



# chainflex®

# lasts!

Starting at 1 m length.

No minimum order.

No cutting costs.

With warranty.

Will ship within 24 hours.








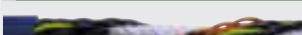


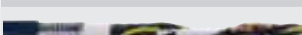
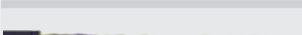
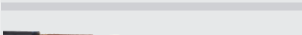
# Your way through the Chainflex® catalogue

Chainflex® cable	Requirements	Travel distance	Resistance to oil
CF210.UL	4	1	2
CF270.UL.D	4	1	3
CF260	4	1	3
CF111/CF111.D	4	1	4
CF130.UL	4	2	1
CF140.UL	4	2	1
CF240	4	2	2
CF77.UL.D	5	2	3
CF78.UL	5	2	3
CF5	5	3	2
CF6	5	3	2
CF211	5	3	2
CF21.UL	5	3	2
CF30	5	3	2
CF31	5	3	2
CFLK	5	1	3
CF2	6	3	3
CF112	6	3	3
CF113/CF113.D	6	3	3
CFLG.2H	6	3	3
CF27.D	6	3	3
CF14.CAT5	6	3	4
CFCRANE	6	4	3
CF9.UL	6	4	4
CF10.UL	6	4	4
CF11/CF11.D	6	4	4
CF12	6	4	4
CF11.LC./LC.D	6	4	4
CFBUS	6	4	4
CFKOAX	6	4	4
CF34.UL.D	6	4	4
CF35.UL	6	4	4
CF300.UL.D	6	4	4
CFPE	6	4	4
CF310.UL	6	4	4
CFLG.2LB	7	3	4
CF9	7	4	4
CF10	7	4	4
CF98	7	4	4
CF99	7	4	4
CFLG.G	7	4	4
CF37.D	7	4	4
CF38	7	4	4
CF330.D	7	4	4
CF340	7	4	4

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# Chainflex® types



Chainflex® cable	Jacket	Shield	Minimum bending radius, moved [factor x dj]	Temperature, moved from/to [°C]	Minimum bending radius, fixed [factor x dj]	Temperature, fixed from/to [°C]	Price index	
<b>Control cables</b>								
	CF130.UL	PVC		7,5-10	-5/ +70	5	-20/ +70	●●●●
	CF140.UL	PVC	✓	7,5-15	-5/ +70	5	-20/ +70	●●●●
	CF5	PVC		6,8-7,5	-5/ +70	4	-20/ +70	●●●●
	CF6	PVC	✓	6,8-7,5	-5/ +70	4	-20/ +70	●●●●
	CF77.UL.D	PUR		6,8-7,5	-35/ +80	4	-40/ +80	●●●●
	CF78.UL	PUR	✓	6,8-7,5	-35/ +80	4	-40/ +80	●●●●
	CF2	PUR	✓	5	-20/ +80	4	-40/ +80	●●●●
	CF9	TPE		5	-35/ +100	3	-40/ +100	●●●●
	CF10	TPE	✓	5	-35/ +100	3	-40/ +100	●●●●
	CF9.UL	TPE		5	-35/ +100	3	-40/ +100	●●●●
	CF10.UL	TPE	✓	5	-35/ +100	3	-40/ +100	●●●●
	CF98	TPE		4	-35/ +90	3	-40/ +90	●●●●
	CF99	TPE	✓	4	-35/ +90	3	-40/ +90	●●●●

These values are based on concrete applications or tests. These values do not represent the limit of what is technically feasible.

Get online and use all the advantages of [www.igus.eu](http://www.igus.eu)

Download the eplan-library for any type of cables

► [www.igus.eu/eplan-download](http://www.igus.eu/eplan-download)

# Chainflex® types

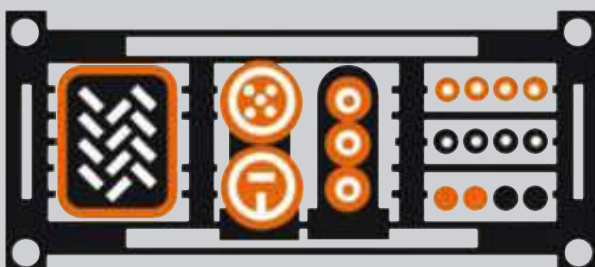


Approvals and standards	Flame-retardant	Oil-resistant	Halogen-free	UV-resistant	Torsion resistant	v max. unsupported [m/s]	v max. gliding [m/s]	a max. [m/s²]	Number of cores	Cross section Ø [mm²]	Page
CE RoHS UL US	✓				✓	3	2	20	2 - 25	0,25 - 6,0	54
CE RoHS UL US	✓					3	2	20	3 - 36	0,25 - 2,5	58
CE RoHS Clean Room UL US	✓	✓		✓	✓	10	5	80	2 - 42	0,25 - 2,5	62
CE RoHS Clean Room UL US	✓	✓		✓		10	5	80	3 - 25	0,25 - 2,5	66
CE RoHS UL US	✓	✓	✓	✓	✓	10	5	80	2 - 30	0,50 - 4,0	70
CE RoHS UL US	✓	✓	✓	✓		10	5	80	3 - 24	0,50 - 4,0	72
CE RoHS UL US	✓	✓		✓		10	5	80	3 - 48	0,14 - 1,5	74
CE RoHS Clean Room		✓	✓	✓	✓	10	6	100	2 - 36	0,25 - 35,0	78
CE RoHS Clean Room		✓	✓	✓		10	6	100	2 - 25	0,14 - 4,0	82
CE RoHS Clean Room UL US	✓	✓		✓	✓	10	6	100	2 - 36	0,25 - 6,0	86
CE RoHS Clean Room UL US	✓	✓		✓		10	6	100	2 - 25	0,25 - 4,0	90
CE RoHS Clean Room		✓	✓	✓	✓	10	6	100	2 - 8	0,14 - 0,5	94
CE RoHS Clean Room		✓	✓	✓		10	6	100	2 - 8	0,14 - 0,34	96

Chainflex® types mentioned in the catalogue as “resistant to bio oil” have been tested by DEA following VDMA 24568 with Plantocut 8 S-MB.

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Table of contents according to industries ► Page 478
















## Chain – cable – guarantee!

Ask for fully harnessed and preassembled Ready-Chains® – increase your cash-flow and profit immediately. The igus® system guarantee also covers components delivered loose.

[www.readychain.eu](http://www.readychain.eu)

# Chainflex® types



Chainflex® Cable	Jacket	Shield	Minimum bending radius, moved [factor x dj]	Temperature, moved from/to [°C]	Minimum bending radius, fixed [factor x dj]	Temperature, fixed from/to [°C]	Price index	
<b>Data cables</b>								
	CF240	PVC	✓	10-12	-5/ +70	5	-20/ +70	●●●●
	CF211	PVC	✓	10	-5/ +70	5	-20/ +70	●●●●
	CF112	PUR	✓	10	-35/ +80	5	-40/ +80	●●●●
	CF113	PUR	✓	10	-35/ +80	5	-40/ +80	●●●●
	CF111	TPE	✓	10	-35/ +100	6	-40/ +100	●●●●
	CF11	TPE	✓	10	-35/ +100	5	-40/ +100	●●●●
	CF12	TPE	✓	10	-35/ +100	5	-40/ +100	●●●●
<b>Bus cables (with selection chart for Chainflex® bus cables)</b>								
	CF BUS	TPE	✓	10-12,5	-35/ +70	5	-40/ +70	●●●●
	CF11.LC	TPE	✓	10	-35/ +70	5	-40/ +70	●●●●
	CF11.LC.D	TPE	✓	10	-35/ +70	5	-40/ +70	●●●●
	CF14 CAT5	TPE	✓	12,5	-35/ +70	7,5	-40/ +70	●●●●
<b>Measuring system cables</b>								
	CF211	PVC	✓	10	-5/ +70	5	-20/ +70	●●●●
	CF113.D	PUR	✓	10	-20/ +80	5	-40/ +80	●●●●
	CF111.D	TPE	✓	12	-35/ +100	6	-40/ +100	●●●●
	CF11.D	TPE	✓	10	-35/ +100	5	-40/ +100	●●●●
<b>Koax cables</b>								
	CF Koax 1	TPE		10	-35/ +100	7,5	-40/ +100	●●●●
<b>Fibre optic cable (FOC)</b>								
	CFLG.2H	PUR		12,5	-20/ +60	7,5	-25/ +60	●●●●
	CFLK	PUR		12,5	-20/ +70	7,5	-25/ +70	●●●●
	CFLG.2LB	TPE		5	-20/ +60	5	-25/ +70	●●●●
	CFLG. G	TPE		15	-40/ +60	8,5	-40/ +60	●●●●

These values are based on concrete applications or tests. These values do not represent the limit of what is technically feasible.

# Chainflex® types



Approvals and standards	Flame-retardant	Oil-resistant	Halogen-free	UV-resistant	Torsion resistant	v max. unsupported [m/s]	v max. gliding [m/s]	a max. [m/s <sup>2</sup> ]	Number of cores	Cross section Ø [mm <sup>2</sup> ]	Page
<b>98</b>											
CE	✓	✓				3	2	20	3 - 24	0,14 - 0,34	100
CE	✓	✓				5	3	50	2 - 28	0,25 - 0,5	102
CE	✓	✓	✓	✓		5	3	50	4 - 12	0,25 - 0,5	104
CE	✓	✓	✓	✓		5	3	50	4 - 12	0,25 - 0,5	106
CE	✓	✓		✓		2		30	2 - 28	0,25 - 0,5	108
CE		✓	✓	✓		10	6	100	4 - 36	0,14 - 2,5	112
CE		✓	✓	✓		10	6	100	4 - 28	0,25 - 1,0	114
<b>116</b>											
CE	✓	✓		✓		10	6	100	2 - 10	0,08 - 1,5	118
CE		✓	✓	✓		10	6	100	2 - 9	0,25 - 1,0	122
CE		✓	✓	✓		10	6	100	2 - 6	0,25 - 1,5	124
CE		✓	✓	✓		10	6	100	4 - 10	0,25	126
<b>128</b>											
CE	✓	✓				5	3	50	6 - 16	0,14 - 1,0	128
CE	✓	✓	✓	✓		5	3	50	4 - 17	0,14 - 1,0	132
CE	✓	✓		✓		2		30	6 - 16	0,14 - 0,5	136
CE		✓	✓	✓		10	6	100	4 - 17	0,14 - 1,0	140
<b>144</b>											
CE		✓		✓		10	5	100	1 - 5		144
<b>146</b>											
CE		✓		✓		10	6	20	2	50 + 62,5/125, 200/230 µm	150
CE		✓	✓	✓		10	5	20	1	980/1000 µm	152
CE		✓		✓		10	6	20	2	50 + 62,5/125	154
CE		✓	✓	✓		10	6	20	6 - 12	50 + 62,5/125 µm	156

Chainflex® types mentioned in the catalogue as “resistant to bio oil” have been tested by DEA following VDMA 24568 with Plantocut 8 S-MB.

# Chainflex® types



Chainflex® Cable	Jacket	Shield	Minimum bending radius, moved [factor x dj]	Temperature, moved from/to [°C]	Minimum bending radius, fixed [factor x dj]	Temperature, fixed from/to [°C]	Price index	
<b>Servo cables</b>								
	CF210.UL	PVC	✓	10	-5/ +70	5	-20/ +70	●●●
	CF21.UL	PVC	✓	7,5	-5/ +70	4	-20/ +70	●●●
	CF260	PUR	✓	10	-20/ +80	5	-40/ +80	●●●
	CF270.UL.D	PUR	✓	10	-20/ +80	5	-40/ +80	●●●
	CF27.D	PUR	✓	7,5	-20/ +80	4	-40/ +80	●●●
<b>Power cables</b>								
	CF30	PVC		7,5	-5/ +70	4	-20/ +70	●●●
	CF31	PVC	✓	7,5	-5/ +70	4	-20/ +70	●●●
	CF34.UL.D	TPE		7,5	-35/ +90	4	-40/ +90	●●●
	CF35.UL	TPE	✓	7,5	-35/ +90	4	-40/ +90	●●●
	CF37.D	TPE		7,5	-35/ +90	4	-40/ +90	●●●
	CF38	TPE	✓	7,5	-35/ +90	4	-40/ +90	●●●
	CF300.UL.D	TPE		7,5	-35/ +90	4	-40/ +90	●●●
	CFPE	TPE		7,5	-35/ +90	4	-40/ +90	●●●
	CF310.UL	TPE	✓	7,5	-35/ +90	4	-40/ +90	●●●
	CF330.D	TPE		7,5	-35/ +90	4	-40/ +90	●●●
	CF340	TPE	✓	7,5	-35/ +90	4	-40/ +90	●●●
	CF BRAID	TPE		7,5	-35/ +70	4	-40/ +70	●●●
	CF BRAID.C	TPE	✓	7,5	-35/ +70	4	-40/ +70	●●●
	CF CRANE	igupren	✓	10	-20/ +80	7,5	-30/ +80	●●●

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# Chainflex® types



Approvals and standards	Flame-retardant	Oil-resistant	Halogen-free	UV-resistant	Torsion resistant	v max. unsupported [m/s]	v max. gliding [m/s]	a max. [m/s <sup>2</sup> ]	Number of cores	Cross section Ø [mm <sup>2</sup> ]	Page
<b>158</b>											
CE RoHS Clean Room	✓	✓	✓			10		80	4 - 8	0.75 - 35 / Pairs 0.34 - 1.5	160
CE RoHS Clean Room	✓	✓	✓			10	5	80	6 - 8	0.75 - 35 / Pairs 0.34 - 1.5	162
CE RoHS		✓	✓	✓		10		50	4 - 8	0.75 - 50 / Pairs 0.34 - 1.5	166
CE RoHS Clean Room	✓	✓	✓	✓		10		50	4 - 8	0.75 - 35 / Pairs 0.34 - 1.5	170
CE RoHS Clean Room	✓	✓	✓	✓		10	5	80	4 - 8	0.75 - 35 / Pairs 0.34 - 1.5	174
<b>178</b>											
CE RoHS Clean Room	✓	✓		✓	✓	10	5	80	4 - 5	1,5 - 50	180
CE RoHS Clean Room	✓	✓		✓		10	5	80	4 - 5	1,5 - 70	182
CE RoHS Clean Room	✓	✓		✓	✓	10	6	80	3 - 5	1,5 - 50	184
CE RoHS Clean Room	✓	✓		✓		10	6	80	3 - 4	0,5 - 50	186
CE RoHS Clean Room		✓	✓	✓	✓	10	6	80	3 - 5	1,5 - 50	188
CE RoHS Clean Room		✓	✓	✓		10	6	80	3 - 4	0,5 - 50	190
CE RoHS Clean Room	✓	✓		✓		10	6	100	1	6 - 185	192
CE RoHS Clean Room	✓	✓		✓		10	6	100	1	1,5 - 35	194
CE RoHS Clean Room	✓	✓		✓		10	6	100	1	4 - 185	196
CE RoHS Clean Room		✓	✓	✓		10	6	100	1	6 - 185	198
CE RoHS Clean Room		✓	✓	✓		10	6	100	1	4 - 185	200
CE RoHS Clean Room	✓	✓		✓		10	6	80	8	2,5	202
CE RoHS Clean Room	✓	✓		✓		10	6	80	8	2,5	202
CE RoHS	✓	✓		✓		10	6	50	1	25 - 95	204








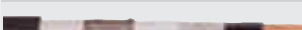
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# Chainflex® types



Chainflex® Cable	Jacket	Shield	Minimum bending radius, moved [factor x dj]	Temperature, moved from/to [°C]	Minimum bending radius, fixed [factor x dj]	Temperature, fixed from/to [°C]	Price index	
<b>Pneumatic hose</b>								
	CF AIR	PU	10	-25/ +80	8	-40/ +85	● ● ●	
	CF Clean AIR	PE	10	-25/ +60	8	-30/ +65	● ● ●	
<b>Tordierbare Leitungen</b>								
	CF ROBOT9	PUR		10	-25/ +80	4	-40/ +80	● ● ●
	CF ROBOT8	PUR	✓	10	-20/ +70	7,5	-25/ +70	● ● ●
	CF ROBOT6	PUR		10	-25/ +80	4	-40/ +80	● ● ●
	CF ROBOT7	PUR	✓	10	-25/ +80	4	-40/ +80	● ● ●
	CF ROBOT5	TPE		12,5	-20/ +60	7,5	-25/ +60	● ● ●
	CF ROBOT	TPE	✓	10	-35/ +100	4	-40/ +100	● ● ●

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# Chainflex® types



Approvals and standards	Flame-retardant	Oil-resistant	Halogen-free	UV-resistant	Torsion resistant	v max. unsupported [m/s]	v max. gliding [m/s]	a max. [m/s <sup>2</sup> ]	Number of cores	Cross section Ø [mm <sup>2</sup> ]	Page
		✓	✓			10	6	50			206
		✓	✓			10	6	50			208
<b>210</b>											
	✓	✓		✓	✓	10		10	2 - 18	0,5 - 2,5	214
	✓	✓		✓	✓	10		10	2 - 4	0,15 - 0,25	216
	✓	✓		✓	✓	10		10	3 - 4	1,5 - 35	218
	✓	✓		✓	✓	10		10	3 - 4	1,5 - 35	218
		✓		✓	✓	10		10	2	50 + 62,5/125 µm	220
		✓			✓	10		10	1	10 - 50	222

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# Chainflex® ReadyCable®



	Cable type	Jacket	Page
Video-, vision engineering/bus technology (with camera reference list ▶ page 244)			224
	<b>FireWire</b> FireWire special cable	TPE	226
	<b>USB</b> USB special cable	TPE	230
	<b>GigE</b> GigE special cable	TPE	232
	<b>LWL</b> FOC special cable	PUR	234
	<b>LWL</b> FOC special cable for robotic	TPE	238
	<b>Koax</b> Koax special cable	TPE	240
Network-/ethernet-/fibre cables (FOC)			248
	<b>CFLG.6G</b> Gradient fiber glass cable	TPE	250
	<b>CFLG.12G</b> Gradient fiber glass cable	TPE	252
	<b>CAT5</b> Ethernet special cable	TPE	254
	<b>CAT6</b> Ethernet special cable	TPE	256

# Chainflex® ReadyCable®

		Cable type	Jacket	Page
<b>Initiators CF9 – CF.INI (minimum bending radius 5 x d)</b>				
		Direct line M12 x 1, straight/angled	TPE	260
		Direct line M12 x 1, straight/angled, LED	TPE	261
		Connecting cable M12 x 1, straight/angled	TPE	262
		Direct line M8 x 1, straight/angled	TPE	263
		Direct line M8 x 1, angled, LED	TPE	264
		Connecting cable M8 x 1, straight/angled	TPE	265
<b>Initiators CF10 – CF.INI (minimum bending radius 5 x d) 360° shielded</b>				
		Direct line M12 x 1, straight/angled	TPE	266
		Connecting cable M12 x 1, straight/angled	TPE	267
<b>Initiators CF98 – CF.INI (minimum bending radius 4 x d)</b>				
		Direct line M12 x 1, straight/angled	TPE	268
		Connecting cable M12 x 1, straight/angled	TPE	269
		Direct line M8 x 1, straight/angled	TPE	270
		Connecting cable M8 x 1, straight/angled	TPE	271

# Chainflex® ReadyCable®



Harnessed according  
to standard

Cable type

Jacket

Page

## Cables for Drive Technology

273

### Siemens – Selection for part no. and material

276



Siemens

Servo cable

PUR/PVC

278



Siemens

Power cable

TPE/PVC

282



Siemens

Signal cables/encoder

TPE/PVC

286

### Lenze – Selection for part no. and material

294



Lenze

Servo cable

PUR/PVC

296



Lenze

Power cable

PUR/PVC

300



Lenze

Signal cables/encoder (Resolver)

TPE/PVC

304



Lenze

Signal cables/encoder (Encoder)

TPE/PVC

308



Lenze

Signal cables/encoder (Feedback)

TPE/PVC

312



Lenze

Signal cables/encoder (Decoder)

TPE/PVC

316



Lenze

Control cable (Fan)

TPE/PVC

320

### Rexroth – Selection for part no. and material

324



Rexroth

Servo cable

PUR/PVC

326



Rexroth

Signal-/encoder cable

TPE/PVC

334

### Fanuc – Selection for part no. and material

338



Fanuc

Servo cable

PUR

340



Fanuc

Signal cables/encoder

TPE

344

### SEW – Selection for part no. and material

348



SEW

Servo cable

PUR/PVC

350

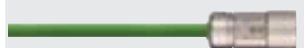


SEW

Power cable

TPE/PVC

354



SEW

Signal cables/encoder

TPE/PVC

358

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Plug configuration "Quick Pin" ► [www.igus.eu/quickpin](http://www.igus.eu/quickpin)

# Chainflex® ReadyCable®

Harnessed according  
to standard

Cable type

Jacket

Page

## Cables for Drive Technology

### Heidenhain – Selection for part no. and material

362



Heidenhain

Signal cables/encoder

PUR/TPE

364

### ELAU – Selection for part no. and material

368



ELAU

Servo cable

PVC/PUR

370



ELAU

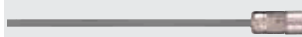
Signal cables/encoder

PVC/TPE

372

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374



Danaher Motion

Signal cables/encoder

PVC/TPE

376



Danaher Motion

Servo cable

PVC/PUR

380



Danaher Motion

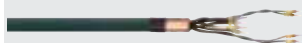
Power cable

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384

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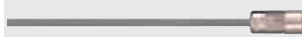


B&R

Servo cable

PVC/PUR

390



B&R

Signal cables/encoder (Resolver)

PVC/TPE

392



B&R

Signal cables/encoder (EnDat)

PVC/TPE

394

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Plug configuration "Quick Pin" ► [www.igus.eu/quickpin](http://www.igus.eu/quickpin)



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Give us your opinion – Catalogue improvement

Definition of the icons used in the catalogue	Cover (back)
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Chainflex® cables classification	Cover (ahead)
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# How to use the catalog: Chainflex® Cables

## Short description

Product data and brief description of the selected Chainflex® cable.

## Product illustration

Description of the Chainflex® cable design structure and detailed product illustration.

## Technical data

Detailed description of the Chainflex® cable, practical illustration by means of icons. Including all information, e.g. on temperature ranges, speeds, tensions, a description of the cable design.

## Cable categories

Chainflex® cable's classification after the criteria requirements, oil-resistance and travel distance.

## Approvals/standards

**CF99**  
TPE  
4 x d

Extremely highly flexible special alloy

Stranding in layers with extremely short pitch

Custom-fitted extruded

Extremely highly flexible special shield made of alloyed wires

Pressure extruded, halogen-free TPE blend

**TPE Control cable**  
**Chainflex® CF99**

- for maximum load requirements and especially small radii up to 4 x d
- TPE outer jacket
- shielded
- oil- and bio-oil-resistant
- PVC-free/halogen-free
- low-temperature-flexible

Temperature range moved	-35 °C to +90 °C, minimum bending radius 4 x d
Temperature range fixed v max.	-40 °C to +90 °C, minimum bending radius 3 x d
unsupported/gliding	10 m/s, 6 m/s
a max.	100 m/s²
Travel distance	Short, very fast applications with small radii and tight design space, Class 4
UV-resistant	High
Nominal voltage	300/300 V
Testing voltage	1500 V
Oil	Oil-resistant (following DIN EN 60811-2-1), bio-oil-resistant (following VDMA 24568), Class 4
Hal	Halogen-free
	Following EN 50267-2-1.
Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
Conductor	Conductor consisting of a highly flexible special alloy.
Core insulation	Mechanically high-quality TPE mixture.
Core stranding	Cores stranded in one layer with especially short pitch length.
Core identification	Colour code in accordance with DIN 47100.
Inner jacket	TPE mixture adapted to suit the requirements in Energy Chains®.
Overall shield	Highly flexible alloyed special shield. Coverage approx. 70% linear, approx. 90% optical.
Outer jacket	Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in Energy Chains®. Colour: dark-blue (similar to RAL 5011).

CE CE Following 2006/95/EG

**... no minimum order quantity**  
eplan download, configurator, PDF catalogues, lifetime ...

**Price index**  
The price index allows comparisons with similar Chainflex® cables of the igus® program.

**Product designation**  
Designation of the selected Chainflex® cable.

**Chapter colour**  
Every cable type has its own colour allowing faster catalog browsing.

**Application area**  
Description of typical cable applications.

**Delivery program**  
Table with part no., number of cores and conductor nominal cross section, copper index and weight.

**Cable type**  
Here: Control cable

**Order example and order information.**

**Strain-relief elements**

**i = Technical notes**

Example Quicklink [www.igus.eu/en/CF99](http://www.igus.eu/en/CF99)

Direct link to this product's online catalog:  
Free CAD-data, pdf files and more.

## Class 7.4.4



CF99  
4 x 0



Following EU guideline (RoHS) 2002/95/EC.



According to ISO Class 1. Outer jacket material complies with DIN 15 07, listed by IPA according to standard 14644-1

### Typical application area

- for maximum load requirements of 4 x d
- almost unlimited resistance to oil, also with bio-oils
- indoor and outdoor applications, UV-resistant
- especially for short, very fast applications with small radii and tight design space
- automatic insertion machines, automatic doors, clean room, very quick handling

Delivery program Part No.	Number of cores and conductor nominal cross section [mm²]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
CF99.01.02	2 x 0.140C	5.5	14	33
CF99.01.03	3 x 0.140C	6.0	17	37
CF99.01.04	4 x 0.140C	6.0	21	43
CF99.01.07	7 x 0.140C	7.5	30	62
CF99.01.08	8 x 0.140C	8.0	34	69
CF99.02.02	3 x 0.250C	6.5	25	48
CF99.02.04	4 x 0.250C	6.5	30	56
CF99.02.07	7 x 0.250C	8.0	46	85
CF99.02.08	8 x 0.250C	8.5	54	93
CF99.03.03	3 x 0.340C	6.5	27	51
CF99.03.04	4 x 0.340C	7.0	35	60
CF99.03.08	8 x 0.340C	9.0	64	105

\* Delivery time upon inquiry.  
Note: The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
● with braided conductors green-yellow ● without braided conductors

**Order example: CF99.01.02 – in your desired length (0.5 m steps)**

CF99 Chainflex® series .01 Code nominal cross section .02 Number of cores

Please use [www.chainflex.eu/en/CF99](http://www.chainflex.eu/en/CF99) for your online order.

**Delivery time 24h or today\***

\* Delivery time means time until shipping of goods



Automatisierte Stapelanlage für Phosphorbronzeformen: geringer Installationsraum, kleiner Bogenradius, 300.000 Doppelhübe pro Monat.

**850 types from stock no cutting costs ...**

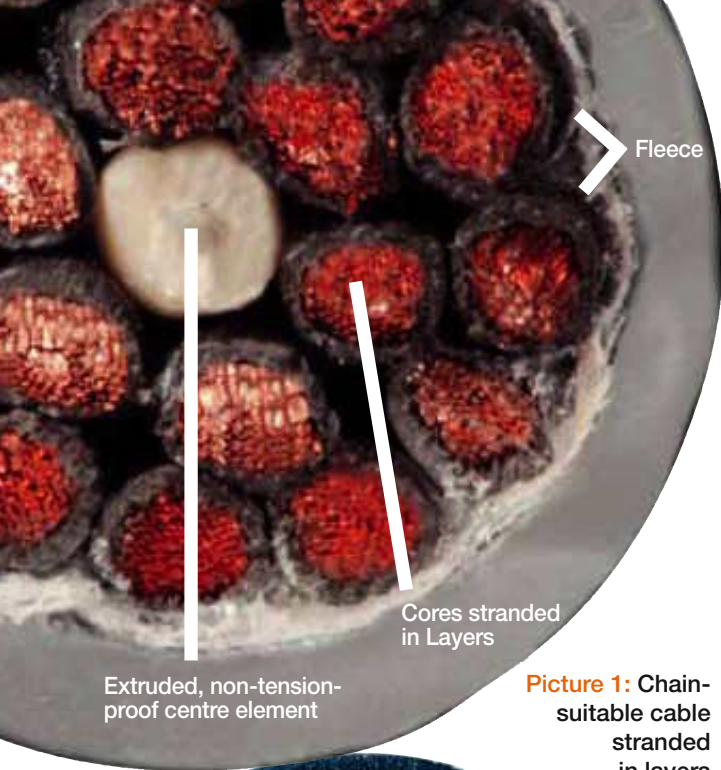
... and order online ► [www.igus.eu/en/CF99](http://www.igus.eu/en/CF99)

Tel. +49-2203-96 49-0  
Fax +49-2203-96 49-222



# Chainflex® ...

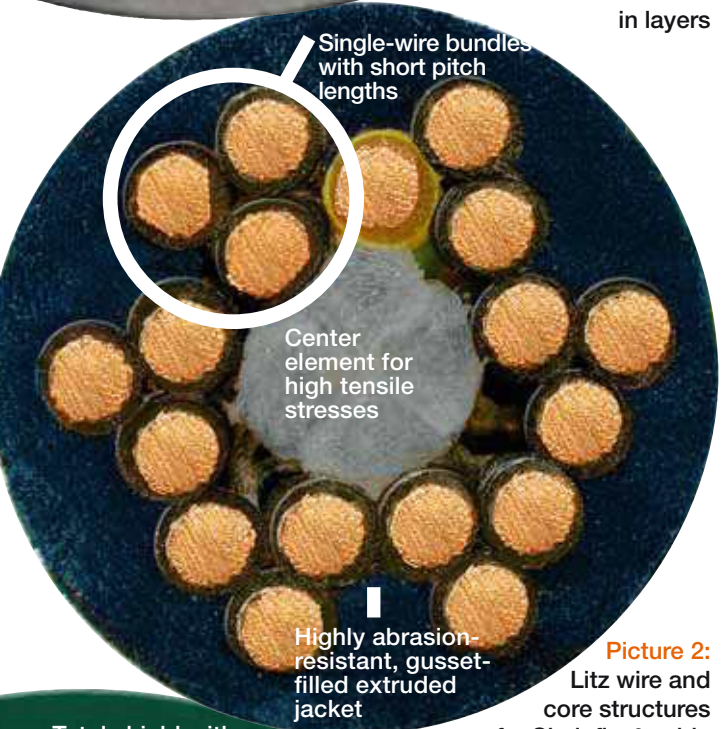
## The tricks and ingenious features of...



**Picture 1: Chain-suitable cable stranded in layers**

From the customer's point of view, a flexible energy supply system only needs to function properly. However, this demand presupposes the perfect operation of all components, including the cables being used in this system. And this is exactly where problems came up in the early 1980s. Due to constantly – and frequently even tremendously – increasing loads resulting from the application of automation technology, guided cables often failed although the energy supply system itself was functioning perfectly. In extreme cases, failures caused by "corkscrews" and core ruptures brought the entire production process to a standstill and resulted in high costs.

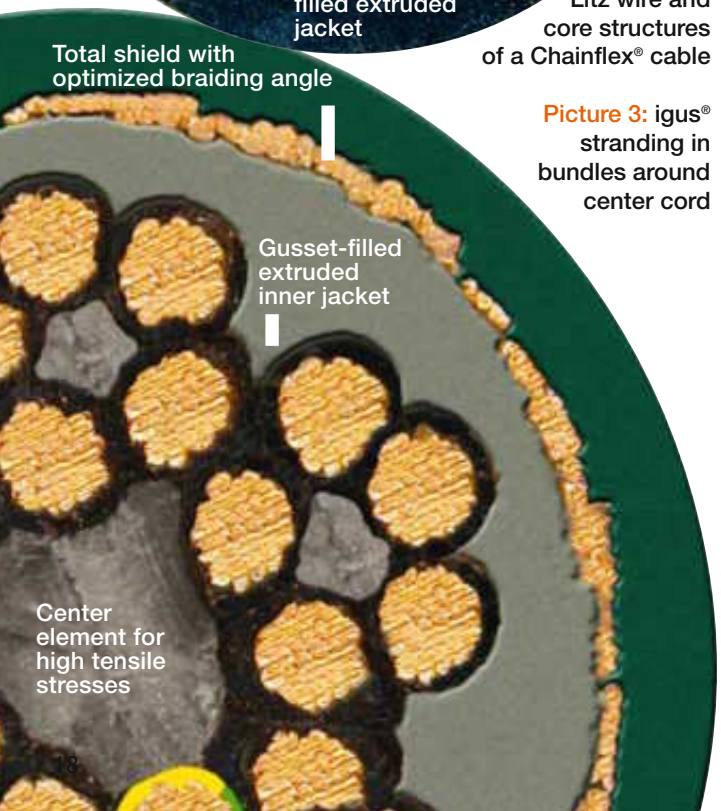
In order to find a solution to this unsatisfactory situation for its customers, igus® decided to take the initiative. As the first company worldwide, igus® began to develop complete Energy Chain Systems®. Chainflex® cables and Energy Chains® are now being offered as a delivery from a single source and with a system guarantee depending on the application in each case. Based on the increasing know-how gained since 1989 and on the very sophisticated series of tests that have been conducted since then, design principles were and are still being created that help prevent machine downtimes in factories throughout the world today.



**Picture 2: Litz wire and core structures of a Chainflex® cable**

### How can "corkscrews" be prevented?

Here, the term "corkscrew" does not refer to a useful instrument for wine connoisseurs. Instead, it refers to the permanent deformation of guided, moved cables caused by excessive stressing – which, in most cases, results in core rupture almost immediately afterwards. How does this happen? How can "corkscrews" be prevented? An important factor here – in addition to a sensible design of the total Energy Chain System® – is the construction of the guided cables. Basically speaking, a clear distinction can be made between cables stranded in bundles and cables stranded in layers (see picture 4).



**Picture 3: igus® stranding in bundles around center cord**

### Properties of stranding in layers

Stranding in layers is significantly easier to produce and is therefore offered on the market in so-called "chain-suitable" cables at low cost. But what appears to be tempting at first glance can quickly turn into an expensive mistake when a "corkscrew" immobilizes the system being operated with these cables. How do these problems arise? A look at the cable structure can be quite helpful (see picture 1).

In the case of stranding in layers, the cable cores are mostly stranded more or less firmly and relatively long in several layers around a center and are then provided with a jacket extruded to the form of a tube. In the case of shielded cables, the cores are wrapped up with fleece or foils. But what, for example, happens to a similarly structured 12-core cable during normal operation?

The bending process compresses, in the movement of the core, the inner radius of the cable and stretches the core in the outer radius. Initially, this works quite well because the elasticity of the material is still sufficient. But very soon, material fatigue causes permanent deformations, and then, due to excursion from the specified paths, the cores make their "own compressing and stretching zones": The corkscrew is created, then followed rather quickly by core ruptures most of the time.

# lasts or your money back!

...the Chainflex® design and why we feel so confident about this design

## Stranding in bundles tried and tested expensively and efficiently millions of times since 1989

Stranding in bundles eliminates these problems by means of its very sophisticated, multiply stranded internal structure. Here, the litz wires are stranded with a special pitch length first and then the resulting cores are stranded into single core bundles. For large cross sections, this is done around a strain relief element. The next step is the renewed stranding of this core bundle around a tension-proof center – a genuine center cord. (see picture 2)

Due to this multiple stranding of the cores, all cores change the inner radius and the outer radius of the bent cable several times at identical spacing distances. Pulling and compressing forces balance one another around the high-tensile center cord that gives the stranded structure its necessary inner stability. Accordingly, the stranding remains stable even under maximum bending stress (see picture 3).

**Picture 4: Shielded "chain-suitable" control cable after only 400.000 to-and-fro cycles with a bending factor of  $10 \times d$**



## What are EMC problems and shield wire breakage?

In principle, cable shields must fulfil two tasks:

- Protecting the cables from external interferences
- Shielding any interferences before transmitting them to the outside

Both tasks are equally important because faulty signals can cause considerable consequential damage in the system itself as well as in any external systems. Furthermore, this is an especially problematic point due to the fact that incorrect shielding usually cannot be detected from outside, and this is something that makes the trouble-shooting procedure extremely difficult. How can these kinds of problems arise in the first place?

Once again, the answer is to be found in the internal structure of the cable itself: Is the shielding designed for the movements of the cable? Although it may be very easy to shield a fixed cable, it is much more difficult to guarantee the permanent shielding of a moving cable.

In the case of so-called "chain-suitable" cables, for example, the stranding bond of an intermediate layer is wrapped up with foils or fleeces. This stranding bond is supposed to guarantee the separation between the cores and the shield braid. But something that functions quite well for the fixed installation of cables is often quite insufficient in the case of moving cables. This has to do with the fact that the foils and fleeces do

## Dictionary of defects

### Core rupture

Failure of electric conductivity due to broken copper wires as a result of subjecting the individual cores to mechanical overload/ tensile load under constant bending stress. In most cases, the causes are incorrect litz wires and/or incorrect stranding pitch directions and lengths.

### Insulation damage

Short circuits due to damage to the insulation above the conductor. The cause can be material fatigue under constant bending stress or material abrasion within the stranded structure. Single-wire breakage of the conductor or the shield braid result in perforation of the insulation.

### Corkscrew

An externally detectable screw-like deformation of the entire cable due to broken copper wires as the result of subjecting the individual cores to mechanical overload/ tensile load during the bending process. In most cases, the causes are unfavorable superstructure properties (stranding in layers, missing center, loose jackets extruded to the form of a "tube") and subjecting the cables to high bending stress.

### Jacket abrasion

The jacket is rubbed off down to the stranding or down to the total shield. In most cases, the causes are incorrect selection of materials and/or unfavorable extrusion processes resulting in detrimental surface properties so that abrasion is an unavoidable effect.

### Jacket swelling/ jacket breakage

Jacket becomes soft and deformed or breaks until the stranding/shield can be seen. The cause can be the incorrect selection of materials with respect to the oils or other chemical substances being used.

### Shielding losses/ EMC problems

Electromagnetic interferences inside or outside an electric cable. In most cases, the cause is shield wire breakage due to mechanical overload with incorrect shield braid angles. Other causes include loose braids over foils without supporting effects or very open coverings.

# Chainflex® ...

## The tricks and ingenious features of...

not create a bond between the stranding, shield and jacket and may fall apart under stress. Consequently, the metallic shield then rubs on the insulation of the cores – short circuits are then to be expected.

But the production of the shield itself is very time-consuming and cost-intensive and may have been the reason for the use of open braid shields or even simple wire wrappings. The disadvantages are quite obvious: Open shields only possess a limited shielding effect in their moved state – motion and expansion reduce this effect even further. The type of shield is therefore an important point that is not even mentioned in some catalogues.

In its up to approx. 70% linearly and approx. 90% optically covered cables, igus® eliminates these weak points by means of an optimized internal structure. In virtually all shielded Chainflex® cables, a gusset-filled extruded inner jacket over the stranded structure is therefore used. This "second jacket" fulfills two tasks:

- It holds the stranded structure together and guides the individual cores as in a channel.
- It serves as a firm, round base for a very tight-fitting shield.

### Shield wire breakage – and how this can be prevented


And even during the production of the shield, there are many things that can be done correctly – or incorrectly. Here, an important parameter is the braiding angle.

In the case of "chain-suitable" cables, a tensile load of the shield wires in the outer radius of the cable must usually be taken into account. If an unfavorable braiding angle is to be added, the tensile load increases even further and shield wire breakage is the result. The consequences range from reduced shielding effects right up to short circuits whenever the sharp wire ends penetrate through the fleeces or foils into the cores. Here, a useful tip: If, after the insulation has been stripped off, the shield can be easily pushed back over the jacket, the shield is then usually unsuitable for use in moved flexible energy supply systems! This is a problem that igus® has now solved with its direct approach:

- The shield braiding angle determined in long-term tests efficiently neutralizes the tensile forces and is therefore highly suitable for Energy Chains®.
- Due to the stable inner jacket, the shield cannot wander uncontrolled.
- The shield itself has a torsion protection effect on the stranded structure.

### Jacket abrasion/ jacket breakage

Whereas defects in the internal structure are hardly detectable on the outside, jacket problems strike the eye immediately. The jacket is the first protection for the complicated internal structure. This is why broken, worn and swollen jackets are a serious quality defect. To prevent this problem, the igus® customer can select among 7 jacket materials to adapt his Energy Chain® cables to suit the conditions of the respective environment.



Jacket breakage at (36x0.14°) after only 900.000 to-and-fro cycles with a bending factor of 7.8 x d

# lasts or your money back!

...the Chainflex® design and why we feel so confident about this design

## Gusset-filled extruded jacket

Here, not only the material is an important factor but also the production process. In the case of the so-called "chain-suitable" cables, the jackets are usually produced extruded to the form of a tube and therefore do not provide the stranded structure with the necessary support for constant bending processes. The stranded structure can fall apart.

Therefore, igus® is the first manufacturer of Energy Chain Systems® to offer the so-called the "gusset-filled extruded" jacket.

Here, the jacket material is injected between the core stranding powdered with talc and ensures that the stranded structure does not open up and also makes sure that the cores are guided as in

a channel. The special characteristic of this type of production is that the intermediate spaces, which are created between the cores during the stranding process, are completely filled with jacket material by the high extrusion pressure. As a result, the jacket material creates a channel-like guide which allows the cores to carry out a defined longitudinal movement. The jacket also provides a supporting function for the stranding.

## The quality bundles of igus® Chainflex® cables

- Strain-relieving center
- Stranding in bundles
- Gusset-filled extruded inner jacket in shielded cables
- Enclosed shield braid
- Optimized shield braiding angle
- Gusset-filled extruded jacket

## Basic rules for a good cable

### 1. Strain-relieving center

Clear space is created in the center of a cable according to the number of cores and the cross section of each cable. This center should be filled, as far as possible, with a genuine center cord (and not, as frequently the case, with fillers or dummy cores consisting of waste materials). These measures will then efficiently protect the stranded structure situated above and prevent the stranding from wandering into the middle of the cable.

### 2. Litz wire structure

With respect to the selection of litz wires, the maximum flexibility has proved to be the best solution. Although very flexible conductors can be made using very thin individual wires, these conductors tend toward extreme formation of kinks. Long-term series of tests provided the result of a shielded combination of single-wire diameter, pitch length and pitch direction as the best bending-resistant solution.

### 3. Core insulation

The insulation materials must be made so that they do not stick to one another within the cable. Furthermore, the insulation is also required to support the stranded individual wires of the conductor. Accordingly, only the highest-quality, high-pressure-extruded PVC or TPE materials that have proved their tested reliability in millions of core kilometers are then used in Energy Chain® applications.

### 4. Stranding

The stranded structure must be stranded around a stable, tension-proof center with an optimized short pitch length.

However, due to the insulating materials being used, this stranded structure should still be defined in mobile form within the stranding. Starting from a quantity of 12 cores, however, the method of stranding in bundles should be applied.

### 5. Inner jacket

A gusset-filled extruded inner jacket must be used instead of inexpensive fleeces, fillers or accessory fillers. This measure ensures that the stranded structure is efficiently guided in longitudinal direction. Moreover, the stranded structure cannot fall apart or wander off.

### 6. Shielding

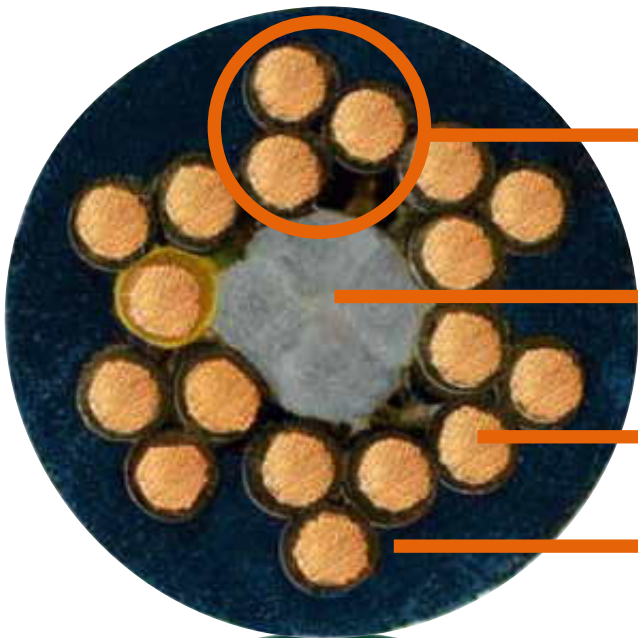
The total shield should be made tight using an optimized shield braiding angle over an extruded inner jacket. Loose open braids or wrapped stranding reduce the EMC protection considerably and can fail very quickly due to shield wire breakage. A tight total braid shield also has a torsion protection effect on the stranded structure.

### 7. Outer jacket

The material-optimized outer jacket can fulfil many different requirements: From UV-resistant to low-temperature-flexible, and from oil-resistant to cost-optimized. But these outer jackets must have one thing in common: A jacket material must be highly abrasion-resistant but not be allowed to stick to anything. It must be flexible but also provide a supporting function. In any case, the jacket should also be extruded under pressure (gusset-filled).

# Sectional views through

Detailed structure of igus<sup>®</sup> control, data, servo and motor



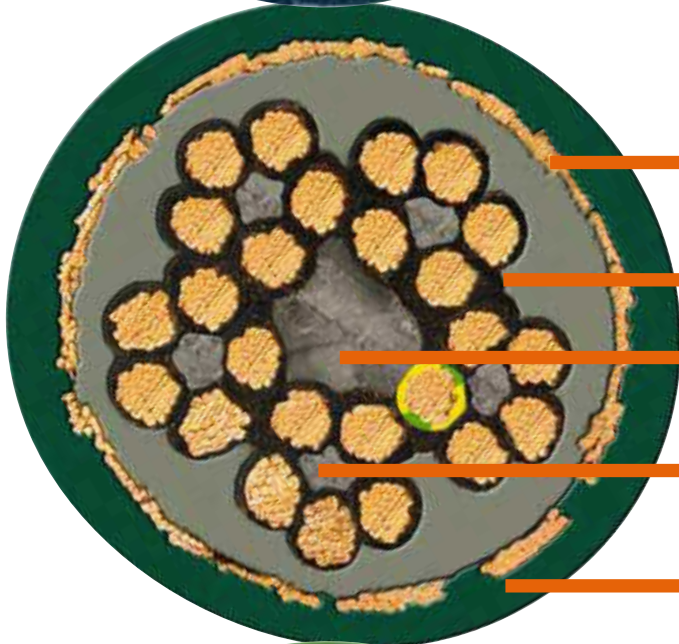
## Chainflex<sup>®</sup> control cable, unshielded

Individual bundles with optimized pitch length and pitch direction

Center element for high tensile stresses

Single-wire diameter optimized for Energy Chains<sup>®</sup>

Highly abrasion-resistant, gusset-filled extruded jacket



## Chainflex<sup>®</sup> control cable, shielded

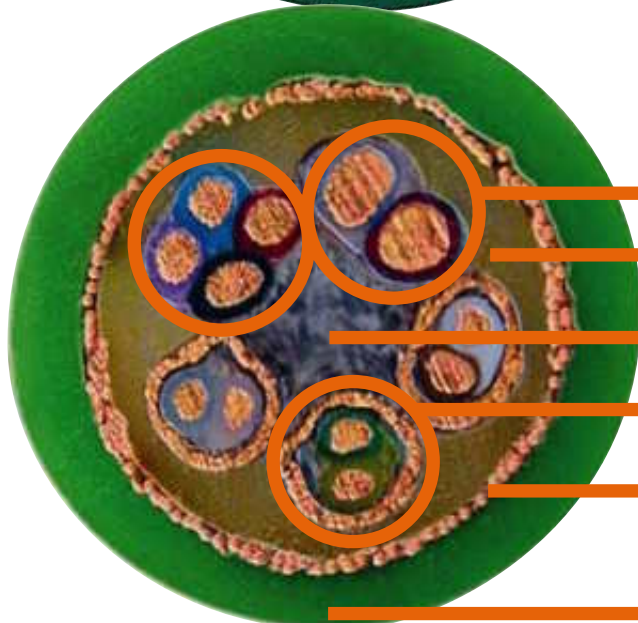
Total shield with optimized braiding angle (covering approx. 70% linear, approx. 90% optical)

Gusset-filled extruded inner jacket supports stranding

Center element for high tensile stresses

Tension-proof center element in individual bundles

Pressure extruded jacket



## Chainflex<sup>®</sup> data/sensor cable, shielded

Stranded elements with optimized pitch length and pitch direction

Gusset-filled extruded inner jacket supports stranding

Center element for high tensile stresses

Pair braid shield

Total shield with optimized braiding angle (covering approx. 70% linear, approx. 90% optical)

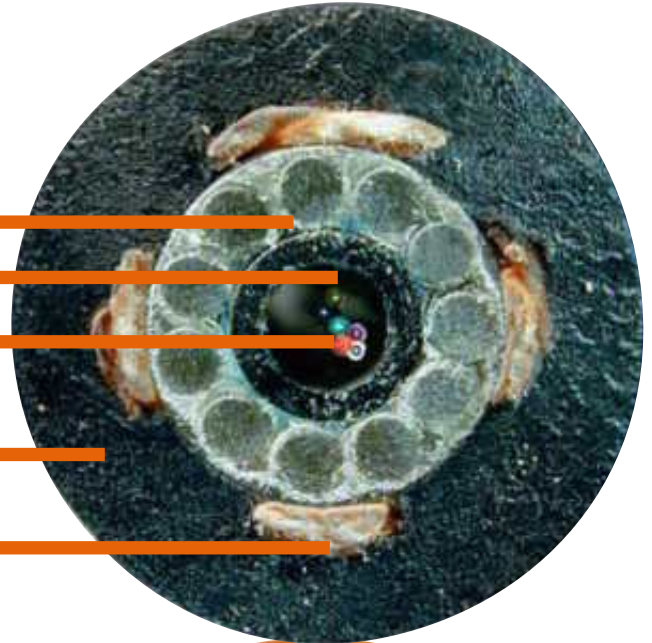
Pressure extruded jacket

# the igus<sup>®</sup> cable types

cables starting from the high-class category

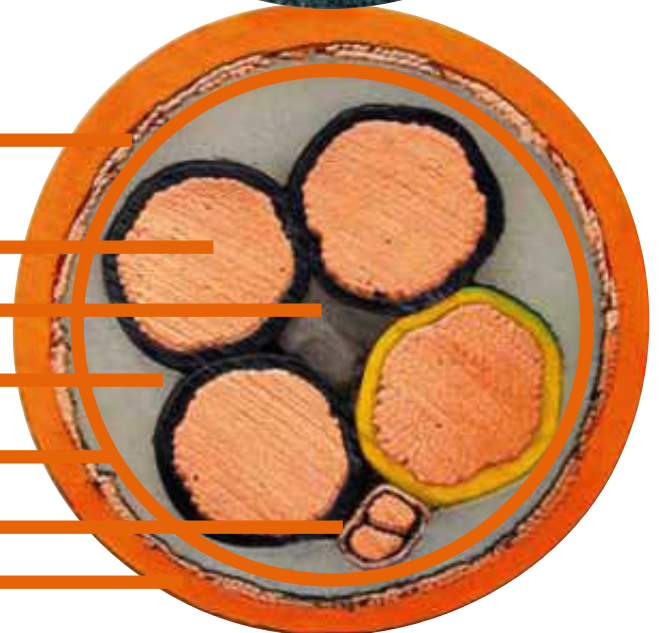
## Chainflex<sup>®</sup> FOC gradient fiber cable

- Supporting braid made of glass-yarn-stranded GRP rods
- Gel-filled fiber sheath
- FOC fibers
- Highly abrasion-resistant TPE jacket
- Integrated torsion protection



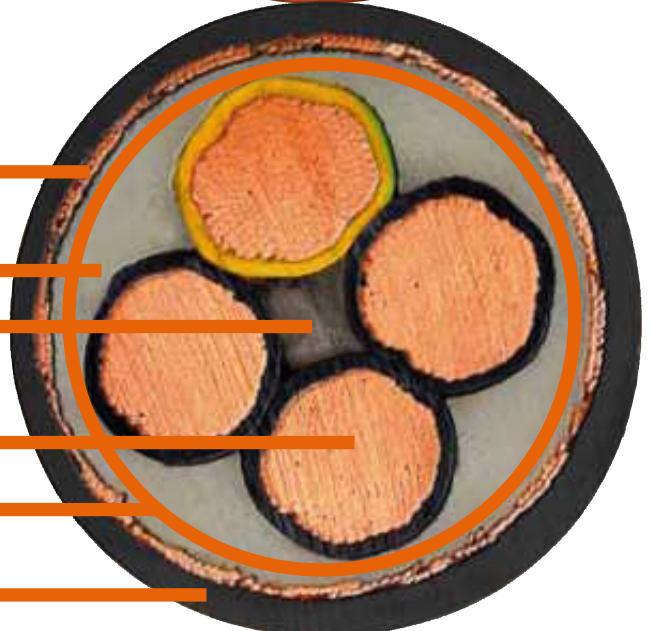
## Chainflex<sup>®</sup> servo cable, shielded

- Total shield with optimized braiding angle (covering approx. 70% linear, approx. 90% optical)
- Optimized single-wire diameter
- Center element for high tensile stresses
- Gusset-filled extruded inner jacket
- Stranding with optimized pitch length and pitch direction
- Pair braid shield over optimized stranded core pair
- Highly abrasion-resistant pressure extruded jacket



## Chainflex<sup>®</sup> power cable, shielded

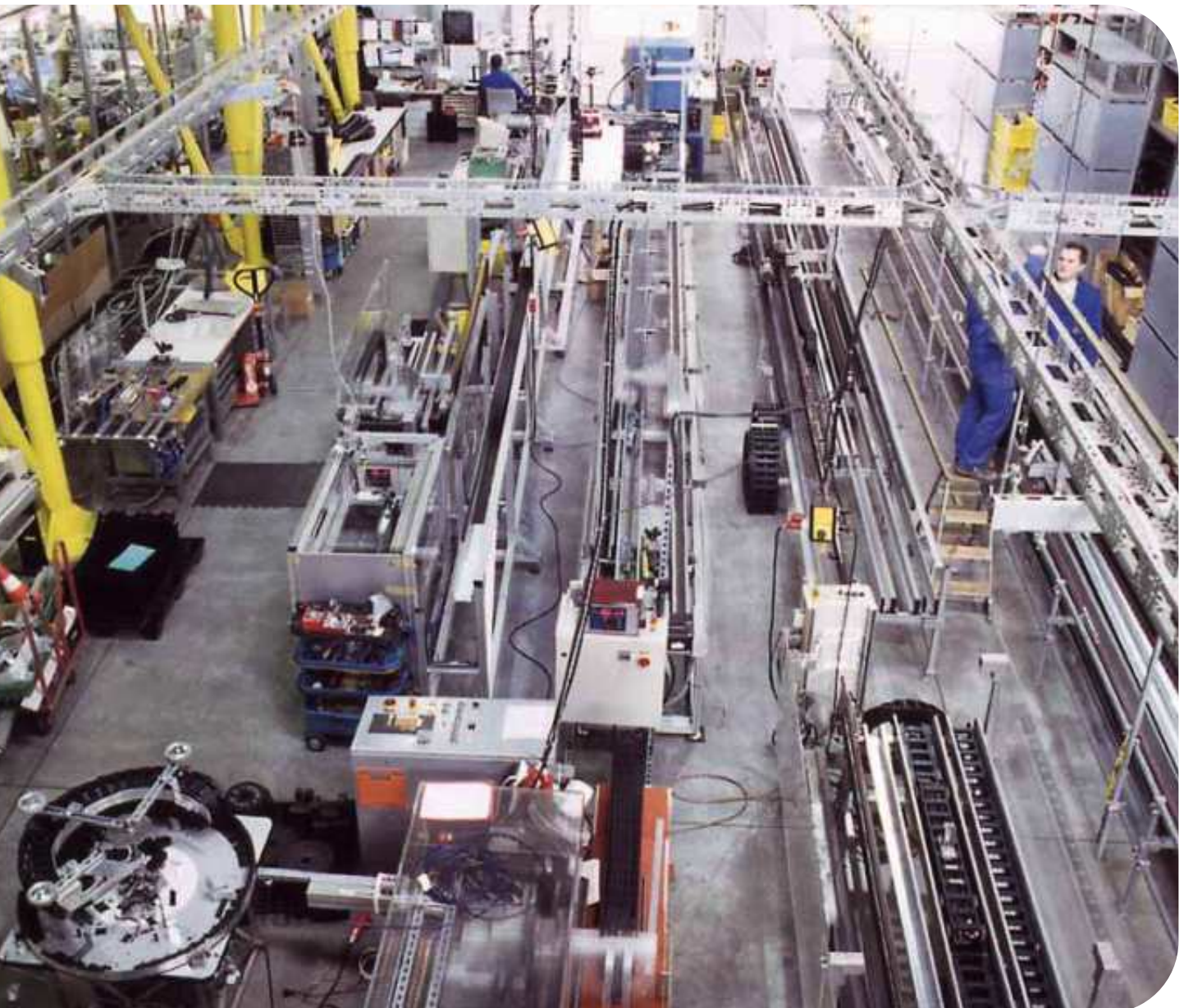
- Total shield with optimized braiding angle (covering approx. 70% linear, approx. 90% optical)
- Gusset-filled extruded inner jacket
- Center element for high tensile stresses
- Optimized single-wire diameter
- Stranding with optimized pitch length and pitch direction
- Highly abrasion-resistant pressure extruded jacket





# Chainflex<sup>®</sup> are the special cables for Energy Chain Systems<sup>®</sup> – tested, tested, tested and tested.

Partial view of igus<sup>®</sup> experimental laboratory – testing, testing, testing of Chainflex<sup>®</sup> cables



# Purpose of every Chainflex® cable

More sensitive applications with high clock cycle numbers, velocities and accelerations as well as sophisticated environmental conditions call for, especially in the field of energy management, tried-and-tested systems that are functionally efficient for a long period of time. EMC safety and the fulfillment of standards and directives such as UL, CSA, VDE, Interbus and Profibus are a necessary requirement today. After all, your automation system is supposed to function correctly non-stop and worldwide even on a low-cost basis. That's the **igus® mission**.

