opening crossbar (**not for long travels**).

Spacers available in the following sizes:

Part No. Unassembled	Part No. Assembled	in.	(mm)
381 -10	382 -10	.39"	(10)
381 -15	382 -15	.59"	(15)
381 -20	382 -20	.79"	(20)

# Energy Chain System® E4/4 Series 2828/2928/R7728 Interior Separation

energy chain® configurator ▶

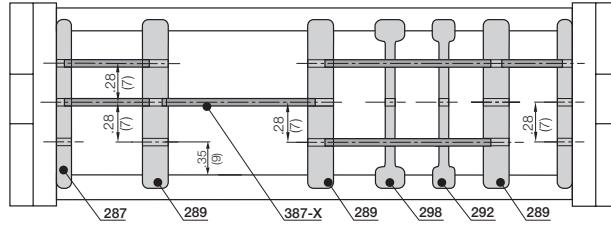


2828  
2928  
R7728



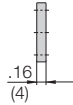
## Option 2: Shelves

Energy Chains® and Energy Tubes can be subdivided both vertically and horizontally using the various interior separation elements. ▶ **Design, Chapter 1** for layout recommendations.



- Side plates 286**

This component is used to form the basic pattern of a shelf system.



### Side Plate

Unassembled	<b>Part No. 286</b>
Assembled	<b>Part No. 287</b>

Side plate  
**286**

- Vertical separator 288**

This component is used to form the basic pattern of a shelf system.



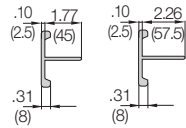
### Vertical Separator

Unassembled	<b>Part No. 288</b>
Assembled	<b>Part No. 289</b>

Vertical separator  
**288**

- Locking vertical separator 281-S**

This separator is slotted and able to be combined with shelves



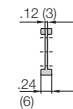
### Separators w/Integrated Shelf

Unassembled	<b>Part No. 281-S-45</b>
Assembled	<b>Part No. 282-S-45</b>
Unassembled	<b>Part No. 281-S-57</b>
Assembled	<b>Part No. 282-S-57</b>

Separator with integrated shelf  
**281-S**

- Closed Slotted separators 291**

These are used for complex subdivisions. However, they cannot be retrofitted into an existing interior separation system without removing the shelves first.



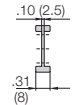
### Slotted Separators (chain only)

Unassembled	<b>Part No. 291</b>
Assembled	<b>Part No. 292</b>

Closed slotted separator  
**291**

- Open slotted separator 297**

This separator can be retrofitted into an existing interior separation system without removing the shelves, as long as these shelves fit into the middle slot only.



### Slotted Separators, Open

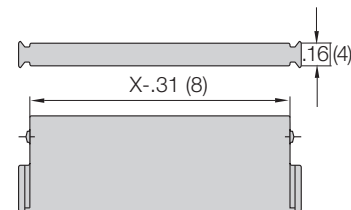
Unassembled	<b>Part No. 297</b>
Assembled	<b>Part No. 298</b>

Open slotted separator  
**297**

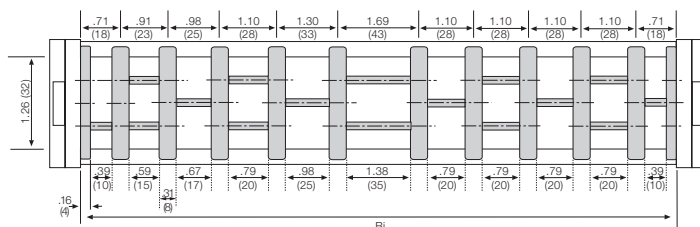
Width X in. (mm)	Usable Width in. (mm)	Part No. Unassembled	Part No. Assembled
.71 (18)	.39 (10)	<b>386-18</b>	<b>387-18</b>
.91 (23)	.59 (15)	<b>386-23</b>	<b>387-23</b>
.98 (25)	.67 (17)	<b>386-25</b>	<b>387-25</b>
1.10 (28)	.79 (20)	<b>386-28</b>	<b>387-28</b>
1.30 (33)	.98 (25)	<b>386-33</b>	<b>387-33</b>
1.69 (43)	1.38 (35)	<b>386-43</b>	<b>387-43</b>
1.97 (50)	1.65 (42)	<b>386-50</b>	<b>387-50</b>
2.13 (54)	1.81 (46)	<b>386-54</b>	<b>387-54</b>
2.44 (62)	2.13 (54)	<b>386-62</b>	<b>387-62</b>
2.95 (75)	2.64 (67)	<b>386-75</b>	<b>387-75</b>
3.43 (87)	3.12 (87)	<b>386-87</b>	<b>387-87</b>
3.94 (100)	3.62 (92)	<b>386-100</b>	<b>387-100</b>
4.25 (108)	3.94 (100)	<b>386-108</b>	<b>387-108</b>
4.92 (125)	4.61 (117)	<b>386-125</b>	<b>387-125</b>
5.91 (150)	5.59 (142)	<b>386-150</b>	<b>387-150</b>
6.89 (175)	6.57 (167)	<b>386-175</b>	<b>387-175</b>
7.87 (200)	7.56 (192)	<b>386-200</b>	<b>387-200</b>
8.19 (208)	7.87 (200)	<b>386-208</b>	<b>387-208</b>
8.86 (225)	8.54 (217)	<b>386-225</b>	<b>387-225</b>