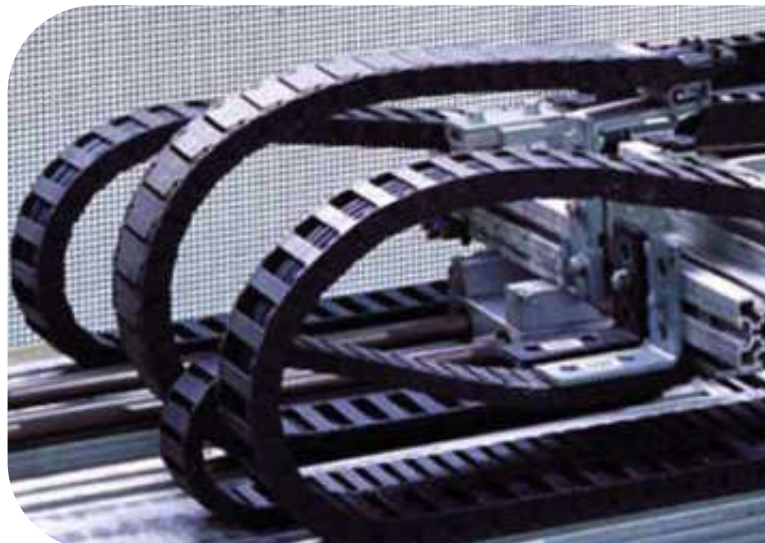
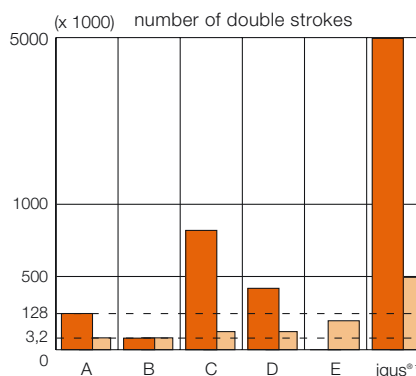
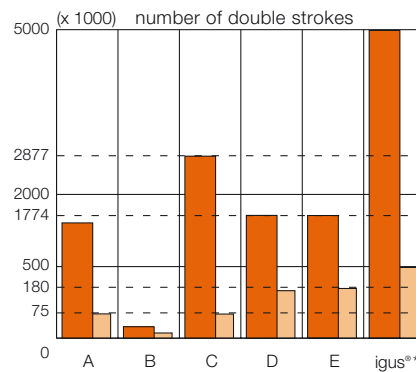


## No contradiction: Good cables cost less.

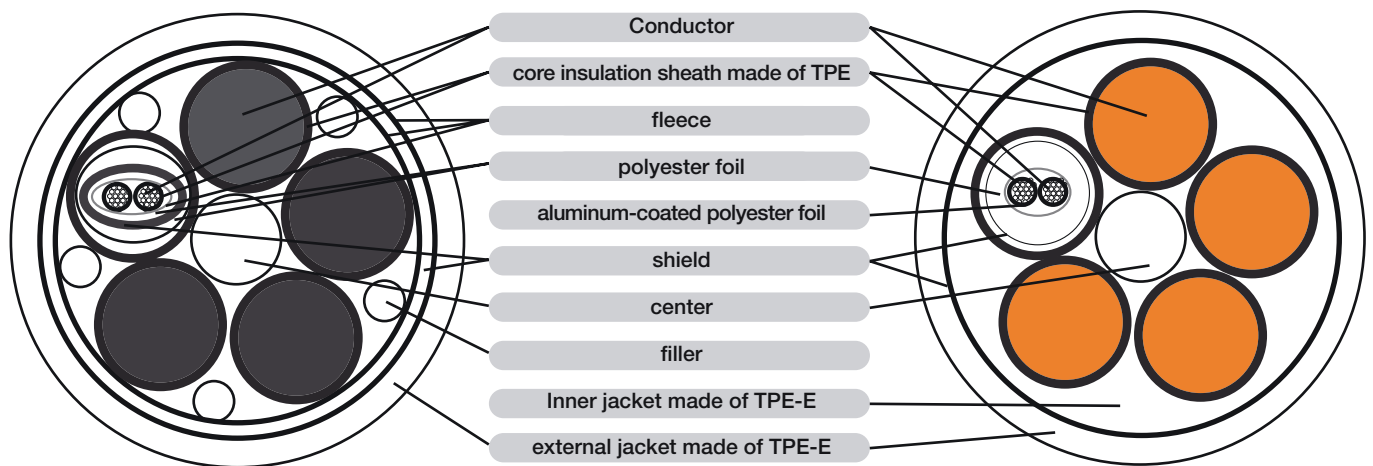
Quick availability throughout the world is a significant purchase criterion. Advantages of our cables: successful tests, presence in more than 40 countries around the world and deliverability ex warehouse. This saves time, money, storage capacity and applies to each one of our 850 cable types which you can order without any minimum quantity purchases or surcharges. Which further advantages can be included is something that depends on your specific conditions of use.

## igus® tested

As a manufacturer of Energy Chains® and special Energy Chain® cables, igus® uses the possibility of testing many different types of chains and cables on a practice-oriented basis. At the company-own technical training center in Cologne, numerous series of tests are carried out on a parallel basis under the most difficult conditions. At the present time, there are more than 35 test setups with their test results being summarized in databases. This extensive, current data pool provides precise, reliable information on the actual service life and is also the basis of new product developments at the company. The test data for Energy Chains® and cables, but also for ready-made systems, are, however, described in such detailed form that igus® confirms a functional guarantee for its Energy Chain Systems®.



# Example 1: tested, tested, tested! Servo cable structure



**Sample B with fleece and filler  
experimental production  
4x10+(2x1.0) C**

The purpose of the test is to determine the advantages of the more expensive internal jacket in shielded servo cables versus the less expensive fleece taping with fillers.

**Sample A with internal jacket  
igus® Chainflex®  
CF27.100.10.02.01.D**



In the case of flexible shielded cables, the shield is usually separated from the composite core structure. On the one hand, this is done in order to achieve a rounder braid form and, on the other hand, the friction of the core insulation sheath against the braided shield structure is prevented due to the separation of the cores and shield. This can be achieved with an internal jacket or a fleece taping which is wrapped around the composite core structure. The internal jacket is more sophisticated and is therefore more expensive to produce. Following the twisting process, the composite core structure must run through the extruder in which the internal jacket is then put on. In contrast to this method, the fleece tape can be put on between the twisting point and the reeling-up device during the twisting process and therefore does not require an own work operation.



**Product information  
CF27.D**

► page 174

## Comparison between the igus® solution with the gusset-filled internal jacket and the fleece version with fillers

Here, the servo cables are highly flexible motor connection cables with a complete copper shield and an integrated, shielded pair of control cores. This cable type was selected due to the fact that here the problematic case of an out-of-round braid form due to the different core cross sections is a significant factor and that the various bending behaviors of the production methods are therefore emphasized.

- **Sample A: CF27.100.10.02.01.D (igus® GmbH)**  
(4x10 mm<sup>2</sup>) + (2x1.0 mm<sup>2</sup>)
- **Sample B: experimental**  
(4x10 mm<sup>2</sup>) + (2x1.0 mm<sup>2</sup>)

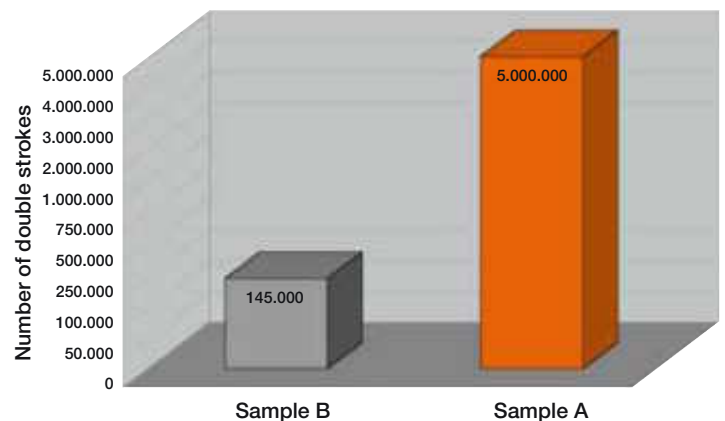
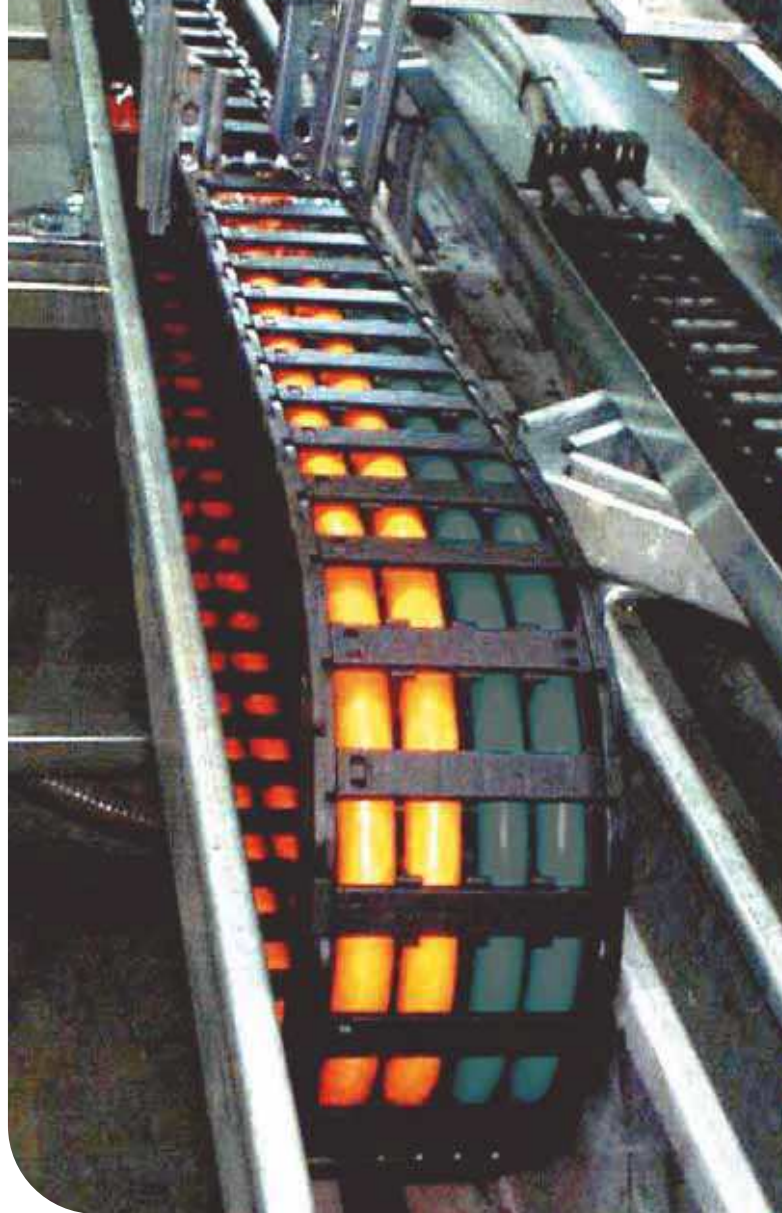
Both cables are provided with identical nominal cross sections and insulation materials. Cable A is equipped with an internal jacket and cable B with a fleece taping and fillers.

The experimental production (sample B) already shows the formation of a corkscrew after 145.000 double strokes. In the case of a cable, the so-called corkscrew refers to a wave-shaped deformation like the one that can be seen in the following picture on sample B.

Whereas, in the case of cable A, the internal jacket fills up the gussets and a round braid structure is created as a result, cable B requires fillers in the gussets. Like the core, the fillers also consist of fibrated polyethylene. They are easy to compress and are therefore hardly capable of taking over any supporting effects. Whereas the internal jacket, which is made of TPE, and the cable A center, which consists of cordage, hold the cores in a defined position, the cores of cable B are able to move about uncontrolled. During the bending process, a core has detached itself from the composite braid structure and has been shifted in the inner bending radius with respect to the center and on the outer bending radius with respect to the jacket. This results in corkscrew-type deformations that repeat themselves periodically with the pitch length.

### Assessment

Despite the extremely low bending factor of 4.76, no signs of wear can be detected in sample A (CF27.100.10.02.01.D) even after 5 million double strokes. Sample B, on the other hand, with its fillers and fleece taping succumbs to a corkscrew formation already after 145.000 double strokes. Accordingly, the result therefore justifies the extra expenditure of the cable with the gusset-filled internal jacket.



Sample A: CF27.100.10.02.01.D



Sample B: experimental production

# Example 2: tested, tested, tested! Technical Data Properties CAT5



## Alteration of the electrical transmission properties of a CAT5 cable when subjected to an application of stress with the minimum bending radius

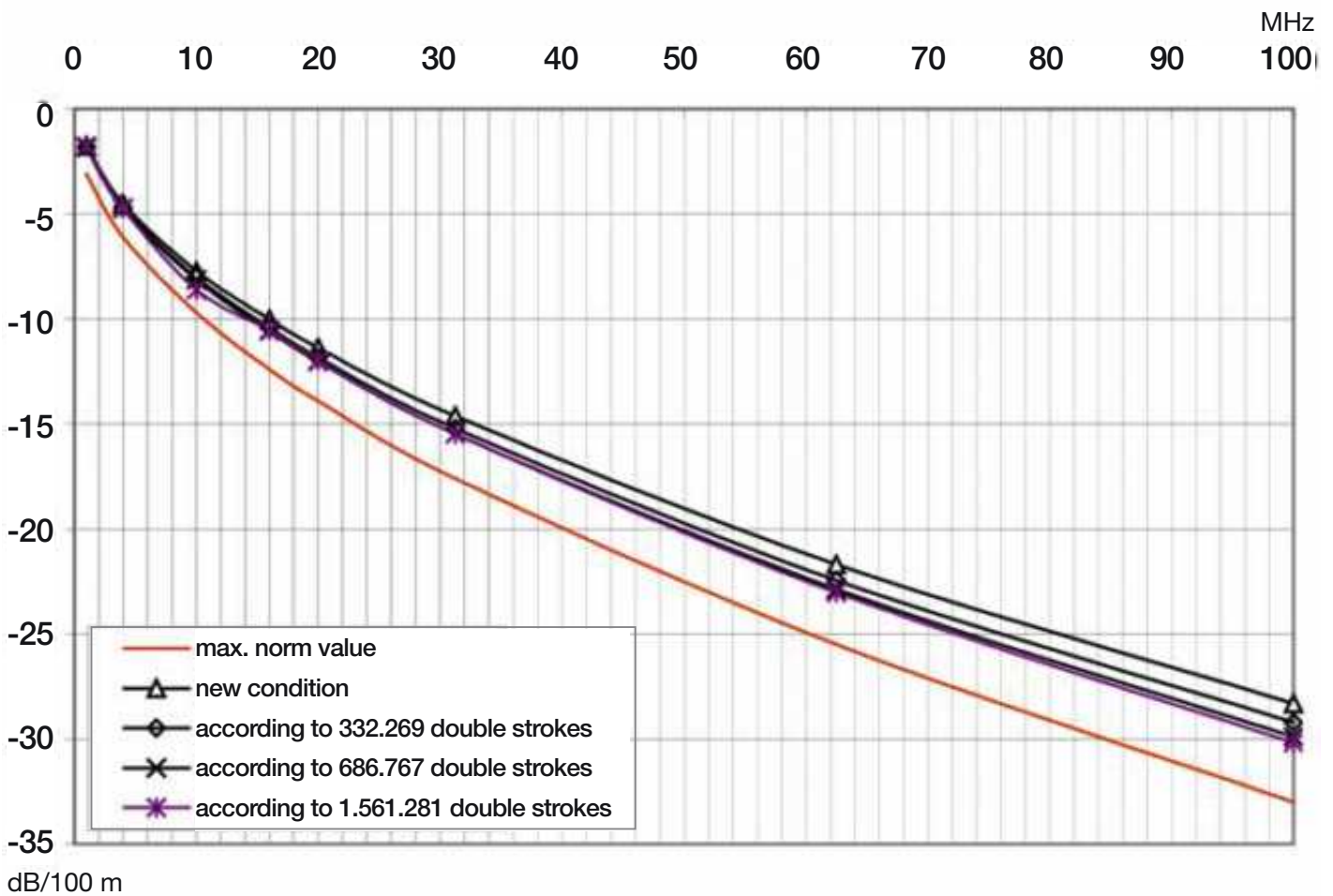
High transmission rates of up to 100 Mbit/s place high demands on the cable structure and its materials. The use of the cables in Energy Chains® subjects these materials to additional stress and results in long-lasting alterations of the electrical properties. A CF 14.02.04.02.CAT5 cable was selected as a cable to be inspected for high transmission rates. Even when subjected to an application of stress with the minimum bending radius, the cable must also be able to meet the electrical requirements of the IEC 61156-6 standard. In the case of the CF14.02.04.02.CAT5 cable, four pairs of cores are stranded with one another, with each core pair possessing a nominal cross section of 0.25 mm<sup>2</sup>. The conductor consists of bare copper wires and is surrounded by an insulation sheath consisting of foamed PE.



The following items were inspected:

- Characteristic wave impedance of single pairs
- Single-pair attenuation
- Return loss of single pairs
- Near-end crosstalk attenuation of single pairs versus one another

The test is to be carried out in order to determine whether the limit values of the IEC standard are complied with by the cable after being subjected to bending stress.



## Attenuation

The maximum values of the individual attenuation for each pair of cores are specified for the corresponding nominal characteristic wave impedance in dB/100m in the DIN IEC 61156-6 standard. Accordingly, the cables are subdivided into several categories according to the transmission frequency planned to be used. For the cable being inspected, transmission frequencies of up to 100 MHz are planned to be used, which corresponds to the category 5e.

## Test result

The attenuation, as a measure of the reduction of the transmitted electrical energy of a signal on the cable, remains, even after more than 1.5 million double strokes, below the specified limit value while being subjected to the application of stress of the minimum bending radius.

The characteristic electrical transmission quantities such as characteristic wave impedance, return loss and near-end crosstalk are fulfilled so that, despite applications of high mechanical stress, the electrical values of the IEC standard are complied with for a cable of the category 5.

## Product information

### CF14 CAT5 ▶ page 126



# Example 3: tested, tested, tested! “Millions of double strokes” in an energy chain

## Profibus cables in permanently-moving industrial use

For users, it is hard to get an overview of the cable market. Competition between cable suppliers is intensifying and manufacturers are outshining one another in their promises to “guarantee service life for cables used in energy chains”. Catalogues claim ten million - or even as many as 50 million - double strokes when it comes to the service life of cables used in applications involving movement.

On taking a closer look at figures claimed, one must ask how testing was done, or how realistic tests carried out actually were (for example length of travel, test radii, etc.) in order to be able to provide such a guarantee.

Even information stating that cables are tested in accordance with VDE (Association of German electrical engineers) 0472, Part 603, test method H, is not helpful when it comes to determining the service life of a cable in energy chains, since the roller testing stand cannot provide any conclusive results and there is no VDE test for special cables in energy chains.



Picture: Sliding application as the basis of the test structure

## Differences in service life

At the beginning of 2002, a test to determine the service life of profibus cables in a real application was commissioned in igus' test laboratory. The aim was to examine any differences in the service life of igus' CFBUS.001 Chainflex® cable and another market leading profibus cable. The parameters required for the test were selected on the basis of data contained in the competitor's catalogue:

Catalogue details	Test item “A” Twin-core profibus cable (2 x AWG24)C	Test item “B” igus® Chainflex® CFBUS.001 (2 x 0.25 mm²)C
Cross section	(2 x AWG24)C	(2 x 0.25 mm²)C
Guaranteed lifetime	Min. 4.0 Mio. Cycles	To be determined in a test
Bending radius	> = 60 mm	85 mm
Diameter	8.0 mm	8.5 mm
Catalogue details	Issue 2002	Issue 2002

Test parameters according to catalogue data of the competition

A gliding application was chosen as a suitable test structure since profibus cable systems are usually used here because of their data integrity, particularly over long lengths of travel and long transmission distances.

In order to be able to carry out non-destructive testing and hence achieve a large number of bending cycles in a short period of time, a genuine profibus transmission path was erected. In a PC at the fixed end of the test chain there was a profibus master insert card. A connection to a profibus slave was located on the moving end. This enabled the transmission rate to be determined with the help of a diagnosis program. Any data packets which might have been transmitted incorrectly could be indicated. The highest-possible transmission rate of 12 megabits/s was set.

The fundamental test, which commenced at the beginning of 2002 and is still in progress today, showed that only a relatively low number of cycles (420.000) resulted in the total failure of test item “A”, which, according to the competitor's catalogue, should have functioned safely for at least 4.0 million cycles. Thus the real lifetime reaches only about 10% of the stated catalogue value.

On the other hand test item “B”, the CFBUS.001, is still undergoing testing without any faulty data transmissions. So far, it has accomplished more than 14.0 million cycles.

## Structure and materials

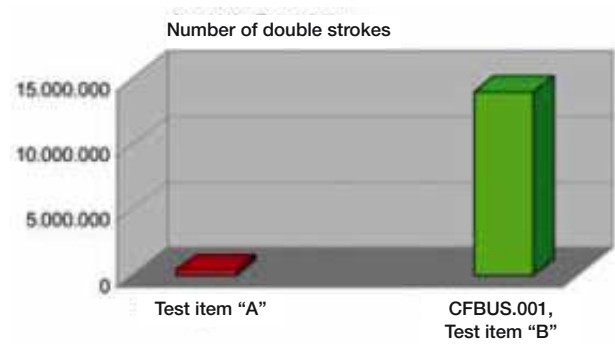
The main reason for the major differences in service life is the differing structural parameters of test item "A" and test item "B" (CFBUS.001), as well as the different materials used for producing the cables. The conductor insulation of the bus comprised of a foam material for all the test items. The electrical assets of this material ensured better transmission properties were achieved. A disadvantage of this material, however, was its weakness under reverse stresses. The forces which affect the bus pair should be absorbed by the element sheathing in order to alleviate the mechanical stress of the conductor insulation.

## Highly-elastic element sheathing

For this reason, test item "B" (igus®) was provided with a mechanically superior, extruded TPE inner, or element, gap-filling sheathing, in order to protect the bus pair against mechanical influences during the bending procedure. The element sheathing must be highly elastic. A mechanically inferior element sheathing made of inexpensive filling material only serves to make the bus pair round, just like frequently used fillers or banding. It is not able to protect the buses from the high degree of mechanical stress present in the chain. Tensile and compression forces which occur mainly influence those parts of the cable core in which there is a break in the element sheathing.

Test parameters	
Distance of travel:	S = 5.0 m
Speed, approx.:	V = 3.5 m/s
Acceleration, approx.:	a = 7.5 m/s <sup>2</sup>
Radius, approx.:	55 mm

The sheathing of test item "B" (CFBUS.001) is on the one hand characterized by a mechanically superior, gusset-filled TPE element jacket, which mechanically relieves the bus pair, fixes the cores in a defined position and bends. The sheathing of test item "B" (CFBUS.001) is on the one hand characterized by a mechanically superior, gusset-filled TPE element jacket,



which mechanically relieves the bus pair, fixes the cores in a defined position and bends. The extremely short pitch of the core strands and special cable also ensure that no great tensile or compression force has an effect on a long length of core.

## UL and CSA approval

Chainflex® CFBUS cables are now also available for all standard field bus systems, complete with UL and CSA approval and DESINA compliance. The highly abrasion-resistant, flame-retardant TPE outer jacket is extruded onto the fully braided shield with an adjusted twisted angle in order to provide the cable with additional stability.

The bus elements braided with a particularly short strand pitch are protected by means of a gap-filling, extruded TPE inner jacket. The bus parameters required are fulfilled by means of a choice of coordinated insulating materials and production procedures.

As with all Chainflex® cables, the new standard field bus cables of the CFBUS series are now available ex stock, without any cutting costs or extra charges for small quantities.

## Product information

### CFBUS ▶ page 118

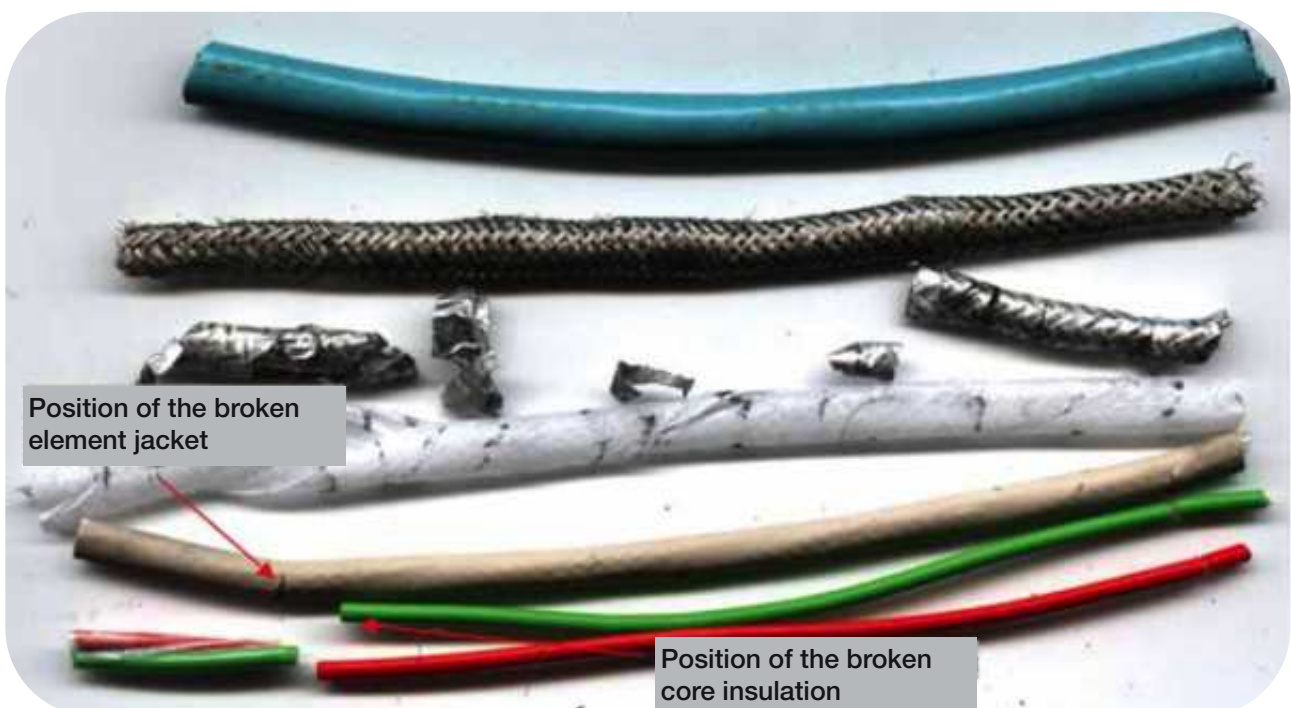


Fig. 3: A mechanically low-quality element jacket can't protect the bus pair against the high mechanical loads inside the Energy Chain®.



# Example 4: tested, tested, tested! CF98 with $< 4xd$ !

For users of very small energy supply chains with mostly very narrow bending radiuses, the question for a suitable cable for very high stroke numbers has come up frequently in the past.

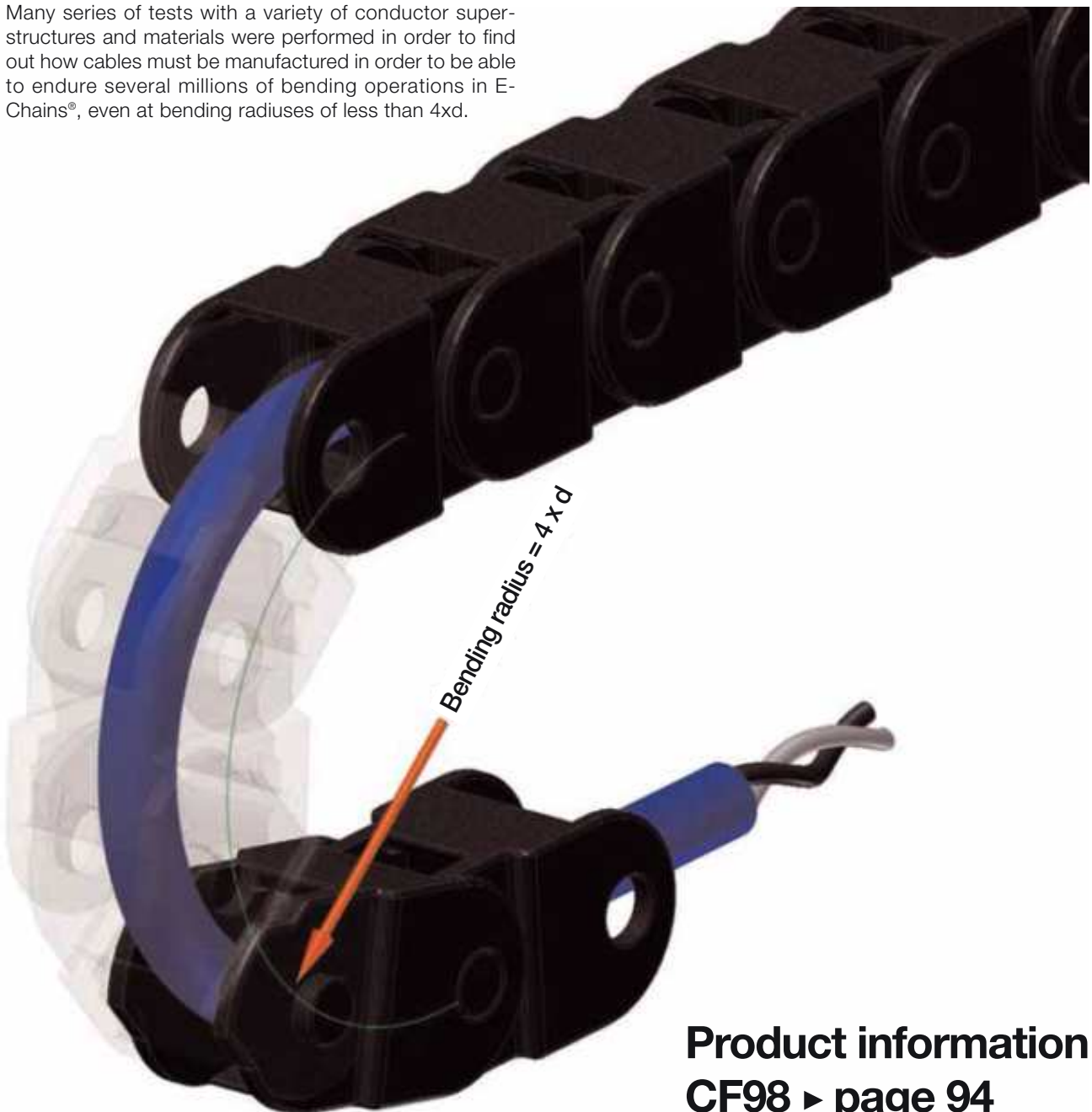
At bending radiuses of less than  $5xd$ , copper quickly reaches its physical limits, which necessitated the search for suitable substitute conductor materials or for fundamentally different conductor superstructures.

Many series of tests with a variety of conductor superstructures and materials were performed in order to find out how cables must be manufactured in order to be able to endure several millions of bending operations in E-Chains<sup>®</sup>, even at bending radiuses of less than  $4xd$ .

## Test set-up: Horizontal, short distance of travel

### Test parameters

Distance of travel:	$S = 0.8 \text{ m}$
Speed, approx.:	$V = 1.5 \text{ m/s}$
Acceleration, approx.:	$a = 0.5 \text{ m/s}^2$
Radius, approx.:	$18 \text{ mm}$



**Product information**  
**CF98 ▶ page 94**

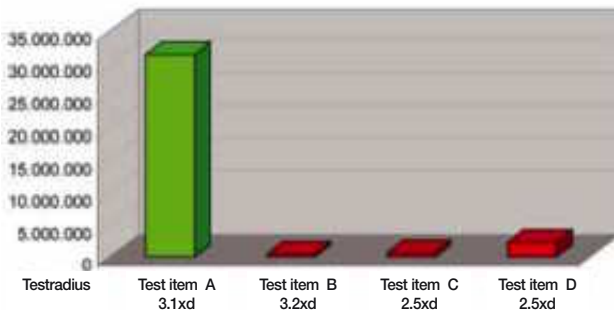
## Test 1: Inspection of four different cable designs

Four different cable constructions has been analyzed:  
 Test item A – conductor with special conductor alloy  
 Test item B – conductor same as test item A, but in copper  
 Test item C – conductor in braided structure  
 Test item D – conductor in stranded construction

This long-term inspection, which was carried out over a period of 2 years, provided the following results:

	Number of double strokes	Cross section	d [mm]	Testradius
Test item A	31.268.000	7x0.20	5.8	3.1xd = 18
Test item B	450.000	7x0.20	5.6	3.2xd = 18
Test item C	638.000	7x0.25	7.3	2.5xd = 18
Test item D	2.350.000	7x0.25	7.3	2.5xd = 18

Number of double strokes



## Test 2:

Two different cable designs were tested, whereby different core numbers and cross-sections were selected in comparison with test 1:

Test item A – conductor with special conductor alloy

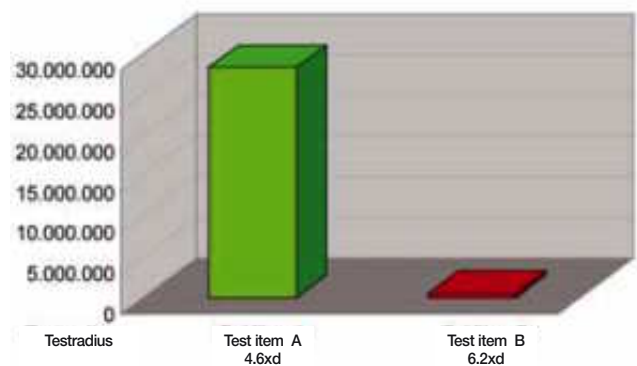
Test item B – conductor in copper

In this case, test item B was manufactured completely identical to test item A except for the conductor material.

The test showed that not a single case of wire breakage could be detected for test item A even after 28 million double strokes. Test item B, however, only achieved approx. 1.4 million double strokes before complete destruction of the conductor was determined. This test also demonstrates that the alloy concept clearly surpasses the life of the copper conductor by more than 19 times and achieves these extraordinary results in the mechanically critical area of very small cross-sections!

	Number of double strokes	Cross section	d [mm]	Testradius
Test item A	28.267.000	2x0.14	3.9	4.6xd = 18
Test item B	1.450.000	2x0.14	2.9	6.2xd = 18

Number of double strokes



## Conductivity of alloys

However, the outstanding mechanical properties of this alloy have to do with a reduced conductivity versus copper, which can be compensated by means of slightly increased cross-sections. This means that the cross-sections mentioned in the catalog meet the electrically defined cross-sections defined using the conductivity value. The conductor diameter of the alloyed conductor increases slightly compared to the conductor diameter of a copper conductor.

This compromise results in a 10% greater external diameter for the CF98 series versus a comparable CF9 type, although the service life differences to be expected between the CF98 versus the CF9 speak for themselves and increase by a multiple factor in comparison with other so-called chain-suitable cables.

As in the case of the CF9 series, further characteristics of the Chainflex® CF98 include the highly abrasion-resistant, gusset-filled extruded TPE outer jacket, the oil resistance and the UV resistance as well as the absence of any PVC and halogen compounds. Especially in areas of application that only possess minimum construction space but also demand a large number of strokes, the igus® cable offers an increased degree of operational safety and efficiency. Areas of application are available in the semiconductor and component parts industry, in the automation sector as well as in the automotive and bank sector. New possibilities of application can also be found in automatic doors for motor vehicles and trains as well as in automatic food and self-service machines and in the packaging industry.

# Example 5: tested!

## Dispersion and attenuation

### Plastic fiber-optic cables in Energy Chains®



Plastic fiber-optic cables have been introduced for data transmission in industrial applications due to their excellent interference-proof properties against electro-magnetic fields and further advantages such as the possibility of reducing dimensions and weights. The application as flexible link lines particularly in Energy supply chains places high demands on plastic fiber-optic cables.

The most important characteristic values of a fiber-optic cable are dispersion and attenuation. Dispersion is the term used to describe the scattering of the travel time of the signal in the fiber-optic cable. In plastic fiber-optic cables this is essentially caused by the mode dispersion, which arises from the different travel times of individual light beams.

Dispersion determines important transmission properties such as bandwidth, cut-off frequency or maximum bit rate. Significant changes in dispersion could not be ascertained in any of the investigations carried out.

The industrial application of igus Chainflex®-lines with plastic fiber-optic cables in supply chains for example is therefore unproblematic with regard to changes in dispersion.

The second important characteristic property, attenuation, determines the maximum possible length of a transmission path.

The attenuation of a plastic fiber, like that of the glass fiber, is also strongly dependent on the wavelength of the light used. For this reason all the investigations were carried out with a wavelength of 666nm.

Depending on the output of the transmitter and the sensitivity of the receiver the operator has a certain "attenuation budget" available for the complete transmission path including all junction and transition regions. This attenuation budget (typical value approx. 20dB) must not be exceeded if a secure transmission of the data is to be guaranteed.

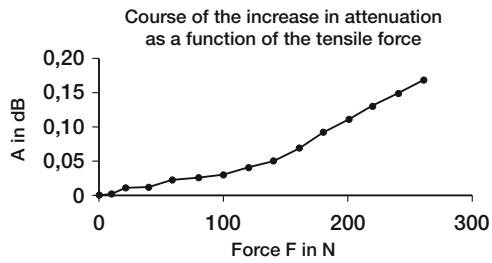
For this reason it is of great interest to the user to know whether and to what extent increases in attenuation are to be expected for his particular application so that these can be taken into account in the compilation of his own attenuation budget.

In addition to continuous bending stress, which is typical for operation in an Energy chain, further mechanical stresses that can occur during installation or operation must be taken into account. Thus, for example, relatively large tensile forces can occur when integrating the line into an Energy chain. The fixing of the lines at the ends of the energy chain using cable clamps leads to permanent transverse loads.

The test of the behaviour under transverse load is carried out following DIN VDE 0472, Part 223. Since the cable clamps only exercise pressure in an area covering a few centimetres, increases in attenuation are relatively low.

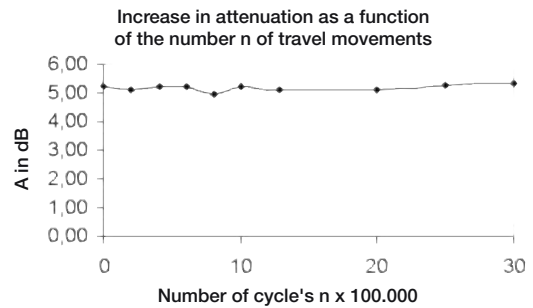
Attenuation under tensile load depends to a great extent of course on the composition of the line. Lines with integrated copper conductors or strain relief elements do not reveal a noticeable increase in attenuation until very much greater tensile forces are applied than is the case with pure fiber-optic cables.

Figure 1 represents test results for a Chainflex®-line with 6 fiber-optic cables. The length of the test sample is 1m and the maximum tensile load 250 N.



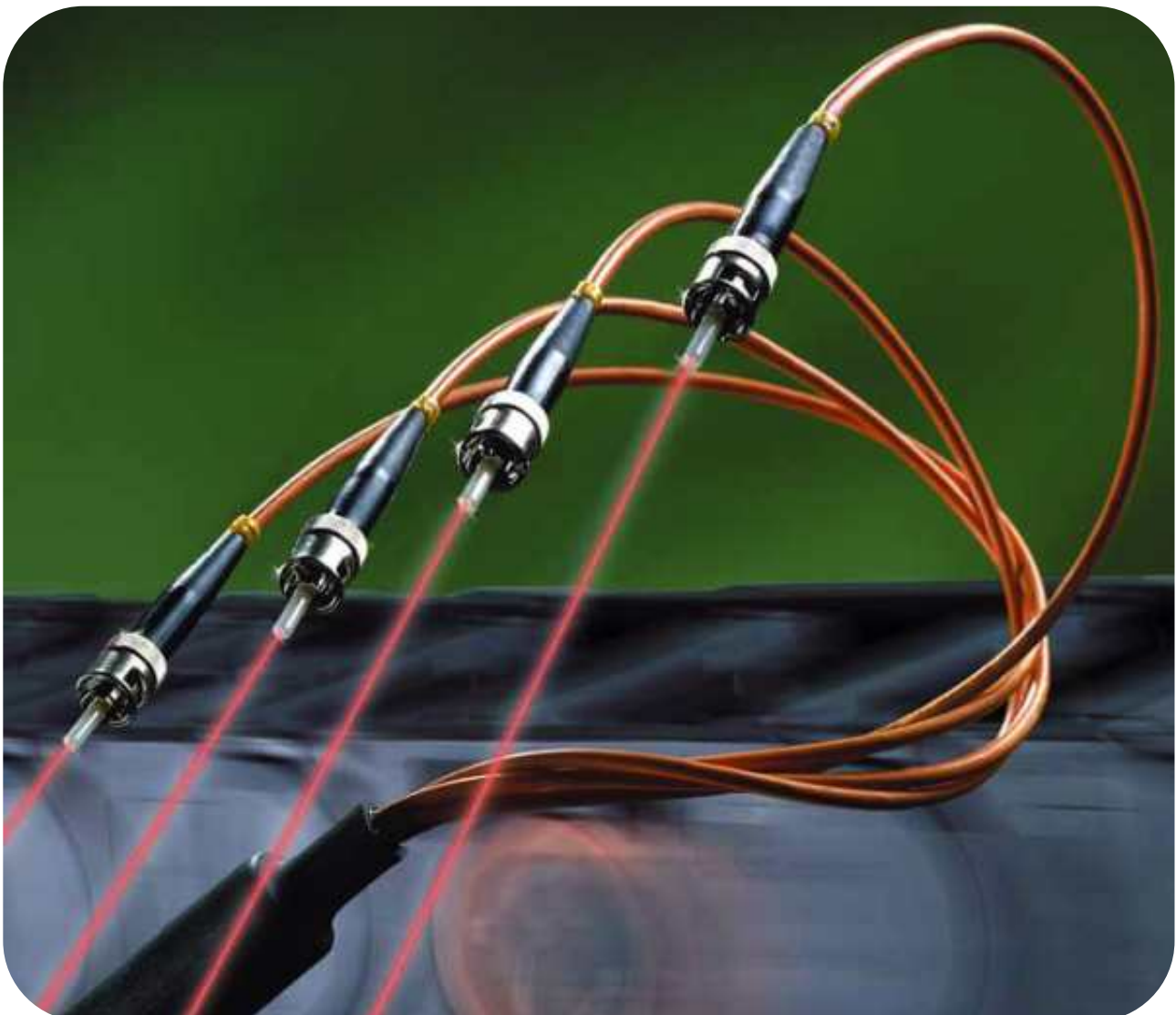
The tensile forces required to integrate fiber-optic cables in Energy Chains® are usually much lower than 250 N. The increase in attenuation was 0.17 dB at maximum tensile force and disappeared completely after the tensile load was released. Thus no effect on attenuation should be expected. In the case of plastic fiber-optic cables that are bent very often, as is the case in applications with Energy Chains®, then further influencing factors such as material fatigue, dulling of the materials, micro-cracks right through to complete fiber fracture must be feared, and their influence on attenuation can only be investigated in extensive practical tests such as those carried out by igus®.

Figure 2: Course of the increase in attenuation as a function of the number of cycles.



The excellent test results, shown in part here, of the Chainflex®-lines must not be taken for granted, as investigations of fiber-optic cables from other manufacturers showed, some of which even failed with complete breaks in the fibers. The investigations revealed that Chainflex® fiber-optic cables are not influenced in their function by mechanical loads such as tensile, transverse or bending stresses in Energy Chains®. Therefore they are perfectly suitable for use in the sometimes rough industrial environments for the interference-proof transfer of information between drive and control elements of machines.

Bibliography: [1] Plastic fiber-optic cables for flexible Energy supply systems: Bernfried Späth, Frank Blase



**Product information FOC ▶ page 234**

# Example 6: tested!

## Selection from test results

Since 1989, we have been working on the development of electrical cables.

Back then, many of our customers lost their faith in the solution with energy supply systems because the cables being used frequently failed. Core breakage, "corkscrews", jacket wear and breakage of the shields were substantial reasons for these failures.

Our Chainflex® product range was then created from this situation of emergency. And due to the fact that we knew very little about cables at that time, we had only one choice:

Testing, testing, testing, testing, testing.

Accordingly, we have since been making use of a firm principle:

We almost always test our cables with a bending radius that is 30-50% less than the bending radius we mention in our catalog. We guarantee the quality requirement specified for our own products based on the production-process-accompanying sample tests that are carried out with at least 1 million reverse bending processes. During the subsequent inspection of the cable, this cable must be completely intact and, especially, none of the single wires must be broken. Newly developed types undergo considerably longer reverse bending processes in Energy Chains® before a new Chainflex® series is released.

Designation	Type	Quantity	Dimensions	#	Material	Temp.	Frequency	Approved use
CF 2 02 18	20	18x12	20	11.0	3.0x0.5 + 0.5	6.3x0.5 + 0.5	2.2	4.024 876
CF 2 02 18	20	18x12	20	11.0	3.0x0.5 + 0.5	6.3x0.5 + 0.5	2.2	4.024 876
CF 2 02 18	20	18x12	20	11.0	3.0x0.5 + 0.5	6.3x0.5 + 0.5	2.2	4.024 876
CF 2 02 18	20	18x12	20	11.0	3.0x0.5 + 0.5	6.3x0.5 + 0.5	2.2	4.024 876
CF 2 02 18	20	18x12	20	11.0	3.0x0.5 + 0.5	6.3x0.5 + 0.5	2.2	4.024 876
CF 2 02 18	20	18x12	20	11.0	3.0x0.5 + 0.5	6.3x0.5 + 0.5	2.2	4.024 876
CF 2 02 18	20	18x12	20	11.0	3.0x0.5 + 0.5	6.3x0.5 + 0.5	2.2	4.024 876
CF 2 02 18	20	18x12	20	11.0	3.0x0.5 + 0.5	6.3x0.5 + 0.5	2.2	4.024 876
CF 2 02 18	20	18x12	20	11.0	3.0x0.5 + 0.5	6.3x0.5 + 0.5	2.2	4.024 876
CF 2 02 18	20	18x12	20	11.0	3.0x0.5 + 0.5	6.3x0.5 + 0.5	2.2	4.024 876

### Extensive database

Today, we have recourse to an extensive database with detailed information on the service life of our Chainflex® cables which makes it possible for us to give you the information you need for your application.

Designation	Type	Quantity	Dimensions	#	Material	Temp.	Frequency	Approved use
CF 11 02 04 02 02 04 04	20	18x12	20	11.0	3.0x0.5 + 0.5	6.3x0.5 + 0.5	2.2	4.024 876
CF 11 02 04 02 02 04 04	20	18x12	20	11.0	3.0x0.5 + 0.5	6.3x0.5 + 0.5	2.2	4.024 876
CF 11 02 04 02 02 04 04	20	18x12	20	11.0	3.0x0.5 + 0.5	6.3x0.5 + 0.5	2.2	4.024 876
CF 11 02 04 02 02 04 04	20	18x12	20	11.0	3.0x0.5 + 0.5	6.3x0.5 + 0.5	2.2	4.024 876
CF 11 02 04 02 02 04 04	20	18x12	20	11.0	3.0x0.5 + 0.5	6.3x0.5 + 0.5	2.2	4.024 876
CF 11 02 04 02 02 04 04	20	18x12	20	11.0	3.0x0.5 + 0.5	6.3x0.5 + 0.5	2.2	4.024 876
CF 11 02 04 02 02 04 04	20	18x12	20	11.0	3.0x0.5 + 0.5	6.3x0.5 + 0.5	2.2	4.024 876
CF 11 02 04 02 02 04 04	20	18x12	20	11.0	3.0x0.5 + 0.5	6.3x0.5 + 0.5	2.2	4.024 876
CF 11 02 04 02 02 04 04	20	18x12	20	11.0	3.0x0.5 + 0.5	6.3x0.5 + 0.5	2.2	4.024 876
CF 11 02 04 02 02 04 04	20	18x12	20	11.0	3.0x0.5 + 0.5	6.3x0.5 + 0.5	2.2	4.024 876

Selection of test results from the igus®-own technical training center in Cologne for the year 2000.

# Example 7: tested!

## EMC tests

### The "electromagnetic compatibility" of Chainflex® cables

The subject of "electromagnetic compatibility (EMC)" is becoming increasingly important. For one thing, this is due to a increase in the electromagnetic interference fields in the long-distance range caused in particular by modern telecommunications and communication technology as well as in the local range caused by energy technology.

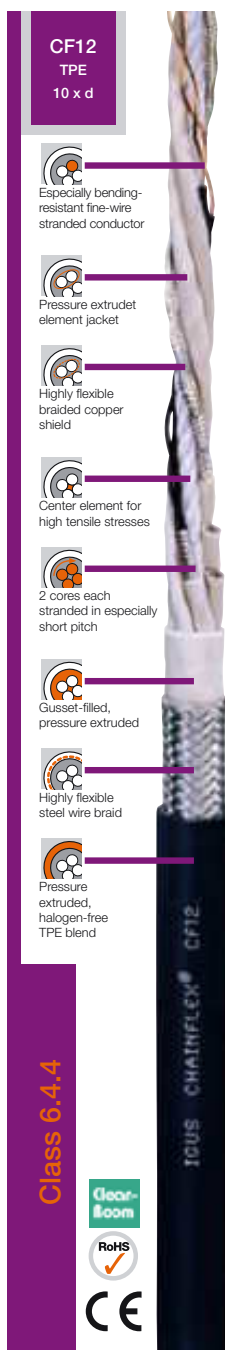
On the other hand, the requirements for data transmission are also increasing. The signals are becoming more susceptible to interference and the electromagnetic environmental influencing factors more diverse. This can be especially problematic for the coupling between cables which, as is frequently the case in energy-conducting chains, are conducted on a parallel basis over a certain distance. A heavy-current cable with interference acts as a producer of an electromagnetic interference field which, in turn, acts upon another cable, normally a signal cable, and then causes cable-conducted interference there.

Already several years ago, we therefore introduced electrical cables with fiber-optic cables made of glass that are also capable of being subjected to the mechanical stress in Energy Chains®. Even the Chainflex® cables with conventional copper conductors were tested with respect to their electromagnetic compatibility in an extensive, application-oriented test program.

An asynchronous motor, for example, was therefore connected via an unshielded heavy-current cable (Chainflex® CF30) to a frequency converter. This frequency converter with pulse width modulation becomes the generator of new spectral shares never existing previously in the primary or secondary networks. On a parallel basis with this heavy-current, Chainflex® cables were also kept available for digital signal transmission in Energy Chains®. Especially good results can be achieved here by the Chainflex® CF12 cable which was specifically designed according to the EMC aspect. This cable possesses twisted-pair cores, the pairs of which are provided with a copper shield, as well as a total shield made of a steel braid in addition. Interference over a broad frequency range can therefore be effectively prevented as a result.

The capacitive as well as the inductive coupling was also tested. In the case of the selected test conditions, it was determined that, even when the energy cables and signal cable touch one another over a longer distance, error-free data transmission is possible if a shielded Chainflex® cable is used and this shield is grounded on both sides.

In addition, tests were carried out in accordance with the existing standards on electromagnetic compatibility. These standards provide a general basis for determining the operating behavior of electrical devices that are repeatedly exposed to electrical interference. They were not introduced specifically for cables. In particular, tests with the "burst generator" were carried out. Here, fast transient interference signals are generated in pulse groups that simulate switching processes in particular. Such processes occur, e.g. during the interruption of inductive loads or during the bouncing of relay contacts. Here, too, the shielded Chainflex® cables have proved their reliability.



# Example 8: tested, tested!

## Fibre optic cables – run 76.000 km



**Go 76.000 km or 1.5 times round the world with Chainflex® fibre optic cables.**

Users of data transmission systems (bus systems) with high data rates or long transmission lengths or even heavy EMC loads are relying on fibre optic cables more and more often.

Many users today, however, are not conscious of the fact that the advantages that apply for fibre optic cables in general are even greater when Chainflex® fibre optic cables are used in E-Chains®.

Data transmission systems on a copper basis usually have two basic disadvantages.

1. The maximum transmission lengths are greatly restricted by the transmission systems (between 5 and 50 m cable length depending on system and transmission frequency).
2. The copper-based cables used in moving energy supplies usually show an increase in attenuation values after some time at high cycle rates, which in turn have a negative effect on the maximum ranges.

The case is completely different with data transmission or bus system-independent fibre optic cables made of glass. As well as being suitable for any transmission/bus system (providing the right converters are used), they have the following advantageous properties:

1. The transmission lengths are not restricted by the data transmission systems used and are – depending on the type of fibre optic cable used – several hundred metres long.
2. With Chainflex® fibre optic cables, the increases in attenuation even at very high cycle rates in E-Chains® are so low that the values are almost non-measurable, and most of the attenuation is to be found near the plug.

The question of how greatly the attenuation behaviour of an igus® Chainflex® fibre optic cable changes has been examined using the following test set-up, which had not been concluded as the catalogue went to press (in 4/08).

**Product information**  
**CFLG.2H ▶ page 152**



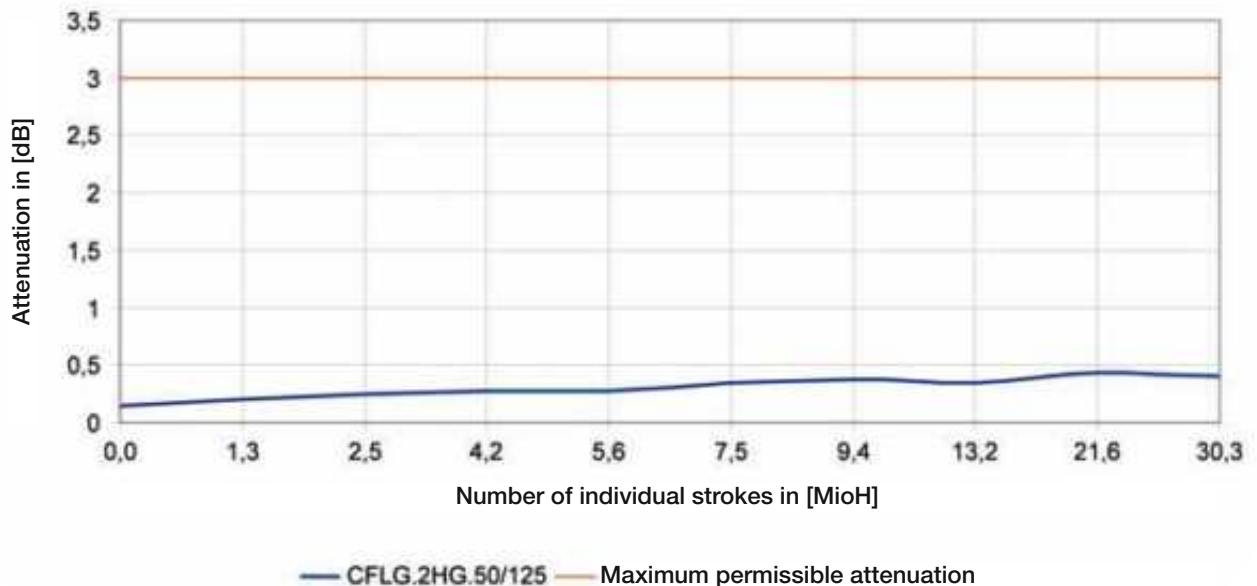
### Test parameters:

Test cable:	igus® Chainflex® CFLG.2HG.MF.50/125
Number of fibres:	2
Type of fibre:	Gradient fibre 50/125µm
Connector:	2 x ST Connector
Travel:	2 m
Length of cable:	3 m
Energy chain:	igus® E-Chain® series 15.015.100.0
Test radius:	11 x d

Taking into consideration that ST plugs have a mean insertion attenuation of 0.3 dB and a maximum insertion attenuation of 0.5 dB, the increase in attenuation of approx. 0.1-0.15 dB after more than 30 million movements in the E-Chain® is absolutely negligible. Thus the cable has covered more than 76.000 km during the test.

The lightwave length considered here is 850 nm.

### Increase in attenuation as a function of the number of individual strokes





# Example 9: tested!

## Fast images

### Fast images in industrial applications: USB, FireWire

The rising resolution and sampling rates of modern digital visual display systems are also inevitably accompanied by the rapid increase in the data quantities to be transmitted.

Fast bus systems which find application for similar data quantities available in the consumer sector were taken from the industry particularly for this purpose.

Here the typical representatives are bus systems such as FireWire (1394a and 1394b), USB (2.0), as well as Gigabit Ethernet or CameraLink.

All these bus systems need special cables, which are offered in the consumer sector by numerous manufacturers at knocked-down prices.

Many of these frequently preassembled cables are developed and manufactured only for static laying or minor mechanical stressing.

Costly production losses would be inescapable, if such cables were used in industrial applications with all the known parameters such as chemicals, electro-magnetic and mechanical load, etc.

These are not only "genuine" downtimes such as wire breakage or short circuits of the litz wires, but errors can be noticed gradually through alteration of the capacitive features with a reduction of the possible transmission rates and increased dampening.

The use of substandard materials and a deficient mechanical structure in fiber optic cables can lead to murkiness of the fibers and thus also to reduced data rates.

A genuine troubleshooting in bus cables is possible only with very expensive equipment and lots of time.

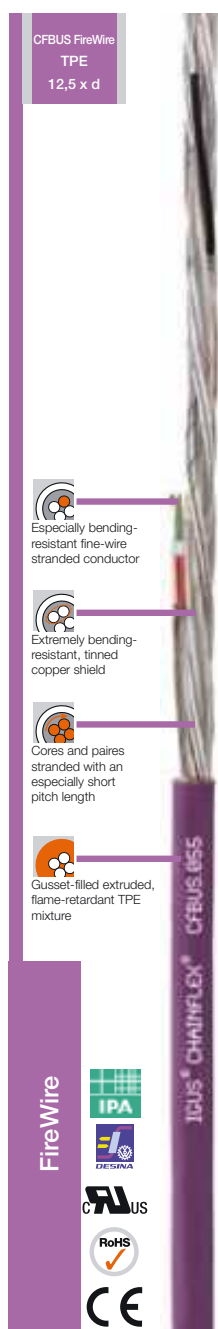
Depending on the position of the damage, the errors may also occur only sporadically during operation and cannot be found once the facility stops.

The good experiences in thousands of applications with classic field bus systems, e.g. Profibus, Interbus, DeviceNet, etc., and the desire of many customers for comparable cables also for the above-mentioned high-speed bus systems led igus® to develop an own cable series, among others, with the following cable types:

- CFBUS.055 for FireWire 1394a
- CFBUS.065 and CFBUS.066 USB 2.0
- CFLG.2HG.MF. Fiber optic cable series for bus-independent, long transmission stretches

The main focus in the development was on mechanically stable cable designs in order to grant the capacitive, inductive and optical features over a high number of cycles.

In the mechanical structure of the shields as well, a long service life was aimed at by material selection and special manufacturing processes.



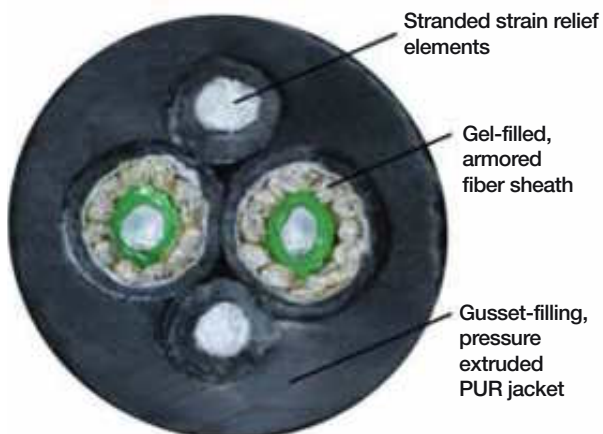
### Product information

► page 226



In the industrial environment, it is not only the electrical and mechanical features that play a role, but also the resistance to a great variety of media such as oils, coolants or the like. The seasoned outer jacket material TPE has already proved its durability in many thousands of applications in other igus® cables.

All cables are subject to ample tests in the igus® laboratory; as there is no existing conclusive test procedure, the igus® engineers chose a very pragmatic method.



Cross section "Chainflex®" fiber optic cable from igus®.

Several industrial cameras traversed on a fast linear motor at a speed of 2 m/s, an acceleration of 5 m/s and a travel of 600 mm, while the bus cables moved continuously in the used E-Chain® systems.

**Test rig:**

**10 m CFBUS.055 FireWire (1394a)** tested in an E-Chain® of the B10.015.125 series with over 6 million movements with a FireWire 1394a camera.

**10 m CFBUS.066 (USB 2.0)** tested in an E-Chain® of the B10.015.100 series with over 3.5 million movements with a USB 2.0 camera.

**10 m CFLG.2HG.MF.50/125** tested in an E-Chain® of the B10.015.075 series with over 3 million movements with a Fire-Wire 1394b camera with optical output.

Despite the long cable lengths, particularly in USB and Fire-Wire, no adverse effects on the picture quality could be determined even according to this stroke rate.

This non-scientific, but practice-oriented test distinctly proves the industrial capability of these high-speed bus cables.

This test is not complete and is continuing.

# Example 10: tested!

## Light in the cold

### Light in the cold – igus® gradient fibre glass cable in the deep freeze test

In the safe transmission of large amounts of data in bus systems at high speeds over long distances, the igus® gradient fibre glass cable of the type CFLG.G has already become a standard in numerous applications in cranes. Insensitivity to electro-magnetic load and resistance to hard environmental influences enable the application together with energy supply cables in very long travels.



What happens in crane facilities in regions with extremely low temperatures? Does the maximum possible cable length of several hundred metres reduce through increase in dampening at low temperatures, or does the cable break in extreme applications, for example at  $-40\text{ }^{\circ}\text{C}$ ?

The sensitive glass fibres are conducted in a gel-filled hollow space. How does the gel behave in highly dynamic conditions and what happens in restarts after long downtimes?

As no precise statement about this topic could be found in relevant technical journals, and as little was known particularly about the thermal features of the gel, igus®, as part of its philosophy, undertook own tests to determine the reliable specifications for applications in E-Chain® systems. For this task, the igus® test laboratory was equipped with a freezer that can generate constant temperatures of  $-40\text{ }^{\circ}\text{C}$  and a test facility was mounted for long travels up to 7 m for a speed of 1.6 m/s and an acceleration up to 6 m/s.

The igus® gradient fibre glass cable CFLG.6G.50/125.TC was tested. The cable was tested with a length of about 15 m as loop in an igus® E-ChainSystem® 3500.125.200.0 with a radius of 200 mm.

Varied and extreme temperature curves thereby served for the simulation of environmental influences, particularly when the temperature plunged during downtimes from plus degrees to -40 °C in the shortest time and the motion was restarted afterward.

Under these application conditions, the dampening of the cable also should not rise above 3 dB at 850 nm wave length. After one million double strokes, which correspond to an operational performance of about 7000 kilometres, the maximum dampening is reached and still remains significantly below 3 dB. The measurements highlighted in the diagram reveal that distinct variations in temperature combined with the constant movement in the E-Chain® have only minor effects on the dampening of the CFLG.6G.TC cable.

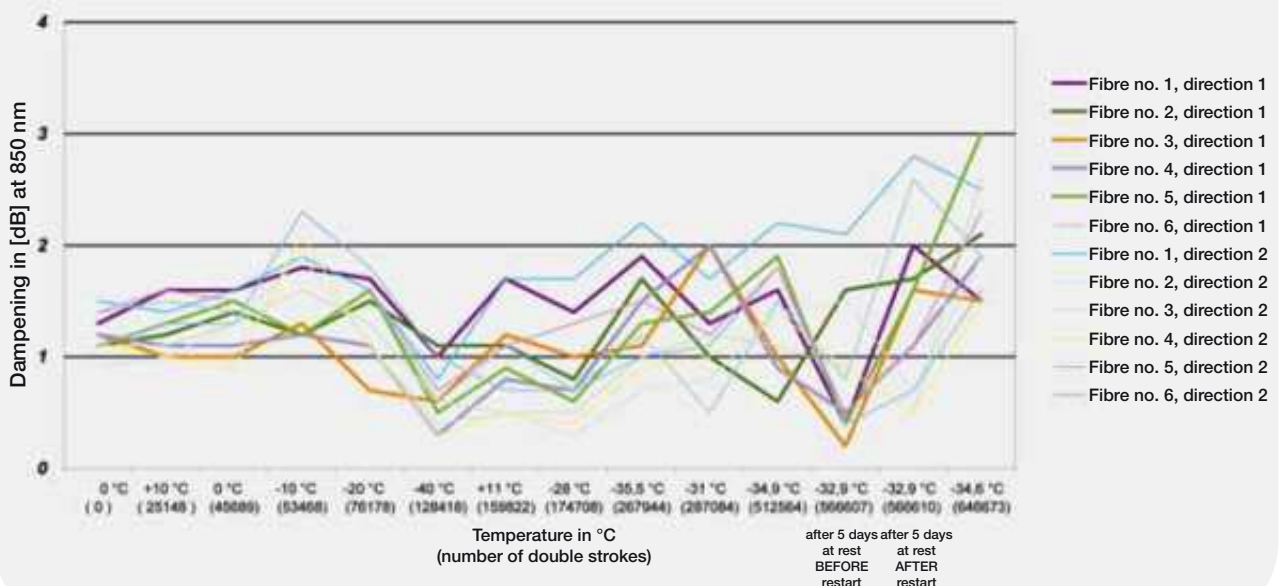
The noticeable high initial dampening is attributed to the plugs used and also reflects the reality here because, in practice, 90 % of the cables used in automation are pluggable fibre optic cables.

## Product information CFLG. G ▶ page 156



The test with the igus® cable makes it quite clear that only realistic and absolutely very expensive tests can fetch clarity about the service life of cables.

Dampening of the fibres 1-6 of the CFLG.6G.50/125.T cable in two directions



# Example 11: tested! Completely turned

Chainflex® cables for E-ChainSystem® are designed for application in linear movements and their efficiency has been proved a million times.

But industrial applications and their necessary motion sequences become increasingly complex, so that special cables are more and more required for torsional movements.

The service life of the most differing constructions are yet harder to calculate for torsion applications, as no fixed sizes such as radii, travels or the like, are defined.

Shielded cables however are very difficult in torsion applications. Braided shields are generally braided in the opposite direction. Whether a cable maintains the torsional demands is very strongly dependent on the application and type of installation.

Unshielded cables, particularly all bundle-stranded Chainflex® types, could be successfully used in many torsion applications.

In torsional movements the shield litz wires are therefore drawn in one winding direction, and the other turned in the other winding direction.

The woven arrangement and the entailing constriction of each winding direction lead to a quick breakage of the shield from the resulting expansion of the shield litz wires.



At igus®, the emphasis is not only on technology but also on beautifully designed products. The TRC and TRE series both received the iF-Design-Award.



**Product information**  
**CF ROBOT ▶ page 210**

The new igus® development of a twistable, shielded single-core cable picks up on this point and ensures, due to its special design and understructure of the shield, that no forces at all or that only the smallest possible forces act on the shield wire.

As the described test clearly shows, massive service life extension can, for example, be determined when compared to a CF310.250.01.

**Test rig:**

The new cable CF ROBOT was tested at the igus® laboratory on a specially developed rig for torsion test.

The torsion angle thereby amounts to  $\pm 270^\circ$  for a total cable length of about 2.5 m (tested in different versions of the Triflex® R).

Fitted for the test were:

- 3 CF ROBOT cables 037
- 3 cables of the series CF310.250.01.UJ
- 3 cables of the series CF310.250.01



igus® test lab: The cables were tested in movements of  $\pm 270^\circ$ .

The initial test sample of the CF310 with braided shield and the CFROBOT were taken after 250.000 movements with a torsion angle of  $\pm 270^\circ$ .

The analyses (cable taken apart) were undertaken in three part areas respectively of the cable length.

In the sample illustrated in Picture 1, distinct damage to the overall shield are noticeable in the upper third of the cable taken apart.



Picture 1: damaged overall shield sample of the braid version after 250,000 movements.



The detail inspection of the shield braid shows distinct damage on the shield wires.

The analyzed samples (Picture 2) of the CF ROBOT (so far samples were taken after 250.000, 1.5 million and 3 million movements). 037 show no damage in the area of the cable or the overall shield even at above 3 million torsional movements of  $\pm 270^\circ$ .



Picture 2: The CF ROBOT shows absolutely no damage after more than 3 million movements.

The detailed analyses (Picture 3) of the shield wires, buffer fibres, PTFE film and the cable show no apparent wear outs. The test is carried out further to determine the maximum service life of the cable.



Picture 3: detail pictures of the CFROBOT after more than 3.0 million movements of  $\pm 270^\circ$ .

# Example 12: tested, tested, tested! Service life comparison

Regular production inspections increase the operational reliability of machines. In addition to tests performed in the igus® in-house laboratory, where new superstructural parts, materials, and customer requirements are constantly being inspected, igus® also performs production-accompanying inspections.

Next to batch tests, which immediately reveal any production-related defects and provide the user with maximum reliability, long-term inspections are performed again and again. These long-term inspections, which can take up to four years – and emphasize the effort and expenditure required for such series of systematic tests – are necessary if the constantly growing market demands are to be met.

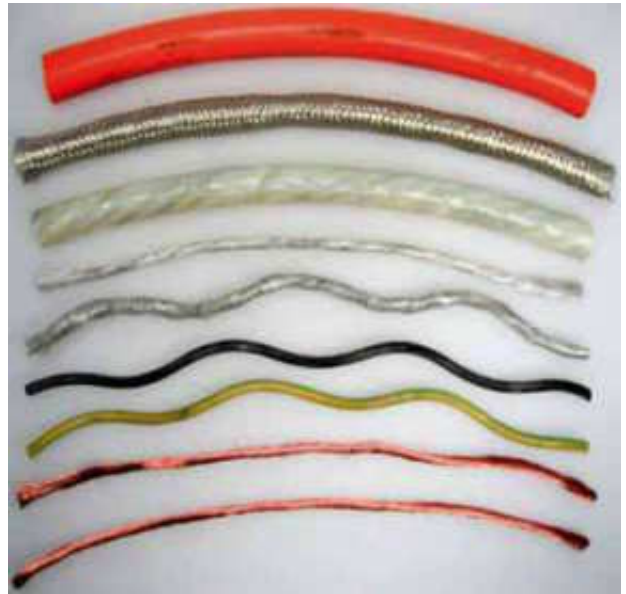
This also applies to the long-term inspection of the Chainflex® servo cable families CF21.UL and CF27.D. These servo cables, which are based on a modular system and only differ in their inner and outer jacket materials in terms of production details, were tested for more than 2.5 years at a radius of 100 mm, a travel distance of approx. 8 m, an acceleration of approx.  $6 \text{ m/s}^2$ , and a velocity of approx. 3.5 m/s.

A core number / cross-section combination which is widely accepted in the field of mechanical engineering but also results in failures due to the extremely asymmetric setup in the case of many normal – so-called chain-suitable – cable superstructural parts was deliberately selected.





CF21.UL: overall stranding including the outer jacket without damage



CF27.D: overall stranding including the outer jacket without damage



CF21.40.10.02.01.UL: after more than 10 million bending movements, no shield wire breakages



CF27.40.10.02.01.D: after more than 10 million bending movements, no shield wire breakages



Deliberately non-conforming chain filling in order to simulate a real application.

The test items, CF21.40.10.02.01.UL (4x4 mm<sup>2</sup> + 2x1.0 mm<sup>2</sup>), and CF27.40.10.02.01.D (4x4 mm<sup>2</sup> + 2x1.0 mm<sup>2</sup>), which were constantly monitored electrically during the test phase, were tested in continuous operation in a real chain-equipped system.

**Result:**

After more than 10 million individual strokes, the cables were disassembled into their individual parts and inspected. As can also be seen in the section photos, it was not possible to determine any wire breakages on the individual conductors or any changes on the insulations.

Only slight traces of abrasion on the outer jacket – which cannot result in any limitation of functions – also show that the cable has completed a large number of strokes.

**Summary:**

The design philosophy, with gusset-filling extruded inner jacket and pressure-extruded outer jacket, clearly shows the long service life and definite advantages of these cables versus the commonly used cables most of which are designed with fillers and tapes.

**Product information**

**CF21.UL** ▶ page 160

**CF27.D** ▶ page 174



# Example 13: tested live! Container crane at 50 m travel distance

In the crane engineering industry, energy supply systems prove their technical and economic strengths more and more frequently. Flexibility, variability, and space-saving installation are only a few of the most important criteria. An important building block of an energy supply system has to do with the cables. Here, users expect a high degree of operational reliability.

In the Chainflex® laboratory, igus® cables undergo constant tests which can be used to obtain important information on the service life of a cable and to derive improvements for the future structural design of the cable.

However, the situation becomes very exciting if you get the rare opportunity to remove cables from their real, tough applications and can inspect them.

## Current inspection

The Chainflex® cable CF9.60.05 has been used in container cranes for many years; in the case presented here with a total travel distance of approx. 47 m. An inspection contract commissioned by the owner-operator was to present a performance balance sheet after more than 40.000 chain kilometres and determine the date from which the next preventive maintenance work for the other equipment should be taken into account.

Following the removal of the CF9.60.05, inspections were performed with the following objectives:

1. outer jacket, abrasion behaviour, other damage;
2. overall stranding, insulation behaviour of the individual cores;
3. litz wire structural design, number of any possibly individual broken wires which might be an indication of an early failure of the entire cable.



An igus® energy supply system with a length of approx. 26 m in a stainless steel trough with middle band support.



The Energy Chain System® was filled with many different igus® Chainflex® cables, e.g. the CF9.60.05

**Result regarding 1:**

No or only barely measurable traces of abrasion could be detected on the highly abrasion-resistant TPE outer jacket. This means that a failure due to abrasion or jacket breakage despite extreme environmental factors (temperature differences, UV irradiation, etc.) is not to be expected.

**Result regarding 2:**

The overall stranding structure showed – due to the gusset-filling extruded outer jacket – no indications of fatigue and had not changed in its pitch length. Due to the large share of talc, no abrasion was determined between the TPE-insulated cores. The high-voltage tests also did not show any age-related changes.

**Result regarding 3:**

The cable was opened all the way to the copper conductor in the most stressed section of the radius. Here too, after more than 40.000 km, the inspection of the individual wires also showed no fatigue breakages which would indicate an early failure of the cable.

To sum up, it can be said that this cable, which was used in a real crane application in the second trolley of an STS crane, is still completely intact even after more than 40.000 km and that preventive repair work is not required.



An igus® energy supply system with an approx. length of 26 m in a stainless steel trough with middle band support.



The individual elements of the CF9 from the cable piece dissected for the test setup.



A close-up of the completely intact copper conductor. The inspection performed over the entire length shows that the conductor is still completely intact and does not have any individual wire breakages.

**Product information**  
**CF9 ▶ page 78**

# Example 14: tested!

## Comparison of sheathing materials in different oils

For years now, specially developed tests tailored to the individual requirements of igus® customers have been used to obtain more meaningful results than would be conceivable if standard tests were used.

The relatively generalised terms such as "oil-resistant" or "coolant-resistant" are little help in making the right selection in terms of sheathing material to be used for an application with oil, lubricant or coolant influence.

Alongside the generally applicable tests according to e.g. DIN EN 60811-2-1 and IEC 60811-1-1, "everyday application conditions" are simulated as realistically as possible in a test set-up specially matching our customers' requirements. Thus, for example, the test samples are mounted in an energy chain that moves into an "oil bath" and then back out of it again.

There is direct and alternating contact between the outer sheath and the medium to be tested and the air surrounding the energy chain or cable – just as in a real application.

After a test duration to be freely chosen or defined according to igus® standard, the test samples can be tested in terms of changes in material characteristics e.g. by comparing material strength, elongation at tear and swelling with the values noted before the test started.



Cracks in the outer sheathing of materials from competitors caused by the "use of oil" in E-Chains®.

This way, customers do not only get a statement referring to the different resistance of the various materials.

In contrast to the material ageing otherwise common following the above-mentioned standards, an estimation of service life in the E-Chain® application is also possible.

If the test samples – such as the external cables depicted – do not achieve the prescribed test duration, we advise against use in the respective application.



# Example 15: tested! Completely twisted, take two.

The "torsion-resistant" requirement for cables for energy chains is not new, but is seldom defined exactly. So how is a statement such as "This cable is torsion-resistant up to  $\pm 180^\circ$ !" to be evaluated? This makes it all the more important to be able to deliver comparable and meaningful test results.

In order to satisfy this requirement, the "torsion test bench" was developed according to igus® standard. Here, various cable types are twisted to a prescribed cable length of 1 metre, which also corresponds to the distance between the fixed points.

The degree of torsion can be freely chosen, and is defined individually according to the requirement made on the test specimen, whereby the test standard is  $\pm 180^\circ$ .

After a prescribed number of double strokes or a negative electrical or mechanical test result, the respective test specimen is dissected, and the type and position of any damage can be determined exactly.

The first Chainflex® CFROBOT types were developed to series maturity on the basis of this igus® standard test.

## Product information CFROBOT ► page 210



The "torsion test bench" especially developed according to the igus® standard.

# Control cables



# Chainflex® types



Chainflex® cable	Jacket	Shield	Minimum bending radius, moved [factor x d]	Temperatur moved from/to [°C]	Approvals and standards	Oil-resistant	Torsion resistant	v max. [m/s] unsupported	v max. [m/s] gliding	a max. [m/s²]	Page
<b>Control cables</b>											
CF130.UL	PVC		7,5-10	-5/ +70	CE RoHS UL US		✓	3	2	20	54
CF140.UL	PVC	✓	7,5-15	-5/ +70	CE RoHS UL US			3	2	20	58
CF5	PVC		6,8-7,5	-5/ +70	CE RoHS Clean Room UL US	✓	✓	10	5	80	62
CF6	PVC	✓	6,8-7,5	-5/ +70	CE RoHS Clean Room UL US	✓		10	5	80	66
CF77.UL.D	PUR		6,8-7,5	-35/ +80	CE RoHS UL US	✓	✓	10	5	80	70
CF78.UL	PUR	✓	6,8-7,5	-35/ +80	CE RoHS UL US	✓		10	5	80	72
CF2	PUR	✓	5	-20/ +80	CE RoHS UL US	✓		10	5	80	74
CF9	TPE		5	-35/ +100	CE Clean Room RoHS	✓	✓	10	6	100	78
CF10	TPE	✓	5	-35/ +100	CE Clean Room RoHS	✓		10	6	100	82
CF9.UL	TPE		5	-35/ +100	CE Clean Room RoHS UL US	✓	✓	10	6	100	86
CF10.UL	TPE	✓	5	-35/ +100	CE Clean Room RoHS UL US	✓		10	6	100	90
CF98	TPE		4	-35/ +90	CE Clean Room RoHS	✓	✓	10	6	100	94
CF99	TPE	✓	4	-35/ +90	CE Clean Room RoHS	✓		10	6	100	96

CF130.UL  
PVC  
7.5-10xd

# PVC Control cable Chainflex® CF130.UL

- for medium load requirements
- PVC outer jacket
- flame-retardant



Fine-wire stranded conductor



Center element for high tensile stresses



Braiding in bundles around high-tensile center cord



Gusset-filled extruded



Temperature range moved

-5 °C to +70 °C, minimum bending radius 7.5 x d with < 10 m travel; minimum bending radius 10 x d with ≥ 10 m travel



Temperature range fixed

-20 °C to +70 °C, minimum bending radius 5 x d



v max. unsupported/gliding

3 m/s, 2 m/s



a max.

20 m/s<sup>2</sup>



Travel distance

Freely suspended travel distances and for gliding applications up to 50 m, Class 2



Nominal voltage

**Number of cores < 12:** 300/500 V  
**Number of cores < 12 (0.25-0.34):** 300/300 V  
**Number of cores ≥ 12:** 300/300 V  
(following DIN VDE 0245)



Testing voltage

2000 V (following DIN VDE 0281-2).



Flame-retardant

According to IEC 332-1, CEI 20-35, FT1.



Silicon-free

Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).



Conductor

Fine-wire stranded conductor consisting of bare copper wires (following EN 60228).



Core insulation

Mechanically high-quality TPE mixture.



Core stranding

**Number of cores < 12:** cores stranded in a layer with short pitch length.

**Number of cores ≥ 12:** cores combined in bundles and stranded together around a centre for high tensile stresses with adapted, short pitch lengths and pitch directions, especially low-torsion structure.



Core identification

**Cores < 0.5 mm<sup>2</sup>:** colour code in accordance with DIN 47100

**Cores ≥ 0.5 mm<sup>2</sup>:** cores black with white numerals, one core green/yellow.



Outer jacket

Low-adhesion mixture on the basis of PVC, adapted to suit the requirements in Energy Chains® (following DIN VDE 0282 Part 10).

Colour: gray (similar to RAL 7001)

IGUS CHAINFLEX® CF130.UL

Class 4.2.1



... no minimum order quantity  
eplan download, configurator, PDF catalogues, lifetime ...

# Class 4.2.1

Price index



igus®

CF130.UL  
PVC  
7.5-10xd



UL/CSA

Style 10493 and 20200, 300 V, 60 °C



CEI

Following CEI 20-35



CE

Following 2006/95/EG



Lead free

Following EU guideline (RoHS) 2002/95/EC.

## Typical application area

- for medium load requirements
- without influence of oil
- preferably indoor applications
- especially for freely suspended travel distances and for gliding applications up 50 m
- wood/stone processing, packaging industry, supply system, handling, adjusting equipment

Control cable

Tel. +49-2203-96 49-0  
Fax +49-2203-96 49-222



**850 types from stock no cutting costs ...**

... and order online ► [www.igus.eu/en/CF130](http://www.igus.eu/en/CF130)

(for up to 10 cuts of the same type)



# PVC Control cable Chainflex® CF130.UL

- for medium load requirements
- PVC outer jacket
- flame-retardant

Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
CF130.02.03.UL	3 x 0.25	4.5	8	24
CF130.02.04.UL	4 x 0.25	5.5	10	37
CF130.03.02.UL	2 x 0.34	4.5	7	33
CF130.03.05.UL	5 x 0.34	5.5	17	48
CF130.05.02.UL	2 x 0.5	5.5	10	40
CF130.05.03.UL	3 G 0.5	6.0	14	55
CF130.05.04.UL	4 G 0.5	6.5	19	60
CF130.05.05.UL	5 G 0.5	7.0	24	65
CF130.05.07.UL	7 G 0.5	8.0	34	100
CF130.05.12.UL	12 G 0.5	9.5	55	116
CF130.05.18.UL	18 G 0.5	12.0	90	158
CF130.05.25.UL	25 G 0.5	13.5	126	222
CF130.07.02.UL	2 x 0.75	6.0	15	50
CF130.07.03.UL	3 G 0.75	6.5	22	60
CF130.07.04.UL	4 G 0.75	7.0	29	80
CF130.07.05.UL	5 G 0.75	7.5	36	90
CF130.07.07.UL	7 G 0.75	8.5	50	130
CF130.07.12.UL	12 G 0.75	10.5	81	149
CF130.07.18.UL	18 G 0.75	13.0	121	214
CF130.07.25.UL	25 G 0.75	15.5	167	303
CF130.10.02.UL	2 x 1.0	6.0	19	50
CF130.10.03.UL	3 G 1.0	7.0	29	75
CF130.10.04.UL	4 G 1.0	7.5	39	90
CF130.10.05.UL	5 G 1.0	8.0	48	110
CF130.10.07.UL	7 G 1.0	9.5	68	170
CF130.10.12.UL	12 G 1.0	11.5	108	185
CF130.10.18.UL	18 G 1.0	14.0	161	263
CF130.10.25.UL	25 G 1.0	17.0	224	371
CF130.15.02.UL <sup>(1)</sup>	2 x 1.5	7.5	29	70
CF130.15.03.UL	3 G 1.5	7.0	44	90
CF130.15.04.UL	4 G 1.5	8.0	58	120
CF130.15.05.UL	5 G 1.5	9.5	72	140
CF130.15.07.UL	7 G 1.5	10.5	101	210
CF130.15.12.UL	12 G 1.5	13.0	162	263
CF130.15.18.UL	18 G 1.5	16.5	242	386
CF130.15.25.UL	25 G 1.5	19.5	350	541

<sup>(1)</sup> Delivery time upon inquiry

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor

# Class 4.2.1

Price index



igus®

CF130.UL  
PVC  
7.5-10xd

Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
CF130.25.03.UL	3 G 2.5	8.5	72	116
CF130.25.04.UL	4 G 2.5	9.5	96	180
CF130.25.07.UL	7 G 2.5	13.0	168	350
CF130.25.12.UL	12 G 2.5	16.0	265	406
CF130.40.03.UL	3 G 4.0	11.0	115	200
CF130.60.04.UL	4 G 6.0	13.5	230	360
CF130.60.05.UL	5 G 6.0	15.0	288	418

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
G = with earthed conductor green-yellow    x = without earthed conductor



**Order example: CF130.05.02.UL – in your desired length (0.5 m steps)**  
CF130.UL Chainflex® series .05 Code nominal cross section .02 Number of cores



Please use [www.chainflex.eu/en/CF130](http://www.chainflex.eu/en/CF130) for your online order.



Delivery time 24h or today\*

\* Delivery time means time until shipping of goods

Control cable

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Chainflex® CF130.UL for woodworking. E-Chain®: E4/light



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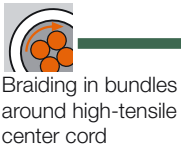
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(for up to 10 cuts of the same type)

CF140.UL  
PVC  
7.5-15xd

# PVC Control cable Chainflex® CF140.UL

- for medium load requirements
- PVC outer jacket
- shielded
- flame-retardant



	Temperature range moved	-5 °C to +70 °C, minimum bending radius 7.5 x d with < 10 m travel; minimum bending radius 15 x d with ≥ 10 m travel
	Temperature range fixed	-20 °C to +70 °C, minimum bending radius 7.5 x d
	v max. unsupported/gliding	3 m/s, 2 m/s
	a max.	20 m/s <sup>2</sup>
	Travel distance	Freely suspended travel distances and for gliding applications up to 50 m, Class 2
	Nominal voltage	<b>Number of cores &lt; 12:</b> 300/500 V <b>Number of cores ≥ 12:</b> 300/300 V (following DIN VDE 0245)
	Testing voltage	2000 V (following DIN VDE 0281-2).
	Flame-retardant	According to IEC 332-1, CEI 20-35, FT1.
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
	Conductor	Fine-wire stranded conductor consisting of bare copper wires (following EN 60228).
	Core insulation	Mechanically high-quality TPE mixture.
	Core stranding	<b>Number of cores &lt; 12:</b> cores stranded in a layer with short pitch length. <b>Number of cores ≥ 12:</b> cores combined in bundles and stranded together around a centre for high tensile stresses with adapted, short pitch lengths and pitch directions, especially low-torsion structure.
	Core identification	<b>Cores &lt; 0.5 mm<sup>2</sup>:</b> colour code in accordance with DIN 47100 <b>Cores ≥ 0.5 mm<sup>2</sup>:</b> cores black with white numerals, one core green/yellow.
	Inner jacket	PVC mixture adapted to suit the requirements in Energy Chains®.
	Overall shield	Bending-resistant, tinned braided copper shield. Coverage approx. 55% linear, approx. 80% optical.

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Class 4.2.1



# Class 4.2.1

Price index



igus®

CF140.UL  
PVC  
7.5-15xd



## Outer jacket

Low-adhesion mixture on the basis of PVC, adapted to suit the requirements in Energy Chains® (following DIN VDE 0282 Part 10).  
Colour: gray (similar to RAL 7001)



## UL/CSA

Style 10493 and 20200, 300 V, 60 °C



## CEI

Following CEI 20-35



## CE

Following 2006/95/EG



## Lead free

Following EU guideline (RoHS) 2002/95/EC

## Typical application area

- for medium load requirements
- without influence of oil
- preferably indoor applications
- especially for freely suspended travel distances and for gliding applications up 50 m
- wood/stone processing, packaging industry, supply system, handling, adjusting equipment

Control cable

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(for up to 10 cuts of the same type)

# PVC Control cable Chainflex® CF140.UL

- for medium load requirements
- PVC outer jacket
- shielded
- flame-retardant

Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
CF140.02.12.UL	(12 x 0.25)C	10.0	69	111
CF140.03.05.UL	(5 x 0.34)C	8.0	42	80
CF140.05.03.UL	(3 G 0.5)C	8.0	37	87
CF140.05.05.UL	(5 G 0.5)C	9.0	52	130
CF140.05.18.UL	(18 G 0.5)C	13.5	130	232
CF140.05.36.UL	(36 G 0.5)C	20.0	273	493
CF140.07.03.UL	(3 G 0.75)C	8.5	48	90
CF140.07.04.UL	(4 G 0.75)C	9.0	57	130
CF140.07.05.UL	(5 G 0.75)C	9.0	66	150
CF140.07.07.UL	(7 G 0.75)C	10.5	84	170
CF140.07.12.UL	(12 G 0.75)C	13.0	130	220
CF140.07.18.UL	(18 G 0.75)C	15.0	179	289
CF140.07.25.UL	(25 G 0.75)C	17.5	256	414
CF140.10.03.UL	(3 G 1.0)C	8.5	44	130
CF140.10.04.UL	(4 G 1.0)C	9.5	55	150
CF140.10.05.UL	(5 G 1.0)C	10.0	77	170
CF140.10.07.UL	(7 G 1.0)C	11.5	107	200
CF140.10.12.UL	(12 G 1.0)C	13.5	162	243
CF140.10.18.UL	(18 G 1.0)C	16.5	227	407
CF140.10.25.UL	(25 G 1.0)C	18.5	322	481
CF140.15.03.UL	(3 G 1.5)C	9.5	69	150
CF140.15.04.UL	(4 G 1.5)C	10.0	89	180
CF140.15.05.UL	(5 G 1.5)C	11.0	105	220
CF140.15.07.UL	(7 G 1.5)C	12.5	135	260
CF140.15.12.UL	(12 G 1.5)C	14.5	215	407
CF140.15.18.UL	(18 G 1.5)C	18.5	339	467
CF140.15.25.UL	(25 G 1.5)C	22.0	480	703
CF140.25.04.UL	(4 G 2.5)C	12.0	174	250

Note: The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
G = with earthed conductor green-yellow    x = without earthed conductor



Order example: **CF140.10.04.UL** – in your desired length (0.5 m steps)  
**CF140.UL** Chainflex® series .10 Code nominal cross section .04 Number of cores



Please use [www.chainflex.eu/en/CF140](http://www.chainflex.eu/en/CF140) for your online order.



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\* Delivery time means time until shipping of goods



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(for up to 10 cuts of the same type)


CF5  
PVC  
6.8-7.5xd


# PVC Control cable Chainflex® CF5

















- for high load requirements
- PVC outer jacket
- oil-resistant
- flame-retardant

 Especially bending-resistant fine-wire stranded conductor

 Center element for high tensile stresses

 Braiding in bundles around high-tensile center cord

 Gusset-filled extruded, oil-proof PVC mixture

	Temperature range moved	-5 °C to +70 °C, minimum bending radius 6.8 x d with < 10 m travel; minimum bending radius 7.5 x d with ≥ 10 m travel
	Temperature range fixed	-20 °C to +70 °C, minimum bending radius 4 x d
	v max. unsupported/gliding	10 m/s, 5 m/s
	a max.	80 m/s <sup>2</sup>
	Travel distance	Freely suspended and gliding travel distances up to 100 m, Class 3
	UV-resistant	Medium
	Nominal voltage	300/500 V (following DIN VDE 0245).
	Testing voltage	2000 V (following DIN VDE 0281-2).
	Oil	Oil-resistant (following DIN EN 60811-2-1, DIN EN 50363-4-1), Class 2
	Flame-retardant	According to IEC 332-1, CEI 20-35, FT1.
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
	Conductor	Fine-wire stranded conductor consisting of bare copper wires (following EN 60228).
	Core insulation	Mechanically high-quality PVC mixture (following DIN VDE 0207 Part 4).
	Core stranding	<b>Number of cores &lt; 12:</b> cores stranded in a layer with short pitch length. <b>Number of cores ≥ 12:</b> cores combined in bundles and stranded together around a centre for high tensile stresses with adapted, short pitch lengths and pitch directions, especially low-torsion structure.
	Core identification	<b>Cores &lt; 0.5 mm<sup>2</sup>:</b> colour code in accordance with DIN 47100 <b>Cores ≥ 0.5 mm<sup>2</sup>:</b> cores black with white numerals, one core green/yellow.
	Outer jacket	Low-adhesion, oil-resistant mixture on the basis of PVC, adapted to suit the requirements in Energy Chains® (following DIN VDE 0282 Part 10). Colour: green (similar to RAL 6005)

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Class 5.3.2

Clean-Room

CRAUS

CE

RoHS

CE

# Class 5.3.2

Price index



igus®

CF5  
PVC  
6.8-7.5xd



UL/CSA

≤ 1.5 mm<sup>2</sup>: Style 1007 and 2464, 300 V, 80 °C

≥ 2.5 mm<sup>2</sup>: Style 1011 and 2570, 600 V, 80 °C



CEI

Following CEI 20-35



CE

Following 2006/95/EG



Lead free

Following EU guideline (RoHS) 2002/95/EC



Clean room

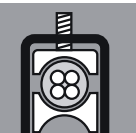
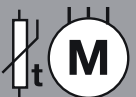
According to ISO Class 2, material/cable tested by IPA according to ISO standard 14644-1

Control cable

## Typical application area

- for high load requirements
- light oil influence
- preferably indoor applications, but also outdoor ones at temperatures > 5 °C
- especially for freely suspended and gliding travel distances up to 100 m
- storage and retrieval units for high-bay warehouses, machining units/packaging machines, quick handling, indoor cranes

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(for up to 10 cuts of the same type)



# PVC Control cable Chainflex® CF5

- for high load requirements
- PVC outer jacket
- oil-resistant
- flame-retardant



Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
CF5.02.36	36 x 0.25	14.5	87	275
CF5.03.15	15 x 0.34	10.0	49	133
CF5.03.18	18 x 0.34	11.5	59	172
CF5.03.25	25 x 0.34	13.5	82	234
CF5.05.02	2 x 0.5	5.5	10	34
CF5.05.03	3 G 0.5	6.0	15	42
CF5.05.05	5 G 0.5	7.0	24	72
CF5.05.07	7 G 0.5	8.0	34	77
CF5.05.12	12 G 0.5	11.5	58	158
CF5.05.18	18 G 0.5	13.5	86	230
CF5.05.25	25 G 0.5	17.0	121	310
CF5.05.30	30 G 0.5	18.5	144	402
CF5.07.03	3 G 0.75	6.5	22	63
CF5.07.04	4 G 0.75	7.0	29	72
CF5.07.05	5 G 0.75	8.0	36	85
CF5.07.07	7 G 0.75	9.0	50	108
CF5.07.12	12 G 0.75	12.0	86	240
CF5.07.18	18 G 0.75	15.5	130	322
CF5.07.25	25 G 0.75	19.0	181	432
CF5.07.36	36 G 0.75	22.0	259	564
CF5.07.42	42 G 0.75	23.5	302	610
CF5.10.03	3 G 1.0	7.0	29	62
CF5.10.04	4 G 1.0	8.0	39	85
CF5.10.05	5 G 1.0	8.5	48	100
CF5.10.07	7 G 1.0	10.0	68	145
CF5.10.12	12 G 1.0	13.5	116	260
CF5.10.18	18 G 1.0	17.5	173	450
CF5.10.25	25 G 1.0	19.5	241	590
CF5.15.03	3 G 1.5	8.0	44	95
CF5.15.04	4 G 1.5	8.0	58	120
CF5.15.05	5 G 1.5	10.0	72	170
CF5.15.07	7 G 1.5	11.0	101	220
CF5.15.12	12 G 1.5	16.0	173	320
CF5.15.18	18 G 1.5	22.0	260	550
CF5.15.25	25 G 1.5	24.0	361	810
CF5.15.36	36 G 1.5	26.0	518	980

Note: The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
G = with earthed conductor green-yellow    x = without earthed conductor

Class 5.3.2



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# Class 5.3.2

Price index



igus®

CF5  
PVC  
6.8-7.5xd

Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
CF5.25.04	4 G 2.5	11.0	96	200
CF5.25.05	5 G 2.5	12.0	120	250
CF5.25.07	7 G 2.5	15.0	168	340
CF5.25.12	12 G 2.5	21.0	288	667
CF5.25.18	18 G 2.5	27.5	432	970
CF5.25.25	25 G 2.5	31.5	600	1366

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
G = with earthed conductor green-yellow    x = without earthed conductor



**Order example: CF5.07.03 – in your desired length (0.5 m steps)**

CF5 Chainflex® series .07 Code nominal cross section .03 Number of cores



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CF5/CF6 for shelf control units: long travel in the longitudinal axis. E-Chain®: Series E4/00 with igus® guide trough out of steel

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(for up to 10 cuts of the same type)

CF6  
PVC  
6.8-7.5xd

# PVC Control cable Chainflex® CF6


- for high load requirements
- PVC outer jacket
- shielded
- oil-resistant
- flame-retardant



Especially bending-resistant fine-wire stranded conductor



Center element for high tensile stresses



Braiding in bundles around high-tensile center cord




















Gusset-filled extruded



Highly flexible braided copper shield



Pressure extruded, oil-resistant PVC blend

	Temperature range moved	-5 °C to +70 °C, minimum bending radius 6.8 x d with < 10 m travel; minimum bending radius 7.5 x d with ≥ 10 m travel
	Temperature range fixed	-20 °C to +70 °C, minimum bending radius 4 x d
	v max. unsupported/gliding	10 m/s, 5 m/s
	a max.	80 m/s <sup>2</sup>
	Travel distance	Freely suspended and gliding travel distances up to 100 m, Class 3
	UV-resistant	Medium
	Nominal voltage	300/500 V (following DIN VDE 0245).
	Testing voltage	2000 V (following DIN VDE 0281-2).
	Oil	Oil-resistant (following DIN EN 60811-2-1, DIN EN 50363-4-1), Class 2
	Flame-retardant	According to IEC 332-1, CEI 20-35, FT1.
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
	Conductor	Fine-wire stranded conductor consisting of bare copper wires (following EN 60228).
	Core insulation	Mechanically high-quality PVC mixture (following DIN VDE 0207 Part 4).
	Core stranding	<b>Number of cores &lt; 12:</b> cores stranded in a layer with short pitch length. <b>Number of cores ≥ 12:</b> cores combined in bundles and stranded together around a centre for high tensile stresses with adapted, short pitch lengths and pitch directions, especially low-torsion structure.
	Core identification	<b>Cores &lt; 0.5 mm<sup>2</sup>:</b> colour code in accordance with DIN 47100 <b>Cores ≥ 0.5 mm<sup>2</sup>:</b> cores black with white numerals, one core green/yellow.
	Inner jacket	PVC mixture adapted to suit the requirements in Energy Chains®.
	Overall shield	Extremely bending-resistant, tinned braided copper shield. Coverage approx. 70% linear, approx. 90% optical.

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Class 5.3.2

Clean-Room

UL US

CE

RoHS

CE



## Outer jacket

Low-adhesion, oil-resistant mixture on the basis of PVC, adapted to suit the requirements in Energy Chains® (following DIN VDE 0282 Part 10).