## Shelves 386-XX

These components form the basic pattern of a shelf system. Shelves of various widths can be arranged at 3 different heights in .28" (7mm) increments



The diagram below is for reference purposes only. Multiple configurations are possible. To create your e-chain shelving cross section please see our online e-chain configurator. Call 1-800-521-2747 for assistance and/or go to [igus.com](http://igus.com) click on the **Products** drop down menu, choose **Energy Chain Cable Carriers** and on the next drop down menu simply click on **e-chain Configurator**.



PDF: [www.igus.com/e-chain-pdfs](http://www.igus.com/e-chain-pdfs)  
Specs/CAD/RFQ: [www.igus.com/e-chains](http://www.igus.com/e-chains)  
RoHS info: [www.igus.com/RoHS](http://www.igus.com/RoHS)



igus® Energy Chain System®

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

Internet: <http://www.igus.com>  
email: [sales@igus.com](mailto:sales@igus.com)  
QuickSpec: <http://www.igus.com/quickspec>

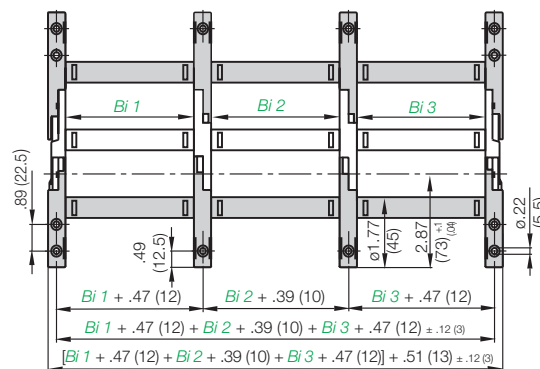


**Extension links - for extremely wide Energy Chains® up to 9.84 ft (3m)**

- For applications in which particularly high fill weights necessitate extremely wide Energy Chains® (up to 118" (3000 mm))
- The extension link design allows virtually limitless side-by-side attachment of chains
- The unsupported length of a chain can be increased when additional loads are required
- Extension links can be used with Energy Chains®, Energy Tubes or a combination of both
- They are suitable for unsupported and gliding applications in a guide trough
- Energy Chains® with extension links are attached with KMA or steel mounting brackets.

Part number example for Energy Chain®  
2828-10/20/10--0  
2828-Bi1/Bi2/Bi3--0

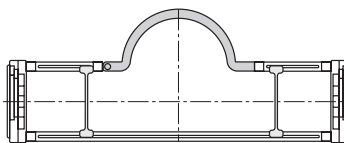
We **strongly recommend** on-site consultation with an igus® technician for individual advice regarding mounting brackets, guide troughs and other design details.



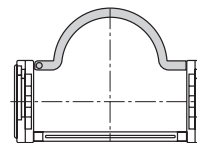
**Extender crossbars - For careful guiding of large diameter cables and hoses**

- Intended for cables and hoses with a maximum outer diameter of 4.13 in. (105 mm).
- Gliding operation with crossbars assembled along the outer radius in conjunction with a special guide trough
- Gliding operation not guaranteed with crossbars assembled along the inner radius
- The extender crossbar can either be attached to the side links directly or can be used in combination with two standard snap-open crossbars.

Consult igus® for your extender crossbar applications. We will be happy to assist you with your design layout.



Round extender crossbar combined with standard snap-open crossbars.

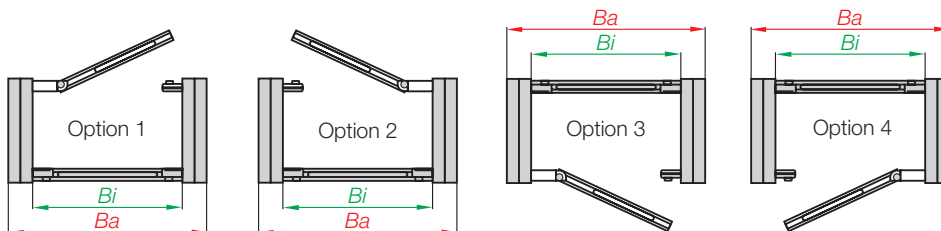


Attached directly to the side link.