Colour: green (similar to RAL 6005)



## UL/CSA

≤ 1.5 mm<sup>2</sup>: Style 1007 and 2464, 300 V, 80 °C

≥ 2.5 mm<sup>2</sup>: Style 1011 and 2570, 600 V, 80 °C



## CEI

Following CEI 20-35



## CE

Following 2006/95/EG



## Lead free

Following EU guideline (RoHS) 2002/95/EC



## Clean room

According to ISO Class 2. Outer jacket material complies with CF5.10.07, tested by IPA according to standard 14644-1

Control cable

## Typical application area

- for high load requirements
- light oil influence
- preferably indoor applications, but also outdoor ones at temperatures > 5 °C
- especially for freely suspended and gliding travel distances up to 100 m
- storage and retrieval units for high-bay warehouses, machining units/package machines, quick handling, indoor cranes

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(for up to 10 cuts of the same type)

# PVC Control cable Chainflex® CF6

- for high load requirements
- PVC outer jacket
- shielded
- oil-resistant
- flame-retardant

Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
CF6.02.04	(4 x 0.25)C	6.5	28	55
CF6.02.24 <sup>(*)</sup>	(24 x 0.25)C	13.5	100	250
CF6.03.05	(5 x 0.34)C	7.5	34	95
CF6.05.05	(5 G 0.5)C	9.0	48	114
CF6.05.07	(7 G 0.5)C	10.5	63	142
CF6.05.09	(9 G 0.5)C	12.5	77	182
CF6.05.12	(12 G 0.5)C	13.0	93	206
CF6.05.18	(18 G 0.5)C	15.0	120	276
CF6.05.24 <sup>(*)</sup>	(24 G 0.5)C	17.0	190	405
CF6.07.03	(3 G 0.75)C	8.5	52	110
CF6.07.04	(4 G 0.75)C	9.0	54	120
CF6.07.05	(5 G 0.75)C	10.0	73	150
CF6.07.07	(7 G 0.75)C	12.0	93	190
CF6.07.12	(12 G 0.75)C	14.0	138	264
CF6.07.18	(18 G 0.75)C	17.5	204	410
CF6.07.24 <sup>(*)</sup>	(24 G 0.75)C	19.5	250	466
CF6.10.03	(3 G 1.0)C	8.5	61	103
CF6.10.04	(4 G 1.0)C	9.0	75	115
CF6.10.05	(5 G 1.0)C	11.0	87	170
CF6.10.07	(7 G 1.0)C	13.0	113	217
CF6.10.12	(12 G 1.0)C	15.0	171	313
CF6.10.18	(18 G 1.0)C	19.0	261	470
CF6.10.24 <sup>(*)</sup>	(24 G 1.0)C	21.0	307	588
CF6.15.03	(3 G 1.5)C	10.0	81	155
CF6.15.04	(4 G 1.5)C	10.0	85	170
CF6.15.05	(5 G 1.5)C	11.0	106	190
CF6.15.07	(7 G 1.5)C	14.0	153	270
CF6.15.12	(12 G 1.5)C	18.0	232	411
CF6.15.18	(18 G 1.5)C	22.0	367	637
CF6.15.25	(25 G 1.5)C	23.0	492	819
CF6.25.04	(4 G 2.5)C	12.5	135	275

The Chainflex® types marked with a <sup>(\*)</sup> refer to cables that are based on a bundling of 4 cores each. Due to their excellent electrical properties (star-quad with especially minimum crosstalk), these cables can virtually be used in all cases in which otherwise twisted-pair cables are required.

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor



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Order example: **CF6.15.12** – in your desired length (0.5 m steps)

CF6 Chainflex® series .15 Code nominal cross section .12 Number of cores



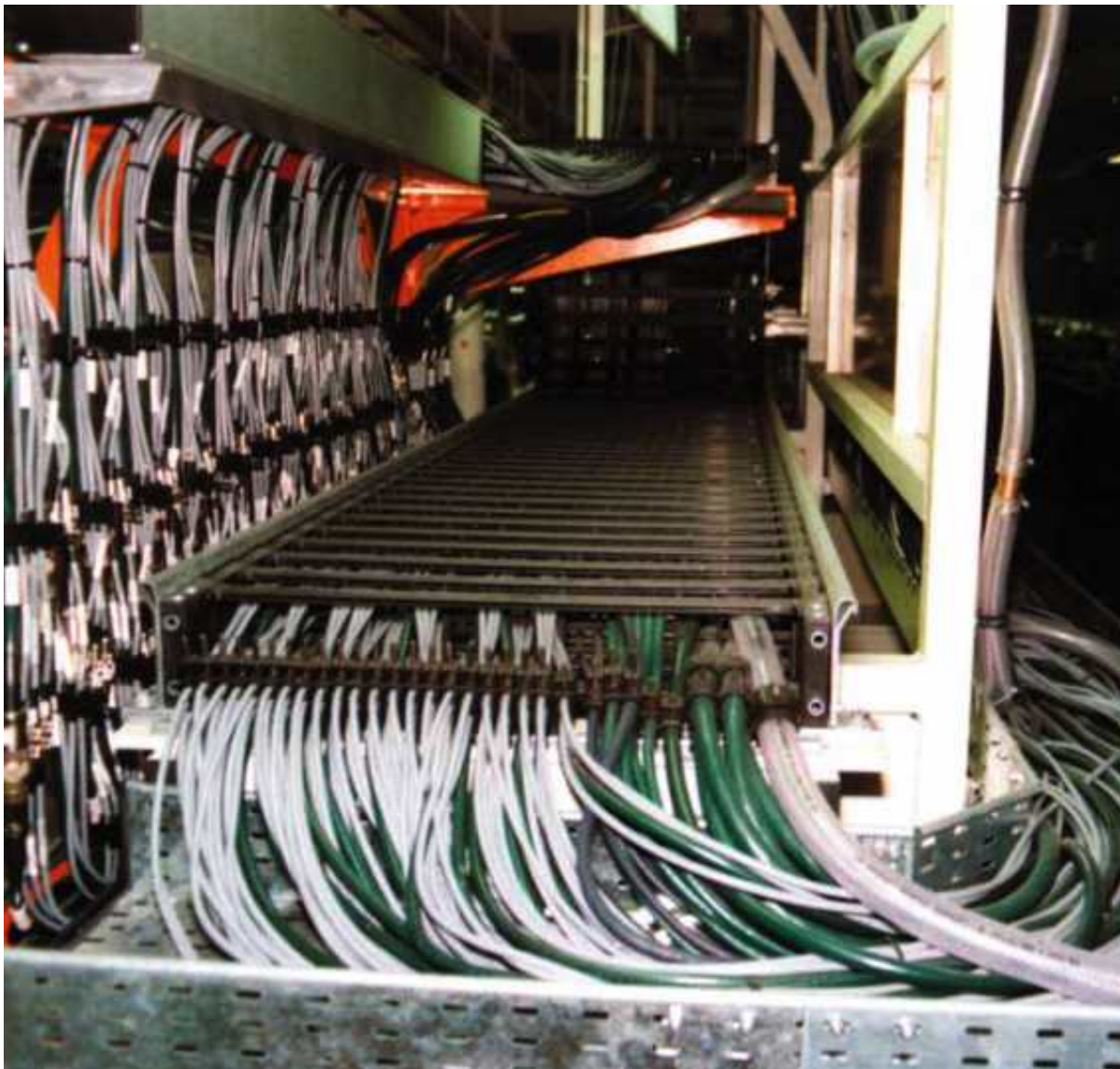
Please use [www.chainflex.eu/en/CF6](http://www.chainflex.eu/en/CF6) for your online order.



Delivery time 24h or today\*

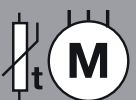
\* Delivery time means time until shipping of goods

Control cable



CF5 and CF6 control cable (green) as well as CF211 measuring system cable (gray) in a screwing station of a motor factory.  
E-Chain®: System E4/00 with Chainfix Clip Strain Relief Devices

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




















... and order online ► [www.igus.eu/en/CF6](http://www.igus.eu/en/CF6)


(for up to 10 cuts of the same type)

CF77.UL.D  
PUR  
6.8-7.5xd


# PUR Control cable Chainflex® CF77.UL.D

- for high load requirements
- PUR outer jacket
- oil-resistant and coolant-resistant
- flame-retardant
- notch-resistant
- PVC-free/halogen-free

	Temperature range moved	-35 °C to +80 °C, minimum bending radius 6.8 x d with < 10 m travel distance, minimum bending radius 7.5 x d
	Temperature range fixed	-40 °C to +80 °C, minimum bending radius 4 x d
	v max.	10 m/s, 5 m/s
	unsupported/gliding	
	a max.	80 m/s <sup>2</sup>
	Travel distance	Freely suspended and gliding travel distances up to 100 m, Class 2
	UV-resistant	Medium
	Nominal voltage	<b>Number of cores &lt; 12:</b> 300/500 V <b>Number of cores ≥ 12:</b> 300/300 V (following DIN VDE 0245)
	Testing voltage	2000 V (following DIN VDE 0281-2)
	Oil	Oil-resistant (following DIN EN 60811-2-1, DIN EN 50363-10-2), Class 3
	Flame-retardant	According to IEC 332-1, CEI 20-35, FT1
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992)
	Halogen-free	Following EN 50267-2-1
	Conductor	Fine-wire stranded conductor consisting of bare copper wires (following EN 60228)
	Core insulation	Mechanically high-quality TPE mixture.
	Core stranding	<b>Number of cores &lt; 12:</b> cores stranded in a layer with short pitch length. <b>Number of cores ≥ 12:</b> cores combined in bundles and stranded together around a centre for high tensile stresses with adapted, short pitch lengths and pitch directions, especially low-torsion structure.
	Core identification	<b>Cores &lt; 0.5 mm<sup>2</sup>:</b> Colour code in accordance with DIN 47100. <b>Cores ≥ 0.5 mm<sup>2</sup>:</b> cores black with white numerals, one core green-yellow.
	Outer jacket	Low-adhesion, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in Energy Chains® (following DIN VDE 0282 Part 10). Colour: gray (similar to RAL 7040) Style 10493 and 20233, 300 V, 80 °C
	UL/CSA	
	CEI	Following CEI 20-35
	CE	Following 2006/95/EG

 Fine-wire stranded conductor

 Center element for high tensile stresses

 Braiding in bundles around high-tensile center cord

 Gusset-filled extruded

IGUS CHAINFLEX® CF77.UL.D

Class 5.2.3



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DESINA

According to VDW, DESINA standardisation



Lead free

Following EU guideline (RoHS) 2002/95/EC

## Typical application area

- for high load requirements
- almost unlimited resistance to oil
- indoor and outdoor applications with average sun radiation
- especially for freely suspended and gliding travel distances up to 100 m
- Machining units/machine tools, storage and retrieval units for high-bay warehouses, packaging industry, quick handling, refrigerating sector

Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]	
CF77.UL.02.04.D	4 x 0,25	5,5	10	34	New
CF77.UL.05.04.D	4 G 0,5	6,0	19	48	
CF77.UL.05.05.D	5 G 0,5	6,5	24	55	
CF77.UL.05.12.D	12 G 0,5	10,0	57	128	
CF77.UL.05.18.D	18 G 0,5	12,0	86	188	
CF77.UL.05.25.D <sup>(1)</sup>	25 G 0,5	13,5	119	244	
CF77.UL.05.30.D <sup>(1)</sup>	30 G 0,5	14,5	143	297	
CF77.UL.07.03.D	3 G 0,75	6,0	21	52	
CF77.UL.07.04.D	4 G 0,75	6,5	28	61	
CF77.UL.07.05.D	5 G 0,75	7,0	35	71	
CF77.UL.07.07.D	7 G 0,75	8,0	49	100	
CF77.UL.07.12.D	12 G 0,75	11,5	84	183	
CF77.UL.07.18.D	18 G 0,75	13,5	126	247	
CF77.UL.07.20.D	20 G 0,75	14,0	140	277	
CF77.UL.10.02.D <sup>(1)</sup>	2 x 1,0	6,0	20	52	
CF77.UL.10.03.D	3 G 1,0	6,5	29	61	
CF77.UL.10.04.D	4 G 1,0	7,0	39	75	
CF77.UL.10.05.D	5 G 1,0	7,5	49	91	
CF77.UL.10.07.D	7 G 1,0	8,5	68	112	
CF77.UL.10.12.D	12 G 1,0	11,5	116	222	
CF77.UL.10.18.D	18 G 1,0	14,5	174	321	
CF77.UL.10.25.D	25 G 1,0	17,0	240	406	New
CF77.UL.15.03.D	3 G 1,5	7,0	42	81	
CF77.UL.15.04.D	4 G 1,5	7,5	55	99	
CF77.UL.15.05.D	5 G 1,5	8,0	69	117	
CF77.UL.15.07.D	7 G 1,5	10,0	96	164	
CF77.UL.15.12.D	12 G 1,5	14,0	165	290	
CF77.UL.15.18.D	18 G 1,5	17,0	260	397	New
CF77.UL.15.25.D	25 G 1,5	19,5	360	555	New
CF77.UL.25.04.D	4 G 2,5	9,0	91	145	
CF77.UL.25.05.D <sup>(1)</sup>	5 G 2,5	10,5	120	179	
CF77.UL.25.07.D	7 G 2,5	12,5	168	253	
CF77.UL.40.04.D <sup>(1)</sup>	4 G 4,0	11,5	154	242	

<sup>(1)</sup> Delivery time upon inquiry

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor

Control cable

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(for up to 10 cuts of the same type)




CF78.UL  
PUR  
6.8-7.5xd

# PUR Control cable Chainflex® CF78.UL

- for high load requirements
- PUR outer jacket
- oil-resistant and coolant-resistant
- flame-retardant
- notch-resistant
- PVC-free/halogen-free



Fine-wire stranded conductor



Braiding in bundles around high-tensile center cord






















Gusset-filled extruded



Biegefester Geflecht-Kupferschirm



Mit Druck extrudiert

	Temperature range moved	-35 °C to +80 °C, minimum bending radius 6.8 x d with < 10 m travel distance, minimum bending radius 7.5 x d with ≥ 10 m travel distance
	Temperature range fixed	-40 °C to +80 °C, minimum bending radius 4 x d
	v max. unsupported/gliding	10 m/s, 5 m/s
	a max.	80 m/s <sup>2</sup>
	Travel distance	Freely suspended and gliding travel distances up to 100 m, Class 2
	UV-resistant	Medium
	Nominal voltage	<b>Number of cores &lt; 12:</b> 300/500 V <b>Number of cores ≥ 12:</b> 300/300 V (following DIN VDE 0245)
	Testing voltage	2000 V (following DIN VDE 0281-2).
	Oil	Oil-resistant (following DIN EN 60811-2-1, DIN EN 50363-10-2), Class 3
	Flame-retardant	According to IEC 332-1, CEI 20-35, FT1.
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
	Halogen-free	Following EN 50267-2-1
	Conductor	Fine-wire stranded conductor consisting of bare copper wires (following EN 60228).
	Core insulation	Mechanically high-quality TPE mixture.
	Core stranding	<b>Number of cores &lt; 12:</b> cores stranded in a layer with short pitch length. <b>Number of cores ≥ 12:</b> cores combined in bundles and stranded together around a centre for high tensile stresses with adapted, short pitch lengths and pitch directions, especially low-torsion structure.
	Core identification	<b>Cores &lt; 0.5 mm<sup>2</sup>:</b> Colour code in accordance with DIN 47100. <b>Cores ≥ 0.5 mm<sup>2</sup>:</b> cores black with white numerals, one core green-yellow.
	Inner jacket	PUR mixture adapted to suit the requirements in Energy Chains®.
	Overall shield	Bending-resistant, tinned braided copper shield. Coverage approx. 55% linear, approx. 80% optical.
	Outer jacket	Low-adhesion, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in Energy Chains® (following DIN VDE 0282 Part 10). Colour: gray (similar to RAL 7040)

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Class 5.2.3





	UL/CSA	Style 10493 and 20233, 300 V, 80 °C
	CEI	Following CEI 20-35
	CE	Following 2006/95/EG
	Lead free	Following EU guideline (RoHS) 2002/95/EC

## Typical application area

- for high load requirements
- almost unlimited resistance to oil
- indoor and outdoor applications with average sun radiation
- especially for freely suspended and gliding travel distances up to 100 m
- Machining units/machine tools, storage and retrieval units for high-bay warehouses, packaging industry, quick handling, refrigerating sector

Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
CF78.UL.05.04	(4 G 0,5)C	8,0	32	77
CF78.UL.05.05 <sup>(1)</sup>	(5 G 0,5)C	8,5	38	88
CF78.UL.05.07 <sup>(1)</sup>	(7 G 0,5)C	9,5	56	117
CF78.UL.05.09	(9 G 0,5)C	10,5	68	144
CF78.UL.05.12 <sup>(1)</sup>	(12 G 0,5)C	12,5	88	198
CF78.UL.05.18	(18 G 0,5)C	14,0	125	268
CF78.UL.05.24 <sup>(1)</sup>	(24 G 0,5)C	15,5	160	334
CF78.UL.07.03	(3 G 0,75)C	8,0	35	82
CF78.UL.07.05	(5 G 0,75)C	9,5	57	119
CF78.UL.07.07 <sup>(1)</sup>	(7 G 0,75)C	10,5	77	153
CF78.UL.07.12	(12 G 0,75)C	13,5	125	252
CF78.UL.07.18 <sup>(1)</sup>	(18 G 0,75)C	15,5	175	337
CF78.UL.10.03	(3 G 1,0)C	8,5	48	101
CF78.UL.10.05	(5 G 1,0)C	9,5	71	137
CF78.UL.10.07	(7 G 1,0)C	11,0	94	179
CF78.UL.10.12	(12 G 1,0)C	14,1	155	299
CF78.UL.10.18 <sup>(1)</sup>	(18 G 1,0)C	17,0	220	412
CF78.UL.10.25	(25 G 1,0)C	19,5	315	535
CF78.UL.15.03	(3 G 1,5)C	9,5	65	126
CF78.UL.15.04	(4 G 1,5)C	10,0	80	145
CF78.UL.15.05	(5 G 1,5)C	10,5	98	172
CF78.UL.15.07	(7 G 1,5)C	12,5	131	225
CF78.UL.15.12	(12 G 1,5)C	15,5	215	370
CF78.UL.25.04	(4 G 2,5)C	11,5	123	205
CF78.UL.25.05 <sup>(1)</sup>	(5 G 2,5)C	12,5	150	245
CF78.UL.25.07	(7 G 2,5)C	14,5	207	330
CF78.UL.40.04 <sup>(1)</sup>	(4 G 4,0)C	15,0	189	322

New

<sup>(1)</sup> Delivery time upon inquiry

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor

Control cable

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(for up to 10 cuts of the same type)

CF2  
PUR  
5 x d

# PUR Control cable Chainflex® CF2


- for maximum load requirements
- PUR outer jacket
- shielded
- oil-resistant and coolant-resistant
- flame-retardant
- notch-resistant
- hydrolysis-resistant and microbe-resistant



Extremely high flexible special conductor



Center element for high tensile stresses



Braiding in bundles around high-tensile center cord



















Gusset-filled, pressure extruded



Highly flexible braided copper shield



Pressure extruded PUR blend

	Temperature range moved	-20 °C to +80 °C, minimum bending radius 5 x d
	Temperature range fixed	-40 °C to +80 °C, minimum bending radius 4 x d
	v max. unsupported/gliding	10 m/s, 5 m/s
	a max.	80 m/s <sup>2</sup>
	Travel distance	Freely suspended and gliding travel distances up to 100 m, Class 3
	UV-resistant	High
	Nominal voltage	300/500 V (following DIN VDE 0245).
	Testing voltage	2000 V (following DIN VDE 0281-2).
	Oil	Oil-resistant (following DIN EN 60811-2-1, DIN EN 50363-10-2), Class 3
	Offshore	MUD-resistant following NEK 606
	Flame-retardant	According to IEC 332-1, CEI 20-35, FT1.
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
	Conductor	Fine-wire stranded conductor in especially bending-resistant version consisting of bare copper wires (following EN 60228).
	Core insulation	Mechanically high-quality PVC mixture (following DIN VDE 0207 Part 4).
	Core stranding	<b>Number of cores &lt; 12:</b> cores stranded in a layer with short pitch length < 0.5 mm <sup>2</sup> : PP mixture <b>Number of cores ≥ 12:</b> cores combined in bundles and stranded together around a centre for high tensile stresses with adapted, short pitch lengths and pitch directions, especially low-torsion structure.
	Core identification	<b>Cores &lt; 0.5 mm<sup>2</sup>:</b> colour code in accordance with DIN 47100 <b>Cores ≥ 0.5 mm<sup>2</sup>:</b> cores black with white numerals, one core green/yellow.

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Class 6.3.3

UL US





**Inner jacket**

PVC mixture adapted to suit the requirements in Energy Chains®.



**Overall shield**

Extremely bending-resistant, tinned braided copper shield.  
Coverage approx. 70% linear, approx. 90% optical.



**Outer jacket**

Low-adhesion, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in Energy Chains® (following DIN VDE 0282 Part 10).

Colour: anthracite-gray (similar to RAL 7016)



**UL/CSA**

< 0.5 mm<sup>2</sup>: Style 10467 and 20317, 300 V, 80 °C

≥ 0.5 mm<sup>2</sup>: Style 1007 and 20317, 300 V, 80 °C

≥ 2.5 mm<sup>2</sup>: Style 1011 and 20234, 600 V, 80 °C



**CEI**

Following CEI 20-35



**CE**

Following 2006/95/EG



**Lead free**

Following EU guideline (RoHS) 2002/95/EC.

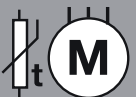
## Typical application area

- for maximum load requirements
- almost unlimited resistance to oil
- indoor and outdoor applications
- especially for freely suspended and gliding travel distances up to 100 m
- storage and retrieval units for high-bay warehouses, machining units/packaging machines, quick handling, indoor cranes, refrigerating sector

Control cable

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(for up to 10 cuts of the same type)

# PUR Control cable Chainflex® CF2

- for maximum load requirements
- PUR outer jacket
- shielded
- oil-resistant and coolant-resistant
- flame-retardant
- notch-resistant
- hydrolysis-resistant and microbe-resistant

Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
CF2.01.04	(4 x 0,14)C	6,0	17	40
CF2.01.08	(8 x 0,14)C	8,0	29	65
CF2.01.12	(12 x 0,14)C	9,0	49	101
CF2.01.18	(18 x 0,14)C	10,0	53	125
CF2.01.24 <sup>(3)</sup>	(24 x 0,14)C	11,5	65	135
CF2.01.36	(36 x 0,14)C	14,0	88	200
CF2.01.48	(48 x 0,14)C	17,0	135	310
CF2.02.04	(4 x 0,25)C	7,0	24	53
CF2.02.08	(8 x 0,25)C	8,0	41	83
CF2.02.18	(18 x 0,25)C	13,0	96	190
CF2.02.24 <sup>(3)</sup>	(24 x 0,25)C	14,0	120	220
CF2.02.48	(48 x 0,25)C	20,0	230	450
CF2.05.05 <sup>(1)</sup>	(5 G 0,5)C	10,5	64	170
CF2.05.07 <sup>(1)</sup>	(7 G 0,5)C	13,0	82	210
CF2.05.09 <sup>(1)</sup>	(9 G 0,5)C	15,0	97	260
CF2.05.12 <sup>(1)</sup>	(12 G 0,5)C	18,0	145	390
CF2.05.18 <sup>(1)</sup>	(18 G 0,5)C	22,0	192	520
CF2.05.24 <sup>(1/3)</sup>	(24 G 0,5)C	23,0	238	620
CF2.07.03 <sup>(1)</sup>	(3 G 0,75)C	10,0	51	140
CF2.07.04 <sup>(1)</sup>	(4 G 0,75)C	10,0	57	160
CF2.07.07 <sup>(1)</sup>	(7 G 0,75)C	14,0	102	240
CF2.07.12 <sup>(1)</sup>	(12 G 0,75)C	19,0	183	440
CF2.07.24 <sup>(1/3)</sup>	(24 G 0,75)C	25,0	302	720
CF2.10.03 <sup>(1)</sup>	(3 G 1,0)C	10,0	63	150
CF2.10.05 <sup>(1)</sup>	(5 G 1,0)C	12,0	91	200
CF2.10.07 <sup>(1)</sup>	(7 G 1,0)C	14,0	120	260
CF2.10.12 <sup>(1)</sup>	(12 G 1,0)C	20,0	213	480
CF2.10.24 <sup>(1)</sup>	(24 G 1,0)C	26,0	363	780
CF2.15.03 <sup>(1)</sup>	(3 G 1,5)C	11,0	85	190
CF2.15.07 <sup>(1)</sup>	(7 G 1,5)C	16,0	163	340
CF2.15.12 <sup>(1)</sup>	(12 G 1,5)C	23,0	289	650

<sup>(1)</sup> Delivery time upon inquiry

The Chainflex® types marked with a ® refer to cables that are based on a bundling of 4 cores each. Due to their excellent electrical properties (star-quad with especially minimum crosstalk), these cables can virtually be used in all cases in which otherwise twisted-pair cables are required.

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor



**... no minimum order quantity**  
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Order example: **CF2.10.24** – in your desired length (0.5 m steps)

**CF2** Chainflex® series **.10** Code nominal cross section **.24** Number of cores



Please use [www.chainflex.eu/en/CF2](http://www.chainflex.eu/en/CF2) for your online order.



Delivery time 24h or today\*

\* Delivery time means time until shipping of goods

Control cable

Tel. +49-2203-96 49-0  
Fax +49-2203-96 49-222



CF2 cables are resistant to oil and coolants. E-Chain®: System E4/00



**850 types from stock no cutting costs ...**

... and order online ► [www.igus.eu/en/CF2](http://www.igus.eu/en/CF2)

(for up to 10 cuts of the same type)

CF9  
TPE  
5 x d

# TPE Control cable Chainflex® CF9


- for maximum load requirements
- TPE outer jacket
- oil-resistant
- bio-oil-resistant
- PVC-free/halogen-free
- low-temperature-flexible
- hydrolysis-resistant and microbe-resistant



Extremely high flexible special conductor






Center element for high tensile stresses



Braiding in bundles around high-tensile center cord



Gusset-filled extruded, halogen-free TPE mixture

	Temperature range moved	-35 °C to +100 °C, minimum bending radius 5 x d
	Temperature range fixed	-40 °C to +100 °C, minimum bending radius 3 x d
	v max. unsupported/gliding	10 m/s, 6 m/s
	a max.	100 m/s <sup>2</sup>
	Travel distance	Freely suspended and gliding travel distances up to 400 m and more, Class 4
	UV-resistant	High
	Nominal voltage	300/500 V (following DIN VDE 0245).
	Testing voltage	2000 V (following DIN VDE 0281-2).
	Oil	Oil-resistant (following DIN EN 60811-2-1), bio-oil-resistant (following VDMA 24568), Class 4
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
	Halogen-free	Following EN 50267-2-1.
	Conductor	Fine-wire stranded conductor in especially bending-resistant version consisting of bare copper wires (following EN 60228).
	Core insulation	Mechanically high-quality TPE mixture.
	Core stranding	<b>Number of cores &lt; 12:</b> cores stranded in a layer with short pitch length. <b>Number of cores ≥ 12:</b> cores combined in bundles and stranded together around a centre for high tensile stresses with adapted, short pitch lengths and pitch directions, especially low-torsion structure.

Class 7.4.4

Clean-Room

RoHS

CE

... no minimum order quantity  
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### Core identification

**Cores < 0.75 mm<sup>2</sup>:** colour code in accordance with DIN 47100  
**Cores ≥ 0.75 mm<sup>2</sup>:** cores black with white numerals, one core green/yellow.  
**CF9.02.03.INI:** brown, blue, black  
**CF9.03.04.INI:** brown, blue, black, white  
**CF9.03.05.INI:** brown, blue, black, white, green-yellow  
**CF9.03.16.07.03.INI:**  
     **(0.75mm<sup>2</sup>):** blue, green-yellow, brown  
     **(0.34mm<sup>2</sup>):** violet, red, gray, red-blue, green, gray-pink, white-green, white-yellow, white-gray, black, yellow-brown, brown-green, white, yellow, pink, gray-brown



### Outer jacket

Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in Energy Chains®.  
 Colour: dark-blue (similar to RAL 5011)



### CE

Following 2006/95/EG



### Lead free

Following EU guideline (RoHS) 2002/95/EC.



### Clean room

According to ISO Class 1, material/cable tested by IPA according to ISO standard 14644-1

## Typical application area

- for maximum load requirements
- almost unlimited resistance to oil, also with bio-oils
- indoor and outdoor applications, UV-resistant
- especially for freely suspended and gliding travel distances up to 400 m and more
- storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, clean room, semiconductor insertion, ship to shore, outdoor cranes, low-temperature applications



Chainflex® CF9 for outdoor crane systems. E-Chain®: Series E4/00

Control cable

Tel. +49-2203-96 49-0

Fax +49-2203-96 49-222



**850 types from stock no cutting costs ...**

... and order online ► [www.igus.eu/en/CF9](http://www.igus.eu/en/CF9)

(for up to 10 cuts of the same type)



# TPE Control cable Chainflex® CF9

- for maximum load requirements
- TPE outer jacket
- oil-resistant
- bio-oil-resistant
- PVC-free/halogen-free
- low-temperature-flexible
- hydrolysis-resistant and microbe-resistant

Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
CF9.03.16.07.03.INI	4 x 4 x 0.34 + 3 x 0.75	11.0	74	159
CF9.02.02	2 x 0.25	4.0	5	18
CF9.02.03.INI	3 x 0.25	4.5	8	20
CF9.02.06	6 x 0.25	5.5	15	35
CF9.02.07	7 x 0.25	6.0	17	42
CF9.02.08	8 x 0.25	6.5	20	46
CF9.02.12	12 x 0.25	8.0	29	70
CF9.02.18 <sup>(1)</sup>	18 x 0.25	9.5	44	98
CF9.03.04.INI	4 x 0.34	5.0	13	31
CF9.03.05.INI	5 x 0.34	5.5	17	37
CF9.03.06	6 x 0.34	6.0	20	43
CF9.03.08	8 x 0.34	6.5	26	55
CF9.05.02	2 x 0.5	5.0	10	31
CF9.05.03	3 x 0.5	5.5	15	32
CF9.05.04	4 x 0.5	5.5	20	36
CF9.05.05	5 x 0.5	6.0	24	46
CF9.05.07	7 x 0.5	7.0	34	78
CF9.05.12	12 x 0.5	9.5	58	105
CF9.05.18	18 x 0.5	12.5	86	165
CF9.05.25	25 x 0.5	13.5	120	201
CF9.05.36	36 x 0.5	17.5	173	368
CF9.07.05	5 G 0.75	6.5	36	58
CF9.07.07	7 G 0.75	7.0	50	76
CF9.07.12	12 G 0.75	11.0	86	142
CF9.07.20	20 G 0.75	13.0	144	231
CF9.07.25	25 G 0.75	14.5	180	320
CF9.10.03	3 G 1.0	6.0	29	49
CF9.10.04	4 G 1.0	6.5	38	56
CF9.10.05	5 G 1.0	7.0	48	70
CF9.10.12	12 G 1.0	11.5	115	181
CF9.10.18	18 G 1.0	14.0	173	267
CF9.10.25	25 G 1.0	17.0	241	329
CF9.15.02	2 x 1.5	6.5	29	54
CF9.15.04	4 G 1.5	7.5	58	86
CF9.15.05	5 G 1.5	8.0	72	110
CF9.15.07	7 G 1.5	9.5	101	140
CF9.15.12	12 G 1.5	14.0	173	265
CF9.15.18	18 G 1.5	17.0	260	400
CF9.15.25	25 G 1.5	20.0	360	602
CF9.15.36	36 G 1.5	23.0	519	840

<sup>(1)</sup> Delivery time upon inquiry

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
G = with earthed conductor green-yellow    x = without earthed conductor



Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
CF9.25.04	4 G 2.5	9.0	96	128
CF9.25.05	5 G 2.5	10.0	120	174
CF9.25.07	7 G 2.5	12.0	168	301
CF9.25.12	12 G 2.5	17.0	288	468
CF9.25.16	16 G 2.5	21.0	384	600
CF9.25.18 <sup>(6)</sup>	18 G 2.5	24.0	432	827
CF9.25.25	25 G 2.5	24.5	600	990
CF9.40.04	4 G 4.0	10.0	154	195
CF9.60.04	4 G 6.0	12.5	230	310
CF9.60.05	5 G 6.0	14.0	288	400
CF9.100.04 <sup>(7)</sup>	4 G 10.0	15.5	384	515
CF9.160.04 <sup>(7)</sup>	4 G 16.0	20.0	614	780
CF9.350.04 <sup>(7)</sup>	4 G 35.0	26.0	1344	1700

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

<sup>(6)</sup> Nominal voltage 600/1000 V <sup>(7)</sup> Nominal voltage 450/750 V

G = with earthed conductor green-yellow x = without earthed conductor



**Order example: CF9.25.04 – in your desired length (0.5 m steps)**

CF9 Chainflex® series .25 Code nominal cross section .04 Number of cores



Please use [www.chainflex.eu/en/CF9](http://www.chainflex.eu/en/CF9) for your online order.



Delivery time 24h or today\*

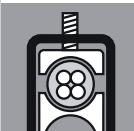
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CF9 for maximum load requirements for both indoor and outdoor applications. E-Chain®: System E4/4

Control cable

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**850 types from stock no cutting costs ...**

... and order online ► [www.igus.eu/en/CF9](http://www.igus.eu/en/CF9)

(for up to 10 cuts of the same type)

CF10  
TPE  
5 x d

# TPE Control cable Chainflex® CF10


- for maximum load requirements
- TPE outer jacket
- shielded
- oil- and bio-oil-resistant
- PVC-free/halogen-free
- low-temperature-flexible
- hydrolysis-resistant and microbe-resistant



Extremely high flexible special conductor



Center element for high tensile stresses



Braiding in bundles around high-tensile center cord


















Gusset-filled, pressure extruded



Highly flexible braided copper shield



Pressure extruded, halogen-free TPE blend

	Temperature range moved	-35 °C to +100 °C, minimum bending radius 5 x d
	Temperature range fixed	-40 °C to +100 °C, minimum bending radius 3 x d
	v max. unsupported/gliding	10 m/s, 5 m/s
	a max.	100 m/s <sup>2</sup>
	Travel distance	Freely suspended and gliding travel distances up to 400 m and more, Class 4
	UV-resistant	High
	Nominal voltage	300/500 V (following DIN VDE 0245).
	Testing voltage	2000 V (following DIN VDE 0281-2).
	Oil	Oil-resistant (following DIN EN 60811-2-1), bio-oil-resistant (following VDMA 24568), Class 4
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
	Halogen-free	Following EN 50267-2-1.
	Conductor	Fine-wire stranded conductor in especially bending-resistant version consisting of bare copper wires (following EN 60228).
	Core insulation	Mechanically high-quality TPE mixture.
	Core stranding	<b>Number of cores &lt; 12:</b> cores stranded in a layer with short pitch length. <b>Number of cores ≥ 12:</b> cores combined in bundles and stranded together around a centre for high tensile stresses with adapted, short pitch lengths and pitch directions, especially low-torsion structure.
	Core identification	<b>Cores &lt; 0.75 mm<sup>2</sup>:</b> colour code in accordance with DIN 47100 <b>Cores ≥ 0.75 mm<sup>2</sup>:</b> cores black with white numerals, one core green/yellow.

Class 7.4.4

Clean-Room

RoHS

CE

... no minimum order quantity  
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**Inner jacket**

TPE mixture adapted to suit the requirements in Energy Chains®.



**Overall shield**

Extremely bending-resistant, tinned braided copper shield.  
Coverage approx. 70% linear, approx. 90% optical.



**Outer jacket**

Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in Energy Chains®.  
Colour: dark-blue (similar to RAL 5011)



**CE**

Following 2006/95/EG



**Lead free**

Following EU guideline (RoHS) 2002/95/EC.



**Clean room**

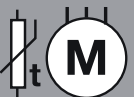
According to ISO Class 1. Outer jacket material complies with CF9.15.07, tested by IPA according to standard 14644-1

## Typical application area

- for maximum load requirements
- almost unlimited resistance to oil, also with bio-oils
- indoor and outdoor applications, UV-resistant
- especially for freely suspended and gliding travel distances up to 400 m and more
- storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, clean room, semiconductor insertion, ship to shore, outdoor cranes, low-temperature applications

Control cable

Tel. +49-2203-96 49-0  
Fax +49-2203-96 49-222



**850 types from stock no cutting costs ...**

... and order online ► [www.igus.eu/en/CF10](http://www.igus.eu/en/CF10)

(for up to 10 cuts of the same type)

# TPE Control cable Chainflex® CF10

- for maximum load requirements
- TPE outer jacket
- shielded
- oil- and bio-oil-resistant
- PVC-free/halogen-free
- low-temperature-flexible
- hydrolysis-resistant and microbe-resistant

Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
CF10.01.12	(12 x 0.14)C	7.5	36	80
CF10.01.18	(18 x 0.14)C	10.0	67	110
CF10.02.04	(4 x 0.25)C	6.5	25	52
CF10.02.08	(8 x 0.25)C	7.5	40	75
CF10.02.12	(12 x 0.25)C	9.5	64	118
CF10.02.24	(24 x 0.25)C	13.0	109	212
CF10.05.04	(4 x 0.5)C	7.0	38	68
CF10.05.05	(5 x 0.5)C	7.5	55	91
CF10.05.12	(12 x 0.5)C	11.5	102	192
CF10.05.18	(18 x 0.5)C	13.5	143	270
CF10.05.25	(25 x 0.5)C	14.5	167	280
CF10.07.04	(4 G 0.75)C	7.5	47	86
CF10.07.05	(5 G 0.75)C	7.5	57	95
CF10.07.07	(7 G 0.75)C	9.0	85	137
CF10.07.12	(12 G 0.75)C	12.5	138	244
CF10.07.20	(20 G 0.75)C	15.0	205	346
CF10.07.24	(24 G 0.75)C	16.5	239	419
CF10.10.02	(2 x 1.0)C	7.0	38	70
CF10.10.03	(3 G 1.0)C	7.5	47	84
CF10.10.04	(4 G 1.0)C	8.0	59	100
CF10.10.05	(5 G 1.0)C	8.5	71	101
CF10.10.07	(7 G 1.0)C	10.0	105	166
CF10.10.12	(12 G 1.0)C	13.5	169	293
CF10.10.18	(18 G 1.0)C	16.5	240	407
CF10.10.24	(24 G 1.0)C	18.0	305	506
CF10.15.04	(4 G 1.5)C	9.0	96	144
CF10.15.05	(5 G 1.5)C	9.5	108	163
CF10.15.07	(7 G 1.5)C	11.5	155	225
CF10.15.12	(12 G 1.5)C	15.5	235	387
CF10.15.18	(18 G 1.5)C	20.0	361	585
CF10.25.04	(4 G 2.5)C	11.0	126	180
CF10.25.07	(7 G 2.5)C	13.5	221	331
CF10.25.12	(12 G 2.5)C	19.0	373	624
CF10.40.04	(4 G 4.0)C	11.5	200	290
CF10.40.05	(5 G 4.0)C	13.5	246	353

Note: The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
G = with earthed conductor green-yellow    x = without earthed conductor



Order example: **CF10.10.12** – in your desired length (0.5 m steps)

**CF10** Chainflex® series **.10** Code nominal cross section **.12** Number of cores



Please use [www.chainflex.eu/en/CF10](http://www.chainflex.eu/en/CF10) for your online order.



Delivery time 24h or today\*

\* Delivery time means time until shipping of goods

Control cable

Tel. +49-2203-96 49-0  
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Control cable CF10 in storage and retrieval units for high-bay warehouses. E-Chain®: System E2 medium



**850 types from stock** no cutting costs ...

... and order online ► [www.igus.eu/en/CF10](http://www.igus.eu/en/CF10)

(for up to 10 cuts of the same type)


CF9.UL

TPE

5 x d

# TPE Control cable Chainflex® CF9.UL


- for maximum load requirements
- TPE outer jacket
- oil- and bio-oil-resistant
- flame-retardant
- PVC-free
- low-temperature-flexible
- hydrolysis-resistant and microbe-resistant



Highly flexible special conductor

















Center element for high tensile stresses



Braiding in bundles around high-tensile center cord



Gusset-filled extruded TPE mixture

	Temperature range moved	-35 °C to +100 °C, minimum bending radius 5 x d
	Temperature range fixed	-40 °C to +100 °C, minimum bending radius 3 x d
	v max. unsupported/gliding	10 m/s, 6 m/s
	a max.	100 m/s <sup>2</sup>
	Travel distance	Freely suspended and gliding travel distances up to 400 m and more, Class 4
	UV-resistant	High
	Nominal voltage	300/500 V (following DIN VDE 0245).
	Testing voltage	2000 V (following DIN VDE 0281-2).
	Oil	Oil-resistant (following DIN EN 60811-2-1), bio-oil-resistant (following VDMA 24568), Class 4
	Flame-retardant	According to IEC 332-1, CEI 20-35, FT1.
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
	Conductor	Fine-wire stranded conductor in especially bending-resistant version consisting of bare copper wires (following EN 60228).
	Core insulation	Mechanically high-quality TPE mixture.
	Core stranding	<b>Number of cores &lt; 12:</b> cores stranded in a layer with short pitch length. <b>Number of cores ≥ 12:</b> cores combined in bundles and stranded together around a centre for high tensile stresses with adapted, short pitch lengths and pitch directions, especially low-torsion structure.

Class 6.4.4

Clean-Room

UL US

CE

RoHS

CE

... no minimum order quantity  
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### Core identification

**Cores < 0.75 mm<sup>2</sup>:** colour code in accordance with DIN 47100  
**Cores ≥ 0.75 mm<sup>2</sup>:** cores black with white numerals, one core green-yellow.  
**CF9.UL.02.03.INI:** brown, blue, black  
**CF9.UL.03.04.INI:** brown, blue, black, white  
**CF9.UL.03.05.INI:** brown, blue, black, white, green-yellow



### Outer jacket

Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in Energy Chains®.  
 Colour: dark-blue (similar to RAL 5011)



### UL/CSA

< 0.5 mm<sup>2</sup>: Style 10479 and 21529, 300 V, 90 °C  
 ≥ 0.5 mm<sup>2</sup>: Style 10258 and 21530, 600 V, 90 °C



### CEI

Following CEI 20-35



### CE

Following 2006/95/EG



### Lead free

Following EU guideline (RoHS) 2002/95/EG.



### Clean room

According to ISO Class 1. Outer jacket material complies with CF34.25.04, tested by IPA according to standard 14644-1

Control cable

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## Typical application area

- for maximum load requirements
- almost unlimited resistance to oil, also with bio-oils
- indoor and outdoor applications, UV-resistant
- especially for freely suspended and gliding travel distances up to 400 m and more
- Storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, clean room, semiconductor insertion, ship to shore, outdoor cranes, low-temperature applications



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(for up to 10 cuts of the same type)



# TPE Control cable

## Chainflex® CF9.UL

- for maximum load requirements
- TPE outer jacket
- oil- and bio-oil-resistant
- flame-retardant
- PVC-free
- low-temperature-flexible
- hydrolysis-resistant and microbe-resistant

Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
CF9.UL.02.02 <sup>(1)</sup>	2 x 0.25	5.0	5	28
CF9.UL.02.03.INI	3 x 0.25	5.5	8	32
CF9.UL.02.04	4 x 0.25	5.5	10	38
CF9.UL.02.06 <sup>(1)</sup>	6 x 0.25	6.0	15	50
CF9.UL.02.07 <sup>(1)</sup>	7 x 0.25	6.5	17	57
CF9.UL.02.08 <sup>(1)</sup>	8 x 0.25	7.0	20	63
CF9.UL.02.12	12 x 0.25	8.5	29	95
CF9.UL.03.04.INI <sup>(1)</sup>	4 x 0.34	6.0	13	43
CF9.UL.03.05.INI <sup>(1)</sup>	5 x 0.34	6.0	16	51
CF9.UL.03.06	6 x 0.34	6.5	20	58
CF9.UL.03.08 <sup>(1)</sup>	8 x 0.34	7.5	26	76
CF9.UL.05.02	2 x 0.5	6.0	10	44
CF9.UL.05.03 <sup>(1)</sup>	3 x 0.5	6.5	15	52
CF9.UL.05.04	4 x 0.5	7.0	20	62
CF9.UL.05.05 <sup>(1)</sup>	5 x 0.5	7.0	24	72
CF9.UL.05.07 <sup>(1)</sup>	7 x 0.5	8.5	34	97
CF9.UL.05.12	12 x 0.5	11.0	58	196
CF9.UL.05.18	18 x 0.5	13.5	87	242
CF9.UL.05.25 <sup>(1)</sup>	25 x 0.5	14.5	120	305
CF9.UL.05.36 <sup>(1)</sup>	36 x 0.5	18.5	173	456
CF9.UL.07.05 <sup>(1)</sup>	5 G 0.75	8.0	36	94
CF9.UL.07.07 <sup>(1)</sup>	7 G 0.75	9.5	51	128
CF9.UL.07.12	12 G 0.75	12.5	87	240
CF9.UL.07.20 <sup>(1)</sup>	20 G 0.75	15.5	144	342
CF9.UL.07.25	25 G 0.75	16.5	180	412
CF9.UL.10.03	3 G 1.0	7.5	29	78
CF9.UL.10.04	4 G 1.0	8.0	39	98
CF9.UL.10.05 <sup>(1)</sup>	5 G 1.0	8.5	48	112
CF9.UL.10.12	12 G 1.0	13.5	116	287
CF9.UL.10.18	18 G 1.0	16.5	173	394
CF9.UL.10.25 <sup>(1)</sup>	25 G 1.0	18.5	240	520
CF9.UL.15.04	4 G 1.5	9.0	58	127
CF9.UL.15.05	5 G 1.5	9.5	72	152
CF9.UL.15.07	7 G 1.5	11.0	101	198
CF9.UL.15.12	12 G 1.5	15.5	173	385
CF9.UL.15.18	18 G 1.5	19.0	260	535
CF9.UL.15.25	25 G 1.5	19.5	360	685

<sup>(1)</sup> Delivery time upon inquiry

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor



Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
CF9.UL.25.04	4 G 2.5	10.5	96	189
CF9.UL.25.05	5 G 2.5	11.0	120	220
CF9.UL.25.07 <sup>(1)</sup>	7 G 2.5	13.5	168	288
CF9.UL.25.12	12 G 2.5	19.0	288	613
CF9.UL.25.16 <sup>(1)</sup>	16 G 2.5	21.5	384	805
CF9.UL.25.18	18 G 2.5	23.5	432	852
CF9.UL.25.25 <sup>(1)</sup>	25 G 2.5	26.5	600	1163
CF9.UL.40.04	4 G 4.0	12.0	154	278
CF9.UL.60.04	4 G 6.0	13.5	231	382

<sup>(1)</sup> Delivery time upon inquiry

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor



**Order example: CF9.UL.02.12 – in your desired length (0.5 m steps)**

CF9.UL Chainflex® series .02 Code nominal cross section .12 Number of cores



Please use [www.chainflex.eu/en/CF9UL](http://www.chainflex.eu/en/CF9UL) for your online order.



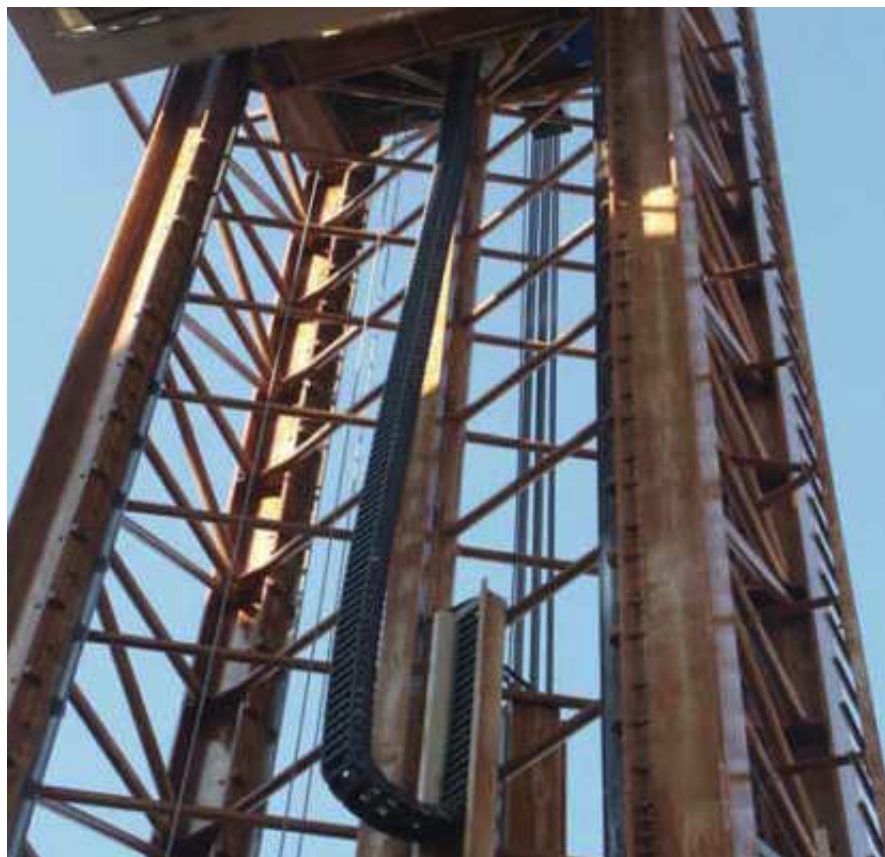
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igus® Chainflex® cables in a rafting channel application.

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(for up to 10 cuts of the same type)

CF10.UL  
TPE  
5 x d

# TPE Control cable Chainflex® CF10.UL


- for maximum load requirements
- TPE outer jacket
- shielded
- oil- and bio-oil-resistant
- flame-retardant
- PVC-free
- low-temperature-flexible
- hydrolysis-resistant and microbe-resistant



Highly flexible special conductor



Center element for high tensile stresses



Braiding in bundles around high-tensile center cord


















Gusset-filled extruded



Highly flexible braided copper shield



Pressure extruded TPE blend

	Temperature range moved	-35 °C to +100 °C, minimum bending radius 5 x d
	Temperature range fixed	-40 °C to +100 °C, minimum bending radius 3 x d
	v max. unsupported/gliding	10 m/s, 6 m/s
	a max.	100 m/s <sup>2</sup>
	Travel distance	Freely suspended and gliding travel distances up to 400 m and more, Class 4
	UV-resistant	High
	Nominal voltage	300/500 V (following DIN VDE 0245).
	Testing voltage	2000 V (following DIN VDE 0281-2).
	Oil	Oil-resistant (following DIN EN 60811-2-1), bio-oil-resistant (following VDMA 24568), Class 4
	Flame-retardant	According to IEC 332-1, CEI 20-35, FT1.
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
	Conductor	Fine-wire stranded conductor in especially bending-resistant version consisting of bare copper wires (following EN 60228).
	Core insulation	Mechanically high-quality TPE mixture.
	Core stranding	<b>Number of cores &lt; 12:</b> cores stranded in a layer with short pitch length. <b>Number of cores ≥ 12:</b> cores combined in bundles and stranded together around a centre for high tensile stresses with adapted, short pitch lengths and pitch directions, especially low-torsion structure.
	Core identification	<b>Cores &lt; 0.75 mm<sup>2</sup>:</b> colour code in accordance with DIN 47100 <b>Cores ≥ 0.75 mm<sup>2</sup>:</b> cores black with white numerals, one core green-yellow.

Class 6.4.4

Clean-Room

UL US









CE

RoHS

CE

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	<b>Inner jacket</b>	TPE mixture adapted to suit the requirements in Energy Chains®.
	<b>Overall shield</b>	Extremely bending-resistant, tinned braided copper shield. Coverage approx. 70% linear, approx. 90% optical.
	<b>Outer jacket</b>	Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in Energy Chains®. Colour: dark-blue (similar to RAL 5011)
	<b>UL/CSA</b>	< 0.5 mm <sup>2</sup> : Style 10479 and 21529, 300 V, 90 °C ≥ 0.5 mm <sup>2</sup> : Style 10258 and 21530, 600 V, 90 °C
	<b>CEI</b>	Following CEI 20-35
	<b>CE</b>	Following 2006/95/EG
	<b>Lead free</b>	Following EU guideline (RoHS) 2002/95/EG.
	<b>Clean room</b>	According to ISO Class 1. Outer jacket material complies with CF34.25.04, tested by IPA according to standard 14644-1

## Typical application area

- for maximum load requirements
- almost unlimited resistance to oil, also with bio-oils
- indoor and outdoor applications, UV-resistant
- especially for freely suspended and gliding travel distances up to 400 m and more
- Storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, clean room, semiconductor insertion, ship to shore, outdoor cranes, low-temperature applications

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(for up to 10 cuts of the same type)

# TPE Control cable

## Chainflex® CF10.UL

- for maximum load requirements
- TPE outer jacket
- shielded
- oil- and bio-oil-resistant
- flame-retardant
- PVC-free
- low-temperature-flexible
- hydrolysis-resistant and microbe-resistant

Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
CF10.UL.02.04	(4 x 0.25)C	7.0	25	71
CF10.UL.02.08	(8 x 0.25)C	8.5	37	101
CF10.UL.02.12	(12 x 0.25)C	10.0	63	153
CF10.UL.02.24	(24 x 0.25)C	13.0	109	242
CF10.UL.05.04	(4 x 0.5)C	8.5	37	101
CF10.UL.05.05 <sup>(1)</sup>	(5 x 0.5)C	8.5	43	111
CF10.UL.05.12	(12 x 0.5)C	13.0	106	258
CF10.UL.05.18 <sup>(1)</sup>	(18 x 0.5)C	15.0	146	332
CF10.UL.05.25	(25 x 0.5)C	16.0	185	411
CF10.UL.07.03	(3 G 0.75)C	8.5	40	104
CF10.UL.07.04	(4 G 0.75)C	9.0	49	123
CF10.UL.07.05	(5 G 0.75)C	9.5	68	150
CF10.UL.07.07 <sup>(1)</sup>	(7 G 0.75)C	11.0	90	194
CF10.UL.07.12	(12 G 0.75)C	14.5	143	336
CF10.UL.07.20 <sup>(1)</sup>	(20 G 0.75)C	17.0	213	456
CF10.UL.07.24 <sup>(1)</sup>	(24 G 0.75)C	19.0	276	578
CF10.UL.10.02 <sup>(1)</sup>	(2 x 1.0)C	8.5	38	104
CF10.UL.10.03 <sup>(1)</sup>	(3 G 1.0)C	9.0	48	120
CF10.UL.10.04	(4 G 1.0)C	9.5	71	155
CF10.UL.10.05 <sup>(1)</sup>	(5 G 1.0)C	10.5	83	174
CF10.UL.10.07 <sup>(1)</sup>	(7 G 1.0)C	12.0	111	230
CF10.UL.10.12	(12 G 1.0)C	14.5	171	370
CF10.UL.10.18 <sup>(1)</sup>	(18 G 1.0)C	19.0	274	545
CF10.UL.10.24 <sup>(1)</sup>	(24 G 1.0)C	21.5	346	709
CF10.UL.15.04	(4 G 1.5)C	10.5	94	192
CF10.UL.15.05	(5 G 1.5)C	11.0	215	112
CF10.UL.15.07	(7 G 1.5)C	13.0	149	279
CF10.UL.15.12	(12 G 1.5)C	17.5	243	508
CF10.UL.15.18	(18 G 1.5)C	21.5	375	724
CF10.UL.25.04	(4 G 2.5)C	12.0	140	268
CF10.UL.25.07 <sup>(1)</sup>	(7 G 2.5)C	15.0	227	404
CF10.UL.25.12 <sup>(1)</sup>	(12 G 2.5)C	21.5	404	804
CF10.UL.40.04	(4 G 4.0)C	13.5	206	369

<sup>(1)</sup> Delivery time upon inquiry

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor



Order example: **CF10.UL.10.02** – in your desired length (0.5 m steps)

**CF10.UL** Chainflex® series **.10** Code nominal cross section **.02** Number of cores



Please use [www.chainflex.eu/en/CF10UL](http://www.chainflex.eu/en/CF10UL) for your online order.

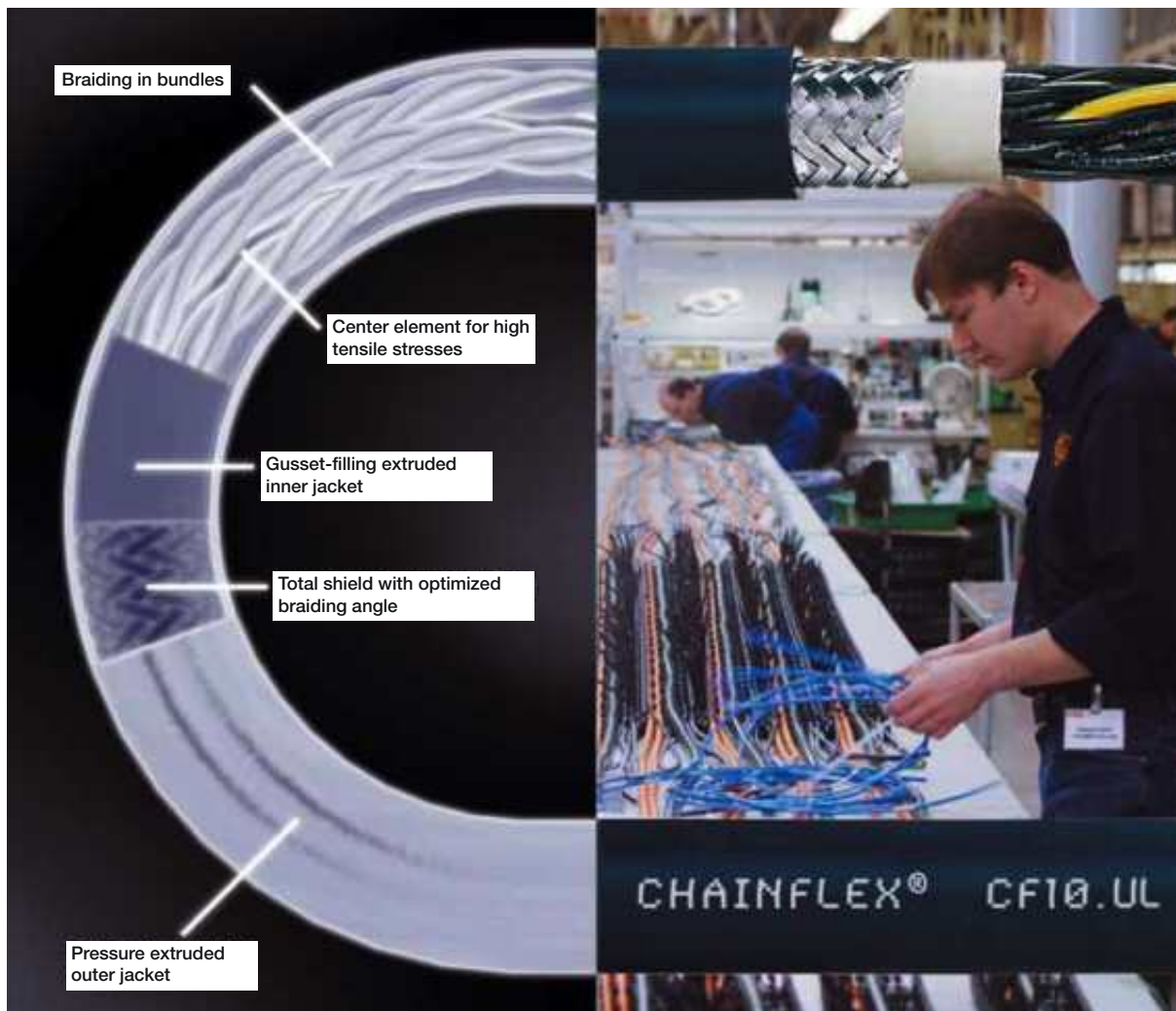


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The special cable structure of Chainflex® CF10.UL guarantees quality – also in the igus® harnessing.



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(for up to 10 cuts of the same type)

CF98  
TPE  
4 x d




















# TPE Control cable Chainflex® CF98

- for maximum load requirements and especially small radii up to 4 x d
- TPE outer jacket
- oil- and bio-oil-resistant
- PVC-free/halogen-free
- low-temperature-flexible
- hydrolysis-resistant and microbe-resistant

 Extremely highly flexible special alloy

 Braiding in layers with extremely short pitch

 Gusset-filled extruded, halogen-free TPE mixture

	Temperature range moved	-35 °C to +90 °C, minimum bending radius 4 x d
	Temperature range fixed	-40 °C to +90 °C, minimum bending radius 3 x d
	v max.	10 m/s, 6 m/s
	a max.	100 m/s <sup>2</sup>
	Travel distance	Short, very fast applications with small radii and tight design space, Class 4
	UV-resistant	High
	Nominal voltage	300/300 V
	Testing voltage	1500 V
	Oil	Oil-resistant (following DIN EN 60811-2-1), bio-oil-resistant (following VDMA 24568), Class 4
	Halogen-free	Following EN 50267-2-1.
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
	Conductor	Conductor consisting of a highly flexible special alloy.
	Core insulation	Mechanically high-quality TPE mixture.
	Core stranding	Cores stranded in one layer with especially short pitch length.
	Core identification	Colour code in accordance with DIN 47100. <b>CF9.02.03.INI:</b> brown, blue, black <b>CF9.03.04.INI:</b> brown, blue, black, white
	Outer jacket	Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in Energy Chains®. Colour: dark-blue (similar to RAL 5011)
	CE	Following 2006/95/EG
	Lead free	Following EU guideline (RoHS) 2002/95/EC.
	Clean room	According to ISO Class 1. Outer jacket material complies with CF9.15.07, tested by IPA according to standard 14644-1

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Class 7.4.4

Clean-Room

RoHS

CE

## Typical application area

- for maximum load requirements at 4 x d
- almost unlimited resistance to oil, also with bio-oils
- indoor and outdoor applications, UV-resistant
- especially for short, very fast applications with small radii and tight design space
- automatic insertion machines, automatic doors, clean room, very quick handling

Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
CF98.01.02	2 x 0.14	4.0	4	11
CF98.01.03 <sup>(1)</sup>	3 x 0.14	4.5	6	14
CF98.01.04	4 x 0.14	5.0	9	16
CF98.01.07 <sup>(1)</sup>	7 x 0.14	6.0	14	21
CF98.01.08	8 x 0.14	6.5	16	24
CF98.02.03.INI	3 x 0.25	5.0	12	25
CF98.02.04	4 x 0.25	5.5	16	30
CF98.02.07	7 x 0.25	6.5	26	53
CF98.02.08	8 x 0.25	7.0	30	60
CF98.03.03 <sup>(1)</sup>	3 x 0.34	5.0	14	28
CF98.03.04.INI	4 x 0.34	5.5	19	35
CF98.03.07	7 x 0.34	7.0	32	55
CF98.03.08 <sup>(1)</sup>	8 x 0.34	7.5	38	63
CF98.05.04	4 x 0.5	6.0	31	40

<sup>(1)</sup> Delivery time upon inquiry

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor



**Order example: CF98.02.04 – in your desired length (0.5 m steps)**  
CF98 Chainflex® series .02 Code nominal cross section .04 Number of cores



Please use [www.chainflex.eu/en/CF98](http://www.chainflex.eu/en/CF98) for your online order.



Delivery time 24h or today\*

\* Delivery time means time until shipping of goods



## Test data ▶ Page 32



Chainflex® CF98 for maximum load requirements and especially small radii at automatic doors.

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(for up to 10 cuts of the same type)

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CF99  
TPE  
4 x d

# TPE Control cable Chainflex® CF99

- for maximum load requirements and especially small radii up to 4 x d
- TPE outer jacket
- shielded
- oil- and bio-oil-resistant
- PVC-free/halogen-free
- low-temperature-flexible



Extremely highly flexible special alloy



Braiding in layers with extremely short pitch






















Gusset-filled extruded



Extremely highly flexible special shield made of alloyed wires



Pressure extruded, halogen-free TPE blend

	Temperature range moved	-35 °C to +90 °C, minimum bending radius 4 x d
	Temperature range fixed	-40 °C to +90 °C, minimum bending radius 3 x d
	v max. unsupported/gliding	10 m/s, 6 m/s
	a max.	100 m/s <sup>2</sup>
	Travel distance	Short, very fast applications with small radii and tight design space, Class 4
	UV-resistant	High
	Nominal voltage	300/300 V
	Testing voltage	1500 V
	Oil	Oil-resistant (following DIN EN 60811-2-1), bio-oil-resistant (following VDMA 24568), Class 4
	Halogen-free	Following EN 50267-2-1.
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
	Conductor	Conductor consisting of a highly flexible special alloy.
	Core insulation	Mechanically high-quality TPE mixture.
	Core stranding	Cores stranded in one layer with especially short pitch length.
	Core identification	Colour code in accordance with DIN 47100.
	Inner jacket	TPE mixture adapted to suit the requirements in Energy Chains®.
	Overall shield	Highly flexible alloyed special shield. Coverage approx. 70% linear, approx. 90% optical.
	Outer jacket	Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in Energy Chains®. Colour: dark-blue (similar to RAL 5011)
	CE	Following 2006/95/EG

... no minimum order quantity  
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Class 7.4.4

Clean-Room

RoHS

CE



**Lead free**

Following EU guideline (RoHS) 2002/95/EC.



**Clean room**

According to ISO Class 1. Outer jacket material complies with CF9.15.07, tested by IPA according to standard 14644-1

## Typical application area

- for maximum load requirements at 4 x d
- almost unlimited resistance to oil, also with bio-oils
- indoor and outdoor applications, UV-resistant
- especially for short, very fast applications with small radii and tight design space
- automatic insertion machines, automatic doors, clean room, very quick handling

### Delivery program

Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
CF99.01.02	(2 x 0.14)C	5.5	14	33
CF99.01.03 <sup>(1)</sup>	(3 x 0.14)C	6.0	17	37
CF99.01.04	(4 x 0.14)C	6.0	21	43
CF99.01.07 <sup>(1)</sup>	(7 x 0.14)C	7.5	32	62
CF99.01.08	(8 x 0.14)C	8.0	36	69
CF99.02.03 <sup>(1)</sup>	(3 x 0.25)C	6.5	25	48
CF99.02.04	(4 x 0.25)C	6.5	30	56
CF99.02.07	(7 x 0.25)C	8.0	48	85
CF99.02.08 <sup>(1)</sup>	(8 x 0.25)C	8.5	54	93
CF99.03.03 <sup>(1)</sup>	(3 x 0.34)C	6.5	27	51
CF99.03.04 <sup>(1)</sup>	(4 x 0.34)C	7.0	35	62
CF99.03.08 <sup>(1)</sup>	(8 x 0.34)C	9.0	64	105

<sup>(1)</sup> Delivery time upon inquiry

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor



**Order example: CF99.01.02 – in your desired length (0.5 m steps)**

**CF99 Chainflex® series .01 Code nominal cross section .02 Number of cores**



Please use [www.chainflex.eu/en/CF99](http://www.chainflex.eu/en/CF99) for your online order.



Delivery time 24h or today\*

\* Delivery time means time until shipping of goods



Automatisierte Stapelanlage für Phosphorbildschirme: gerader Installationsraum, kleiner Biegeradius, 300.000 Doppelhübe pro Monat.

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... and order online ► [www.igus.eu/en/CF99](http://www.igus.eu/en/CF99)

(for up to 10 cuts of the same type)

Control cable

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Fax +49-2203-96 49-222



# Data cables

Bus cables

Encoder cables

Koax cables



# Chainflex® types



Chainflex® cable	Jacket	Shield	Minimum bending radius, moved [factor x d]	Temperature moved from/to [°C]	Approvals and standards	Oil-resistant	Torsion resistant	v max. [m/s] unsupported	v max. [m/s] gliding	a max. [m/s <sup>2</sup> ]	Page
<b>Data cables</b>											
CF240	PVC	✓	10-12	-5/ +70	CE RoHS Chainflex UL US	✓		3	2	20	100
CF211	PVC	✓	10	-5/ +70	CE RoHS Chainflex UL US	✓		5	3	50	102
CF112	PUR	✓	10	-35/ +80	CE RoHS Chainflex UL US	✓		5	3	50	104
CF113	PUR	✓	10	-35/ +80	CE RoHS Chainflex UL US	✓		5	3	50	106
CF111**	TPE	✓	10	-35/ +100	CE RoHS Chainflex UL US	✓		2		30	108
CF11	TPE	✓	10	-35/ +100	CE RoHS Chainflex	✓		10	6	100	112
CF12	TPE	✓	10	-35/ +100	CE RoHS Chainflex	✓		10	6	100	114
<b>Bus cables (with selection chart for Chainflex® bus cables) 116</b>											
CF BUS*	TPE	✓	10-12,5	-35/ +70	CE RoHS Chainflex UL US	✓		10	6	100	118
CF11.LC*	TPE	✓	10	-35/ +70	CE RoHS Chainflex	✓		10	6	100	122
CF11.LC.D*	TPE	✓	10	-35/ +70	CE RoHS Chainflex	✓		10	6	100	124
CF14 CAT5*	TPE	✓	12,5	-35/ +70	CE RoHS Chainflex	✓		10	6	100	126
<b>Measuring system cables</b>											
CF211	PVC	✓	10	-5/ +70	CE RoHS Chainflex UL US	✓		5	3	50	128
CF113.D	PUR	✓	10	-20/ +80	CE RoHS Chainflex UL US	✓		5	3	50	132
CF111.D	TPE	✓	12	-35/ +100	CE RoHS Chainflex UL US	✓		2		30	136
CF11.D	TPE	✓	10	-35/ +100	CE RoHS Chainflex	✓		10	6	100	140
<b>Koax cables</b>											
CF KOAX 1	TPE		10	-35/ +100	CE RoHS Chainflex	✓		10	5	100	144


















\* Selection chart for bus cables ► Page 116




\*\* phase-out model, is replaced by CF113

CF240  
PVC  
10-12 x d

# PVC Data cable Chainflex® CF240


- for high load requirements
- PVC outer jacket
- shielded
- oil-resistant
- flame-retardant


	Temperature range moved	-5 °C to +70 °C, minimum bending radius 10 x d with < 10 m travel; minimum bending radius 12 x d with ≥ 10 m travel
	Temperature range fixed	-20 °C to +70 °C, minimum bending radius 5 x d
	v max. unsupported/gliding	3 m/s, 2 m/s
	a max.	20 m/s <sup>2</sup>
	Travel distance	Freely suspended and gliding travel distances up to 50 m, Class 2
	Nominal voltage	300/300 V (following DIN VDE 0245).
	Testing voltage	1500 V
	Oil	Oil-resistant (following DIN EN 60811-2-1, DIN EN 50363-4-1), Class 2
	Flame-retardant	According to IEC 332-1, CEI 20-35, FT1.
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
	Conductor	Very finely stranded special cores of particularly high-flex design made of bare copper wires.
	Core insulation	Mechanically high-quality PVC mixture (following DIN VDE 0207 Part 4).
	Core stranding	The individual cores are stranded in layers with short pitch lengths.
	Core identification	Colour code in accordance with DIN 47100.
	Intermediate sheath	Foil taping over the external layer.
	Overall shield	Extremely bending-resistant, tinned braided copper shield. Coverage approx. 70% linear, approx. 90% optical.
	Outer jacket	Low-adhesion, oil-resistant mixture on the basis of PVC, adapted to suit the requirements in Energy Chains® (following DIN VDE 0282 Part 10). Colour: gray (similar to RAL 7001)

	UL/CSA	Style 10467 and 2464, 300 V, 80 °C
	CEI	Following CEI 20-35
	CE	Following 2006/95/EG

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 Fine-wire special conductor

 Braiding in layers with extremely short pitch

 Highly flexible braided copper shield

 Pressure extruded

Class 4.2.2





Lead free

Following EU guideline (RoHS) 2002/95/EC



Clean room

According to ISO Class 2. Outer jacket material complies with CF5.10.07, tested by IPA according to standard 14644-1

## Typical application area

- for high load requirements
- light oil influence
- preferably indoor applications, but also outdoor ones at temperatures > 5 °C
- especially for freely suspended and gliding travel distances up to 50 m
- storage and retrieval units for high-bay warehouses, machining units/packages machines, handling, indoor cranes

Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
CF240.01.03	(3 x 0.14)C	4.5	16	35
CF240.01.04	(4 x 0.14)C	5.0	18	38
CF240.01.05	(5 x 0.14)C	5.5	20	42
CF240.01.07	(7 x 0.14)C	6.0	25	51
CF240.01.14	(14 x 0.14)C	7.0	42	76
CF240.01.18	(18 x 0.14)C	8.0	48	90
CF240.01.24	(24 x 0.14)C	9.5	60	113
CF240.02.03	(3 x 0.25)C	5.5	21	40
CF240.02.04	(4 x 0.25)C	5.5	24	48
CF240.02.05	(5 x 0.25)C	6.0	27	52
CF240.02.07	(7 x 0.25)C	7.0	35	66
CF240.02.08	(8 x 0.25)C	7.5	40	74
CF240.02.14	(14 x 0.25)C	8.0	57	100
CF240.02.18	(18 x 0.25)C	9.0	71	122
CF240.02.24	(24 x 0.25)C	11.0	92	174
CF240.03.03	(3 x 0.34)C	5.5	24	45
CF240.03.04	(4 x 0.34)C	6.0	28	51
CF240.03.05	(5 x 0.34)C	6.5	32	58
CF240.03.07	(7 x 0.34)C	7.0	43	75
CF240.03.10	(10 x 0.34)C	8.5	55	110
CF240.03.14	(14 x 0.34)C	8.5	71	116
CF240.03.18	(18 x 0.34)C	10.0	87	140
CF240.03.24	(24 x 0.34)C	12.0	115	203

Note: The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
G = with earthed conductor green-yellow    x = without earthed conductor



Order example: **CF240.02.03** – in your desired length (0.5 m steps)  
CF240 Chainflex® series .02 Code nominal cross section .03 Number of cores



Please use [www.chainflex.eu/en/CF240](http://www.chainflex.eu/en/CF240) for your online order.

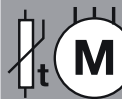
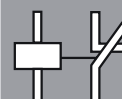


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\* Delivery time means time until shipping of goods

Data cable

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(for up to 10 cuts of the same type)

CF211  
PVC  
10 x d

# PVC Data cable Chainflex® CF211

- for high load requirements
- PVC outer jacket
- shielded
- oil-resistant
- flame-retardant



Center element  
for high tensile  
stresses



Fine-wire special  
conductor

























2 cores each  
stranded with  
short pitch



Highly flexible  
braided copper  
shield



Pressure extruded

	Temperature range moved	-5 °C to +70 °C, minimum bending radius 10 x d
	Temperature range fixed	-20 °C to +70 °C, minimum bending radius 5 x d
	v max. unsupported/gliding	5 m/s, 3 m/s
	a max.	50 m/s <sup>2</sup>
	Travel distance	Freely suspended and gliding travel distances up to 100 m, Class 3
	Nominal voltage	300/300 V (following DIN VDE 0245).
	Testing voltage	1500 V
	Oil	Oil-resistant (following DIN EN 60811-2-1, DIN EN 50363-4-1), Class 2
	Flame-retardant	According to IEC 332-1, CEI 20-35, FT1.
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
	Conductor	Very finely stranded special cores of particularly high-flex design made of bare copper wires.
	Core insulation	Mechanically high-quality PVC mixture (following DIN VDE 0207 Part 4).
	Core stranding	2 cores each stranded in pairs with short pitch lengths, core pairs also stranded with short pitch lengths.
	Core identification	Colour code in accordance with DIN 47100.
	Intermediate sheath	Foil taping over the external layer.
	Overall shield	Extremely bending-resistant, tinned braided copper shield. Coverage approx. 70% linear, approx. 90% optical.
	Outer jacket	Low-adhesion, oil-resistant mixture on the basis of PVC, adap- ted to suit the requirements in Energy Chains® (following DIN VDE 0282 Part 10). Colour: gray (similar to RAL 7001)
	UL/CSA	< 0.5 mm <sup>2</sup> : Style 10467 and 2464, 300 V, 80°C ≥ 0.5 mm <sup>2</sup> : Style 1729 and 2464, 300 V, 80 °C
	CEI	Following CEI 20-35
	CE	Following 2006/95/EG
	Lead free	Following EU guideline (RoHS) 2002/95/EC
	Clean room	According to ISO Class 2. Outer jacket material complies with CF5.10.07, tested by IPA according to standard 14644-1

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Class 5.3.2





## Typical application area

- for high load requirements
- light oil influence
- preferably indoor applications, but also outdoor ones at temperatures > 5 °C
- especially for freely suspended and gliding travel distances up to 100 m
- storage and retrieval units for high-bay warehouses, machining units/packaging machines, handling, indoor cranes

Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
CF211.02.01.02	(1 x (2 x 0.25))C	5.0	16	35
CF211.02.02.02 <sup>(2)</sup>	(2 x (2 x 0.25))C	5.5	28	60
CF211.02.03.02	(3 x (2 x 0.25))C	7.0	37	73
CF211.02.04.02	(4 x (2 x 0.25))C	8.0	44	85
CF211.02.05.02	(5 x (2 x 0.25))C	8.5	51	97
CF211.02.06.02	(6 x (2 x 0.25))C	9.5	58	110
CF211.02.08.02	(8 x (2 x 0.25))C	11.5	75	160
CF211.02.10.02	(10 x (2 x 0.25))C	13.0	93	195
CF211.02.14.02	(14 x (2 x 0.25))C	13.5	109	205
CF211.03.03.02	(3 x (2 x 0.34))C	8.0	37	79
CF211.03.08.02	(8 x (2 x 0.34))C	12.0	98	202
CF211.03.10.02 <sup>(1)</sup>	(10 x (2 x 0.34))C	12.0	118	254
CF211.05.01.02	(1 x (2 x 0.5))C	5.5	23	50
CF211.05.02.02 <sup>(2)</sup>	(2 x (2 x 0.5))C	8.5	44	80
CF211.05.03.02	(3 x (2 x 0.5))C	9.0	57	100
CF211.05.04.02	(4 x (2 x 0.5))C	9.5	68	120
CF211.05.05.02	(5 x (2 x 0.5))C	11.0	80	145
CF211.05.06.02	(6 x (2 x 0.5))C	12.5	99	185
CF211.05.08.02	(8 x (2 x 0.5))C	14.0	124	230
CF211.05.10.02	(10 x (2 x 0.5))C	16.0	175	320
CF211.05.14.02	(14 x (2 x 0.5))C	17.0	187	335

<sup>(1)</sup> Delivery time upon inquiry

The Chainflex® types marked with <sup>(2)</sup> are cables designed as a star-quad.

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor



**Order example: CF211.02.04.02 – in your desired length (0.5 m steps)**

**CF211** Chainflex® series **.02** Code nominal cross section **.04** Number of pairs **.02** Identification pairs



Please use [www.chainflex.eu/en/CF211](http://www.chainflex.eu/en/CF211) for your online order.



Delivery time 24h or today\*

\* Delivery time means time until shipping of goods

## Delivery program Measuring system cable

- ▶ Page 128, CF211 (PVC)
- ▶ Page 136, CF111.D (TPE)
- ▶ Page 140, CF11.D (TPE)

**850 types from stock no cutting costs ...**

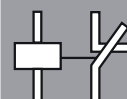
... and order online ▶ [www.igus.eu/en/CF211](http://www.igus.eu/en/CF211)

(for up to 10 cuts of the same type)

Data cable

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CF112  
PUR  
10 x d

# New! PUR Data cable Chainflex® CF112

- for high load requirements
- PUR outer jacket
- double-shielded, twisted-pair
- oil-resistant and coolant-resistant
- notch-resistant
- PVC-free/halogen-free
- flame-retardant
- hydrolysis-resistant and microbe-resistant



Especially bending-resistant fine-wire stranded conductor



Highly flexible braided copper shield



Center element for high tensile stresses



2 cores each stranded with short pitch





















Gusset-filled extruded



Highly flexible braided copper shield



Pressure extruded, halogen-free PUR blend

	Temperature range moved	-35 °C to +80 °C, minimum bending radius 10 x d
	Temperature range fixed	-40 °C to +80 °C, minimum bending radius 5 x d
	v max. unsupported/gliding	10 m/s, 5 m/s
	a max.	80 m/s <sup>2</sup>
	Travel distance	Freely suspended and gliding travel distances up to 100 m, Class 3
	Nominal voltage	300/300 V (following DIN VDE 0245).
	Testing voltage	1500 V
	Oil	Oil-resistant (following DIN EN 60811-2-1, DIN EN 50363-10-2), Class 3.
	Flame-retardant	According to IEC 332-1, CEI 20-35, FT1.
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 192).
	Conductor	Very finely stranded special cores of particularly high-flex design made of bare copper wires.
	Core insulation	Mechanically high-quality TPE mixture.
	Core stranding	2 cores each stranded in pairs with short pitch lengths, core pairs also stranded with short pitch lengths.
	Core identification	Colour code in accordance with DIN 47100
	Element shield	Extremely bending-resistant, tinned braided copper shield. Coverage approx. 70% linear, approx. 90% optical.
	Intermediate jacket	PUR mixture adapted to suit the requirements in Energy Chains®.
	Overall shield	Extremely bending-resistant, tinned braided copper shield. Coverage approx. 70% linear, approx. 90% optical.
	Outer jacket	Low-adhesion, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in Energy Chains® (following DIN VDE 0282 Part 10). Colour: gray (similar to RAL 7016)

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Class 6.3.3





	UL/CSA	Style 10493 and 20233, 300 V, 80°C
	CEI	Following CEI 20-35
	CE	Following 2006/95/EG
	Lead free	Following EU guideline (RoHS) 2002/95/EG.

## Typical application area

- for high load requirements
- almost unlimited resistance to oil
- indoor and outdoor applications with average sun radiation
- especially for freely suspended and gliding travel distances up to 100 m
- Machining units/machine tools, storage and retrieval units for high-bay warehouses, packaging industry, quick handling, refrigerating sector

Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]	
CF112.02.02.02 <sup>(1)</sup>	(2 x (2 x 0.25)C)C	9.5	54	125	New
CF112.02.03.02 <sup>(1)</sup>	(3 x (2 x 0.25)C)C	10.0	68	144	New
CF112.02.04.02	(4 x (2 x 0.25)C)C	11.0	78	159	New
CF112.02.05.02 <sup>(1)</sup>	(5 x (2 x 0.25)C)C	11.5	95	184	New
CF112.02.06.02 <sup>(1)</sup>	(6 x (2 x 0.25)C)C	12.0	107	210	New
CF112.05.02.02 <sup>(1)</sup>	(2 x (2 x 0.5)C)C	11.5	72	168	New
CF112.05.03.02 <sup>(1)</sup>	(3 x (2 x 0.5)C)C	12.0	95	192	New
CF112.05.04.02 <sup>(1)</sup>	(4 x (2 x 0.5)C)C	12.5	113	221	New
CF112.05.05.02 <sup>(1)</sup>	(5 x (2 x 0.5)C)C	13.5	137	263	New
CF112.05.06.02 <sup>(1)</sup>	(6 x (2 x 0.5)C)C	14.5	155	307	New

<sup>(1)</sup> Delivery time upon inquiry

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with green-yellow earth core    x = without earth core



**Order example: CF112.02.04.02 – in your desired length (0.5 m steps)**

**CF112 Chainflex® series .02 Code nominal cross section .04 Number of pairs .02 Identification pairs**



Please use [www.chainflex.eu/en/CF112](http://www.chainflex.eu/en/CF112) for your online order.

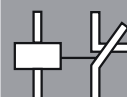


Delivery time 24h or today\*

\* Delivery time means time until shipping of goods

Data cable

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**850 types from stock no cutting costs ...**


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(for up to 10 cuts of the same type)

CF113  
PUR  
10 x d

# New! PUR Data cable Chainflex® CF113


- for high load requirements
- PUR outer jacket
- twisted-pair
- oil-resistant and coolant-resistant
- notch-resistant
- PVC-free/halogen-free
- flame-retardant
- hydrolysis-resistant and microbe-resistant



Especially bending-resistant fine-wire stranded conductor




Center element for high tensile stresses



2 cores each stranded with short pitch





















Gusset-filled extruded



Highly flexible braided copper shield



Pressure extruded, halogen-free PUR blend

	Temperature range moved	-35 °C to +80 °C, minimum bending radius 10 x d
	Temperature range fixed	-40 °C to +80 °C, minimum bending radius 5 x d
	v max. unsupported/gliding	10 m/s, 5 m/s/
	a max.	80 m/s <sup>2</sup>
	Travel distance	Freely suspended and gliding travel distances up to 100 m, Class 3
	Nominal voltage	300/300 V (following DIN VDE 0245).
	Testing voltage	1500 V
	Oil	Oil-resistant (following DIN EN 60811-2-1, DIN EN 50363-10-2), Class 3.
	Flame-retardant	According to IEC 332-1, CEI 20-35, FT1.
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 192).
	Halogen-free	Following EN 50267-2-1.
	Conductor	Very finely stranded special cores of particularly high-flex design made of bare copper wires.
	Core insulation	Mechanically high-quality TPE mixture.
	Core stranding	2 cores each stranded in pairs with short pitch lengths, core pairs also stranded with short pitch lengths.
	Core identification	Colour code in accordance with DIN 47100
	Intermediate jacket	PUR mixture adapted to suit the requirements in Energy Chains®.
	Overall shield	Extremely bending-resistant, tinned braided copper shield. Coverage approx. 70% linear, approx. 90% optical.
	Outer jacket	Low-adhesion, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in Energy Chains® (following DIN VDE 0282 Part 10). Colour: gray (similar to RAL 7016)

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Class 6.3.3





	UL/CSA	Style 10493 and 20233, 300 V, 80°C
	CEI	Following CEI 20-35
	CE	Following 2006/95/EG
	Lead free	Following EU guideline (RoHS) 2002/95/EG.

## Typical application area

- for high load requirements
- almost unlimited resistance to oil
- indoor and outdoor applications with average sun radiation
- especially for freely suspended and gliding travel distances up to 100 m
- Machining units/machine tools, storage and retrieval units for high-bay warehouses, packaging industry, quick handling, refrigerating sector

Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]	
CF113.02.02.02 <sup>(1/2)</sup>	(2 x (2 x 0.25))C	8.0	31	86	New
CF113.02.03.02 <sup>(1)</sup>	(3 x (2 x 0.25))C	8.5	40	96	New
CF113.02.04.02	(4 x (2 x 0.25))C	9.0	45	107	New
CF113.02.05.02 <sup>(1)</sup>	(5 x (2 x 0.25))C	9.5	56	125	New
CF113.02.06.02 <sup>(1)</sup>	(6 x (2 x 0.25))C	10.0	62	137	New
CF113.05.02.02 <sup>(1/2)</sup>	(2 x (2 x 0.5))C	10.0	50	127	New
CF113.05.03.02 <sup>(1)</sup>	(3 x (2 x 0.5))C	10.5	62	142	New
CF113.05.04.02 <sup>(1)</sup>	(4 x (2 x 0.5))C	11.0	70	162	New
CF113.05.05.02 <sup>(1)</sup>	(5 x (2 x 0.5))C	11.5	84	185	New
CF113.05.06.02 <sup>(1)</sup>	(6 x (2 x 0.5))C	12.5	95	207	New

<sup>(1)</sup> Delivery time upon inquiry

The Chainflex® types marked with <sup>(2)</sup> are cables designed as a star-quad.

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with green-yellow earth core    x = without earth core



**Order example: CF113.02.06.02 – in your desired length (0.5 m steps)**

**CF113** Chainflex® series **.02** Code nominal cross section **.06** Number of pairs **.02** Identification pairs



Please use [www.chainflex.eu/en/CF113](http://www.chainflex.eu/en/CF113) for your online order.

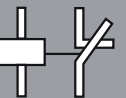


Delivery time 24h or today\*

\* Delivery time means time until shipping of goods

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(for up to 10 cuts of the same type)

CF111  
TPE  
10 x d

# TPE Data cable Chainflex® CF111

- for high load requirements
- TPE outer jacket
- shielded
- oil- and bio-oil-resistant
- flame-retardant
- PVC-free
- hydrolysis-resistant and microbe-resistant




Center element for high tensile stresses



Fine-wire special conductor





















Cores each stranded with short pitch



Bending-resistant braided copper shield



Pressure extruded, flame-retard TPE blend

	Temperature range moved	-35 °C to +100 °C, minimum bending radius 10 x d
	Temperature range fixed	-40 °C to +100 °C, minimum bending radius 6 x d
	v max. unsupported	2 m/s
	a max.	30 m/s <sup>2</sup>
	Travel distance	Freely suspended travel distances, Class 1
	UV-resistant	Medium
	Nominal voltage	300 V
	Testing voltage	1500 V
	Oil	Oil-resistant (following DIN EN 60811-2-1), bio-oil-resistant (following VDMA 24568), Class 4
	Flame-retardant	According to IEC 332-1, CEI 20-35, FT1
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
	Conductor	Very finely stranded special cores of particularly high-flex design made of bare copper wires.
	Core insulation	Mechanically high-quality PP mixture.
	Core stranding	2 cores each stranded in pairs with short pitch lengths, core pairs also stranded with short pitch lengths.
	Core identification	Colour code in accordance with DIN 47100.
	Intermediate jacket	Foil taping over the external layer.
	Overall shield	Bending-resistant, tinned braided copper shield. Coverage approx. 55% linear, approx. 80% optical.
	Outer jacket	Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in Energy Chains®. Colour: gray (similar to RAL 7001)

Class 4.1.4



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# Class 4.1.4

Price index








igus®

CF111

TPE

10 x d

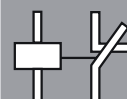
	UL/CSA	Style 10467 and 21259, 300 V, 90 °C
	CEI	Following CEI 20-35
	CE	Following 2006/95/EG
	Lead free	Following EU guideline (RoHS) 2002/95/EC
	Clean room	According to ISO Class 1. Outer jacket material complies with CF34.25.04, tested by IPA according to standard 14644-1

## Typical application area

- for high load requirements
- almost unlimited resistance to oil, also with bio-oils
- indoor and outdoor applications without direct sun radiation
- especially for freely suspended travel distances
- Machining units/machine tools, low temperature applications

Data cable

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(for up to 10 cuts of the same type)

# TPE Data cable Chainflex® CF111

- for high load requirements
- TPE outer jacket
- shielded
- oil- and bio-oil-resistant
- flame-retardant
- PVC-free
- hydrolysis-resistant and microbe-resistant

phase-out model

Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
CF111.02.01.02 <sup>(1)</sup>	(1 x (2 x 0.25))C	5.5	13	38
CF111.02.02.02 <sup>(1/2)</sup>	(2 x (2 x 0.25))C	6.0	21	50
CF111.02.03.02*	(3 x (2 x 0.25))C	7.5	28	68
CF111.02.04.02	(4 x (2 x 0.25))C	8.0	34	80
CF111.02.05.02 <sup>(1)</sup>	(5 x (2 x 0.25))C	8.5	41	93
CF111.02.06.02 <sup>(1)</sup>	(6 x (2 x 0.25))C	9.5	55	116
CF111.02.08.02 <sup>(1)</sup>	(8 x (2 x 0.25))C	10.5	64	143
CF111.02.10.02 <sup>(1)</sup>	(10 x (2 x 0.25))C	12.0	88	183
CF111.02.14.02 <sup>(1)</sup>	(14 x (2 x 0.25))C	12.5	107	207
CF111.03.03.02 <sup>(1)</sup>	(3 x (2 x 0.34))C	8.0	34	78
CF111.03.10.02 <sup>(1)</sup>	(10 x (2 x 0.34))C	12.5	66	177
CF111.05.01.02 <sup>(1)</sup>	(1 x (2 x 0.5))C	6.0	19	48
CF111.05.02.02 <sup>(1/2)</sup>	(2 x (2 x 0.5))C	7.0	31	67
CF111.05.03.02 <sup>(1)</sup>	(3 x (2 x 0.5))C	8.5	45	97
CF111.05.04.02	(4 x (2 x 0.5))C	8.5	55	110
CF111.05.05.02 <sup>(1)</sup>	(5 x (2 x 0.5))C	10.0	77	147
CF111.05.06.02 <sup>(1)</sup>	(6 x (2 x 0.5))C	11.0	91	171
CF111.05.08.02 <sup>(1)</sup>	(8 x (2 x 0.5))C	12.5	116	218
CF111.05.10.02 <sup>(1)</sup>	(10 x (2 x 0.5))C	13.5	144	276
CF111.05.14.02 <sup>(1)</sup>	(14 x (2 x 0.5))C	14.5	182	315


\* phase-out model, is replaced by CF113


<sup>(1)</sup> Delivery time upon inquiry


The Chainflex® types marked with <sup>(2)</sup> are cables designed as a star-quad.

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor

 **Order example: CF111.05.06.02** – in your desired length (0.5 m steps)  
**CF111** Chainflex® series **.05** Code nominal cross section **.06** Number of pairs **.02** Identification pairs

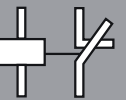
 Please use [www.chainflex.eu/en/CF111](http://www.chainflex.eu/en/CF111) for your online order.

 Delivery time 24h or today\*  
 \* Delivery time means time until shipping of goods



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(for up to 10 cuts of the same type)



CF11  
TPE  
10 x d

# TPE Data cable Chainflex® CF11

- for maximum load requirements
- TPE outer jacket
- shielded
- oil-resistant
- bio-oil-resistant
- PVC-free/halogen-free
- hydrolysis-resistant and microbe-resistant




Especially bending-resistant fine-wire stranded conductor



2 cores each stranded in especially short pitch























Gusset-filled extruded



Highly flexible braided copper shield



Pressure extruded, halogen-free TPE blend

	Temperature range moved	-35 °C to +100 °C, minimum bending radius 10 x d
	Temperature range fixed	-40 °C to +100 °C, minimum bending radius 5 x d
	v max. unsupported/gliding	10 m/s, 6 m/s
	a max.	100 m/s <sup>2</sup>
	Travel distance	Freely suspended and gliding travel distances up to 400 m and more, Class 4
	UV-resistant	High
	Nominal voltage	300/300 V (following DIN VDE 0245).
	Testing voltage	1500 V
	Oil	Oil-resistant (following DIN EN 60811-2-1), bio-oil-resistant (following VDMA 24568), Class 4
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
	Halogen-free	Following EN 50267-2-1.
	Conductor	Fine-wire stranded conductor in especially bending-resistant version consisting of bare copper wires (following EN 60228).
	Core insulation	Mechanically high-quality TPE mixture.
	Core stranding	2 cores each stranded in pairs with short pitch lengths, core pairs also stranded with short pitch lengths.
	Core identification	<b>Cores &lt; 1.0 mm<sup>2</sup></b> : colour code in accordance with DIN 47100 <b>Cores ≥ 1.0 mm<sup>2</sup></b> : cores black with white numerals
	Inner jacket	TPE mixture adapted to suit the requirements in Energy Chains®.
	Overall shield	Extremely bending-resistant, tinned braided copper shield. Coverage approx. 70% linear, approx. 90% optical.
	Outer jacket	Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in Energy Chains®. Colour: dark-blue (similar to RAL 5011)
	CE	Following 2006/95/EG
	Lead free	Following EU guideline (RoHS) 2002/95/EC.

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Class 6.4.4





Clean room

According to Class 1. Outer jacket material complies with CF9.15.07, tested by PA according to standard 14644-1

## Typical application area

- for maximum load requirements
- almost unlimited resistance to oil, also with bio-oils
- indoor and outdoor applications, UV-resistant
- especially for freely suspended and gliding travel distances up to 400 m and more
- storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, clean room, semiconductor insertion, ship to shore, outdoor cranes, low-temperature applications

Delivery program Bus cable Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
CF11.01.04.02	(4 x (2 x 0,14))C	7,0	28	64
CF11.01.18.02	(18 x (2 x 0,14))C	14,0	86	164
CF11.02.02.02 <sup>(2)</sup>	(2 x (2 x 0,25))C	6,5	25	52
CF11.02.03.02	(3 x (2 x 0,25))C	8,0	34	60
CF11.02.04.02	(4 x (2 x 0,25))C	9,0	44	80
CF11.02.05.02	(5 x (2 x 0,25))C	9,0	55	100
CF11.02.06.02	(6 x (2 x 0,25))C	10,0	66	127
CF11.02.09.02	(9 x (2 x 0,25))C	12,5	92	198
CF11.02.10.02	(10 x (2 x 0,25))C	13,0	99	200
CF11.02.14.02	(14 x (2 x 0,25))C	13,5	120	238
CF11.03.08.02	(8 x (2 x 0,34))C	12,5	90	154
CF11.05.04.02	(4 x (2 x 0,5))C	10,0	91	108
CF11.05.06.02	(6 x (2 x 0,5))C	11,5	95	190
CF11.05.08.02	(8 x (2 x 0,5))C	14,0	131	250
CF11.07.03.02	(3 x (2 x 0,75))C	11,0	77	131
CF11.10.04.02	(4 x (2 x 1,0))C	12,0	121	180
CF11.15.06.02	(6 x (2 x 1,5))C	17,0	242	419
CF11.25.03.02	(3 x (2 x 2,5))C	16,5	210	410

The Chainflex® types marked with <sup>(2)</sup> are cables designed as a star-quad.

Note: The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor



Order example: **CF11.02.03.02** – in your desired length (0.5 m steps)

**CF11** Chainflex® series **.02** Code nominal cross section **.03** Number of pairs **.02** Identification pairs



Please use [www.chainflex.eu/en/CF111](http://www.chainflex.eu/en/CF111) for your online order.



Delivery time 24h or today\*

\* Delivery time means time until shipping of goods

## Delivery program Measuring system cable

- ▶ Page 128, CF211 (PVC)
- ▶ Page 136, CF111.D (TPE)
- ▶ Page 140, CF11.D (TPE)

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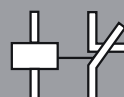
... and order online ▶ [www.igus.eu/en/CF11](http://www.igus.eu/en/CF11)

(for up to 10 cuts of the same type)

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


















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CF12  
TPE  
10 x d

# TPE Data cable Chainflex® CF12

- for maximum load requirements
- TPE outer jacket
- double-shielded
- oil-resistant
- bio-oil-resistant
- PVC-free/halogen-free
- hydrolysis-resistant and microbe-resistant

	Temperature range moved	-35 °C to +100 °C, minimum bending radius 10 x d
	Temperature range fixed	-40 °C to +100 °C, minimum bending radius 5 x d
	v max. unsupported/gliding	10 m/s, 6 m/s
	a max.	100 m/s <sup>2</sup>
	Travel distance	Freely suspended and gliding travel distances up to 400 m, Class 4
	UV-resistant	High
	Nominal voltage	300/300 V (following DIN VDE 0245).
	Testing voltage	1500 V
	Oil	Oil-resistant (following DIN EN 60811-2-1), bio-oil-resistant (following VDMA 24568), Class 4
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
	Halogen-free	Following EN 50267-2-1.
	Conductor	Fine-wire stranded conductor in especially bending-resistant version consisting of bare copper wires (following EN 60228).
	Core insulation	Mechanically high-quality TPE mixture.
	Core stranding	2 cores each stranded in pairs with short pitch lengths, core pairs also stranded with short pitch lengths.
	Core identification	<b>Cores &lt; 0.5 mm<sup>2</sup>:</b> colour code in accordance with DIN 47100 <b>Cores ≥ 0.5 mm<sup>2</sup>:</b> cores black with white numerals
	Element shield	Extremely bending-resistant, tinned braided copper shield. Coverage approx. 70% linear, approx. 90% optical.
	Element jacket	TPE mixture adapted to suit the requirements in Energy Chains® over pair shield.
	Inner jacket	TPE mixture adapted to suit the requirements in Energy Chains®.
	Overall shield	Highly flexible shield consisting of galvanized steel wire braid. Coverage approx. 70% linear, approx. 90% optical.

Especially bending-resistant fine-wire stranded conductor

Pressure extruded element jacket

Highly flexible braided copper shield

Center element for high tensile stresses

2 cores each stranded in especially short pitch

Gusset-filled, pressure extruded

Highly flexible steel wire braid

Pressure extruded, halogen-free TPE blend

IGUS CHAINFLEX® CF12.

Class 6.4.4



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**Outer jacket**

bw-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in Energy Chains®.  
Colour:dark-blue (similar to B5011)



**CE**

Following 2006/95/EG



**Lead free**

Following EU guideline (609/2002/95/EC).



**Clean room**

According to Class 1. Outer jacket material complies with CF9.15.07, tested by PA according to standard 14644-1

Data cable

## Typical application area

- for maximum load requirements
- almost unlimited resistance to oil, also with bio-oils
- indoor and outdoor applications, UV-resistant
- especially for freely suspended and gliding travel distances up to 400 m
- storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, clean room, semiconductor insertion, outdoor cranes, low-temperature applications, for especially high EMV safety

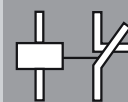
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Delivery program Part No.	Number of cores and conductor nominal cross section [mm²]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
CF12.02.02.02	(2 x (2 x 0,25)C)C	11,0	27	152
CF12.02.03.02 <sup>(1)</sup>	(3 x (2 x 0,25)C)C	11,5	40	172
CF12.02.04.02	(4 x (2 x 0,25)C)C	11,5	61	179
CF12.02.05.02	(5 x (2 x 0,25)C)C	13,0	93	220
CF12.05.03.02	(3 x (2 x 0,5)C)C	13,0	66	210
CF12.05.04.02	(4 x (2 x 0,5)C)C	14,0	88	255
CF12.05.05.02	(5 x (2 x 0,5)C)C	15,5	110	297
CF12.05.06.02	(6 x (2 x 0,5)C)C	17,0	132	360
CF12.05.08.02	(8 x (2 x 0,5)C)C	20,0	177	477
CF12.05.10.02	(10 x (2 x 0,5)C)C	23,0	221	548
CF12.05.14.02	(14 x (2 x 0,5)C)C	23,0	309	723
CF12.10.06.02	(6 x (2 x 1,0)C)C	20,0	198	542

<sup>(1)</sup> Delivery time upon inquiry

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G =with earthed conductor green-yellow    x =without earthed conductor



**Order example: CF12.02.03.02 – in your desired length (0.5 m steps)**  
CF12 Chainflex® series .02 Code nominal cross section .03 Number of pairs .02 Identification pairs



Please use [www.chainflex.eu/en/CF12](http://www.chainflex.eu/en/CF12) for your online order.