Part No.	Max Ø Hose	Style	Installation Side Link	Combined with Snap-Open Crossbars
385-15-RHD115	By request	Round	No	Yes
385-18-RD115	By request	Round	Yes	No

**Hinged crossbars**

- Typically, Energy Chain® crossbars are completely removable. In cases where it is preferable that the opening crossbars remain on the Energy Chain®, a hinged design has been developed.
- Please consult igus® for design assistance



# Energy Chain System® E4/4

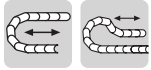
## Series 2828/2928/R7728

### Mounting Brackets - KMA

energy chain® configurator ▶



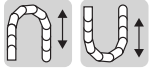
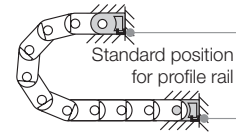
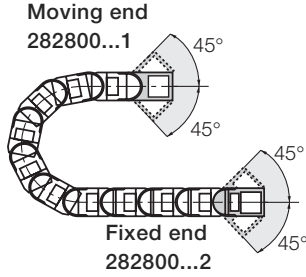
2828  
2928  
R7728



**Standard**

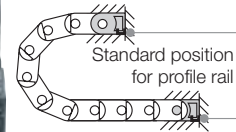
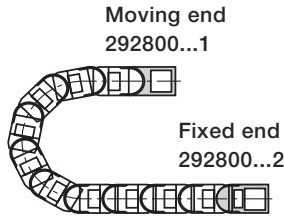
#### Option 1: pivoting

- Profile rail option
- Universal use
- Corrosion resistant
- Short and long travels
- Space-restricted conditions

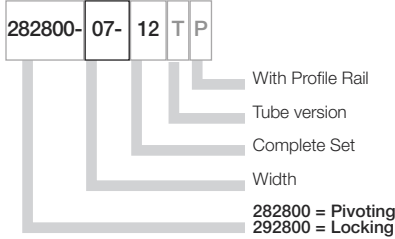


#### Option 2: locking

- Profile rail option
- Universal use
- Corrosion resistant
- Vertical hanging/standing travels
- Extreme accelerations



#### Part Number Structure



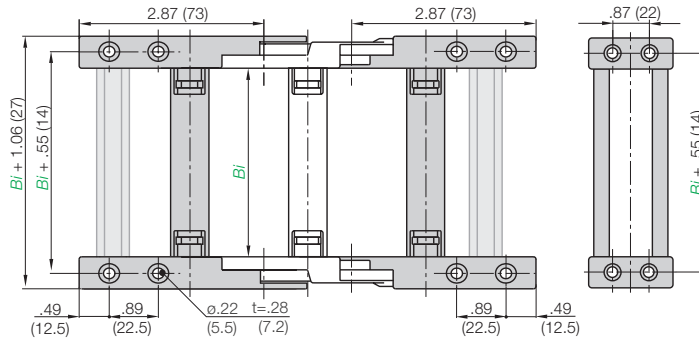
Full set, for both ends:

282800-07-12 Full set, each part with pin/bore

Single-part order:

282800-07-1 Mounting bracket with bore

282800-07-2 Mounting bracket with pin



Part number examples are shown for pivoting brackets. For locking brackets change part number to 292800

Part No. Full Set (pivoting)  
Series 2828 or 2928:  
282800-Width-12

Part No. Full Set (pivoting)  
with profile rail  
Series 2828 or 2928  
282800-Width-12P

Part No. Full Set (pivoting)  
Tube Series R7728  
282800-Width-12T

Part No. Full Set (pivoting)  
with Profile Rail  
Tube Series R7728  
282800-Width-12TP

Width	Part No. Full Set		Tube Option	With Profile Rail	Bi in. (mm)	
	Pivoting	Locking				
-05*	282800	292800	-05-12	T	P	1.97 (50)
-06	282800	292800	-06-12		P	2.68 (68)
-07	282800	292800	-07-12	T	P	2.95 (75)
-087	282800	292800	-087-12		P	3.43 (87)
-10	282800	292800	-10-12	T	P	3.94 (100)
-11	282800	292800	-11-12	T	P	4.25 (108)
-112	282800	292800	-112-12		P	4.41 (112)
-12	282800	292800	-12-12	T	P	4.92 (125)
-137	282800	292800	-137-12		P	5.39 (137)
-15	282800	292800	-15-12	T	P	5.91 (150)
-162	282800	292800	-162-12		P	6.38 (162)
-17	282800	292800	-17-12	T	P	6.61 (168)
-18	282800	292800	-18-12		P	6.89 (175)
-187	282800	292800	-187-12		P	7.36 (187)
-20	282800	292800	-20-12	T	P	7.87 (200)
-212	282800	292800	-212-12		P	8.35 (212)