Delivery time 24h or today\*  
\* Delivery time means time until shipping of goods

## Test data ▶ Page 37

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... and order online ▶ [www.igus.eu/en/CF12](http://www.igus.eu/en/CF12)

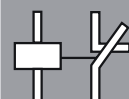
(for up to 10 cuts of the same type)

# Selection chart for Chainflex® bus cables

Chainflex® cable	Profibus	Interbus	CAN Bus	DeviceNet	CC-Link	Ethernet/ CAT5	Profinet
<b>CF BUS</b>							
CFBUS.001	✓						
CFBUS.002	✓						
CFBUS.003	✓						
CFBUS.010		✓					
CFBUS.011		✓					
CFBUS.020			✓				
CFBUS.021			✓				
CFBUS.022			✓				
CFBUS.030				✓			
CFBUS.031				✓			
CFBUS.035 CC-Link					✓		
CFBUS.040						✓	
CFBUS.041						✓	
CFBUS.042						✓	
CFBUS.044 GigE						✓	
CFBUS.045						✓	
CFBUS.050 CAT6						CAT6	
CFBUS.055 FireWire							
CFBUS.060 Profinet							✓
CFBUS.065 USB							
CFBUS.066 USB							
<b>CF11.LC</b>							
CF11.02.02.02.PBA.LC	✓						
CF11.05.01.02.LC			✓				
CF11.05.02.02.LC			✓				
CF11.02.03.02.IB-S		✓					
CF11.02.03.02.10.03.IB-S		✓					
<b>CF11.LC.D</b>							
CF11.02.02.02.LC.D			✓				
CF11.05.01.02.LC.D			✓				
CF11.02.01.02.PBA.LC.D	✓						
CF11.02.02.07.03.PBA.LC.D	✓						
CF11.02.02.15.04.PBA.LC.D	✓						
<b>CF14 CAT5</b>							
CF14.02.02.02.CAT5						✓	
CF14.02.04.02.CAT5						✓	
CF14.02.05.02.CAT5						✓	

FireWire	USB	Characteristic wave impedance [Ω]	Flame- retardant	CE	RoHS	UL	UL	UL	UL	UL	UL	Halogen-free	Page
		150	✓	✓	✓	✓	✓	✓	✓	✓	✓		118
		150	✓	✓	✓	✓	✓	✓	✓	✓	✓		118
		150	✓	✓	✓	✓	✓	✓	✓	✓	✓		118
		100	✓	✓	✓	✓	✓	✓	✓	✓	✓		118
		100	✓	✓	✓	✓	✓	✓	✓	✓	✓		118
		120	✓	✓	✓	✓	✓	✓	✓	✓	✓		118
		120	✓	✓	✓	✓	✓	✓	✓	✓	✓		118
		120	✓	✓	✓	✓	✓	✓	✓	✓	✓		118
		120	✓	✓	✓	✓	✓	✓	✓	✓	✓		118
		120	✓	✓	✓	✓	✓	✓	✓	✓	✓		118
		110	✓	✓	✓	✓	✓	✓	✓	✓	✓		118
		100	✓	✓	✓	✓	✓	✓	✓	✓	✓		118
		100	✓	✓	✓	✓	✓	✓	✓	✓	✓		118
		100	✓	✓	✓	✓	✓	✓	✓	✓	✓		118
		100	✓	✓	✓	✓	✓	✓	✓	✓	✓		118
		100	✓	✓	✓	✓	✓	✓	✓	✓	✓		118
		100	✓	✓	✓	✓	✓	✓	✓	✓	✓		118
✓		100	✓	✓	✓	✓	✓	✓	✓	✓	✓		118
		100	✓	✓	✓	✓	✓	✓	✓	✓	✓		118
	✓	100	✓	✓	✓	✓	✓	✓	✓	✓	✓		118
	✓	100	✓	✓	✓	✓	✓	✓	✓	✓	✓		118
		150		✓	✓							✓	122
		120		✓	✓							✓	122
		120		✓	✓							✓	122
		100		✓	✓							✓	122
		100		✓	✓							✓	122
		120		✓	✓					✓		✓	124
		120		✓	✓					✓		✓	124
		150		✓	✓					✓		✓	124
		150		✓	✓					✓		✓	124
		150		✓	✓					✓		✓	124
		100		✓	✓					✓		✓	126
		100		✓	✓					✓		✓	126
		100		✓	✓					✓		✓	126

Bus cable

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CFBUS  
TPE  
10-12.5 x d

# TPE Bus cable Chainflex® CFBUS

- for maximum load requirements
- TPE outer jacket
- shielded
- oil-resistant
- bio-oil-resistant
- flame-retardant
- hydrolysis-resistant and microbe-resistant




Especially bending-resistant fine-wire stranded conductor



Cores each stranded in especially short pitch





















Gusset-filled extruded



Highly flexible braided copper shield



Pressure extruded, flame-retardant TPE blend

	Temperature range moved	-35 °C to +70 °C, minimum bending radius 10-12.5 x d
	Temperature range fixed	-40 °C to +70 °C, minimum bending radius 5 x d
	v max. unsupported/gliding	10 m/s, 6 m/s
	a max.	100 m/s <sup>2</sup>
	Travel distance	Freely suspended and gliding travel distances up to 400 m, Class 4
	UV-resistant	Medium
	Nominal voltage	30 V
	Testing voltage	500 V
	Oil	Oil-resistant (following DIN EN 60811-2-1), bio-oil-resistant (following VDMA 24568), Class 4
	Flame-retardant	According to IEC 332-1, CEI 20-35, FT1.
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
	Conductor	Fine-wire stranded conductor in especially bending-resistant version consisting of bare copper wires (following EN 60228).
	Core insulation	According to bus specification.
	Core stranding	According to bus specification.
	Core identification	According to bus specification ► Schedule delivery program
	Inner jacket	TPE mixture adapted to suit the requirements in Energy Chains®.
	Overall shield	Extremely bending-resistant, tinned braided copper shield. Coverage approx. 70% linear, approx. 90% optical.
	Outer jacket	Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in Energy Chains®. Colour: violet (similar to RAL 4001)

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Class 6.4.4



IGUS CHAINFLEX® CFBUS.001



	UL/CSA	Style 1589 and 21371, 30 V, 80 °C
	CE	Following 2006/95/EG
	DESINA	According to VDW, DESINA standardisation
	Lead free	Following EU guideline (RoHS) 2002/95/EC.
	Clean room	According to ISO Class 1. Outer jacket material complies with CF34.25.04, tested by IPA according to standard 14644-1

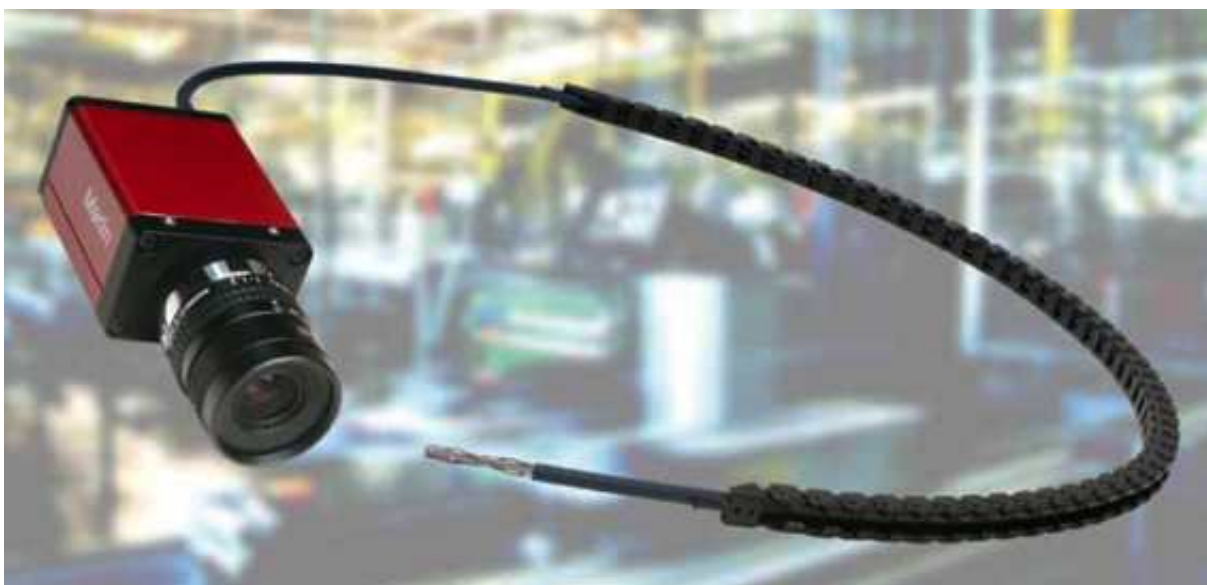
Bus cable

## Typical application area

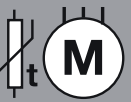
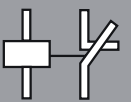
- for maximum load requirements
- almost unlimited resistance to oil, also with bio-oils
- indoor and outdoor applications without direct sun radiation
- especially for freely suspended and gliding travel distances up to 400 m
- bus connection cable for storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, clean room, semiconductor insertion, indoor cranes, low-temperature applications

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## Test data ► Page 30



FireWire cable for moving energy supplies in digital camera technology.



**850 types from stock no cutting costs ...**  
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# TPE Bus cable Chainflex® CFBUS

- for maximum load requirements
- TPE outer jacket
- shielded
- oil-resistant
- bio-oil-resistant
- flame-retardant
- hydrolysis-resistant and microbe-resistant

Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter in mm approx.	Copper index [kg/km]	Weight [kg/km]
<b>Profibus (minimum bending radius 10 x d)</b>				
CFBUS.001	(2x0,25)C	8,5	23	70
CFBUS.002	4x1,5(2x0,25)C	12,5	96	175
CFBUS.003	3x0,75(2x0,25)C	11,0	58	121
<b>Interbus (minimum bending radius 10 x d)</b>				
CFBUS.010	(3x(2x0,25))C	8,5	42	83
CFBUS.011	(3x(2x0,25)3x1,0)C	10,0	74	135
<b>CAN-BUS/Fieldbus (minimum bending radius 10 x d)</b>				
CFBUS.020 <sup>(2)</sup>	(2x(2x0,25))C	7,5	33	66
CFBUS.021	(2x0,5)C	8,5	36	77
CFBUS.022 <sup>(2)</sup>	(2x(2x0,5))C	8,5	45	83
<b>DeviceNet (minimum bending radius 10 x d)</b>				
CFBUS.030 Drop	(1x2x1,0(2x0,25)1x2x1,0(2x0,25))C	7,5	33	65
CFBUS.031 Trunk	(1x2x1,0(2x0,25)3x1x2x1,0(2x0,25))C	11,5	96	110
<b>CC-Link (minimum bending radius 10 x d)</b>				
CFBUS.035	(3x1,0)C	8,5	44	90
<b>Ethernet/CAT5 (minimum bending radius 12.5 x d)</b>				
CFBUS.040 <sup>(2)</sup>	(2x(2x0,25))C	7,0	33	43
CFBUS.041	(4x(2x0,25))C	10,0	46	101
CFBUS.042 <sup>(1)</sup>	(5x(2x0,25))C	10,5	53	106
CFBUS.044	(4x(2x0,15))C	8,0	35	79
CFBUS.045	(4x(2x0,15))C	8,0	35	79
<b>Ethernet/CAT6 (minimum bending radius 12.5 x d)</b>				
CFBUS.050	(4x(2x0,14))C	10,0	77	131
<b>FireWire (minimum bending radius 12.5 x d)</b>				
CFBUS.055	(2x(2x0,15)C2x(0,34)C)	7,5	42	118
<b>Profinet (minimum bending radius 12.5 x d)</b>				
CFBUS.060	(4x0,38)C	7,5	37	71
<b>USB (minimum bending radius 12.5 x d)</b>				
CFBUS.065	(2x0,51x(2x0,08))C	5,0	26	45
CFBUS.066	(2x0,51x(2x0,24))C	6,0	32	56

<sup>(1)</sup> Delivery time upon inquiry

The Chainflex® types marked with <sup>(2)</sup> are cables designed as a star-quad.

**Other types available on request.**

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor



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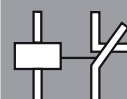
Delivery program Part No.	Characteris- tic wave impedance in $\Omega$ approx.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	Colour code
<b>Profibus</b>			
CFBUS.001	150	(2x0.25)C	red, green
CFBUS.002	150	4x1.5+ (2x0.25)C	black with white numbers red/green
CFBUS.003	150	3x0.75+ (2x0.25)C	black, blue, green-yellow red/green
<b>Interbus</b>			
CFBUS.010	100	(3x(2x0.25))C	white/brown, green/yellow, gray/pink
CFBUS.011	100	(3x1.0+ 3x(2x0.25))C	red, blue, green-yellow white/brown, green/yellow, gray/pink
<b>CAN-BUS/Fieldbus</b>			
CFBUS.020	120	(2x(2x0.25))C	white, green, brown, yellow (star-quad stranding)
CFBUS.021	120	(2x0.5)C	white, brown
CFBUS.022	120	(2x(2x0.5))C	white, green, brown, yellow (star-quad stranding)
<b>DeviceNet</b>			
CFBUS.030 Drop	120	(1x2xAWG24)+ (1x2xAWG22)C	white/blue red/black
CFBUS.031 Trunk	120	(1x2xAWG18)+ (1x2xAWG15)C	white/blue red/black
<b>CC-Link</b>			
CFBUS.035	110	(3xAWG20)C	white, yellow, blue
<b>Ethernet/CAT5</b>			
CFBUS.040	100	(2x(2x0.25))C	white, green, brown, yellow (star-quad stranding)
CFBUS.041	100	(4x(2x0.25))C	white/brown, green/yellow, gray/pink, blue/red
CFBUS.042	100	(5x(2x0.25))C	white/brown, green/yellow, gray/pink, blue/red, black/violet
CFBUS.044	100	(4x(2x0.15))C	white/brown, green/yellow, gray/pink, blue/red
CFBUS.045	100	(4x(2x0.15))C	white-blue/blue, white-orange/orange, white-green/green, white-brown/brown
<b>Ethernet/CAT6</b>			
CFBUS.050	100	(4x(2x0.14)C)C	white/blue, white/orange, white/green, white/brown
<b>FireWire</b>			
CFBUS.055	100	2x(2x0.15)C+ 2x(0.34)C	orange/blue, green/red black, white
<b>Profinet</b>			
CFBUS.060	100	(4x0,38)C	white/yellow/blue/orange
<b>USB</b>			
CFBUS.065	90	2x0.5 2x0.08	red, black white, green
CFBUS.066	90	2x0.5 2x0.24	red, black white, green

## Technical information

The USB, FireWire and GigE-cables shown on these pages were developed for the ambitious industrial usage in E-Chains®. High proofness to oil and lubricants is as secured as protection against electromagnetic interferences. This high mechanical service life was reached with the usage of high quality materials which even care for the electrical safeness. In single cases communication errors can occur, if very different hardware and software is combined. We recommend tests with all components and the cables before starting serial production, to get the prove for a perfect running system. Of course we support you with the details of these electrical tests. Just give us a call!

Bus cable

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(for up to 10 cuts of the same type)

CF11.LC

TPE

10 x d

# TPE Bus cable

## Chainflex® CF11.LC (low capacitance)

- for maximum load requirements
- TPE outer jacket
- shielded
- oil-resistant
- bio-oil-resistant
- PVC-free/halogen-free
- UV-resistant
- hydrolysis-resistant and microbe-resistant



Especially bending-resistant fine-wire stranded conductor



Cores each stranded in especially short pitch



Gusset-filled extruded



Highly flexible braided copper shield



Pressure extruded, halogen-free TPE blend



Temperature range moved

-35 °C to +70 °C, minimum bending radius 10 x d



Temperature range fixed

-40 °C to +70 °C, minimum bending radius 5 x d



v max.

unsupported/gliding 10 m/s, 6 m/s



a max.

100 m/s<sup>2</sup>



Travel distance

Freely suspended and gliding travel distances up to 400 m, Class 4



UV-resistant

High



Nominal voltage

30 V



Testing voltage

500 V



Oil

Oil-resistant (following DIN EN 60811-2-1), bio-oil-resistant (following VDMA 24568), Class 4



Silicon-free

Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).



Halogen-free

Following EN 50267-2-1.



Conductor

Fine-wire stranded conductor in especially bending-resistant version consisting of bare copper wires (following EN 60228).



Core insulation

According to bus specification.



Core stranding

According to bus specification.



Core identification

According to bus specification ► Schedule delivery program



Inner jacket

TPE mixture adapted to suit the requirements in Energy Chains®.



Overall shield

Extremely bending-resistant, tinned braided copper shield. Coverage approx. 70% linear, approx. 90% optical.



Outer jacket

Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in Energy Chains®. Colour: dark-blue (similar to RAL 5011)



CE

Following 2006/95/EG

## ... no minimum order quantity

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Lead free

Following EU guideline (RoHS) 2002/95/EC.



Clean room

According to ISO Class 1. Outer jacket material complies with CF9.15.07, tested by IPA according to standard 14644-1

Bus cable

## Typical application area

- for maximum load requirements
- almost unlimited resistance to oil, also with bio-oils
- indoor and outdoor applications, UV-resistant
- especially for freely suspended and gliding travel distances up to 400 m
- bus connection cable for storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, clean room, semiconductor insertion, indoor cranes, low-temperature applications

Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
<b>Interbus</b>				
CF11.02.03.02.IB-S	(3x2x0.25)C	8.5	42	83
CF11.02.03.02.10.03.IB-S	(3x2x0.25+3x1.0)C	10.0	74	135
<b>CAN-Bus</b>				
CF11.05.01.02.LC	(1x2x0.5)C	8.5	36	77
CF11.05.02.02.LC <sup>(2)</sup>	(2x2x0.5)C	8.5	45	83
CF11.02.02.02.PBA.LC <sup>(2)</sup>	(2x(2x0.25))C	8.5	33	80

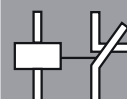
The Chainflex® types marked with <sup>(2)</sup> are cables designed as a star-quad.

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor

Delivery program Part No.	Characteris- tic wave impedance approx. [Ω]	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	Colour code
<b>Interbus</b>			
CF11.02.03.02.IB-S	100	(3x(2x0.25))C	white/brown, green/yellow, gray/pink
CF11.02.03.02.10.03.IB-S	100	(3x2x0.25+ 3x1.0)C	white/brown, green/yellow, gray/pink red, blue, green-yellow
<b>CAN-Bus</b>			
CF11.05.01.02.LC	120	(2x0.5)C	white, brown
CF11.05.02.02.LC	120	(2x(2x0.5))C	white, green, brown, yellow (star-quad stranding)
<b>Profibus</b>			
CF11.02.02.02.PBA.LC	150	(2x(2x0.25))C	green/red, yellow/brown

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... and order online ► [www.igus.eu/en/CF11LC](http://www.igus.eu/en/CF11LC)

(for up to 10 cuts of the same type)

CF11.LC.D





















TPE

10 x d

# TPE Bus cable

## Chainflex® CF11.LC.D (low capacitance)

- for maximum load requirements
- TPE outer jacket
- shielded
- PVC-free/halogen-free
- oil-resistant
- bio-oil-resistant
- hydrolysis-resistant and microbe-resistant

	Temperature range moved	-35 °C to +70 °C, minimum bending radius 10 x d
	Temperature range fixed	-40 °C to +70 °C, minimum bending radius 5 x d
	v max. unsupported/gliding	10 m/s, 6 m/s
	a max.	100 m/s <sup>2</sup>
	Travel distance	Freely suspended and gliding travel distances up to 400 m, Class 4
	UV-resistant	Medium
	Nominal voltage	30 V
	Testing voltage	500 V
	Oil	Oil-resistant (following DIN EN 60811-2-1), bio-oil-resistant (following VDMA 24568), Class 4
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
	Halogen-free	Following EN 50267-2-1.
	Conductor	Fine-wire stranded conductor in especially bending-resistant version consisting of bare copper wires (following EN 60228).
	Core insulation	According to bus specification.
	Core stranding	According to bus specification.
	Core identification	According to bus specification ► Schedule delivery program
	Inner jacket	TPE mixture adapted to suit the requirements in Energy Chains®.
	Overall shield	Extremely bending-resistant, tinned braided copper shield. Coverage approx. 70% linear, approx. 90% optical.
	Outer jacket	Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in Energy Chains®. Colour: violet (similar to RAL 4001)
	CE	Following 2006/95/EG
	DESINA	According to VDW, DESINA standardisation

Especially bending-resistant fine-wire stranded conductor

Cores each stranded in especially short pitch

Gusset-filled extruded

Highly flexible braided copper shield

Pressure extruded, halogen-free TPE blend

Class 6.4.4



IGUS CHAINFLEX® CF11.PBA.LC.D.

IGUS CHAINFLEX® CF11.LC.D.

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**Lead free**

Following EU guideline (RoHS) 2002/95/EC.



**Clean room**

According to ISO Class 1. Outer jacket material complies with CF9.15.07, tested by IPA according to standard 14644-1

## Typical application area

- for maximum load requirements
- almost unlimited resistance to oil, also with bio-oils
- indoor and outdoor applications without direct sun radiation
- especially for freely suspended and gliding travel distances up to 400 m
- bus connection cable for storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, clean room, semiconductor insertion, indoor cranes, low-temperature applications

Delivery program Part No. Profibus	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
CF11.02.01.02.PBA.LC.D	(1x(2x0.25)C	8.5	23	70
CF11.02.02.15.04.PBA.LC.D	(4x1.5+(2x0.25)C	12.5	96	175
CF11.02.02.07.03.PBA.LC.D	(3x0.75+(2x0.25)C	11.0	58	121

### Fieldbus (CAN-Bus)

CF11.02.02.02.LC.D <sup>(2)</sup>	(2x(2x0.25)C	7.5	33	66
CF11.05.01.02.LC.D	(1x(2x0.5)C	8.5	36	77

The Chainflex® types marked with <sup>(2)</sup> are cables designed as a star-quad.

**Other types available on request.**

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor

Delivery program Part No. Profibus	Characteris- tic wave impedance approx. [Ω]	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	Colour code
CF11.02.01.02.PBA.LC.D	150	(1x(2x0.25))C	red/green
CF11.02.02.15.04.PBA.LC.D	150	(4x1.5+ (2x0.25)C	black with white numbers red/green
CF11.02.02.07.03.PBA.LC.D	150	(3x0.75+ (2x0.25)C	black, blue, green-yellow red/green

### Fieldbus (CAN-Bus)

CF11.02.02.02.LC.D	120	(2x(2x0.25))C	white, green, brown, yellow (star-quad stranding)
CF11.05.01.02.LC.D	120	(1x(2x0.5))C	white/brown



**Order example: CF11.02.03.02.IB-S – in your desired length (0.5 m steps)**

**CF11.LC** Chainflex® series **.02** Code nominal cross section **.03** Number of pairs  
**.02** Identification pairs **.IB-S** Special identification



Please use [www.chainflex.eu/en/CF11LCD](http://www.chainflex.eu/en/CF11LCD) for your online order.



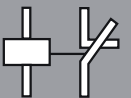
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\* Delivery time means time until shipping of goods

Bus cable

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**Test data ▶ Page 30**

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(for up to 10 cuts of the same type)

CF14  
TPE  
12.5 x d


# TPE Bus cable

## Chainflex® CF14 CAT5

- Ethernet special cable for maximum load requirements
- TPE outer jacket
- oil-resistant
- bio-oil-resistant
- PVC-free/halogen-free
- UV-resistant
- hydrolysis-resistant and microbe-resistant




Especially bending-resistant fine-wire stranded conductor



2 cores each stranded in especially short pitch, PP special insulation






















Gusset-filled extruded



Highly flexible braided copper shield



Pressure extruded, halogen-free TPE blend

	Temperature range moved	-35 °C to +70 °C, minimum bending radius 12.5 x d
	Temperature range fixed	-40 °C to +70 °C, minimum bending radius 7.5 x d
	v max. unsupported/gliding	10 m/s, 6 m/s
	a max.	100 m/s <sup>2</sup>
	Travel distance	Freely suspended and gliding travel distances up to 100 m, Class 3
	UV-resistant	Medium
	Nominal voltage	30 V
	Testing voltage	500 V
	Oil	Oil-resistant (following DIN EN 60811-2-1), bio-oil-resistant (following VDMA 24568), Class 4
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
	Halogen-free	Following EN 50267-2-1.
	Conductor	19-wire conductor consisting of bare copper wires in especially bending-resistant braiding quality.
	Core insulation	Special PP-isolating mixture.
	Core stranding	2 cores each stranded in pairs with short pitch lengths, core pairs also stranded with short pitch lengths.
	Core identification	Colour code in accordance with DIN 47100
	Inner jacket	TPE mixture adapted to suit the requirements in Energy Chains®.
	Overall shield	Extremely bending-resistant, tinned braided copper shield. Coverage approx. 70% linear, approx. 90% optical.
	Outer jacket	Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in Energy Chains®. Colour: violet (similar to RAL 4001)
	CE	Following 2006/95/EG

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Class 6.3.4





DESINA

According to VDW, DESINA standardisation



Lead free

Following EU guideline (RoHS) 2002/95/EC.



Clean room

According to ISO Class 1. Outer jacket material complies with CF9.15.07, tested by IPA according to standard 14644-1

Bus cable

## Typical application area

- for maximum load requirements
- almost unlimited resistance to oil, also with bio-oils
- indoor and outdoor applications without direct sun radiation
- especially for freely suspended and gliding travel distances up to 100 m
- ethernet cable for Storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, clean room, semiconductor insertion, indoor cranes, low-temperature applications

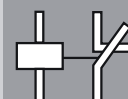
Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
Ethernet CAT5 CF14.02.02.02.CAT5 <sup>2)</sup>	(2x2x0.25)C	7.0	33	43
CF14.02.04.02.CAT5	(4x2x0.25)C	10.0	46	101
CF14.02.05.02.CAT5	(5x2x0.25)C	10.5	53	106

The Chainflex<sup>®</sup> types marked with <sup>2)</sup> are cables designed as a star-quad.

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor

Delivery program Part No.	Characteris- tic wave impedance approx. [Ω]	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	Colour code
Ethernet CAT5 CF14.02.02.02.CAT5	100	(2x(2x0.25))C	white, green, brown, yellow (star-quad stranding)
CF14.02.04.02.CAT5	100	(4x(2x0.25))C	white/brown, green/yellow, gray/pink, blue/red
CF14.02.05.02.CAT5	100	(5x(2x0.25))C	white/brown, green/yellow, gray/pink, blue/red, black/violet



**Order example: CF14.02.02.02.CAT5 – in your desired length (0.5 m steps)**

**CF14 CAT5** Chainflex<sup>®</sup> series **.02** Code nominal cross section **.02** Number of pairs  
**.02** Identification pairs **.CAT5** CAT5 identification



Please use [www.chainflex.eu/en/CF14](http://www.chainflex.eu/en/CF14) for your online order.



Delivery time 24h or today\*

\* Delivery time means time until shipping of goods

**Test data ▶ Page 28**

**More CAT5/CAT6 cables ▶ Page 118, CFBUS**

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(for up to 10 cuts of the same type)



CF211  
PVC  
10 x d

# PVC Measuring system cable Chainflex® CF211

- for high load requirements
- PVC outer jacket
- shielded
- oil-resistant
- flame-retardant



Center element  
for high tensile  
stresses



Fine-wire special  
conductor













Cores each stranded  
with short pitch



Highly flexible  
braided copper  
shield



Pressure extruded

	Temperature range moved	-5 °C to +70 °C, minimum bending radius 10 x d
	Temperature range fixed	-20 °C to +70 °C, minimum bending radius 5 x d
	v max. unsupported/gliding	5 m/s, 3 m/s
	a max.	50 m/s <sup>2</sup>
	Travel distance	Freely suspended and gliding travel distances up to 100 m, Class 3
	Nominal voltage	30 V
	Testing voltage	500 V
	Oil	Oil-resistant (following DIN EN 60811-2-1, DIN EN 50363-4-1), Class 2
	Flame-retardant	According to IEC 332-1, CEI 20-35, FT1.
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
	Conductor	Very finely stranded special cores of particularly high-flex design made of bare copper wires.
	Core insulation	Mechanically high-quality PP mixture.
	Core stranding	According to measuring system specification.
	Core identification	According to measuring system specification ▶ Schedule delivery program
	Element shield	Extremely bending-resistant, tinned braided copper shield. Coverage approx. 70% linear, approx. 90% optical.
	Intermediate sheath	Foil taping over the external layer.
	Element jacket	TPE mixture adapted to suit the requirements in Energy Chains® over pair shield.
	Overall shield	Extremely bending-resistant, tinned braided copper shield. Coverage approx. 70% linear, approx. 90% optical.
	Outer jacket	Low-adhesion, oil-resistant mixture on the basis of PVC, adapted to suit the requirements in Energy Chains® (following DIN VDE 0282 Part 10). Colour: gray (similar to RAL 7001)

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Class 5.3.2



# Class 5.3.2

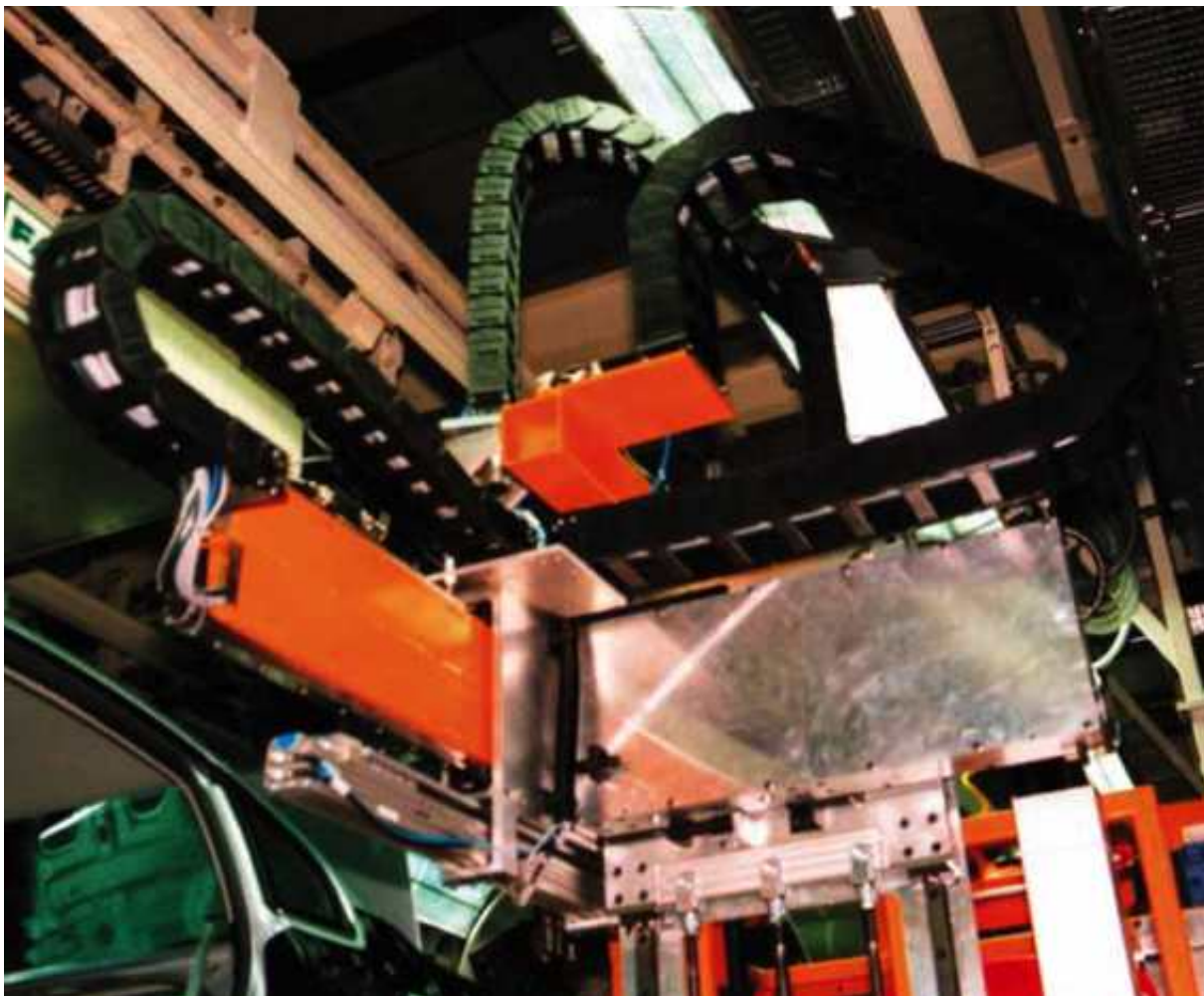


CF211  
PVC  
10 x d

	UL/CSA	Style 1589 and 2502, 30 V, 80 °C
	CEI	Following CEI 20-35
	CE	Following 2006/95/EG
	Lead free	Following EU guideline (RoHS) 2002/95/EC
	Clean room	According to ISO Class 2. Outer jacket material complies with CF5.10.07, tested by IPA according to standard 14644-1

## Typical application area

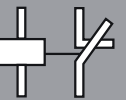
- for high load requirements
- light oil influence
- preferably indoor applications, but also outdoor ones at temperatures > 5 °C
- especially for freely suspended and gliding travel distances up to 100 m
- storage and retrieval units for high-bay warehouses, machining units/packaging machines, handling, indoor cranes



Three Energy Chain Systems® in several axes fitted with specially cables from igus®. E-Chain®: System E4/00 and System E4/0

Measuring system cable

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# PVC Measuring system cable Chainflex® CF211

- for high load requirements
- PVC outer jacket
- shielded
- oil-resistant
- flame-retardant

Delivery program* Part No.	Number of cores and conductor nominal cross section [mm²]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
CF211.001	(3x(2x0.14)C+ (4x0.14)+(2x0.5))C	9.0	61	100
CF211.002	(3x(2x0.14)C+(2x0.5C))C	9.0	63	110
CF211.006	(3x(2x0.14)C+ 2x0.5+4x0.14+4x0.23)C	9.5	72	120
CF211.009	(4x(2x0.25)+2x0.5)c	9.0	51	111
CF211.010	(4x(2x0.25)+2x1.0)C	9.5	74	141
CF211.011	(4x(2x0.34)+4x0.5)C	9.0	75	135
CF211.014	(4x(2x0.25)C+1x2x0.5)C	13.0	84	211
CF211.016	(3x(2x0.25)C)C	11.0	85	170
CF211.017	(4x(2x0.14)+ 4x1.0+(4x0.14)C)C	9.0	85	124
CF211.018	(2x(2x0.25)+2x0.5)C	7.0	41	62
CF211.019	(3x0.25+3x(2x0.25)C+ 2x1.0)C	9.0	82	115
CF211.027	(5x(2x0.14)+2x0.5)C	9.0	45	102

\* Previous product numbers – see reference list on page 482

Other types available on request.

Note: The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor



Order example: **CF211.001** – in your desired length (0.5 m steps)

**CF211** Chainflex® series **.001** Code Measuring system



Please use [www.chainflex.eu/en/CF211M](http://www.chainflex.eu/en/CF211M) for your online order.



Delivery time 24h or today\*

\* Delivery time means time until shipping of goods



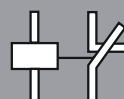
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Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	Core group	Colour code
CF211.001	(3x(2x0.14)C+ (4x0.14)+(2x0.5))C	3x(2x0.14)C	yellow/green, black/brown, red/orange
		4x0.14	gray, blue, white-yellow, white-black
		2x0.5	brown-red, brown-blue
CF211.002	(3x(2x0.14)C+ (2x0.5C))C	3x(2x0.14)C	green/yellow, black/brown, red/orange
		2x0.5C	black, red
CF211.006	(3x(2x0.14)C+ 2x0.5+4x0.14+ 4x0.23)C	3x(2x0.14)C	green/yellow, black/brown, red/orange
		4x0.14	gray, blue, white-yellow, white-black
		4x0.23	brown-yellow, brown-gray, green-black, green-red
		2x0.5	brown-red, brown-blue
CF211.009	(4x(2x0.25)+(2x0.5))C	4x(2x0.25)	brown/green, blue/violet, gray/pink, red/black
		2x0.5	white, brown
CF211.010	(4x(2x0.25)+(2x1.0))C	4x(2x0.25)	brown/green, blue/violet, gray/pink, red/black
		2x1.0	white, brown
CF211.011	(4x(2x0.34)+(4x0.5))C	4x(2x0.34)	black/brown, red/orange, yellow/green, blue/violet
		4x0.5	blue-white, black-white, red-white, yellow-white
CF211.014	(4x(2x0.25)C+ (2x0.5))C	4x(2x0.25)C	white/brown, green/yellow, gray/pink, blue/red
		2x0.5	black (numeral printing 1-2)
CF211.016	(3x(2x0.25)C)C	3x(2x0.25)C	white/brown, green/yellow, gray/pink
CF211.017	(4x(2x0.14)+ (4x1.0)+(4x0.14)C)C	(4x0.14)C	blue-black, red-black, yellow-black, green-black
		4x(2x0.14)	red/black, green/brown, yellow/violet, pink/gray
		4x1.0	white-green, brown-green, blue, white
CF211.018	(2x(2x0.25)+(2x0.5))C	2x(2x0.25)	red/black, gray/pink
		2x0.5	white, brown
CF211.019	((3x0.25)+ 3x(2x0.25)C+(2x1.0))C	3x(2x0.25)	brown/green, pink/gray, red/black
		(3x0.25)	blue, yellow, violet
		(2x1.0)	white, brown
CF211.027	(5x(2x0.14) +(2x0.5))C	5x(2x0.14)	green/brown, gray/yellow, white/violet, black/red, blue/pink
		2x0.5	white-green, white-red

Measuring system cable

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(for up to 10 cuts of the same type)


CF113.D

PUR


10 x d

# PUR Measuring system cable Chainflex® CF113.D

- for maximum load requirements
- PUR outer jacket
- shielded
- oil-resistant and coolant-resistant
- notch-resistant
- flame-retardant
- hydrolysis-resistant and microbe-resistant
- PVC-free/halogen-free



Especially bending-resistant fine-wire stranded conductor



Highly flexible braided copper shield




Center element for high tensile stresses



Cores each stranded in especially short pitch





















Gusset-filled extruded



Highly flexible braided copper shield



Pressure extruded PUR blend










	Temperature range moved	-20 °C to +80 °C, minimum bending radius 10 x d
	Temperature range fixed	-40 °C to +80 °C, minimum bending radius 5 x d
	v max. unsupported/gleitend	5 m/s, 3 m/s
	a max.	50 m/s <sup>2</sup>
	Travel distance	Freely suspended and gliding travel distances up to 100 m, Class 3
	UV-resistant	Medium
	Nominal voltage	30 V
	Testing voltage	500 V
	Oil	Oil-resistant (following DIN EN 60811-2-1, DIN EN 50363-10-2), Class 3
	Offshore	MUD-resistant following NEK 606
	Flame-retardant	According to IEC 332-1, CEI 20-35, FT1
	Halogen-free	Following EN 50267-2-1
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
	Conductor	Fine-wire stranded conductor in especially bending-resistant version consisting of bare copper wires (following EN 60228).
	Core insulation	Mechanically high-quality PP mixture.
	Core stranding	According to measuring system specification
	Core identification	According to measuring system specification ▶ Schedule Delivery Program
	Element shield	Extremely bending-resistant, tinned braided copper shield. Coverage approx. 70% linear, approx. 90% optical.

**... no minimum order quantity**  
eplan download, configurator, PDF catalogues, lifetime ...

Class 6.3.3





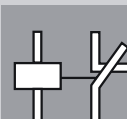
	<b>Inner jacket</b>	TPE mixture adapted to suit the requirements in Energy Chains®.
	<b>Overall shield</b>	Extremely bending-resistant, tinned braided copper shield. Coverage approx. 70% linear, approx. 90% optical.
	<b>Outer jacket</b>	Low-adhesion, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in Energy Chains® (following DIN VDE 0282 Part 10). Colour: green (similar to RAL 6018)
	<b>UL/CSA</b>	Style 1589 and 20236, 30 V, 80 °C
	<b>CEI</b>	Following CEI 20-35
	<b>CE</b>	Following 2006/95/EG
	<b>DESINA</b>	According to VDW, DESINA standardisation
	<b>Lead free</b>	Following EU guideline (RoHS) 2002/95/EC
	<b>Clean room</b>	According to ISO Class 1. Outer jacket material complies with CF27.07.05.02.01.D, tested by IPA according to standard 14644-1

## Typical application area

- for maximum load requirements
- almost unlimited resistance to oil
- indoor and outdoor applications without direct sun radiation
- especially for freely suspended and gliding travel distances up to 100 m
- Storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, clean room, semiconductor insertion, indoor cranes, low-temperature applications

Measuring system cable

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**850 types from stock no cutting costs ...**

... and order online ► [www.igus.eu/en/CF113D](http://www.igus.eu/en/CF113D)

(for up to 10 cuts of the same type)

# PUR Measuring system cable

## Chainflex® CF113.D

- for maximum load requirements
- PUR outer jacket
- shielded
- oil-resistant and coolant-resistant
- notch-resistant
- flame-retardant
- hydrolysis-resistant and microbe-resistant
- PVC-free/halogen-free

Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
CF113.001.D	(3x(2x0.14)C)+(4x0.14)+ (2x0.5)C	12.0	90	203
CF113.002.D <sup>(1)</sup>	(3x(2x0.14)C)+(2x0.5C)C	12.0	96	212
CF113.003.D <sup>(1)</sup>	(3x(2x0.14)+2x1.0)C	9.5	59	132
CF113.004.D	(4x(2x0.14)+(4x0.14)C+ 4x0.5)C	12.0	90	214
CF113.005.D <sup>(1)</sup>	(4x(2x0.14)+4x0.5)C	10.0	64	107
CF113.006.D <sup>(1)</sup>	(3x(2x0.14)C+ 2x0.5+4x0.14+ 4x0.23)C	11.5	92	180
CF113.007.D <sup>(1)</sup>	(2x(2x0.34))C	6.5	24	47
CF113.008.D <sup>(1)</sup>	(3x(2x0.25))C	8.5	33	97
CF113.009.D <sup>(1)</sup>	(4x(2x0.25)+2x0.5)C	10.0	63	142
CF113.010.D <sup>(1)</sup>	(4x(2x0.25)+2x1.0)C	10.5	75	158
CF113.011.D <sup>(1)</sup>	(4x(2x0.34)+4x0.5)C	11.0	84	176
CF113.012.D <sup>(1)</sup>	(3x(2x0.14)C+ (2x0.5+6x0.14)+ (1x(3x0.14)C)C	12.0	94	184
CF113.013.D <sup>(1)</sup>	(3x(2x0.14)C+2x0.5)C	9.0	54	122
CF113.015.D	(4x(2x0.14)+4x0.5)C	10.0	64	107
CF113.017.D <sup>(1/4)</sup>	(4x(2x0.14)+4x1.0+ (4x0.14)C)C	13.0	114	236
CF113.018.D <sup>(1/4)</sup>	(2x(2x0.25)+2x0.5)C	9.0	48	114
CF113.019.D <sup>(1/4)</sup>	(3x0.25+3x(2x0.25)C+ 2x1.0)C	11.5	108	208
CF113.021.D <sup>(1)</sup>	(6x0.5+5x2x0.25)C	13.0	102	227
CF113.022.D <sup>(1)</sup>	(5x0.5+1x2x0.25)C	9.0	49	115
CF113.025.D <sup>(1)</sup>	(3x(2x0.14)C)+(2x0.5)C)C	12.0	96	226
CF113.027.D <sup>(1)</sup>	(5x(2x0.14)+2x0.5)C	10.0	57	138
CF113.028.D	(2x(2x0.15)+(2x0.38)C	7.5	47	72

<sup>(1)</sup> Delivery time upon inquiry

<sup>(4)</sup> manufactured without inner jacket

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor



# Class 6.3.3

Price index



igus®

CF113.D

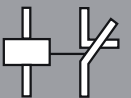
PUR

10 x d

Delivery program Part No.	Number of cores and conductor nominal cross section [mm²]	Core group	Colour code
CF113.001.D	(3x(2x0.14)C+ (4x0.14)+(2x0.5))C	3x(2x0.14)C	yellow/green, black/brown, red/orange
		4x0.14	gray, blue, white-yellow, white-black
		2x0.5	brown-red, brown-blue
CF113.002.D	(3x(2x0.14)C+ (2x0.5C))C	3x(2x0.14)C	green/yellow, black/brown, red/orange
		2x0.5C	black, red
CF113.003.D	(3x(2x0.14)+(2x1.0))C	3x(2x0.14) 2x1.0	white/brown, green/yellow, gray/pink blue, red
CF113.004.D	(4x(2x0.14)+ (4x0.14)C+(4x0.5))C	4x(2x0.14)	brown/green, violet/yellow, gray/pink, red/black
		(4x0.14)C	yellow-black, red-black, green-black, blue-black
		4x0.5	brown-green, white-green, blue, white
CF113.005.D	(4x(2x0.14)+(4x0.5))C	4x(2x0.14)	white/brown, green/yellow, gray/pink, blue/red
		4x0.5	black, violet, gray-pink, red-blue
CF113.006.D	(3x(2x0.14)C+ 2x0.5+4x0.14+ 4x0.23)C	3x(2x0.14)C	green/yellow, black/brown, red/orange
		4x0.14	gray, blue, white-yellow, white-black
		4x0.23	brown-yellow, brown-gray, green-black, green-red
		2x0.5	brown-red, brown-blue
CF113.007.D	(2x(2x0.34))C	4x0.34	white, brown, green, yellow
CF113.008.D	(3x(2x0.25))C	3x(2x0.25)	white/brown, green/yellow, gray/pink
CF113.009.D	(4x(2x0.25)+(2x0.5))C	4x(2x0.25)	brown/green, blue/violet, gray/pink, red/black
		2x0.5	white, brown
CF113.010.D	(4x(2x0.25)+(2x1.0))C	4x(2x0.25)	brown/green, blue/violet, gray/pink, red/black
		2x1.0	white, brown
CF113.011.D	(4x(2x0.34)+(4x0.5))C	4x(2x0.34)	black/brown, red/orange, yellow/green, blue/violet
		4x0.5	blue-white, black-white, red-white, yellow-white
CF113.012.D	(3x(2x0.14)C+ (2x0.5+6x0.14)+ (3x0.14)C)C	3x(2x0.14)C	green/yellow, white/gray, blue/red
		(3x0.14)C	red, green, brown
		6x0.14	blue, gray, gray, yellow, pink, violet
CF113.013.D	(3x(2x0.14)C+(2x0.5))C	2x0.5	brown-red, brown-blue
		3x(2x0.14)C	white/brown, green/yellow, gray/pink
CF113.015.D	(4x(2x0.14)+(4x0.5))C	4x(2x0.14)	red, blue
		4x0.5	brown/green, violet/yellow, gray/pink, red/black blau, white, brown-green, white-green
CF113.017.D	(4x(2x0.14)+ (4x1.0)+(4x0.14)C)C	(4x0.14)C	blue-black, red-black, yellow-black, green-black
		4x(2x0.14)	red/black, green/brown, yellow/violet, pink/gray
		4x1.0	white-green, brown-green, blue, white
CF113.018.D	(2x(2x0.25)+(2x0.5))C	2x(2x0.25)	red/black, gray/pink
		2x0.5	white, brown
CF113.019.D	((3x0.25)+ 3x(2x0.25)C+(2x1.0))C	3x(2x0.25)C	brown/green, pink/gray, red/black
		3x0.25	blue, yellow, violet
		2x1.0	white, brown
CF113.021.D	((6x0.5)+5x(2x0.25))C	(3x0.5)	black (numeral printing 1-3)
		(3x0.5)	red (numeral printing 1-3)
		5x(2x0.25)	yellow/white, gray/white, black/orange, white/brown, black/gray
CF113.022.D	((5x0.5)+(2x0.25))C	(5x0.5)	blue, green, yellow, gray, pink
		(2x0.25)	white, brown
CF113.025.D	(3x(2x0.14)C+ (2x0.5)C)C	3x(2x0.14)	green/yellow, blue/red, gray/pink
		(2x0.5)	white, brown
CF113.027.D	(5x(2x0.14)+ (2x0.5))C	5x(2x0.14)	green/brown, gray/yellow, white/violet, black/red, blue/pink
		(2x0.5)	white-green, white-red
CF113.028.D	(2x(2x0.15)+ (2x0.38))C	(2x(2x0.15))	green/yellow; pink/blue
		(2x0.38)	red, black

Measuring system cable

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CF111.D

TPE

12 x d

# TPE Measuring system cable Chainflex® CF111.D

- for medium load requirements
- TPE outer jacket
- shielded
- oil-resistant
- bio-oil-resistant
- flame-retardant
- hydrolysis-resistant and microbe-resistant



Center element for high tensile stresses



Fine-wire special conductor



Cores each stranded with short pitch



Bending-resistant braided copper shield



Pressure extruded, flame-retardant TPE blend



Temperature range moved

-35 °C to +100 °C, minimum bending radius 12 x d



Temperature range fixed

-40 °C to +100 °C, minimum bending radius 6 x d



v max. unsupported

2 m/s



a max.

30 m/s<sup>2</sup>



Travel distance

Freely suspended travel distances, Class 1



UV-resistant

Medium



Nominal voltage

30 V



Testing voltage

500 V



Oil

Oil-resistant (following DIN EN 60811-2-1), bio-oil-resistant (following VDMA 24568), Class 4



Flame-retardant

According to IEC 332-1, CEI 20-35, FT1.



Silicon-free

Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).



Conductor

Very finely stranded special cores of particularly high-flex design made of bare copper wires.



Core insulation

Mechanically high-quality PP mixture.



Core stranding

According to measuring system specification.



Core identification

According to measuring system specification

► Schedule delivery program



Element shield

Bending-resistant, tinned braided copper shield.

Coverage approx. 55% linear, approx. 80% optical.



Intermediate sheath

Foil taping over the external layer.



Overall shield

Bending-resistant, tinned braided copper shield.

Coverage approx. 55% linear, approx. 80% optical.



Outer jacket

Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in Energy Chains®.

Colour: green (similar to RAL 6018)

## ... no minimum order quantity

online plan download, configurator, PDF catalogues, lifetime ...

Class 4.1.4

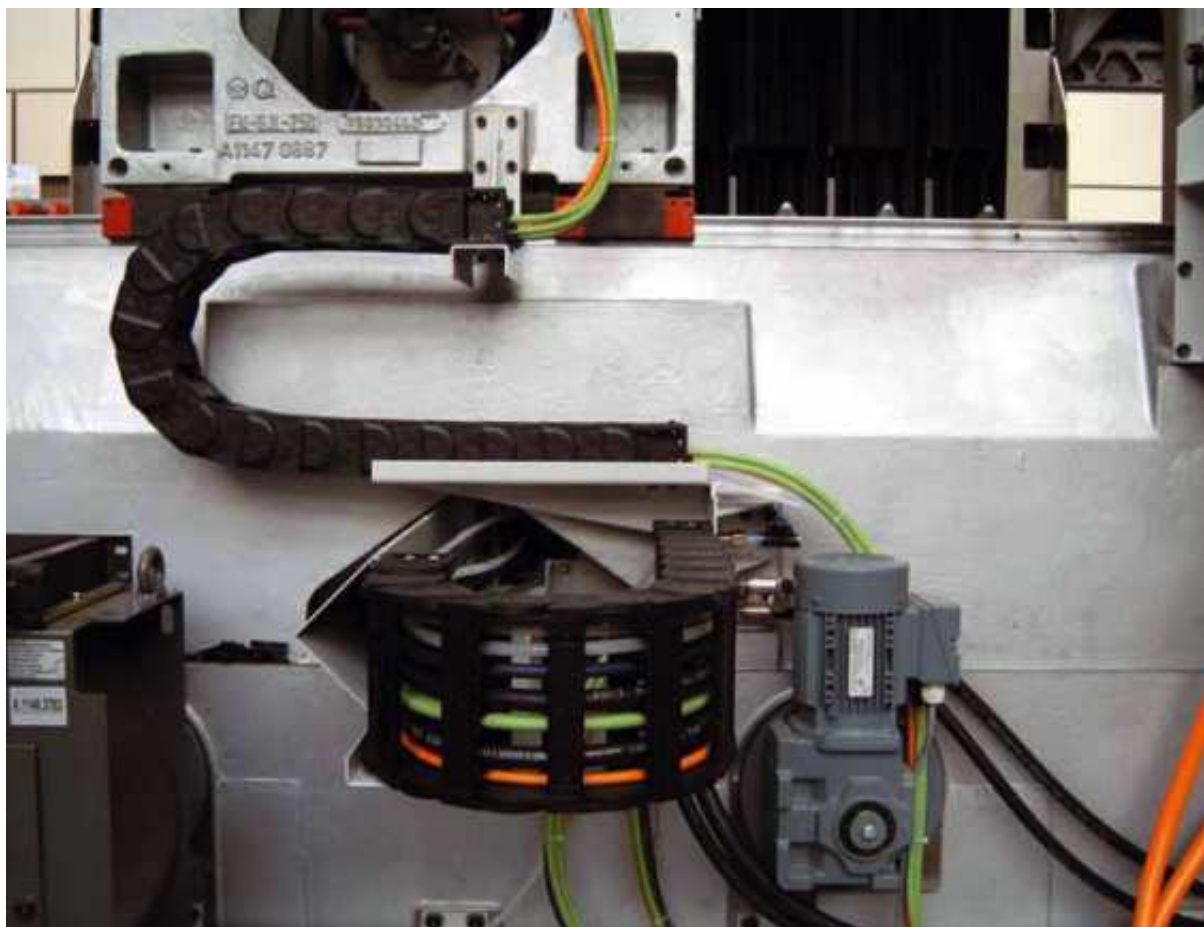




	UL/CSA	Style 1589 and 21371, 30 V, 80 °C
	CEI	Following CEI 20-35
	CE	Following 2006/95/EG
	DESINA	According to VDW, DESINA standardisation
	Lead free	Following EU guideline (RoHS) 2002/95/EC.
	Clean room	According to ISO Class 1. Outer jacket material complies with CF34.25.04, tested by IPA according to standard 14644-1

## Typical application area

- for medium load requirements
- almost unlimited resistance to oil, also with bio-oils
- indoor and outdoor applications without direct sun radiation
- especially for freely suspended travel distances
- machining units/machine tools, low temperature applications



The ReadyChain® systems from igus® are completely pre-assembled with Chainflex® cables, hoses, screw attachments, metal parts etc.

**850 types from stock no cutting costs ...**

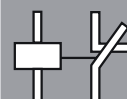
... and order online ► [www.igus.eu/en/CF111D](http://www.igus.eu/en/CF111D)

(for up to 10 cuts of the same type)

Measuring system cable

Tel. +49-2203-96 49-0

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# TPE Measuring system cable

## Chainflex® CF111.D

- for high load requirements
- TPE outer jacket
- shielded
- oil-resistant
- bio-oil-resistant
- flame-retardant
- hydrolysis-resistant and microbe-resistant

Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
CF111.001.D	(3x(2x0.14)C+ (4x0.14)+(2x0.5))C	8.5	56	87
CF111.004.D	(4x(2x0.14)+ (4x0.14)C+4x0.5)C	10.5	72	113
CF111.006.D	(3x(2x0.14)C+ 2x0.5+4x0.14+4x0.23)C	10.0	69	112
CF111.011.D	(4x(2x0.34)+4x0.5)C	9.5	69	106
CF111.015.D	(4x(2x0.14)+4x0.5)C	8.0	49	76
CF111.021.D	(6x0.5+5x2x0.25)C	10.0	79	125
CF111.022.D	(5x0.5+1x2x0.25)C	8.0	49	78
CF111.027.D <sup>(1)</sup>	(5x(2x0.14)+2x0.5)C	9.0	54	109
CF111.028.D	(2x(2x0.15)+2x0.38)C	7.5	41	64
CF111.035.D	(4x(2x0.25)C+2x(2x0.5))C	12.5	118	202

<sup>(1)</sup> Delivery time upon inquiry

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

**G** = with earthed conductor green-yellow    **x** = without earthed conductor



**Order example: CF111.021.D – in your desired length (0.5 m steps)**

**CF111.D Chainflex® series .001 Code Measuring system**



Please use [www.chainflex.eu/en/CF111D](http://www.chainflex.eu/en/CF111D) for your online order.