Width	Part No. Full Set		Tube Option	With Profile Rail	Bi in. (mm)	
	Pivoting	Locking				
-23	282800	292800	-23-12		P	8.86 (225)
-237	282800	292800	-237-12		P	9.33 (237)
-25	282800	292800	-25-12	T	P	9.84 (250)
-262	282800	292800	-262-12		P	10.31 (262)
-28	282800	292800	-28-12		P	10.83 (275)
-29	282800	292800	-29-12		P	11.30 (287)
-30	282800	292800	-30-12	T	P	11.81 (300)
-312	282800	292800	-312-12		P	12.28 (312)
-325	282800	292800	-325-12		P	12.79 (325)
-337	282800	292800	-337-12		P	13.27 (337)
-350	282800	292800	-350-12		P	13.78 (350)
-362	282800	292800	-362-12		P	14.25 (362)
-375	282800	292800	-375-12		P	14.76 (375)
-387	282800	292800	-387-12		P	15.24 (387)
-400	282800	292800	-400-12		P	15.75 (400)

PDF: [www.igus.com/e-chain-pdfs](http://www.igus.com/e-chain-pdfs)  
Specs/CAD/RFQ: [www.igus.com/e-chains](http://www.igus.com/e-chains)  
RoHS info: [www.igus.com/RoHS](http://www.igus.com/RoHS)

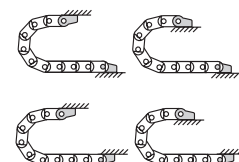
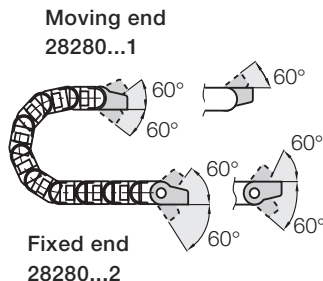






**Option 1: pivoting**

- For pivoting connections
- One part (two-piece) for all chain widths
- Electrically conductive



Possible installation configurations -

**Part No. Mounting Brackets Full Set**

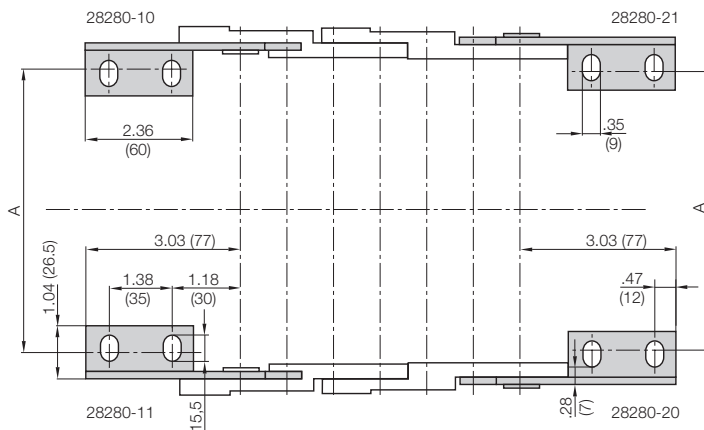
4 parts, 2 with pin, 2 with bore  
Series 2828, 2928 or R7728:  
**28280-12**

**Part No. Mounting Bracket Moving End**

2 parts, 1 left & 1 right  
Series 2828, 2928 or R7728:  
**28280-1**

**Part No. Mounting Bracket Fixed End**

2 parts, 1 left & 1 right  
Series 2828, 2928 or R7728:  
**28280-2**



Width of Chain <i>Bi</i>	Mounting Brackets				Mounting Dimension A in. (mm)	Width of Chain <i>Bi</i>	Mounting Brackets				Mounting Dimension A in. (mm)
	Part Number	Full Set	Moving End Only	Fixed End Only			Part Number	Full Set	Moving End Only	Fixed End Only	
1.97 (50)	28280	-12	-1	-2	1.18 (30)	8.86 (225)	28280	-12	-1	-2	8.07 (205)
2.56 (65)	28280	-12	-1	-2	1.77 (45)	9.33 (237)	28280	-12	-1	-2	8.54 (217)
2.95 (75)	28280	-12	-1	-2	2.16 (55)	9.84 (250)	28280	-12	-1	-2	9.05 (230)
3.94 (100)	28280	-12	-1	-2	3.15 (80)	10.31 (262)	28280	-12	-1	-2	9.53 (242)
3.94 (100)	28280	-12	-1	-2	3.15 (80)	10.83 (275)	28280	-12	-1	-2	10.04 (255)
4.41 (112)	28280	-12	-1	-2	3.62 (92)	11.30 (287)	28280	-12	-1	-2	10.51 (267)
3.94 (100)	28280	-12	-1	-2	3.15 (80)	11.81 (300)	28280	-12	-1	-2	11.02 (280)
4.92 (125)	28280	-12	-1	-2	4.13 (105)	12.28 (312)	28280	-12	-1	-2	11.49 (292)
5.39 (137)	28280	-12	-1	-2	4.61 (117)	12.79 (325)	28280	-12	-1	-2	12.00 (305)
5.91 (150)	28280	-12	-1	-2	5.12 (130)	13.27 (337)	28280	-12	-1	-2	12.48 (317)
6.38 (162)	28280	-12	-1	-2	5.59 (142)	13.78 (350)	28280	-12	-1	-2	12.99 (330)
6.89 (175)	28280	-12	-1	-2	6.10 (155)	14.25 (362)	28280	-12	-1	-2	13.46 (342)
7.36 (187)	28280	-12	-1	-2	6.57 (167)	14.76 (375)	28280	-12	-1	-2	13.97 (355)
7.36 (187)	28280	-12	-1	-2	6.57 (167)	15.24 (387)	28280	-12	-1	-2	14.45 (367)
7.87 (200)	28280	-12	-1	-2	7.09 (180)	15.75 (400)	28280	-12	-1	-2	14.96 (380)
8.35 (212)	28280	-12	-1	-2	7.56 (192)						

Chainfix clamps for the profile rail



igus® Chainfix strain relief elements are available in either steel or stainless steel. They can be adjusted with a hexagon socket and are available in single, double and triple configurations.

Part No. Single Clamp		Part No. Double Clamp		Part No. Triple Clamp		Cable ø	
Steel	Stainless	Steel	Stainless	Steel	Stainless	in.	(mm)
CFX12-1M	CFX12-1E	CFX12-2	CFX12-2E	CFX12-3	-	.24 - .47	(06 - 12)
CFX14-1M	CFX14-1E	CFX14-2	CFX14-2E	CFX14-3	-	.47 - .55	(12 - 14)
CFX16-1M	CFX16-1E	CFX16-2	CFX16-2E	CFX16-3	-	.55 - .63	(14 - 16)
CFX18-1M	CFX18-1E	CFX18-2	CFX18-2E	CFX18-3	-	.63 - .71	(16 - 18)
CFX20-1M	CFX20-1E	CFX20-2	CFX20-2E	CFX20-3	-	.71 - .79	(18 - 20)
CFX22-1M	CFX22-1E	CFX22-2	CFX22-2E	CFX22-3	-	.79 - .87	(20 - 22)
CFX26-1M	CFX26-1E	CFX26-2	CFX26-2E	-	-	.87 - 1.02	(22 - 26)
CFX30-1M	CFX30-1E	CFX30-2	CFX30-2E	-	-	1.02 - 1.18	(26 - 30)
CFX34-1M	CFX34-1E	CFX34-2	CFX34-2E	-	-	1.18 - 1.34	(30 - 34)
CFX38-1M	CFX38-1E	-	-	-	-	1.34 - 1.50	(34 - 38)
CFX42-1M	CFX42-1E	-	-	-	-	1.50 - 1.65	(38 - 42)

For more information please refer to strain relief section of Chapter 10

Chainfix Clip

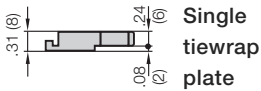
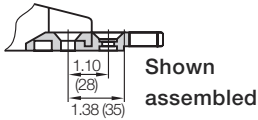


Modular snap-on strain relief device

Chainfix clip is available for cable diameters ranging from .16" (4mm) to .94" (24 mm). It is suitable for assembly on KMA mounting brackets, clip-on strain relief for crossbars as well as profile rails. Quick assembly without the use of tools. **For more information please refer to strain relief section of Chapter 10**

Cable ø	Part No. Clamp	Part No. Bottom
.16-.31	CFC-08-M	CFC-08-C
.31-.47	CFC-12-M	CFC-12-C
.47-.63	CFC-16-M	CFC-16-C
.63-.79	CFC-20-M	CFC-20-C
.79-.94	CFC-24-M	CFC-24-C

Tiewrap Plates

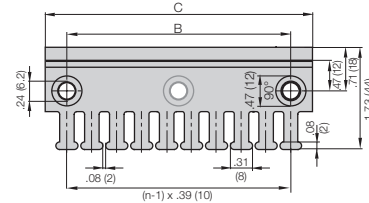


Option 1:

Tiewrap plates as an individual part

Available as an individual component, can be fixed onto a mounting bracket with the use of a profile rail.