Delivery time 24h or today\*

\* Delivery time means time until shipping of goods



# Class 4.1.4

Price index



igus®

CF111.D

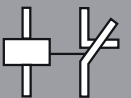
TPE

12 x d

Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	Core group	Colour code
CF111.001.D	(3x(2x0.14)C+(4x0.14)+(2x0.5))C	3x(2x0.14)C	yellow/green, black/brown, red/orange
		4x0.14	gray, blue, white-yellow, white-black
		2x0.5	brown-red, brown-blue
CF111.004.D	(4x(2x0.14)+(4x0.14)C+(4x0.5))C	4x(2x0.14)	brown/green, violet/yellow, gray/pink, red/black
		(4x0.14)C	yellow-black, red-black, green-black, blue-black
		4x0.5	brown-green, white-green, blue, white
CF111.006.D	(3x(2x0.14)C+2x0.5+4x0.14+4x0.23)C	3x(2x0.14)C	green/yellow, black/brown, red/orange
		4x0.14	gray, blue, white-yellow, white-black
		4x0.23	brown-yellow, brown-gray, green-black, green-red
		2x0.5	brown-red, brown-blue
CF111.011.D	(4x(2x0.34)+(4x0.5))C	4x(2x0.34)	black/brown, red/orange, yellow/green, blue/violet
		4x0.5	blue-white, black-white, red-white, yellow-white
CF111.015.D	(4x(2x0.14)+(4x0.5))C	4x(2x0.14)	brown/green, violet/yellow, gray/pink, red/black
		4x0.5	blue, white, brown-green, white-green
CF111.021.D	((6x0.5)+5x(2x0.25))C	(3x0.5)	black with numerals 1-3
		(3x0.5)	red with numerals 1-3
		(5x2x0.25)	yellow/white, gray/white, black/orange, white/brown, black/gray
CF111.022.D	((5x0.5)+(2x0.25))C	(5x0.5)	blue, green, yellow, gray, pink
		(2x0.25)	white, brown
CF111.027.D	(5x(2x0.14)+2x0.5)C	5x(2x0.14)	green/brown, gray/yellow, white/violet, black/red, blue/pink
		2x0.5	white-green, white-red
CF111.028.D	(2x(2x0.15)+(2x0.38))C	2x(2x0.15)	green/yellow, pink/blue
		2x0.38	red, black
CF111.035.D	(4x(2x0.25)C+2x(2x0.5))C	4x(2x0.15)C	white, brown, green, yellow, gray, pink, blue, red
		2x(2x0.5)	black (numeral printing 1-4)

Measuring system cable

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**850 types from stock no cutting costs ...**




















... and order online ► [www.igus.eu/en/CF111D](http://www.igus.eu/en/CF111D)

(for up to 10 cuts of the same type)

# TPE Measuring system cable

## Chainflex® CF11.D

- for maximum load requirements
- TPE outer jacket
- shielded
- twisted-pair
- oil- and bio-oil-resistant
- PVC-free/halogen-free
- hydrolysis-resistant and microbe-resistant

	Temperature range moved	-35 °C to +100 °C, minimum bending radius 10 x d
	Temperature range fixed	-40 °C to +100 °C, minimum bending radius 5 x d
	v max. unsupported/gliding	10 m/s, 6 m/s
	a max.	100 m/s <sup>2</sup>
	Travel distance	Freely suspended and gliding travel distances up to 400 m, Class 4
	UV-resistant	Medium
	Nominal voltage	30 V
	Testing voltage	500 V
	Oil	Oil-resistant (following DIN EN 60811-2-1), bio-oil-resistant (following VDMA 24568), Class 4
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
	Halogen-free	Following EN 50267-2-1.
	Conductor	Fine-wire stranded conductor in especially bending-resistant version consisting of bare copper wires (following EN 60228).
	Core insulation	Mechanically high-quality PP mixture.
	Core stranding	According to measuring system specification.
	Core identification	According to measuring system specification ► Schedule delivery program
	Element shield	Extremely bending-resistant, tinned braided copper shield. Coverage approx. 70% linear, approx. 90% optical.
	Inner jacket	TPE mixture adapted to suit the requirements in Energy Chains®.
	Overall shield	Extremely bending-resistant, tinned braided copper shield. Coverage approx. 70% linear, approx. 90% optical.
	Outer jacket	Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in Energy Chains®. Colour: green (similar to RAL 6018)

Especially bending-resistant fine-wire stranded conductor

Extrem Highly flexible braided copper shield

Center element for high tensile stresses

Cores each stranded in especially short pitch

Gusset-filled extruded

Highly flexible braided copper shield

Pressure extruded, halogen-free TPE blend



CE

Following 2006/95/EG



DESINA

According to VDW, DESINA standardisation



Lead free

Following EU guideline (RoHS) 2002/95/EC.

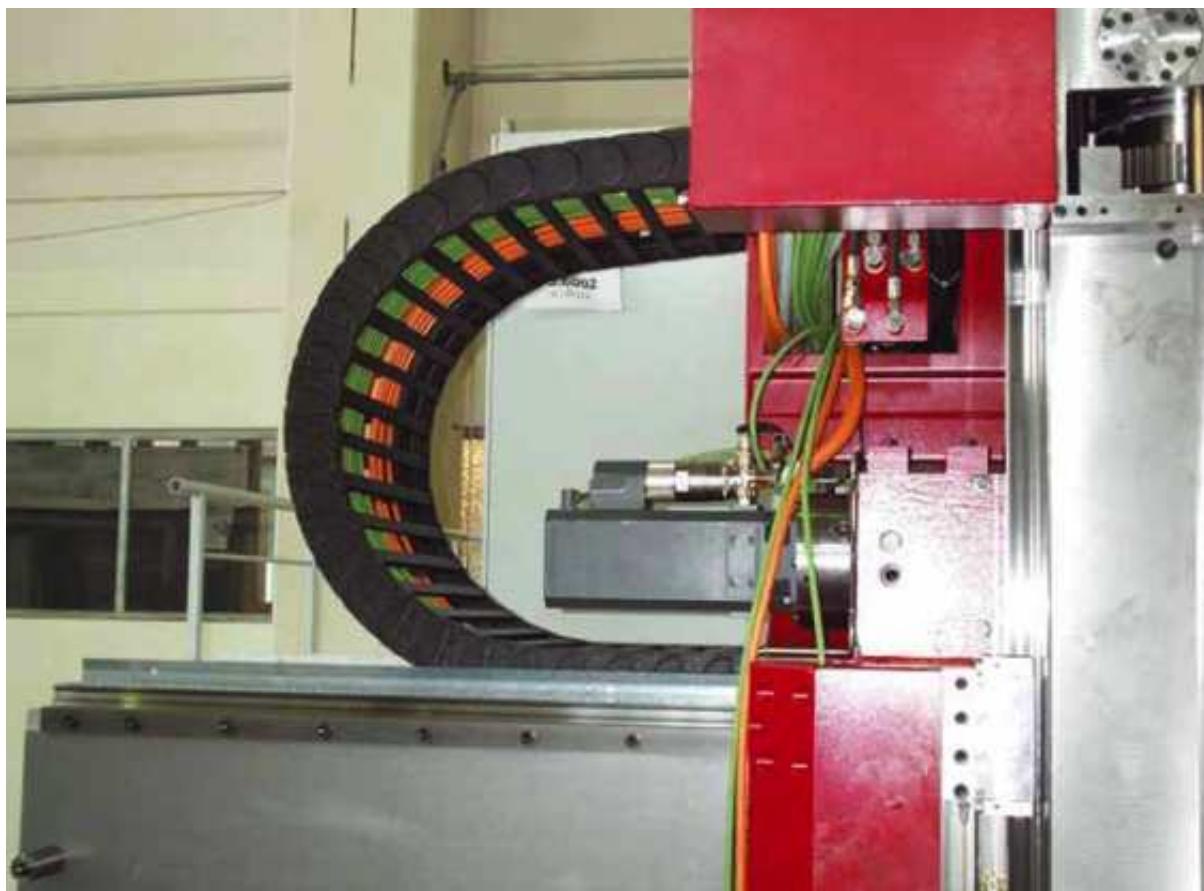


Clean room

According to ISO Class 1. Outer jacket material complies with CF34.25.04, tested by IPA according to standard 14644-1

## Typical application area

- for maximum load requirements
- almost unlimited resistance to oil, also with bio-oils
- indoor and outdoor applications without direct sun radiation
- especially for freely suspended and gliding travel distances up to 400 m
- storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, clean room, semiconductor insertion, outdoor cranes, low-temperature applications

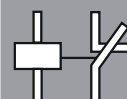


Pre-assembled igus® energy supply systems for machine tool manufacture. E-Chain®: System E4/4

Measuring system cable

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**850 types from stock no cutting costs ...**

... and order online ► [www.igus.eu/en/CF11D](http://www.igus.eu/en/CF11D)

(for up to 10 cuts of the same type)

# TPE Measuring system cable

## Chainflex® CF11.D

- for maximum load requirements
- TPE outer jacket
- shielded
- twisted-pair
- oil- and bio-oil-resistant
- PVC-free/halogen-free
- hydrolysis-resistant and microbe-resistant

Delivery program* Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
CF11.001.D	(3x(2x0.14)C+ (4x0.14)+(2x0.5))C	10.5	78	130
CF11.002.D	(3x(2x0.14)C+(2x0.5C))C	10.5	66	120
CF11.003.D	(3x(2x0.14)+2x1.0)C	8.0	50	90
CF11.004.D	(4x(2x0.14)+ (4x0.14)C+4x0.5)C	12.0	93	184
CF11.005.D	(4x(2x0.14)+4x0.5)C	9.0	64	105
CF11.006.D	(3x(2x0.14)C+ 2x0.5+4x0.14+4x0.23)C		1	125
CF11.007.D	(2x(2x0.34))C	7.5	31	70
CF11.008.D	(3x(2x0.25))C	8.5	35	85
CF11.009.D	(4x(2x0.25)+2x0.5)C	9.5	63	115
CF11.010.D	(4x(2x0.25)+2x1.0)C	9.5	75	130
CF11.011.D	(4x(2x0.34)+4x0.5)C	10.5	77	130
CF11.012.D	(3x(2x0.14)C+ (2x0.5+6x0.14)+ (1x(3x0.14)C)C	12.0	94	163
CF11.013.D	(3x(2x0.14)C+2x0.5)C	9.5	78	115
CF11.015.D	(4x(2x0.14)+4x0.5)C	9.0	64	105
CF11.017.D <sup>(4)</sup>	(4x(2x0.14)+4x1.0+ (4x0.14)C)C	9.0	85	160
CF11.018.D <sup>(4)</sup>	(2x(2x0.25)+2x0.5)C	7.0	41	57
CF11.019.D <sup>(4)</sup>	(3x0.25+3x(2x0.25)C+ 2x1.0)C	9.0	82	112
CF11.021.D	(6x0.5+5x2x0.25)C	12.5	105	171
CF11.022.D	(5x0.5+1x2x0.25)C	8.5	60	90
CF11.025.D	(3x(2x0.14)C+(2x0.5)C)C	12.5	120	170
CF11.027.D	(5x(2x0.14)+2x0.5)C	9.5	59	113

\* Previous product numbers – see reference list on page 483

<sup>(4)</sup> manufactured without inner jacket

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

**G** = with earthed conductor green-yellow    **x** = without earthed conductor



**... no minimum order quantity**  
 eplan download, configurator, PDF catalogues, lifetime ...

# Class 6.4.4

Price index



igus®

CF11.D

TPE

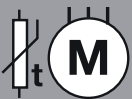
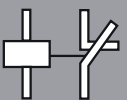
10 x d

Measuring system cable

Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	Core group	Colour code
CF11.001.D	(3x(2x0.14)C+ (4x0.14)+(2x0.5))C	3x(2x0.14)C	yellow/green, black/brown, red/orange
		4x0.14	gray, blue, white-yellow, white-black
		2x0.5	brown-red, brown-blue
CF11.002.D	(3x(2x0.14)C+ (2x0.5C))C	3x(2x0.14)C	green/yellow, black/brown, red/orange
		2x0.5C	black, red
CF11.003.D	(3x(2x0.14)+(2x1.0))C	3x(2x0.14)	white/brown, green/yellow, gray/pink
		2x1.0	blue, red
CF11.004.D	(4x(2x0.14)+ (4x0.14)C+(4x0.5))C	4x(2x0.14)	brown/green, violet/yellow, gray/pink, red/black
		(4x0.14)C	yellow-black, red-black, green-black, blue-black
		4x0.5	brown-green, white-green, blue, white
CF11.005.D	(4x(2x0.14)+(4x0.5))C	4x(2x0.14)	white/brown, green/yellow, gray/pink, blue/red
		4x0.5	black, violet, gray-pink, red-blue
CF11.006.D	(3x(2x0.14)C+ (2x0.5+2x0.14)+ (4x0.23+2x0.14))C	3x(2x0.14)C	green/yellow, black/brown, red/orange
		4x0.14	gray, blue, white-yellow, white-black
		4x0.23	brown-yellow, brown-gray, green-black, green-red
		2x0.5	brown-red, brown-blue
CF11.007.D	(2x(2x0.34))C	4x0.34	white, brown, green, yellow
CF11.008.D	(3x(2x0.25))C	3x(2x0.25)	white/brown, green/yellow, gray/pink
CF11.009.D	(4x(2x0.25)+(2x0.5))C	4x(2x0.25)	brown/green, blue/violet, gray/pink, red/black
		2x0.5	white, brown
CF11.010.D	(4x(2x0.25)+(2x1.0))C	4x(2x0.25)	brown/green, blue/violet, gray/pink, red/black
		2x1.0	white, brown
CF11.011.D	(4x(2x0.34)+(4x0.5))C	4x(2x0.34)	black/brown, red/orange, yellow/green, blue/violet
		4x0.5	blue-white, black-white, red-white, yellow-white
CF11.012.D	(3x(2x0.14)C+ (2x0.5+6x0.14)+ (3x0.14)C)C	3x(2x0.14)C	green/yellow, white/gray, blue/red
		(3x0.14)C	red, green, brown
		6x0.14	blue, gray, gray, yellow, pink, violet
CF11.013.D	(3x(2x0.14)C+(2x0.5))C	2x0.5	white/brown, green/yellow, gray/pink
		2x0.5	red, blue
CF11.015.D	(4x(2x0.14)+(4x0.5))C	4x(2x0.14)	brown/green, violet/yellow, gray/pink, red/black
		4x0.5	blue, white, brown-green, white-green
CF11.017.D	(4x(2x0.14)+ (4x1.0)+ (4x0.14)C)C	(4x0.14)C	blue-black, red-black, yellow-black, green-black
		4x(2x0.14)	red/black, green/brown, yellow/violet, pink/gray
		4x1.0	white-green, brown-green, blue, white
CF11.018.D	(2x(2x0.25)+(2x0.5))C	2x(2x0.25)	red/black, gray/pink
		2x0.5	white, brown
CF11.019.D	((3x0.25)+ 3x(2x0.25)C+2x1.0))C	3x(2x0.25)C	brown/green, pink/gray, red/black
		3x0.25	blue, yellow, violet
		2x1.0	white, brown
CF11.021.D	((6x0.5)+5x(2x0.25))C	(3x0.5)	black with numerals 1-3
		(3x0.5)	red with numerals 1-3
		(5x2x0.25)	yellow/white, gray/white, black/orange, white/brown, black/gray
CF11.022.D	((5x0.5)+ (2x0.25))C	(5x0.5)	blue, green, yellow, gray, pink
		(2x0.25)	white, brown
CF11.025.D	(3x(2x0.14)C+ (2x0.5)C)C	3x(2x0.14)	green/yellow, blue/red, gray/pink
		(2x0.5)	white, brown
CF11.027.D	(5x(2x0.14)+ 2x0.5)C	5x(2x0.14)	green/brown, gray/yellow, white/violet, black/red, blue/pink
		2x0.5	white-green, white-red

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... and order online ► [www.igus.eu/en/CF11D](http://www.igus.eu/en/CF11D)

(for up to 10 cuts of the same type)




# TPE Koax cable Chainflex® CF Koax 1

- 75 Ω koax cable for maximum load requirements
- TPE outer jacket
- oil-resistant
- bio-oil-resistant
- UV-resistant
- hydrolysis-resistant and microbe-resistant




Especially bending-resistant special conductor























Highly flexible braided copper shield



Elements stranded with short pitch, FEP special insulation



Gusset-filled extruded, halogen-free TPE mixture

	Temperature range moved	-35 °C to +100 °C, minimum bending radius 10 x d
	Temperature range fixed	-40 °C to +100 °C, minimum bending radius 7.5 x d
	v max.	10 m/s, 5 m/s
	a max.	100 m/s <sup>2</sup>
	Travel distance	Freely suspended and gliding travel distances up to 400 m, Class 4
	UV-resistant	High
	Nominal voltage	300/300 V (following DIN VDE 0245).
	Testing voltage	1500 V
	Oil	Oil-resistant (following DIN EN 60811-2-1), bio-oil-resistant (following VDMA 24568), Class 4
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
	Conductor	Multi-wire; adapted in single-wire diameter and pitch length to suit the requirements in Energy Chains®.
	Core insulation	Special FEP-isolating mixture.
	Core stranding	Cores stranded in one layer with especially short pitch length.
	Core identification	► Schedule delivery program
	Element shield	Extremely bending-resistant, tinned braided copper shield. Coverage approx. 70% linear, approx. 90% optical.
	Element jacket	TPE mixture adapted to suit the requirements in Energy Chains®.
	Outer jacket	Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in Energy Chains®. Colour: dark-blue (similar to RAL 5011)
	CE	Following 2006/95/EG
	Lead free	Following EU guideline (RoHS) 2002/95/EC.
	Clean room	According to ISO Class 1. Outer jacket material complies with CF9.15.07, tested by IPA according to standard 14644-1



**i** Info

The coax elements used in cables of the CF Koax1 series are comparable with a HF75-0.3/1.6 according to MIL-C-17/94-RG179 and thus fit in an RG179 plug!

## Typical application area

- for maximum load requirements
- almost unlimited resistance to oil, also with bio-oils
- indoor and outdoor applications, UV-resistant
- especially for freely suspended and gliding travel distances up to 400 m
- storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, clean room, semiconductor insertion, outdoor cranes, low-temperature applications

Delivery program Part No.	Number of cores	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
CFKoax 1.01	1 coaxial element	4.5	9	25
CFKoax 1.05	5 coaxial elements	10.0	47	135

Note: The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

Delivery program Part No.	Characteristic wave impedance approx. [ $\Omega$ ]	Number of cores	Colour code
CF Koax 1.01	75	1 coaxial element	black
CF Koax 1.05	75	5 coaxial elements	red, green, blue, white, black



Order example: **CFKoax1.01** – in your desired length (0.5 m steps)  
**CF Koax1** Chainflex® series .01 Number of coaxial elements

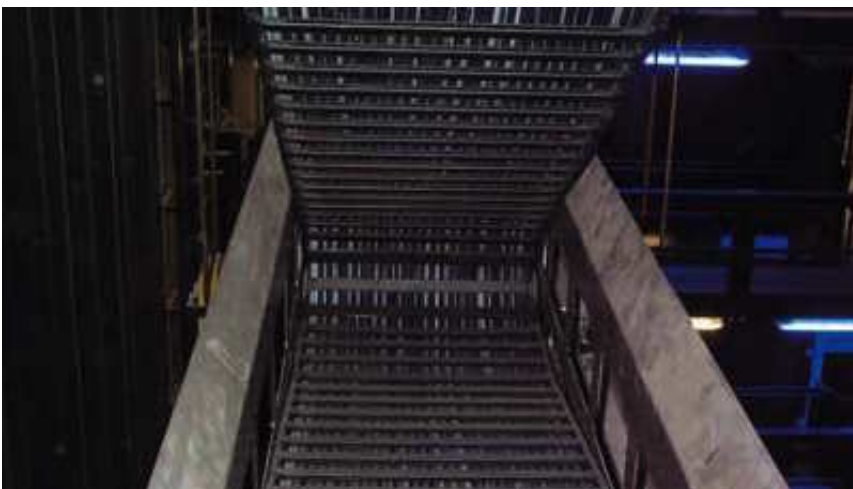


Please use [www.chainflex.eu/en/CFKOAX1](http://www.chainflex.eu/en/CFKOAX1) for your online order.



Delivery time 24h or today\*

\* Delivery time means time until shipping of goods



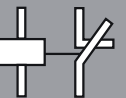
Koax cables and other Chainflex® cables in platform technology. E-Chain®: System E4/4

**850 types from stock no cutting costs ...**

... and order online ► [www.igus.eu/en/CFKOAX1](http://www.igus.eu/en/CFKOAX1) (for up to 10 cuts of the same type)

Koax cable

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# Fibre optic cables



# Chainflex® Typen



Chainflex® cable	Jacket	Shield	Minimum bending radius, moved [factor x d]	Temperature moved from/to [°C]	Approvals and standards	Oil-resistant	Torsion resistant	v max. [m/s] unsupported	v max. [m/s] gliding	a max. [m/s <sup>2</sup> ]	Page
<b>Fibre optic cables (FOC)*</b>											
CFLG.2H	PUR		12.5	-20/ +60	CE	✓		10	6	20	150
CFLK	PUR		12.5	-20/ +70	CE	✓		10	5	20	152
CFLG.2LB	TPE		5	-40/ +60	CE	✓		10	6	20	154
CFLG. G	TPE		15	-40/ +60	CE	✓		10	6	20	156

\* CFROBOT5, torsionable fibre optic cables ► Page 220

## The safest and often cheapest way to transfer data to machines and plant.

Fault-free communication between all systems in machines and plant that is becoming more and more complex all the time should be a matter of course these days.

However, many plant manufacturers or operators have major EMC problems that occur sporadically or even only years later.

These problems are often based on conventional bus cables that either have insufficient or unreliable shielding.

Alongside igus® Chainflex® bus cables that already prevent these problems to a large extent, Chainflex® glass fibre optic cables provide further advantages for even greater data safety.

Fibre optic cables (FOC) do not require a braided shielding that is susceptible to mechanical damage as EMC protection, and are insensitive to EMC on account of their very nature, since industrial conventional interference fields do not have any effect on light signals.

In addition, fibre optic cables can be used independently of the system, since a special bus cable is not required for every bus system, rather one FOC type can usually be used to operate any bus system providing the bus system manufacturer provides respective FOC converters.

The large number of fibre optic cables in industrial data transmission is also much more manageable than the large number of different field or high-speed buses which require a separate cable for each bus.

Thus the following fibre types can be used for industrial data communication, completely independently of the type of field bus used. The fibre type and number depends only on which converters are used and which fibre type the respective manufacturer prescribes. The fibres are defined on the basis of diameter and result in a clear and limited choice.

### Important fibre types:

#### ● Multi-mode fibres

50/125 µm

62,5/125 µm

The ideal fibre for large data volumes and longer transmission lengths in the field of automation. On account of the very low output attenuation (0.8-3 db/km per fibre and light wave length) of these fibre types, transmission lengths of several hundred metres can be realised quite easily.

#### ● POF (Plastic fibres)

980/1000 µm

The ideal and low-cost fibre for short transmission paths. On account of the high output attenuation of the fibre type of 160-230 dB/km, lengths over 15 mm must be avoided in permanent-motion energy chains®.

#### ● PCF (Polymer Cladded Fibre)

200/230 µm

The ideal compromise for POF fibre. This plastic-coated quartz glass fibre is a viable alternative for many terminal devices that have been designed for POF.

This means greater transmission lengths (100 m and more) are possible without the original POF terminal devices having to be replaced.

## ... no minimum order quantity

Chainflex® FOC offer the operator the following advantages:

#### 1. Greater data security thanks to

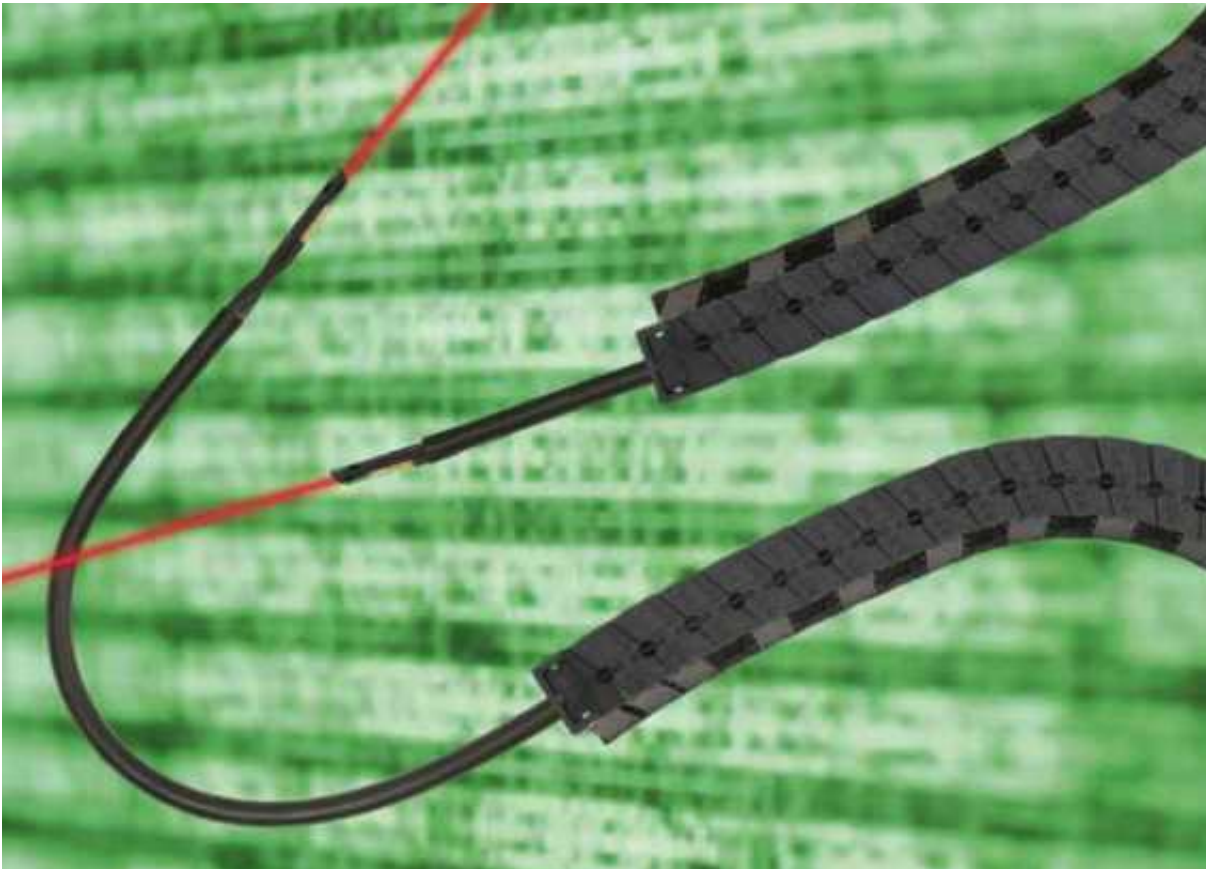
- FOC-typical better transmission characteristics
- Greater possible transmission lengths of several 100 m
- Greater possible data volumes thanks to lower attenuation values
- Maximum EMC protection for the data transmitted
- Future-proof installation (no cable replacement with new bus systems)

#### 2. Greater mechanical protection through

- The FOC designed for permanent mechanical movement
- The igus®-typical highly abrasion-proof and chemical resistant sheathing materials
- The special Chainflex® design concept (tested at 30 million cycles without a significant increase in attenuation)

#### 3. Future-oriented cost reduction through

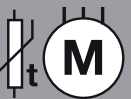
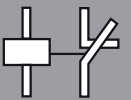
- Bus-independent bus cable wiring
- Longer service life in E-Chains®
- Extendable without transmission limits



**Test data ▶ Page 38**

**850 types from stock no cutting costs ...**  
(for up to 10 cuts of the same type)

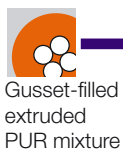
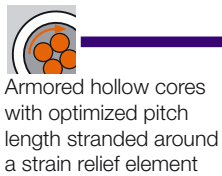
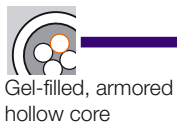
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CFLG.2H  
PUR  
12.5 x d

# PUR Fibre optic cable (FOC) Chainflex® CFLG.2H

- for high load requirements
- PUR outer jacket
- metal-free
- oil-resistant
- UV-resistant



	Temperature range moved	-20 °C to +60 °C, minimum bending radius 12.5 x d
	Temperature range fixed	-25 °C to +60 °C, minimum bending radius 7.5 x d
	v max. unsupported/gliding	10 m/s, 6 m/s
	a max.	20 m/s <sup>2</sup>
	Travel distance	Freely suspended and gliding travel distances up to 100 m, Class 3
	UV-resistant	High
	Oil	Oil-resistant (following DIN EN 60811-2-1, DIN EN 50363-10-2), Class 3
	Offshore	MUD-resistant following NEK 606
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
	Fibre optic cable	50/125 µm, 62,5/125 µm, 200/230 µm fibres in gel-filled hollow cores.
	Core stranding	Hollow cores with integrated FOC-fibres stranded with two strain relief elements.
	Core identification	Cores black with white numerals.
	Outer jacket	Low-adhesion mixture on the basis of PUR, adapted to suit the requirements in Energy Chains® (following DIN VDE 0282 Part 10). Colour: black (similar to RAL 9005)
	CE	Following 2006/95/EG
	Lead free	Following EU guideline (RoHS) 2002/95/EC.

## Typical application area

- for high load requirements
- maximum EMC protection, with high transmission qualities in terms of glass-specific requirements
- almost unlimited resistance to oil
- indoor and outdoor applications
- only for freely suspended and gliding travel distances up to 100 m
- Storage and retrieval units for high-bay warehouses, machining units/packaging machines, quick handling, cranes, refrigerating sector

... no minimum order quantity

eplan download, configurator, PDF catalogues, lifetime ...

Class 6.3.3





Delivery program Part No.	Number of fibres	Fibre diameter approx. [µm]	External diameter approx. [mm]	Weight [kg/km]
CFLG.2HG.MF.62.5/125	2	62.5 / 125	9.0	85
CFLG.2HG.MF.50/125	2	50 / 125	9.0	85
CFLG.2HS.MF.200/230	2	200 / 230	9.0	85

Note: The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

Delivery program Part No.	Bandwidth with 850 nm [MHz x km]	Attenuation with 850 nm [dB/km]	Bandwidth with 1300 nm [MHz x km]	Attenuation with 1300 nm [dB/km]	Colour code
CFLG.2HG.MF.62.5/125	160 - 200	3.2	200 - 500	0.9	black with white numbers
CFLG.2HG.MF.50/125	200 - 600	2.5 - 3.5	600 - 1200	0.7 - 1.5	black with white numbers
CFLG.2HG.MF.200/230	20	6.0	-	-	black with white numbers



Order example: **CFLG.2HG.MF.62,5/125** – in your desired length (0.5 m steps)  
**CFLG.2H** Chainflex® series **.MF** Metal-free **.62,5/125** Type of fibres



Please use [www.chainflex.eu/en/CFLG2HG](http://www.chainflex.eu/en/CFLG2HG) for your online order.



Delivery time 24h or today\*

\* Delivery time means time until shipping of goods

Fibre optic cable

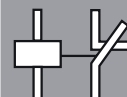
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## Test data ▶ Page 38



Metal-free fibre optic cables for fast handling applications. E-Chain®: System E2/000



**850 types from stock no cutting costs ...**

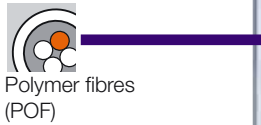
... and order online ▶ [www.igus.eu/en/CFLG2HG](http://www.igus.eu/en/CFLG2HG)

(for up to 10 cuts of the same type)



# PUR Fibre optic cable (FOC) Chainflex® CFLK

- POF fibres for high stressing capacity and interference-free transmission
- PUR outer jacket
- oil-resistant



	<b>Temperature range moved</b>	-20 °C to +70 °C, minimum bending radius 12.5 x d
	<b>Temperature range fixed</b>	-25 °C to +70 °C, minimum bending radius 7.5 x d
	<b>v max.</b>	
	<b>unsupported/gliding</b>	10 m/s, 5 m/s
	<b>a max.</b>	20 m/s <sup>2</sup>
	<b>Travel distance</b>	Freely suspended and gliding travel distances up to 15 m, Class 1
	<b>UV-resistant</b>	Medium
	<b>Oil</b>	Oil-resistant (following DIN EN 60811-2-1, DIN EN 50363-10-2), Class 3
	<b>Silicon-free</b>	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
	<b>Halogen-free</b>	Following EN 50267-2-1.
	<b>Fibre optic cable</b>	980/1000 µm fibre with PE isolation.
	<b>Core stranding</b>	POF fibre with stranded high-tensile plastic reinforcement.
	<b>Core identification</b>	Black core.
	<b>Outer jacket</b>	Low-adhesion mixture on the basis of PUR, adapted to suit the requirements in Energy Chains® (following DIN VDE 0282 Part 10). Colour: violet (similar to RAL 4001)
	<b>CE</b>	Following 2006/95/EG
	<b>Lead free</b>	Following EU guideline (RoHS) 2002/95/EC.

## Typical application area

- for high load requirements
- maximum EMC protection
- almost unlimited resistance to oil
- preferably indoor applications
- especially for freely suspended and gliding travel distances up to 15 m
- wood/stone processing, packaging industry, supply system, handling, adjusting equipment

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# Class 5.1.3

Price index



CFLK  
PUR  
12.5 x d

Delivery program Part No.	Number of fibres	Fibre diameter approx. [µm]	External diameter approx. [mm]	Weight [kg/km]
CFLK.L1.01	1	980/1000	6.0	25

Note: The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

Delivery program Part No.	Bandwidth with 650 nm [MHz x km]	Attenuation with 650 nm [dB/km]	Colour code
CFLK.L1.01	40	200	black



Order example: **CFLK.L1.01** – in your desired length (0.5 m steps)

**CFLK** Chainflex® series **.L1** Type of fibres **.01** Number of cores



Please use [www.chainflex.eu/en/CFLK](http://www.chainflex.eu/en/CFLK) for your online order.



Delivery time 24h or today\*

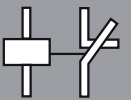
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Woodworking machines with E-Chains® and Chainflex® cables


















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(for up to 10 cuts of the same type)

# New! TPE Fibre optic cable (FOC) Chainflex® CFLG.2LB

- Gradient glass-fiber cable for heavy-duty use
- TPE outer jacket
- metal-free
- oil-resistant
- low-temperature-flexible up to -40 °C
- UV-resistant

	Temperature range moved	-40 °C to +60 °C, minimum bending radius 5 x d
	Temperature range fixed	-40 °C to +60 °C, minimum bending radius 5 x d
	v max. unsupported/gliding	10 m/s, 6 m/s
	a max.	20 m/s <sup>2</sup>
	Travel distance	Freely suspended and gliding travel distances up to 100 m and more, Class 3
	UV-resistant	High
	Oil	Oil-resistant (following DIN EN 60811-2-1), bio-oil-resistant (following VDMA 24568), Class 4.
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 192).
	Fibre optic cable	50/125 µm, 62.5/125 µm special fixed wire elements with aramide strain relief.
	Core stranding	FOC wires stranded with high-tensile aramide dampers with especially short pitch length.
	Core identification	Cores blue with white numerals.
	Overall shield	Extremely bending-resistant aramid braid for torsion protection.
	Outer jacket	Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in Energy Chains®. Colour: black (similar to RAL 9005)
	CE	following 2006/95/EG
	Lead free	Following EU guideline (RoHS) 2002/95/EG.

## Typical application area

- for maximum load requirements at 5 x d
- Maximum EMC protection, with high transmission qualities in terms of glass-specific requirements
- almost unlimited resistance to oil, also with bio-oils
- Indoor and outdoor applications
- especially for freely suspended and gliding travel distances up to 100 m and more
- Storage and retrieval units for high-bay warehouses, machining units/packages machines, quick handling, semiconductor insertion, refrigerating sector

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FOC cores with high-tensile aramide fibres

Reinforced optical fibres twisted with an optimized pitch

Aramid braid for torsion protection

Pressure extruded, halogen-free TPE blend

# Class 7.3.4

Price index



igus®

CFLG.2LB

TPE

5 x d

Delivery program Part No.	Number of fibres	Fibre diameter approx. [µm]	External diameter approx. [mm]	Weight [kg/km]	
<b>CFLG.2LB.62,5/125<sup>(1)</sup></b>	2	62.5/125	8	47	<b>New</b>
<b>CFLG.2LB.50/125</b>	2	50/125	8	47	<b>New</b>

<sup>(1)</sup> Delivery time upon inquiry.

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

Delivery program Part No.	Bandwidth with 850 nm [MHz x km]	Attenuation with 850 nm [dB/km]	Bandwidth with 1300 nm [MHz x km]	Attenuation with 1300 nm [dB/km]	Colour code
<b>CFLG.2LB.62,5/125</b>	160 - 200	3.2	200 - 500	0.9	blue with white numbers
<b>CFLG.2LB.50/125</b>	200 - 600	2.5 - 3.5	600 - 1200	0.7 - 1.5	blue with white numbers



**Order example: CFLG.2LB.50/125 – in your desired length (0.5 m steps)**  
**CFLG.2LB** Chainflex® series **.50/125** Type of fibres



Please use [www.chainflex.eu/en/CFLG2LB](http://www.chainflex.eu/en/CFLG2LB) for your online order.



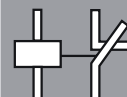
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(for up to 10 cuts of the same type)

# TPE Fibre optic cable (FOC) Chainflex® CFLG. G

- gradient glass-fibre cable for heavy-duty use
- TPE outer jacket
- halogen-free
- low-temperature-flexible up to -40 °C
- hydrolysis-resistant and microbe-resistant



	<b>Temperature range moved</b>	-40 °C to +60 °C, minimum bending radius 15 x d
	<b>Temperature range fixed</b>	-40 °C to +60 °C, minimum bending radius 8.5 x d
	<b>v max. unsupported/gliding</b>	10 m/s, 6 m/s
	<b>a max.</b>	20 m/s <sup>2</sup>
	<b>Travel distance</b>	Freely suspended and gliding travel distances up to 500 m and more, Class 4
	<b>UV-resistant</b>	High
	<b>Oil</b>	Oil-resistant (following DIN EN 60811-2-1), bio-oil-resistant (following VDMA 24568), Class 4
	<b>Silicon-free</b>	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
	<b>Halogen-free</b>	Following EN 50267-2-1.
	<b>Fibre optic cable</b>	50/125 µm, 62.5/125 µm fibres in gel-filled hollow cores.
	<b>Core stranding</b>	Stranded GRP rods with integrated torsion protection braid in the outer jacket over gel-filled fiber sheath..
	<b>Core identification</b>	► Schedule delivery program
	<b>Outer jacket</b>	Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in Energy Chains®. Colour: black (similar to RAL 9005)
	<b>CE</b>	Following 2006/95/EG
	<b>Lead free</b>	Following EU guideline (RoHS) 2002/95/EC.

## Typical application area

- for maximum load requirements
- maximum EMC protection, with high transmission qualities in terms of glass-specific requirements
- almost unlimited resistance to oil, also with bio-oils
- indoor and outdoor applications
- only for freely suspended and gliding travel distances up to 500 m and more
- outdoor ship to shore, crane applications, conveyer technology

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Delivery program Part No.	Number of fibres	Fibre diameter approx. [µm]	External diameter approx. [mm]	Weight [kg/km]
CFLG.6G.62.5/125.TC	6	62.5/125	11.5	110
CFLG.12G.62.5/125.TC	12	62.5/125	11.5	110
CFLG.6G.50/125.TC	6	50/125	11.5	110
CFLG.12G.50/125.TC	12	50/125	11.5	110

Other number of fibers upon inquiry

Note: The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

Delivery program Part No.	Bandwidth with 850 nm [MHz x km]	Attenuation with 850 nm [dB/km]	Bandwidth with 1300 nm [MHz x km]	Attenuation with 1300 nm [dB/km]	Colour code
CFLG.6G.62.5/125.T	160 - 200	3.2	200 - 500	0.9	ecru, yellow, green, red, violet, blue
CFLG.12G.62.5/125.T	160 - 200	3.2	200 - 500	0.9	ecru, yellow, green, red, violet, blue, lightblue, gray, brown, black, orange, pink
CFLG.6G.50/125.T	200 - 600	2.5 - 3.5	600 - 1200	0.7 - 1.5	ecru, yellow, green, red, violet, blue
CFLG.12G.50/125.T	200 - 600	2.5 - 3.5	600 - 1200	0.7 - 1.5	ecru, yellow, green, red, violet, blue, lightblue, gray, brown, black, orange, pink



Order example: **CFLG.6G.62,5/125.TC** – in your desired length (0.5 m steps)  
**CFLG.G** Chainflex® series **.6G** Number of cores **.62,5/125** Type of fibres **.TC** Special identification

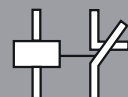


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## Test data ▶ Page 42



igus® fibre optic cables with 441 m travel. E-Chain®: System E4/4

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# Servo cables



# Chainflex® types



Chainflex® cable	Jacket	Shield	Minimum bending radius, moved [factor x d]	Temperature moved from/to [°C]	Approvals and standards	Oil-resistant	Torsion resistant	v max. [m/s] unsupported	v max. [m/s] gliding	a max. [m/s <sup>2</sup> ]	Page
Servo cables											
CF210.UL	PVC	✓	10	-5/ +70	CE RoHS Chainflex UL	✓		10		50	160
CF21.UL	PVC	✓	7,5	-5/ +70	CE RoHS Chainflex UL	✓		10	5	80	162
CF260*	PUR	✓	10	-20/ +80	CE RoHS	✓		10		50	166
CF270.UL.D	PUR	✓	10	-20/ +80	CE RoHS Chainflex UL	✓		10		50	170
CF27.D	PUR	✓	7,5	-20/ +80	CE RoHS Chainflex UL	✓		10	5	80	174

\* phase-out model, is replaced by CF210.UL (PVC) and CF270.UL.D (PUR)



CF210.UL

PVC

10 x d

# New! PVC Servo cable Chainflex® CF210.UL

- for medium load requirements
- PVC outer jacket
- shielded
- oil-resistant
- flame-retardant



Bending-resistant conductor



Extremely highly flexible braided-pair copper shield



Energy conductor with signal pair elements stranded together with elements for high tensile stresses



Bending-resistant braided copper shield



Pressure extruded, oil-resistant PVC blend



Temperature range moved

-5 °C to +70 °C, minimum bending radius 10 x d



Temperature range fixed

-20 °C to +70 °C, minimum bending radius 5 x d



v max. unsupported

10 m/s



a max.

50 m/s²



Travel distance

Freely suspended travel distances, Class 1



UV-resistant

Medium



Nominal voltage

600/1000 V (following DIN VDE 0250).



Testing voltage

4000 V (following DIN VDE 0281-2).



Oil

Oil-resistant (following DIN EN 60811-2-1, DIN EN 50363-4-1), Class 2.



Flame-retardant

According to IEC 332-1, CEI 20-35, FT1.



Silicon-free

Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 192).



Conductor

Fine-wire stranded conductor in bending-resistant version consisting of bare copper wires (following EN 60228).



Core insulation

Mechanically high-quality, especially low-capacitance PE mixture.



Core stranding

Energy conductor with signal pair elements stranded together with elements for high tensile stresses.



Core identification

**Energy conductor:** cores black with white numerals, one core green-yellow.

1. core: U / L1 / C / L+

2. core: V / L2

3. core: W / L3 / D / L-

**1 signal pair:** cores black with white numerals.

1. control core: 4

2. control core: 5

**2 signal pairs:** cores black with white numerals.

1. control core: 5

2. control core: 6

3. control core: 7

4. control core: 8

**Star-quad:** yellow, black, red, white



Element shield

Bending-resistant, tinned braided copper shield.



Intermediate jacket

Coverage approx. 55% linear, approx. 80% optical.

Foil taping over the external layer.

Class 4.1.2



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	<b>Overall shield</b>	Bending-resistant, tinned braided copper shield. Coverage approx. 55% linear, approx. 80% optical.
	<b>Outer jacket</b>	Low-adhesion, oil-resistant mixture on the basis of PVC, adapted to suit the requirements in Energy Chains® (following DIN VDE 0282 Part 10). Colour: orange (similar to RAL 2003) Style 10989 and 2570, 1000 V, 80 °C
	<b>UL</b>	
	<b>CEI</b>	Following CEI 20-35
	<b>CE</b>	Following 2006/95/EG
	<b>Lead free</b>	Following EU guideline (RoHS) 2002/95/EG
	<b>Clean room</b>	According to ISO Klasse 2. Outer jacket material complies with CF5.10.07, tested by IPA according to standard 14644-1

## Typical application area

- for medium load requirements
- light oil influence
- preferably indoor applications, but also outdoor ones at temperatures > 5 °C
- especially for freely suspended travel distances
- Wood/stone processing, packaging industry, supply system, handling, adjusting equipment

Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]	
<b>1 control pair shielded</b>					
CF210.UL.15.15.02.01 <sup>(1)</sup>	(4 G 1.5+(2x1.5)C)C	12.0	149	250	New
CF210.UL.25.15.02.01	(4 G 2.5+(2x1.5)C)C	13.5	203	320	New
CF210.UL.40.15.02.01 <sup>(1)</sup>	(4 G 4.0+(2x1.5)C)C	15.0	272	412	New
CF210.UL.60.15.02.01 <sup>(1)</sup>	(4 G 6.0+(2x1.5)C)C	16.5	364	521	New
<b>2 control pairs shielded</b>					
CF210.UL.15.07.02.02 <sup>(1)</sup>	(4 G 1.5+2x(2x0.75)C)C	13.5	169	290	New
CF210.UL.25.15.02.02 <sup>(1)</sup>	(4 G 2.5+2x(2x1.5)C)C	15.5	260	408	New
CF210.UL.40.15.02.02 <sup>(1)</sup>	(4 G 4.0+2x(2x1.5)C)C	17.0	330	506	New
CF210.UL.60.15.02.02 <sup>(1)</sup>	(4 G 6.0+2x(2x1.5)C)C	18.5	425	633	New

<sup>(1)</sup> Delivery time upon inquiry.

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with green-yellow earth core    x = without earth core



**Order example: CF210.25.15.02.01.UL – in your desired length (0.5 m steps)**

CF210.UL Chainflex® series .25 Code nominal cross section .15 Code nominal cross section signal pairs  
.02 Identification pairs .01 Number of pairs



Please use [www.chainflex.eu/en/210.UL](http://www.chainflex.eu/en/210.UL) for your online order.

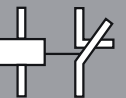


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(for up to 10 cuts of the same type)


CF21.UL  
PVC  
7.5 x d

# PVC Servo cable Chainflex® CF21.UL


- for high load requirements
- PVC outer jacket
- shielded
- oil-resistant
- flame-retardant



Highly flexible special conductor



Energy conductor with signal pair elements stranded around high-tensile center cord



Extremely highly flexible braided-pair copper shield


















Gusset-filled, pressure extruded



Highly flexible braided copper shield



Pressure extruded, oil-proof PVC sheath blend










	<b>Temperature range moved</b>	-5 °C to +70 °C, minimum bending radius 7.5 x d
	<b>Temperature range fixed</b>	-20 °C to +70 °C, minimum bending radius 4 x d
	<b>v max. unsupported/gliding</b>	10 m/s, 5 m/s
	<b>a max.</b>	80 m/s <sup>2</sup>
	<b>Travel distance</b>	Freely suspended and gliding travel distances up to 100 m, Class 3
	<b>UV-resistant</b>	Medium
	<b>Nominal voltage</b>	600/1000 V (following DIN VDE 0250).
	<b>Testing voltage</b>	4000 V (following DIN VDE 0281-2).
	<b>Oil</b>	Oil-resistant (following DIN EN 60811-2-1, DIN EN 50363-4-1), Class 2
	<b>Flame-retardant</b>	According to IEC 332-1, CEI 20-35, FT1.
	<b>Silicon-free</b>	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
	<b>Conductor</b>	Fine-wire stranded conductor in especially bending-resistant version consisting of bare copper wires (following EN 60228).
	<b>Core insulation</b>	Mechanically high-quality, especially low-capacitance TPE mixture.
	<b>Core stranding</b>	Energy conductor with signal pair elements stranded around high-tensile center cord.
	<b>Core identification</b>	<b>Energy conductor:</b> cores black with white numerals, one core green/yellow. 1. core: U / L1 / C / L+ 2. core: V / L2 3. core: W / L3 / D / L- <b>1 control pair:</b> cores black with white numerals. 1. control pair: 4      2. control pair: 5 <b>2 control pairs:</b> cores black with white numerals. 1. control pair: 5      2. control pair: 6 3. control pair: 7      4. control pair: 8

Class 5.3.2



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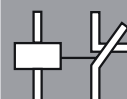
	<b>Element shield</b>	Extremely bending-resistant, tinned braided copper shield. Coverage approx. 70% linear, approx. 90% optical.
	<b>Inner jacket</b>	PVC mixture adapted to suit the requirements in Energy Chains®.
	<b>Overall shield</b>	Extremely bending-resistant, tinned braided copper shield. Coverage approx. 70% linear, approx. 90% optical.
	<b>Outer jacket</b>	Low-adhesion, oil-resistant mixture on the basis of PVC, adapted to suit the requirements in Energy Chains® (following DIN VDE 0282 Part 10). Colour: green (similar to RAL 6005)
	<b>UL/CSA</b>	Style 10492 and 2570, 1000 V, 80 °C
	<b>CEI</b>	Following CEI 20-35
	<b>CE</b>	Following 2006/95/EG
	<b>Lead free</b>	Following EU guideline (RoHS) 2002/95/EC
	<b>Clean room</b>	According to ISO Class 2. Outer jacket material complies with CF5.10.07, tested by IPA according to standard 14644-1

## Typical application area

- for high load requirements
- light oil influence
- preferably indoor applications, but also outdoor ones at temperatures > 5 °C
- especially for freely suspended and gliding travel distances up to 100 m
- storage and retrieval units for high-bay warehouses, machining units/packaging machines, quick handling, indoor cranes

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(for up to 10 cuts of the same type)

# PVC Servo cable Chainflex® CF21.UL

- for high load requirements
- PVC outer jacket
- shielded
- oil-resistant
- flame-retardant

Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
------------------------------	--	--------------------------------------	----------------------------	-------------------

#### 1 control pair shielded

CF21.07.05.02.01.UL	(4 G 0.75+(2x0.5)C)C	11.0	95	172
CF21.15.10.02.01.UL	(4 G 1.5+(2x1)C)C	12.5	125	250
CF21.15.15.02.01.UL <sup>(1)</sup>	(4 G 1.5+(2x1.5)C)C	13.0	140	280
CF21.25.10.02.01.UL	(4 G 2.5+(2x1)C)C	13.5	177	300
CF21.25.15.02.01.UL <sup>(1)</sup>	(4 G 2.5+(2x1.5)C)C	14.0	182	312
CF21.40.10.02.01.UL	(4 G 4.0+(2x1)C)C	15.5	232	372
CF21.40.15.02.01.UL	(4 G 4.0+(2x1.5)C)C	16.0	241	390
CF21.60.10.02.01.UL	(4 G 6.0+(2x1)C)C	18.0	327	495
CF21.60.15.02.01.UL <sup>(1)</sup>	(4 G 6.0+(2x1.5)C)C	18.5	357	605
CF21.100.10.02.01.UL <sup>(1)</sup>	(4 G 10.0+(2x1)C)C	22.0	530	786
CF21.100.15.02.01.UL	(4 G 10.0+(2x1.5)C)C	22.5	540	925
CF21.160.10.02.01.UL <sup>(1)</sup>	(4 G 16.0+(2x1)C)C	24.5	700	1050
CF21.160.15.02.01.UL <sup>(1)</sup>	(4 G 16.0+(2x1.5)C)C	24.5	716	1165
CF21.250.15.02.01.UL <sup>(1)</sup>	(4 G 25.0+(2x1.5)C)C	29.5	1056	1466
CF21.350.15.02.01.UL <sup>(1)</sup>	(4 G 35.0+(2x1.5)C)C	33.0	1557	2090


#### 2 control pairs shielded


CF21.07.03.02.02.UL	(4 G 0.75+2x(2x0.34)C)C	12.5	113	210
CF21.10.07.02.02.UL	(4 G 1.0+2x(2x0.75)C)C	13.5	146	266
CF21.15.07.02.02.UL	(4 G 1.5+2x(2x0.75)C)C	14.5	175	310
CF21.25.15.02.02.UL	(4 G 2.5+2x(2x1.5)C)C	17.0	265	370
CF21.40.15.02.02.UL	(4 G 4.0+2x(2x1.5)C)C	18.5	304	435
CF21.60.15.02.02.UL	(4 G 6.0+2x(2x1.5)C)C	20.5	397	697
CF21.100.15.02.02.UL	(4 G 10.0+2x(2x1.5)C)C	24.0	560	1025
CF21.160.15.02.02.UL	(4 G 16.0+2x(2x1.5)C)C	27.0	790	1270
CF21.250.15.02.02.UL	(4 G 25.0+2x(2x1.5)C)C	31.0	1140	1910
CF21.350.15.02.02.UL	(4 G 35.0+2x(2x1.5)C)C	34.0	1597	2175


<sup>(1)</sup> Delivery time upon inquiry

Note: The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor

 **Order example: CF21.15.10.02.01.UL – in your desired length (0.5 m steps)**  
**CF21.UL** Chainflex® series **.15** Code nominal cross section **.10** Code nominal cross section signalpairs  
**.02** Identification pairs **.01** Number of pairs

 Please use [www.chainflex.eu/en/CF21UL](http://www.chainflex.eu/en/CF21UL) for your online order.