Tiewrap Plate	n Number of Teeth	C Overall Width in. (mm)	B Bore Width in. (mm)	Center Bore
3050-ZB	5	1.97 (50)	1.18 (30)	no
3075-ZB	7	2.95 (75)	2.16 (55)	no
3100-ZB	10	3.94 (100)	3.15 (80)	no
3115-ZB	11	4.53 (115)	3.74 (95)	no
3125-ZB	12	4.92 (125)	4.13 (105)	no
3150-ZB	15	5.91 (150)	5.12 (130)	no
3175-ZB	17	6.89 (175)	6.10 (155)	no
3200-ZB	20	7.87 (200)	7.09 (180)	yes
3225-ZB	22	8.86 (225)	8.07 (205)	yes
3250-ZB	25	9.84 (250)	9.06 (230)	yes



If used with KMA brackets with profile rail please add "KMA" to the end of the part number.

**Example: 3050-ZBKMA**

For more information please refer to strain relief section of Chapter 10



Option 2:

Clip-on Tiewrap plates

Available as a clip-on tiewrap plate without the use of bolts They are inserted and removed with a screwdriver used as a lever. Clip-on tiewrap plates are also available as an attachment to the opening crossbars.

Part No.	Number of Teeth	Width of Strain Relief	
		in.	(mm)
3050-ZC	5	1.97	(50)
3075-ZC	7	2.95	(75)

For more information please refer to strain relief section of Chapter 10



Option 3:

Clip-on Tiewrap plates for opening crossbars

Clip-on tiewrap plates are also available as an attachment to opening crossbars. They can be positioned at any point along the Energy Chain®.

Part No.	Number of Teeth	Width of Strain Relief	
		in.	(mm)
3850-ZS	5	1.89	(48)

For more information please refer to strain relief section of Chapter 10



Guide troughs are used with applications where the upper run of the Energy Chain® glides on the lower run. If using igus® steel guide troughs, the following components are required:

- Full travel length of guide trough  
**Part Number 98-30**
- 1/2 travel length of glide bars  
**Part number 92-01**
- Installation sets as end connectors  
**Part Number 93-50-XX**

-XX indicates the length of the profile rail on which the guide trough is mounted. The values and part numbers are specified in the table on the left. The standard length of the trough components and glide bars is 6.56 ft (2 m.) The required overall length of the guide trough directly correlates to the length of travel.

Width of Crossbar  
280-05-200-0

	$B_{Ri}$	Installation Part No.
-05	3.11 (79)	93-50-200
-06	3.82 (97)	93-50-225
-07	4.09 (104)	93-50-225
-087	4.57 (116)	93-50-225
-10	5.08 (129)	93-50-250
-11	5.39 (137)	93-50-250
-112	5.59 (142)	93-50-250
-12	6.06 (154)	93-50-275
-137	6.57 (167)	93-50-275
-15	7.05 (179)	93-50-300
-162	7.56 (192)	93-50-300
-17	7.76 (197)	93-50-325
-18	8.03 (204)	93-50-325
-187	8.54 (217)	93-50-325
-20	9.02 (229)	93-50-350
-212	9.53 (242)	93-50-350
-23	10.00 (254)	93-50-375
-237	10.51 (267)	93-50-375
-25	10.98 (279)	93-50-400
-262	11.50 (292)	93-50-400
-28	11.97 (304)	93-50-425
-29	12.48 (317)	93-50-425
-30	12.95 (329)	93-50-450
-312	13.46 (342)	93-50-450
-325	13.94 (354)	93-50-475
-337	14.45 (367)	93-50-475
-350	14.92 (379)	93-50-500
-362	15.43 (392)	93-50-500
-375	15.91 (404)	93-50-525
-387	16.42 (417)	93-50-525
-400	16.89 (429)	93-50-550

**Example:**

Length of travel 164 ft (50 m)  
Center mounted

**Required guide troughs:**

164 ft (50 m) guide trough  
82 ft (25 m) glide bar  
= 25 sections of 6.56 ft (2 m) guide trough

**Part No. 98-30**

= 13 sections of 6.56 ft (2 m) glide bar

**Part No. 92-01**

**Required number of installation sets:**

= Number of guide trough components + 1  
= 25 + 1 = 26

Part number of the installation sets

**93-50-XXX**

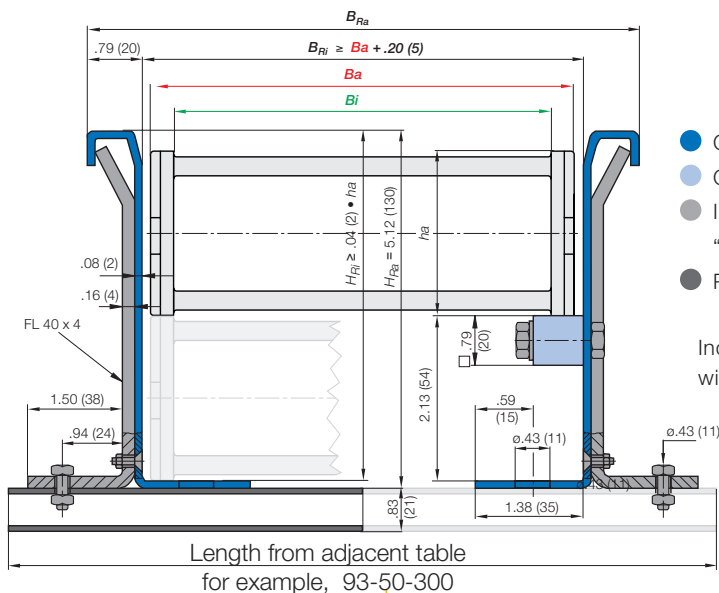
Example: 93-50-400 for 15.75 (400 mm) long profile rail.



Left: Guide trough with glide bars  
Right: Guide troughs without glide bars



Installation sets as section connectors



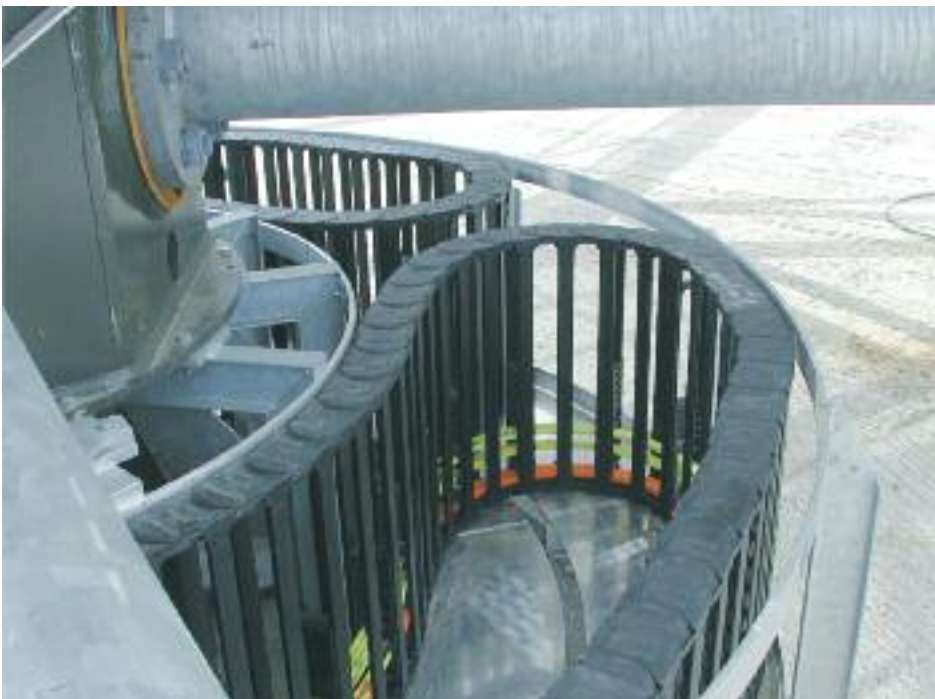
- Guide trough
- Glide bars
- Installation set
- "Basic"
- Profile rail

Individual attachment without profile rail

\* Specialized guide trough available upon request

For further technical information on guide troughs  
▶ Chapter 9

Standard length profile rail



High unsupported lengths and perfect suitability for circular movements (RBR-versions) are some features for the E4/4-System

## Roll instead of gliding: Rol E-Chain®

Special solution for long travels. 75% less drive power (gliding application) with igus® Rol E-Chain®.

Series 2828R - Order example 2828R-30-220-0

Further information: Call igus at 800-521-2747



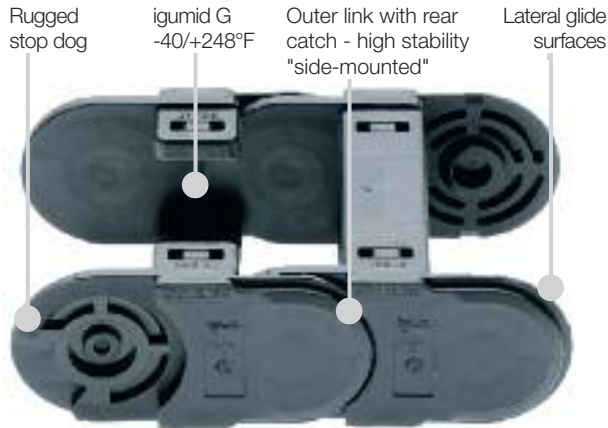
PDF: [www.igus.com/e-chain-pdfs](http://www.igus.com/e-chain-pdfs)  
Specs/CAD/RFQ: [www.igus.com/e-chains](http://www.igus.com/e-chains)  
RoHS info: [www.igus.com/RoHS](http://www.igus.com/RoHS)





# Energy Chain System® E4/4 Selection Guide

energy chain® configurator 



- Best unsupported lengths "side-mounted"
- Rol E-Chain® links available
- For very long travels up to 492-820 ft. (150 - 250 m)
- High torsional rigidity
- Good for tough environments with dirt and debris
- ESD version available
- Interior separation tool box available
- You can find more technical data about the material, chemical resistance, temperatures ► **Design, Chapter 1**

## Crossbars every link for particularly demanding applications



Series	Inner height <i>hi</i> in. (mm)	Inner width <i>Bi</i> in. (mm)	Outer width <i>Ba</i> in. (mm)	Outer height <i>ha</i> in. (mm)	Bending radius <i>R</i> in. (mm)
2828	1.25 (32)	1.97-15.75 (50-400)	2.91-16.69 (74-424)	2.13 (54)	2.48-11.81 (63-300)
3838	1.65 (42)	1.97-15.75 (50-400)	3.03-16.81 (77-427)	2.52 (64)	2.95-13.78 (75-350)
4040	2.20 (56)	1.97-23.62 (50-600)	3.39-25.04 (86-636)	3.31 (84)	5.31-19.69 (135-500)
5050	3.15 (80)	1.97-23.62 (50-600)	3.94-25.59 (100-650)	4.25 (108)	5.91-39.37 (150-1000)

## Crossbars every 2<sup>nd</sup> link for almost all applications



Series	Inner height <i>hi</i> in. (mm)	Inner width <i>Bi</i> in. (mm)	Outer width <i>Ba</i> in. (mm)	Outer height <i>ha</i> in. (mm)	Bending radius <i>R</i> in. (mm)
2828	1.25 (32)	1.97-15.75 (50-400)	2.91-16.69 (74-424)	2.13 (54)	2.48-11.81 (63-300)
3838	1.65 (42)	1.97-15.75 (50-400)	3.03-16.81 (77-427)	2.52 (64)	2.95-13.78 (75-350)
4140	2.20 (56)	1.97-23.62 (50-600)	3.39-25.04 (86-636)	3.31 (84)	5.31-19.69 (135-500)
5050	3.15 (80)	1.97-23.62 (50-600)	3.94-25.59 (100-650)	4.25 (108)	5.91-39.37 (150-1000)

## Energy Tubes fully enclosed, excellent cable protection for hot chips up to 1,562°F



Series	Inner height <i>hi</i> in. (mm)	Inner width <i>Bi</i> in. (mm)	Outer width <i>Ba</i> in. (mm)	Outer height <i>ha</i> in. (mm)	Bending radius <i>R</i> in. (mm)
R7728	1.25 (32)	1.97-11.81 (50-300)	2.91-12.76 (74-324)	2.13 (54)	4.92-11.81 (125-300)
R7838	1.65 (42)	1.97-11.81 (50-300)	3.03-12.87 (77-327)	2.52 (64)	4.92-13.78 (125-350)
R8840	2.20 (56)	2.95-18.19 (75-462)	4.37-19.65 (111-499)	3.31 (84)	5.91-19.69 (150-500)
R9850	3.15 (80)	2.95-18.19 (75-462)	4.92-20.20 (125-513)	4.25 (108)	7.87-39.37 (200-1000)

# Energy Chain System® E4/4 Assembly Instructions

## Energy Chains® and Energy Tubes - Assembling



**1**  
Remove crossbars at connection point. Slide side links into each other - Press together



**2**  
Join the side links - join the second side link by pressing from the top



**3**  
Join the side links together on the opposite side by applying pressure to the outer link



**4**  
Assemble crossbars - Push down and snap in by using a screwdriver

## Assembling continued



**5**  
Assemble clips (Energy Chains® with crossbars every other link) - Push down and snap in



**6**  
Assemble Energy Tube lids/bottoms - Attach to the connector at an angle - Snap in

## Energy Chains® and Energy Tubes - Separating



**1**  
Remove crossbars, clips, and lids on two adjacent chain links. Guide the screwdriver into the slot between side links and release it by levering it and separate the Energy Chain®



**2**  
Release only **one side** to open the lid

## Energy Chains® - Opening



**1**  
Remove crossbars - Insert screwdriver into the slot, using a lever action, apply pressure to the screwdriver to remove the crossbar.



**2**  
Remove clips - Insert screwdriver into the slot, using a lever action, apply pressure to the screwdriver to remove the clip

## Energy Tube - Opening



**1**  
Remove lids/bottoms - Insert screwdriver into the slot, using a lever action apply pressure to the screwdriver to release



**2**  
Release only **one side** to open the lid