 Delivery time 24h or today\*  
 \* Delivery time means time until shipping of goods

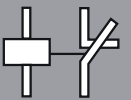
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Chainflex® CF21.UL: cables for energy supply systems in spinneret production. E-Chain®: Series E2/000

Servo cable

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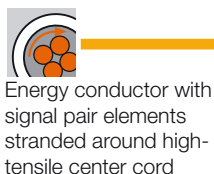
... and order online ► [www.igus.eu/en/CF21UL](http://www.igus.eu/en/CF21UL)

(for up to 10 cuts of the same type)

CF260  
PUR  
10 x d

# PUR Servo cable Chainflex® CF260

- for medium load requirements
- PUR outer jacket
- shielded
- oil-resistant
- PVC-free/halogen-free



	Temperature range moved	-20 °C to +80 °C, minimum bending radius 10 x d
	Temperature range fixed	-40 °C to +80 °C, minimum bending radius 5 x d
	v max. unsupported	10 m/s
	a max.	50 m/s <sup>2</sup>
	Travel distance	Freely suspended travel distances, Class 1
	UV-resistant	Medium
	Nominal voltage	600/1000 V (following DIN VDE 0250).
	Testing voltage	4000 V (following DIN VDE 0281-2).
	Oil	Oil-resistant (following DIN EN 60811-2-1, DIN EN 50363-10-2), Class 3
	Offshore	MUD-resistant following NEK 606
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
	Halogen-free	Following EN 50267-2-1.
	Conductor	Fine-wire stranded conductor in bending-resistant version consisting of bare copper wires (following EN 60228).
	Core insulation	Mechanically high-quality, especially low-capacitance TPE mixture.
	Core stranding	Energy conductor with signal pair elements stranded around high-tensile center cord.
	Core identification	<b>Energy conductor:</b> cores black with white numerals, one core green/yellow. 1. core: U / L1 / C / L+ 2. core: V / L2 3. core: W / L3 / D / L- <b>1 control pair:</b> cores black with white numerals. 1. control pair: 4                      2. control pair: 5 <b>2 control pairs:</b> cores black with white numerals. 1. control pair: 6                      2. control pair: 7 3. control pair: 8                      4. control pair: 8 <b>Star-quad:</b> yellow, black, red, white

Class 4.1.3



... no minimum order quantity  
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# Class 4.1.3

Price index



igus®

CF260  
PUR  
10 x d

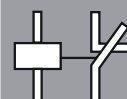
	<b>Element shield</b>	Bending-resistant, tinned braided copper shield. Coverage approx. 55% linear, approx. 80% optical.
	<b>Intermediate sheath</b>	Foil taping over the external layer.
	<b>Overall shield</b>	Bending-resistant, tinned braided copper shield. Coverage approx. 55% linear, approx. 80% optical.
	<b>Outer jacket</b>	Low-adhesion mixture on the basis of PUR, adapted to suit the requirements in Energy Chains® (following DIN VDE 0282 Part 10). Colour: orange (similar to RAL 2003)
	<b>CE</b>	Following 2006/95/EG
	<b>DESINA</b>	According to VDW, DESINA standardisation
	<b>Lead free</b>	Following EU guideline (RoHS) 2002/95/EC.

## Typical application area

- for medium load requirements
- almost unlimited resistance to oil
- indoor and outdoor applications without direct sun radiation
- especially for freely suspended travel distances
- machining units/machine tools, low temperature applications

Servo cable

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**850 types from stock no cutting costs ...**

... and order online ► [www.igus.eu/en/CF260](http://www.igus.eu/en/CF260)

(for up to 10 cuts of the same type)



# PUR Servo cable Chainflex® CF260

- for medium load requirements
- PUR outer jacket
- shielded
- oil-resistant
- PVC-free/halogen-free

Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
<b>1 control pair shielded</b>				
CF260.15.10.02.01	(4 G 1.5+(2x1.0)C)C	11.0	120	178
CF260.25.10.02.01	(4 G 2.5+(2x1.0)C)C	12.5	160	229
CF260.40.10.02.01	(4 G 4.0+(2x1.0)C)C	13.5	235	309
CF260.60.10.02.01	(4 G 6.0+(2x1.0)C)C	15.0	309	402
CF260.100.10.02.01	(4 G 10.0+(2x1.0)C)C	20.0	530	690
CF260.160.10.02.01	(4 G 16.0+(2x1.0)C)C	21.5	753	905
<b>2 control pairs shielded</b>				
CF260.10.07.02.02	(4 G 1.0+2x(2x0.75)C)C	12.0	148	295
CF260.15.07.02.02	(4 G 1.5+2x(2x0.75)C)C	12.5	155	225
<b>1 star quad shielded</b>				
CF260.25.05.04	(4 G 2.5+(4 G 0.5)C)C	13.0	181	258
CF260.60.05.04	(4 G 6.0+(4 G 0.5)C)C	16.0	344	430
<b>Without control pair</b>				
CF260.15.04	(4 G 1.5)C	8.5	76	113
CF260.25.04	(4 G 2.5)C	10.5	128	155
CF260.40.04	(4 G 4.0)C	12.0	193	231
CF260.60.04	(4 G 6.0)C	14.0	272	347
CF260.100.04	(4 G 10.0)C	17.5	441	548
CF260.160.04	(4 G 16.0)C	20.5	672	801
CF260.250.04	(4 G 25.0)C	26.0	1095	1299
CF260.350.04	(4 G 35.0)C	29.0	1447	1692

\* phase-out model, is replaced by CF210.UL(PVC) and CF270.UL.D (PUR)

Note: The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
G = with earthed conductor green-yellow    x = without earthed conductor

# Class 4.1.3

Price index



igus®

CF260  
PUR  
10 x d



Order example: **CF260.15.10.02.01** – in your desired length (0.5 m steps)  
CF260 Chainflex® series .15 Code nominal cross section .10 Code nominal cross section signalpairs  
.02 Identification pairs .01 Number of pairs



Please use [www.chainflex.eu/en/CF260](http://www.chainflex.eu/en/CF260) for your online order.



Delivery time 24h or today\*

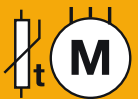
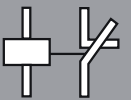
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(for up to 10 cuts of the same type)

CF270.UL.D  
PUR  
10 x d

# New! PUR Servo cable Chainflex® CF270.UL.D


- for medium load requirements
- PUR outer jacket
- shielded
- oil-resistant and coolant-resistant
- notch-resistant
- flame-retardant
- hydrolysis-resistant and microbe-resistant
- PVC-free/halogen-free



Bending-resistant conductor



Extremely highly flexible braided-pair copper shield



















Energy conductor with signal pair elements stranded together with elements for high tensile stresses



Bending-resistant braided copper shield



Pressure extruded PUR blend

	Temperature range moved	-20 °C to +80 °C, minimum bending radius 10 x d
	Temperature range fixed	-40 °C to +80 °C, minimum bending radius 5 x d
	v max. unsupported	10 m/s
	a max.	50 m/s <sup>2</sup>
	Travel distance	Freely suspended travel distances, Class 1
	UV-resistant	Medium
	Nominal voltage	600/1000 V (following DIN VDE 0250).
	Testing voltage	4000 V (following DIN VDE 0281-2).
	Oil	Oil-resistant (following DIN EN 60811-2-1, DIN EN 50363-10-2), Class 3.
	Offshore	MUD-resistant following NEK 606.
	Flame-retardant	According to IEC 332-1, CEI 20-35, FT1.
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 192).
	Halogen-free	Following EN 50267-2-1.
	Conductor	Fine-wire stranded conductor in bending-resistant version consisting of bare copper wires (following EN 60228)
	Core insulation	Mechanically high-quality, especially low-capacitance PE mixture.
	Core stranding	Energy conductor with signal pair elements stranded together with elements for high tensile stresses.

Class 4.1.3



... no minimum order quantity  
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### Core identification

**Energy conductor:** cores black with white numerals, one core green-yellow.

1. core: U / L1 / C / L+
2. core: V / L2
3. core: W / L3 / D / L-

**1 signal pair:** cores black with white numerals.

1. control core: 4
2. control core: 5

**2 signal pairs:** cores black with white numerals.

1. control core: 5
2. control core: 6
3. control core: 7
4. control core: 8



### Element shield

Bending-resistant, tinned braided copper shield.

Coverage approx. 55% linear, approx. 80% optical.



### Intermediate jacket

Foil taping over the external layer.



### Overall shield

Bending-resistant, tinned braided copper shield.

Coverage approx. 55% linear, approx. 80% optical.



### Outer jacket

Low-adhesion mixture on the basis of PUR, adapted to suit the requirements in Energy Chains® (following DIN VDE 0282 Part 10).

Colour: orange (similar to RAL 2003)

Style 10989 and 21223, 1000 V, 80 °C



### UL/CSA



### CEI

Following CEI 20-35



### CE

Following 2006/95/EG



### DESINA

According to VDW, DESINA standardisation



### Lead free

Following EU guideline (RoHS) 2002/95/EG.



### Clean room

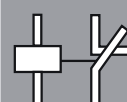
According to ISO Class 1, material/cable tested by IPA according to ISO standard 14644-1

## Typical application area

- for medium load requirements
- almost unlimited resistance to oil
- indoor and outdoor applications without direct sun radiation
- especially for freely suspended travel distances
- Machining units/machine tools, low temperature applications

Servo cable

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# New! PUR Servo cable Chainflex® CF270.UL.D

- for medium load requirements
- PUR outer jacket
- shielded
- oil-resistant and coolant-resistant
- notch-resistant
- flame-retardant
- hydrolysis-resistant and microbe-resistant
- PVC-free/halogen-free

Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]	
<b>1 control pair shielded</b>					
CF270.UL.15.15.02.01.D	(4 G 1.5+(2x1.5)C)C	12.0	149	246	New
CF270.UL.25.15.02.01.D <sup>(1)</sup>	(4 G 2.5+(2x1.5)C)C	13.5	203	317	New
CF270.UL.40.15.02.01.D <sup>(1)</sup>	(4 G 4.0+(2x1.5)C)C	15.0	272	408	New
CF270.UL.60.15.02.01.D <sup>(1)</sup>	(4 G 6.0+(2x1.5)C)C	16.5	364	521	New
CF270.UL.100.15.02.01.D <sup>(1)</sup>	(4 G 10.0+(2x1.5)C)C	20.5	582	841	New
CF270.UL.160.15.02.01.D <sup>(1)</sup>	(4 G 16.0+(2x1.5)C)C	24.0	855	1225	New
<b>2 control pairs shielded</b>					
CF270.UL.10.07.02.02.D <sup>(1)</sup>	(4 G 1.0+2x(2x0.75)C)C	13.0	143	251	New
CF270.UL.15.07.02.02.D <sup>(1)</sup>	(4 G 1.5+2x(2x0.75)C)C	13.5	169	290	New
CF270.UL.25.15.02.02.D <sup>(1)</sup>	(4 G 2.5+2x(2x1.5)C)C	15.5	260	408	New
CF270.UL.40.15.02.02.D <sup>(1)</sup>	(4 G 4.0+2x(2x1.5)C)C	17.0	330	506	New
CF270.UL.60.15.02.02.D <sup>(1)</sup>	(4 G 6.0+2x(2x1.5)C)C	18.5	425	633	New
CF270.UL.100.15.02.02.D <sup>(1)</sup>	(4 G 10.0+2x(2x1.5)C)C	22.0	632	940	New
CF270.UL.160.15.02.02.D <sup>(1)</sup>	(4 G 16.0+2x(2x1.5)C)C	26.0	901	1315	New
CF270.UL.250.15.02.02.D <sup>(1)</sup>	(4 G 25.0+2x(2x1.5)C)C	28.0	1365	1847	New
CF270.UL.350.15.02.02.D <sup>(1)</sup>	(4 G 35.0+2x(2x1.5)C)C	35.0	1804	2516	New
<b>Without signal pair</b>					
CF270.UL.15.04.D <sup>(1)</sup>	(4 G 1.5)C	9.0	82	147	New
CF270.UL.25.04.D <sup>(1)</sup>	(4 G 2.5)C	11.0	141	224	New
CF270.UL.40.04.D <sup>(1)</sup>	(4 G 4.0)C	12.5	211	309	New
CF270.UL.60.04.D <sup>(1)</sup>	(4 G 6.0)C	14.5	306	434	New
CF270.UL.100.04.D <sup>(1)</sup>	(4 G 10.0)C	18.0	496	698	New
CF270.UL.160.04.D <sup>(1)</sup>	(4 G 16.0)c	21.5	782	1052	New
CF270.UL.250.04.D <sup>(1)</sup>	(4 G 25.0)C	25.5	1197	1572	New
CF270.UL.350.04.D <sup>(1)</sup>	(4 G 35.0)C	33.0	1695	2312	New

<sup>(1)</sup> Delivery time upon inquiry.

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
G = with green-yellow earth core    x = without earth core



# Class 4.1.3

Price index



igus®

CF270.ULD

PUR

10 x d



Order example: **CF270.UL.25.15.02.01.D** – in your desired length (0.5 m steps)

**CF270.UL.D** Chainflex® series **.25** Code nominal cross section **.15** Code nominal cross section signal pairs  
**.02** Identification pairs **.01** Number of pairs



Please use [www.chainflex.eu/en/CF270ULD](http://www.chainflex.eu/en/CF270ULD) for your online order.

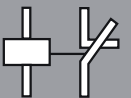


Delivery time 24h or today\*

\* Delivery time means time until shipping of goods

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CF27.D

PUR


7.5 x d

# PUR Servo cable Chainflex® CF27.D


- for maximum load requirements
- PUR outer jacket
- shielded
- oil-resistant and coolant-resistant
- notch-resistant
- flame-retardant
- hydrolysis-resistant and microbe-resistant
- PVC-free/halogen-free



Highly flexible special conductor



Energy conductor with signal pair elements stranded around high-tensile center cord



Extremely highly flexible braided-pair copper shield



















Gusset-filled extruded



Highly flexible braided copper shield



Pressure extruded, halogen-free PUR blend

	Temperature range moved	-20 °C to +80 °C, minimum bending radius 7.5 x d
	Temperature range fixed	-40 °C to +80 °C, minimum bending radius 4 x d
	v max. unsupported/gliding	10 m/s, 5 m/s
	a max.	80 m/s <sup>2</sup>
	Travel distance	Freely suspended and gliding travel distances up to 100 m, Class 3
	UV-resistant	Medium
	Nominal voltage	600/1000 V (following DIN VDE 0250).
	Testing voltage	4000 V (following DIN VDE 0281-2).
	Oil	Oil-resistant (following DIN EN 60811-2-1, DIN EN 50363-10-2), Class 3
	Offshore	MUD-resistant following NEK 606
	Flame-retardant	According to IEC 332-1, CEI 20-35, FT1.
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
	Halogen-free	Following EN 50267-2-1.
	Conductor	Fine-wire stranded conductor in especially bending-resistant version consisting of bare copper wires (following EN 60228).
	Core insulation	Mechanically high-quality, especially low-capacitance TPE mixture.
	Core stranding	Energy conductor with signal pair elements stranded around high-tensile center cord.

**... no minimum order quantity**  
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Class 6.3.3





### Core identification

**Energy conductor:** cores black with white numerals, one core green/yellow.

- 1. core: U / L1 / C / L+      2. core: V / L2
- 3. core: W / L3 / D / L-

**1 control pair:** cores black with white numerals.

- 1. control pair: 4      2. control pair: 5

**2 control pairs:** cores black with white numerals.

- 1. control pair: 5      2. control pair: 6
- 3. control pair: 7      4. control pair: 8

**Star-quad:** yellow, black, red, white



### Element shield

Extremely bending-resistant, tinned braided copper shield.  
Coverage approx. 70% linear, approx. 90% optical.



### Inner jacket

PUR mixture adapted to suit the requirements in Energy Chains®.



### Overall shield

Extremely bending-resistant, tinned braided copper shield.  
Coverage approx. 70% linear, approx. 90% optical.



### Outer jacket

Low-adhesion, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in Energy Chains® (following DIN VDE 0282 Part 10).  
Colour: orange (similar to RAL 2003)



### UL/CSA

Style 10492 and 20234, 1000 V, 80 °C



### CEI

Following CEI 20-35



### CE

Following 2006/95/EG



### DESINA

According to VDW, DESINA standardisation



### Lead free

Following EU guideline (RoHS) 2002/95/EC.



### Clean room

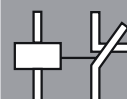
According to ISO Class 1, material/cable tested by IPA according to ISO standard 14644-1

## Typical application area

- for maximum load requirements
- almost unlimited resistance to oil
- indoor and outdoor applications, UV-resistant
- especially for freely suspended and gliding travel distances up to 100 m
- storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, clean room, semiconductor insertion, outdoor cranes, low-temperature applications

Servo cable

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(for up to 10 cuts of the same type)



# PUR Servo cable Chainflex® CF27.D

- for maximum load requirements
- PUR outer jacket
- shielded
- oil-resistant and coolant-resistant
- notch-resistant
- flame-retardant
- hydrolysis-resistant and microbe-resistant
- PVC-free/halogen-free

Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
------------------------------	--	--------------------------------------	----------------------------	-------------------

### 1 control pair shielded

CF27.07.05.02.01.D	(4 G 0.75+(2x0.5)C)C	11.5	95	171
CF27.15.10.02.01.D	(4 G 1.5+(2x1)C)C	12.5	125	220
CF27.15.15.02.01.D <sup>(1)</sup>	(4 G 1.5+(2x1.5)C)C	12.5	140	260
CF27.25.10.02.01.D	(4 G 2.5+(2x1)C)C	13.5	177	286
CF27.25.15.02.01.D <sup>(1)</sup>	(4 G 2.5+(2x1.5)C)C	14.0	182	300
CF27.40.10.02.01.D	(4 G 4.0+(2x1)C)C	16.0	232	356
CF27.40.15.02.01.D <sup>(1)</sup>	(4 G 4.0+(2x1.5)C)C	16.0	241	375
CF27.60.10.02.01.D	(4 G 6.0+(2x1)C)C	17.5	327	481
CF27.60.15.02.01.D <sup>(1)</sup>	(4 G 6.0+(2x1.5)C)C	17.5	357	580
CF27.100.10.02.01.D	(4 G 10.0+(2x1)C)C	20.5	530	740
CF27.100.15.02.01.D <sup>(1)</sup>	(4 G 10.0+(2x1.5)C)C	21.5	540	900
CF27.160.10.02.01.D	(4 G 16.0+(2x1)C)C	23.0	700	1023
CF27.160.15.02.01.D <sup>(1)</sup>	(4 G 16.0+(2x1.5)C)C	24.5	716	1150
CF27.250.15.02.01.D	(4 G 25.0+(2x1.5)C)C	28.5	1056	1435
CF27.350.15.02.01.D	(4 G 35.0+(2x1.5)C)C	32.5	1553	2079

### 2 control pairs shielded

CF27.07.03.02.02.D <sup>(1)</sup>	(4 G 0.75+2x(2x0.34)C)C	12.5	102	195
CF27.10.07.02.02.D	(4 G 1.0+2x(2x0.75)C)C	13.5	143	251
CF27.15.07.02.02.D	(4 G 1.5+2x(2x0.75)C)C	14.5	175	295
CF27.25.15.02.02.D	(4 G 2.5+2x(2x1.5)C)C	16.5	265	349
CF27.40.15.02.02.D	(4 G 4.0+2x(2x1.5)C)C	18.0	303	405
CF27.60.15.02.02.D	(4 G 6.0+2x(2x1.5)C)C	19.5	397	643
CF27.100.15.02.02.D	(4 G 10.0+2x(2x1.5)C)C	23.5	560	1000
CF27.160.15.02.02.D	(4 G 16.0+2x(2x1.5)C)C	26.0	790	1250
CF27.250.15.02.02.D	(4 G 25.0+2x(2x1.5)C)C	30.0	1140	1890
CF27.350.15.02.02.D <sup>(1)</sup>	(4 G 35.0+2x(2x1.5)C)C	33.5	1597	2150

### 1 star quad shielded

CF27.15.05.04.D <sup>(1)</sup>	(4 G 1.5+(4x0.5)C)C	14.5	142	310
CF27.25.05.04.D <sup>(1)</sup>	(4 G 2.5+(4x0.5)C)C	15.0	199	325
CF27.40.05.04.D <sup>(1)</sup>	(4 G 4.0+(4x0.5)C)C	17.0	256	480
CF27.60.05.04.D <sup>(1)</sup>	(4 G 6.0+(4x0.5)C)C	18.0	371	550

<sup>(1)</sup> Delivery time upon inquiry

Note: The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
G = with earthed conductor green-yellow    x = without earthed conductor



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# Class 6.3.3

Price index



igus®

CF27.D  
PUR  
7.5 x d

Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
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Without control pair

CF27.07.04.D <sup>(1)</sup>	(4 G 0.75)C	9.5	52	113
CF27.10.04.D <sup>(1)</sup>	(4 G 1.0)C	10.0	62	126
CF27.15.04.D	(4 G 1.5)C	10.5	86	160
CF27.25.04.D	(4 G 2.5)C	12.0	140	260
CF27.50.04.D	(4 G 50.0)C	37.5	2230	3200

<sup>(1)</sup> Delivery time upon inquiry

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor



**Order example: CF27.15.10.02.01.D – in your desired length (0.5 m steps)**

CF27 Chainflex® series .15 Code nominal cross section .10 Code nominal cross section signalpairs  
.02 Identification pairs .01 Number of pairs



Please use [www.chainflex.eu/en/CF27D](http://www.chainflex.eu/en/CF27D) for your online order.



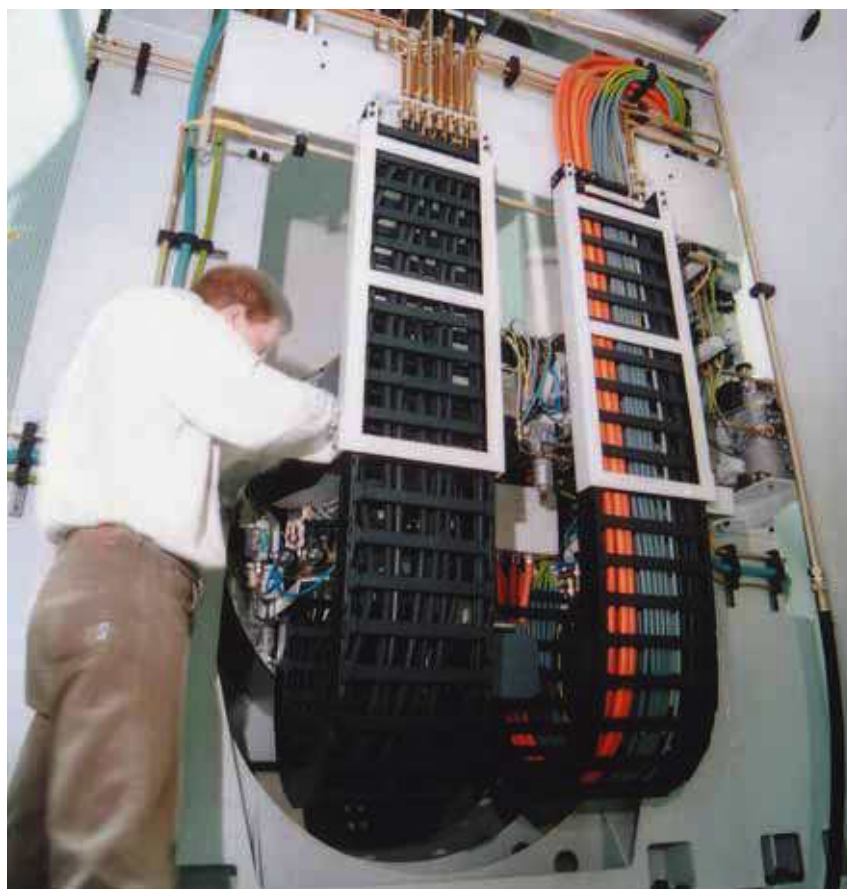
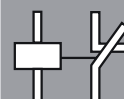
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\* Delivery time means time until shipping of goods

Servo cable

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(for up to 10 cuts of the same type)

# Power cable



# Chainflex® types





Chainflex® cable	Jacket	Shield	Minimum bending radius, moved [factor x d]	Temperature moved from/to [°C]	Approvals and standards	Oil-resistant	Torsion resistant	v max. [m/s] unsupported	v max. [m/s] gliding	a max. [m/s <sup>2</sup> ]	Page
<b>Power cables</b>											
CF30	PVC		7.5	-5/ +70	CE RoHS Chainflex UL US	✓	✓	10	5	80	180
CF31	PVC	✓	7.5	-5/ +70	CE RoHS Chainflex UL US	✓		10	5	80	182
CF34.UL.D	TPE		7.5	-35/ +90	CE RoHS Chainflex UL US	✓	✓	10	6	80	184
CF35.UL	TPE	✓	7.5	-35/ +90	CE RoHS Chainflex UL US	✓		10	6	80	186
CF37.D	TPE		7.5	-35/ +90	CE RoHS Chainflex UL US	✓	✓	10	6	80	188
CF38	TPE	✓	7.5	-35/ +90	CE RoHS Chainflex	✓		10	6	80	190
CF300.UL.D	TPE		7.5	-35/ +90	CE RoHS Chainflex UL US	✓		10	6	100	192
CFPE	TPE		7.5	-35/ +90	CE RoHS Chainflex UL US	✓		10	6	100	194
CF310.UL	TPE	✓	7.5	-35/ +90	CE RoHS Chainflex UL US	✓		10	6	100	196
CF330.D	TPE		7.5	-35/ +90	CE RoHS Chainflex UL US	✓		10	6	100	198
CF340	TPE	✓	7.5	-35/ +90	CE RoHS Chainflex	✓		10	6	100	200
CF BRAID	TPE		7.5	-35/ +70	CE RoHS Chainflex UL US	✓		10	6	80	202
CF BRAID.C	TPE	✓	7.5	-35/ +70	CE RoHS Chainflex UL US	✓		10	6	80	202
CF CRANE	igupren	✓	10	-20/ +80	CE RoHS	✓		10	6	50	204
<b>Pneumatic hoses</b>											
CF AIR	PU		10	-25/ +80	RoHS	✓		10	6	50	206
CF Clean AIR	PE		10	-25/ +60	RoHS Clean Room	✓		10	6	50	208

CF30  
PVC  
7.5 x d


















# PVC Power cable Chainflex® CF30

- for high load requirements
- PVC outer jacket
- oil-resistant
- flame-retardant

 Highly flexible special conductor

 Energy conductor stranded around high-tensile center cord

 Gusset-filled extruded, oil-resistant PVC mixture

	Temperature range moved	-5 °C to +70 °C, minimum bending radius 7.5 x d
	Temperature range fixed	-20 °C to +70 °C, minimum bending radius 4 x d
	v max. unsupported/gliding	10 m/s, 5 m/s
	a max.	80 m/s <sup>2</sup>
	Travel distance	Freely suspended and gliding travel distances up to 100 m, Class 3
	UV-resistant	Medium
	Nominal voltage	600/1000 V (following DIN VDE 0250).
	Testing voltage	4000 V (following DIN VDE 0281-2).
	Oil	Oil-resistant (following DIN EN 60811-2-1, DIN EN 50363-4-1), Class 2
	Flame-retardant	According to IEC 332-1, CEI 20-35, FT1.
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
	Conductor	< 10 mm <sup>2</sup> : Fine-wire stranded conductor in especially bending-resistant version consisting of bare copper wires (following EN 60228). ≥ 10 mm <sup>2</sup> : conductor cable consisting of pre-leads (following EN 60228).
	Core insulation	Mechanically high-quality, especially low-capacitance TPE mixture.
	Core stranding	Cores stranded in short pitch lengths over a centre for high tensile stresses.
	Core identification	<b>Energy conductor:</b> cores black with white numerals, one core green/yellow. 1. core: U / L1 / C / L+      2. core: V / L2 3. core: W / L3 / D / L-      4. core: 4 / N
	Outer jacket	Low-adhesion, oil-resistant mixture on the basis of PVC, adapted to suit the requirements in Energy Chains® (following DIN VDE 0282 Part 10). Colour: black (similar to RAL 9005)
	UL/CSA	Style 10492 and 2570, 1000 V, 80 °C

**... no minimum order quantity**  
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Class 5.3.2





CEI Following CEI 20-35



CE Following 2006/95/EG



DESINA According to VDW, DESINA standardisation



Lead free Following EU guideline (RoHS) 2002/95/EC



Clean room According to ISO Class 2. Outer jacket material complies with CF5.10.07, tested by IPA according to standard 14644-1

Power cable

## Typical application area

- for high load requirements
- light oil influence
- preferably indoor applications, but also outdoor ones at temperatures > 5 °C
- especially for freely suspended and gliding travel distances up to 100 m
- storage and retrieval units for high-bay warehouses, machining units/packaging machines, quick handling, indoor cranes

Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
CF30.15.04	4 G 1.5	8.5	55	101
CF30.25.04	4 G 2.5	10.5	95	164
CF30.25.05 <sup>(1)</sup>	5 G 2.5	11.5	119	196
CF30.40.04	4 G 4.0	12.0	152	237
CF30.40.05	5 G 4.0	13.0	191	286
CF30.60.04	4 G 6.0	14.0	235	344
CF30.60.05	5 G 6.0	15.0	293	417
CF30.100.04	4 G 10.0	17.5	391	555
CF30.100.05	5 G 10.0	19.5	489	698
CF30.160.04	4 G 16.0	20.5	610	834
CF30.160.05	5 G 16.0	23.5	763	1062
CF30.250.04	4 G 25.0	25.5	944	1345
CF30.350.04	4 G 35.0	28.5	1339	1731
CF30.500.04	4 G 50.0	34.0	1898	2596

<sup>(1)</sup> Delivery time upon inquiry

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor



**Order example: CF30.15.04 – in your desired length (0.5 m steps)**

CF30 Chainflex® series .15 Code nominal cross section .04 Number of cores

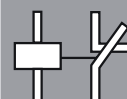


Please use [www.chainflex.eu/en/CF30](http://www.chainflex.eu/en/CF30) for your online order.



Delivery time 24h or today\*

\* Delivery time means time until shipping of goods



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(for up to 10 cuts of the same type)


CF31  
PVC  
7.5 x d

# PVC Power cable Chainflex® CF31

- for high load requirements
- PVC outer jacket
- shielded
- oil-resistant
- flame-retardant



Highly flexible special conductor



Energy conductor stranded around high-tensile center cord






















Gusset-filled extruded



Highly flexible braided copper shield



Pressure extruded, oil-proof PVC sheath blend

	Temperature range moved	-5 °C to +70 °C, minimum bending radius 7.5 x d
	Temperature range fixed	-20 °C to +70 °C, minimum bending radius 4 x d
	v max. unsupported/gliding	10 m/s, 5 m/s
	a max.	80 m/s <sup>2</sup>
	Travel distance	Freely suspended and gliding travel distances up to 100 m, Class 3
	UV-resistant	Medium
	Nominal voltage	600/1000 V (following DIN VDE 0250).
	Testing voltage	4000 V (following DIN VDE 0281-2).
	Oil	Oil-resistant (following DIN EN 60811-2-1, DIN EN 50363-4-1), Class 2
	Flame-retardant	According to IEC 332-1, CEI 20-35, FT1.
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
	Conductor	< 10 mm <sup>2</sup> : Fine-wire stranded conductor in especially bending-resistant version consisting of bare copper wires (following EN 60228). ≥ 10 mm <sup>2</sup> : conductor cable consisting of pre-leads (following EN 60228).
	Core insulation	Mechanically high-quality, especially low-capacitance TPE mixture.
	Core stranding	Cores stranded in short pitch lengths over a centre for high tensile stresses.
	Core identification	<b>Energy conductor:</b> cores black with white numerals, one core green/yellow. 1. core: U / L1 / C / L+      2. core: V / L2 3. core: W / L3 / D / L-      4. core: 4 / N
	Inner jacket	PVC mixture adapted to suit the requirements in Energy Chains®.
	Overall shield	Extremely bending-resistant, tinned braided copper shield. Coverage approx. 70% linear, approx. 90% optical.
	Outer jacket	Low-adhesion, oil-resistant mixture on the basis of PVC, adapted to suit the requirements in Energy Chains® (following DIN VDE 0282 Part 10). Colour: black (similar to RAL 9005)
	UL/CSA	Style 10492 and 2570, 1000 V, 80 °C

Class 5.3.2



IGUS CHAINFLEX® CF31

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CEI

Following CEI 20-35



CE

Following 2006/95/EG



Lead free

Following EU guideline (RoHS) 2002/95/EC



Clean room

According to ISO Class 2. Outer jacket material complies with CF5.10.07, tested by IPA according to standard 14644-1

Power cable

## Typical application area

- for high load requirements
- light oil influence
- preferably indoor applications, but also outdoor ones at temperatures > 5 °C
- especially for freely suspended and gliding travel distances up to 100 m
- storage and retrieval units for high-bay warehouses, machining units/packaging machines, quick handling, indoor cranes

Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
CF31.15.04	(4 G 1.5)C	10.5	82	168
CF31.25.04	(4 G 2.5)C	12.5	128	236
CF31.25.05	(5 G 2.5)C	13.5	156	277
CF31.40.04	(4 G 4.0)C	14.0	192	320
CF31.40.05	(5 G 4.0)C	15.0	246	390
CF31.60.04	(4 G 6.0)C	16.0	297	470
CF31.60.05	(5 G 6.0)C	18.5	358	565
CF31.100.04	(4 G 10.0)C	20.5	484	754
CF31.100.05	(5 G 10.0)C	22.0	598	903
CF31.160.04	(4 G 16.0)C	23.0	737	1046
CF31.250.04	(4 G 25.0)C	28.5	1081	1605
CF31.350.04	(4 G 35.0)C	32.0	1493	2088
CF31.500.04	(4 G 50.0)C	37.5	2081	3011
CF31.700.04 <sup>⑥</sup>	(4 G 70.0)C	47.0	2961	4650

<sup>⑥</sup> Cable with PVC core insulation, UL-Style 10579 and 2570, 600 V, 80 °C

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor



**Order example: CF31.25.04 – in your desired length (0.5 m steps)**

**CF31** Chainflex® series **.25** Code nominal cross section **.04** Number of cores

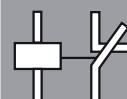


Please use [www.chainflex.eu/en/CF31](http://www.chainflex.eu/en/CF31) for your online order.



Delivery time 24h or today\*

\* Delivery time means time until shipping of goods



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(for up to 10 cuts of the same type)



CF34.UL.D



















TPE


7.5 x d


# TPE Power cable

## Chainflex® CF34.UL.D

- for maximum load requirements
- TPE outer jacket
- oil- and bio-oil-resistant
- flame-retardant
- UV-resistant
- hydrolysis-resistant and microbe-resistant

	Temperature range moved	-35 °C to +90 °C, minimum bending radius 7.5 x d
	Temperature range fixed	-40 °C to +90 °C, minimum bending radius 4 x d
	v max. unsupported/gliding	10 m/s, 6 m/s
	a max.	80 m/s <sup>2</sup>
	Travel distance	Freely suspended and gliding travel distances up to 400 m and more, Class 4
	UV-resistant	High
	Nominal voltage	600/1000 V (following DIN VDE 0250).
	Testing voltage	4000 V (following DIN VDE 0281-2).
	Oil	Oil-resistant (following DIN EN 60811-2-1), bio-oil-resistant (following VDMA 24568), Class 4
	Flame-retardant	According to IEC 332-1, CEI 20-35, FT1.
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
	Conductor	< 10 mm <sup>2</sup> : Fine-wire stranded conductor in especially bending-resistant version consisting of bare copper wires (following EN 60228). ≥ 10 mm <sup>2</sup> : conductor cable consisting of pre-leads (following EN 60228).
	Core insulation	Mechanically high-quality, especially low-capacitance TPE mixture.
	Core stranding	Cores stranded in short pitch lengths over a centre for high tensile stresses.
	Core identification	<b>Energy conductor:</b> cores black with white numerals, one core green/yellow. 1. core: U / L1 / C / L+      2. core: V / L2 3. core: W / L3 / D / L-      4. core: 4 / N
	Outer jacket	Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in Energy Chains®. Colour: black (similar to RAL 9005)
	UL/CSA	Style 10492 and 21184, 1000 V, 80 °C
	CEI	Following CEI 20-35

 Highly flexible special conductor

 Energy conductor stranded around high-tensile center cord

 Gusset-filled extruded TPE mixture

Class 6.4.4



IGUS CHAINFLEX® CF34

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CE Following 2006/95/EG



DESINA According to VDW, DESINA standardisation



Lead free Following EU guideline (RoHS) 2002/95/EC.



Clean room According to ISO Class 1, material/cable tested by IPA according to ISO standard 14644-1

Power cable

## Typical application area

- for maximum load requirements
- almost unlimited resistance to oil, also with bio-oils
- indoor and outdoor applications, UV-resistant
- especially for freely suspended and gliding travel distances up to 400 m and more
- storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, clean room, semiconductor insertion, ship to shore, outdoor cranes, low-temperature applications

Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
CF34.UL.15.04.D	4 G 1.5	8.5	55	105
CF34.UL.25.04.D	4 G 2.5	10.0	91	156
CF34.UL.40.04.D	4 G 4.0	12.0	152	234
CF34.UL.60.04.D	4 G 6.0	14.0	235	341
CF34.UL.60.05.D	5 G 6.0	15.0	283	414
CF34.UL.100.04.D	4 G 10.0	17.0	391	531
CF34.UL.100.05.D	5 G 10.0	18.5	489	655
CF34.UL.160.04.D	4 G 16.0	19.5	610	788
CF34.UL.160.05.D	5 G 16.0	23.5	763	1072
CF34.UL.250.04.D	4 G 25.0	24.5	944	1245
CF34.UL.60.04.O.PE.D	4 x 6	14.0	235	341
CF34.UL.100.04.O.PE.D	4 x 10	17.0	391	531
CF34.UL.160.04.O.PE.D	4 x 16	19.5	610	788
CF34.UL.500.03.O.PE.D	3 x 50	30.0	1423	1947

Other types available on request.

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor



Order example: **CF34.UL.160.04.D** – in your desired length (0.5 m steps)

**CF34.UL** Chainflex® series **.160** Code nominal cross section **.04** Number of cores

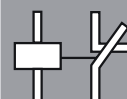


Please use [www.chainflex.eu/en/CF34](http://www.chainflex.eu/en/CF34) for your online order.



Delivery time 24h or today\*

\* Delivery time means time until shipping of goods



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... and order online ► [www.igus.eu/en/CF34](http://www.igus.eu/en/CF34)

(for up to 10 cuts of the same type)


CF35.UL  
TPE  
7.5 x d

# TPE Power cable Chainflex® CF35.UL

- for maximum load requirements
- TPE outer jacket
- shielded
- oil- and bio-oil-resistant
- flame-retardant
- UV-resistant
- hydrolysis-resistant and microbe-resistant



Highly flexible special conductor



Energy conductor stranded around high-tensile center cord






















Gusset-filled, pressure extruded TPE inner jacket



Highly flexible braided copper shield



Pressure extruded TPE blend

	Temperature range moved	-35 °C to +90 °C, minimum bending radius 7.5 x d
	Temperature range fixed	-40 °C to +90 °C, minimum bending radius 4 x d
	v max. unsupported/gliding	10 m/s, 6 m/s
	a max.	80 m/s <sup>2</sup>
	Travel distance	Freely suspended and gliding travel distances up to 400 m and more, Class 4
	UV-resistant	High
	Nominal voltage	600/1000 V (following DIN VDE 0250).
	Testing voltage	4000 V (following DIN VDE 0281-2).
	Oil	Oil-resistant (following DIN EN 60811-2-1), bio-oil-resistant (following VDMA 24568).
	Flame-retardant	According to IEC 332-1, CEI 20-35, FT1.
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
	Conductor	< 10 mm <sup>2</sup> : Fine-wire stranded conductor in especially bending-resistant version consisting of bare copper wires (following EN 60228). ≥ 10 mm <sup>2</sup> : conductor cable consisting of pre-leads (following EN 60228).
	Core insulation	Mechanically high-quality, especially low-capacitance TPE mixture.
	Core stranding	Cores stranded in short pitch lengths over a centre for high tensile stresses.
	Core identification	<b>Energy conductor:</b> cores black with white numerals, one core green/yellow. 1. core: U / L1 / C / L+      2. core: V / L2 3. core: W / L3 / D / L-      4. core: 4 / N
	Inner jacket	TPE mixture adapted to suit the requirements in Energy Chains®.
	Overall shield	Extremely bending-resistant, tinned braided copper shield. Coverage approx. 70% linear, approx. 90% optical.
	Outer jacket	Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in Energy Chains®. Colour: black (similar to RAL 9005)
	UL/CSA	Style 10492 and 21184, 1000 V, 80 °C

Class 6.4.4



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CEI

Following CEI 20-35



CE

Following 2006/95/EG



Lead free

Following EU guideline (RoHS) 2002/95/EC.



Clean room

According to ISO Class 1. Outer jacket material complies with CF34.25.04, tested by IPA according to standard 14644-1

Power cable

## Typical application area

- for maximum load requirements
- almost unlimited resistance to oil, also with bio-oils
- indoor and outdoor applications, UV-resistant
- especially for freely suspended and gliding travel distances up to 400 m and more
- storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, clean room, semiconductor insertion, ship to shore, outdoor cranes, low-temperature applications

Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
CF35.UL.05.04	(4 G 0.5)C	8.0	39	81
CF35.UL.07.04	(4 G 0.75)C	8.5	52	99
CF35.UL.15.04	(4 G 1.5)C	9.5	82	146
CF35.UL.25.04	(4 G 2.5)C	11.5	123	205
CF35.UL.40.04	(4 G 4.0)C	14.0	201	321
CF35.UL.60.04	(4 G 6.0)C	15.5	291	428
CF35.UL.100.04	(4 G 10.0)C	19.5	449	672
CF35.UL.160.04	(4 G 16.0)C	22.0	696	965
CF35.UL.250.04	(4 G 25.0)C	27.0	1082	1489
CF35.UL.60.03.O.PE <sup>(1)</sup>	(3 x 6.0)C	14.5	228	363
CF35.UL.100.03.O.PE <sup>(1)</sup>	(3 x 10.0)C	17.0	315	522
CF35.UL.160.03.O.PE	(3 x 16.0)C	20.0	536	772
CF35.UL.250.03.O.PE <sup>(1)</sup>	(3 x 25.0)C	24.5	852	1184
CF35.UL.350.03.O.PE	(3 x 35.0)C	28.5	1142	1603
CF35.UL.500.03.O.PE	(3 x 50.0)C	32.0	1593	2216

<sup>(1)</sup> Delivery time upon inquiry

Note: The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor



Order example: **CF35.UL.15.04** – in your desired length (0.5 m steps)

**CF35.UL** Chainflex® series **.15** Code nominal cross section **.04** Number of cores

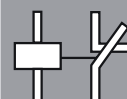


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Delivery time 24h or today\*

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(for up to 10 cuts of the same type)

CF37.D  
TPE  
7.5 x d

















# TPE power cable Chainflex® CF37.D

- for maximum load requirements
- TPE outer jacket
- oil- and bio-oil-resistant
- PVC-free/halogen-free
- UV-resistant
- hydrolysis-resistant and microbe-resistant

 Highly flexible special conductor

 Energy conductor stranded around high-tensile center cord

 Gusset-filled extruded TPE mixture

	Temperature range moved	-35 °C to +90 °C, minimum bending radius 7.5 x d
	Temperature range fixed	-40 °C to +90 °C, minimum bending radius 4 x d
	v max. unsupported/gliding	10 m/s, 6 m/s
	a max.	80 m/s <sup>2</sup>
	Travel distance	Freely suspended and gliding travel distances up to 400 m and more, Class 4
	UV-resistant	High
	Nominal voltage	600/1000 V (following DIN VDE 0250).
	Testing voltage	4000 V (following DIN VDE 0281-2).
	Oil	Oil-resistant (following DIN EN 60811-2-1), bio-oil-resistant (following VDMA 24568), Class 4
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
	Halogen-free	Following EN 50267-2-1.
	Conductor	< 10 mm <sup>2</sup> : stranded conductor in especially bending-resistant version consisting of bare copper wires (following EN 60228). ≥ 10 mm <sup>2</sup> : conductor cable consisting of pre-leads (following EN 60228).
	Core insulation	Mechanically high-quality, especially low-capacitance TPE mixture.
	Core stranding	Cores stranded in short pitch lengths over a centre for high tensile stresses.
	Core identification	<b>Energy conductor:</b> cores black with white numerals, one core green-yellow. 1. core: U / L1 / C / L+      2. core: V / L2 3. core: W / L3 / D / L-      4. core: 4 / N
	Outer jacket	Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in Energy Chains®. Colour: black (similar to RAL 9005)

Class 7.4.4

Clean-Room

DESINA

RoHS

CE

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CE Following 2006/95/EG



DESINA According to VDW, DESINA standardisation



Lead free Following EU guideline (RoHS) 2002/95/EC



Clean room According to ISO Class 1, material/cable tested by IPA according to ISO standard 14644-1

Power cable

## Typical application area

- for maximum load requirements
- almost unlimited resistance to oil, also with bio-oils
- indoor and outdoor applications, UV-resistant
- especially for freely suspended and gliding travel distances up to 400 m and more
- Storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, clean room, semiconductor insertion, ship to shore, outdoor cranes, low-temperature applications

Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
CF37.15.04.D	4 G 1.5	8.5	55	105
CF37.25.04.D	4 G 2.5	10.0	91	156
CF37.40.04.D <sup>(1)</sup>	4 G 4.0	12.0	152	234
CF37.60.04.D	4 G 6.0	14.0	235	341
CF37.60.05.D <sup>(1)</sup>	5 G 6.0	15.0	283	414
CF37.100.04.D	4 G 10.0	17.0	391	531
CF37.100.05.D <sup>(1)</sup>	5 G 10.0	18.5	489	655
CF37.160.04.D	4 G 16.0	19.5	610	788
CF37.160.05.D <sup>(1)</sup>	5 G 16.0	23.5	763	1072
CF37.250.04 .D	4 G 25.0	24.5	944	1245
CF37.60.04.O.PE.D <sup>(1)</sup>	4 x 6	14.0	235	341
CF37.100.04.O.PE.D <sup>(1)</sup>	4 x 10	17.0	391	531
CF37.160.04.O.PE.D <sup>(1)</sup>	4 x 16	19.5	610	788
CF37.500.03.O.PE.D	3 x 50	30.0	1423	1947

<sup>(1)</sup> Delivery time upon inquiry  
Other types available on request.

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
G = with earthed conductor green-yellow    x = without earthed conductor



**Order example: CF37.250.04.D – in your desired length (0.5 m steps)**

**CF37.D** Chainflex® series **.250** Code nominal cross section **.04** Number of cores

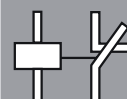


Please use [www.chainflex.eu/en/CF37](http://www.chainflex.eu/en/CF37) for your online order.



Delivery time 24h or today\*

\* Delivery time means time until shipping of goods



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

















... and order online ► [www.igus.eu/en/CF37](http://www.igus.eu/en/CF37)

(for up to 10 cuts of the same type)

CF38  
TPE  
7.5 x d

# TPE power cable Chainflex® CF38

- for maximum load requirements
- TPE outer jacket
- shielded
- oil- and bio-oil-resistant
- **PVC-free/halogen-free**
- UV-resistant
- hydrolysis-resistant and microbe-resistant

	Temperature range moved	-35 °C to +90 °C, minimum bending radius 7.5 x d
	Temperature range fixed	-40 °C to +90 °C, minimum bending radius 4 x d
	v max. unsupported/gliding	10 m/s, 6 m/s
	a max.	80 m/s <sup>2</sup>
	Travel distance	Freely suspended and gliding travel distances up to 400 m and more, Class 4
	UV-resistant	High
	Nominal voltage	600/1000 V (following DIN VDE 0250).
	Testing voltage	4000 V (following DIN VDE 0281-2).
	Oil	Oil-resistant (following DIN EN 60811-2-1), bio-oil-resistant (following VDMA 24568), Class 4
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
	Halogen-free	Following EN 50267-2-1.
	Conductor	< 10 mm <sup>2</sup> : stranded conductor in especially bending-resistant version consisting of bare copper wires (following EN 60228). ≥ 10 mm <sup>2</sup> : conductor cable consisting of pre-leads (following EN 60228).
	Core insulation	Mechanically high-quality, especially low-capacitance TPE mixture.
	Core stranding	Cores stranded in short pitch lengths over a centre for high tensile stresses.
	Core identification	<b>Energy conductor:</b> cores black with white numerals, one core green-yellow. 1. core: U / L1 / C / L+      2. core: V / L2 3. core: W / L3 / D / L-      4. core: 4 / N
	Inner jacket	TPE mixture adapted to suit the requirements in Energy Chains®.
	Overall shield	Extremely bending-resistant, tinned braided copper shield. Coverage approx. 70% linear, approx. 90% optical.
	Outer jacket	Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in Energy Chains®. Colour: black (similar to RAL 9005)

Highly flexible special conductor

Energy conductor stranded around high-tensile center cord

Gusset-filled pressure extruded TPE inner jacket

Highly flexible braided copper shield

Pressure extruded TPE blend

Class 7.4.4



**... no minimum order quantity**  
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CE Following 2006/95/EG



Lead free Following EU guideline (RoHS) 2002/95/EC



Clean room According to ISO Class 1. Outer jacket material complies with CF34.25.04, tested by IPA according to standard 14644-1

## Typical application area

- for maximum load requirements
- almost unlimited resistance to oil, also with bio-oils
- indoor and outdoor applications, UV-resistant
- especially for freely suspended and gliding travel distances up to 400 m and more
- Storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, clean room, semiconductor insertion, ship to shore, outdoor cranes, low-temperature applications

Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
CF38.05.04 <sup>(1)</sup>	(4 G 0.5)C	8.0	39	81
CF38.07.04 <sup>(1)</sup>	(4 G 0.75)C	8.5	52	99
CF38.15.04	(4 G 1.5)C	9.5	82	146
CF38.25.04 <sup>(1)</sup>	(4 G 2.5)C	11.0	123	205
CF38.40.04	(4 G 4.0)C	14.0	201	321
CF38.60.04 <sup>(1)</sup>	(4 G 6.0)C	15.5	291	428
CF38.100.04	(4 G 10.0)C	19.5	449	672
CF38.160.04	(4 G 16.0)C	22.0	696	965
CF38.250.04	(4 G 25.0)C	27.0	1082	1489
CF38.60.03.O.PE <sup>(1)</sup>	(3 x 6.0)C	14.5	228	363
CF38.100.03.O.PE <sup>(1)</sup>	(3 x 10.0)C	17.0	315	522
CF38.160.03.O.PE <sup>(1)</sup>	(3 x 16.0)C	20.0	536	772
CF38.250.03.O.PE <sup>(1)</sup>	(3 x 25.0)C	24.5	852	1184
CF38.350.03.O.PE <sup>(1)</sup>	(3 x 35.0)C	28.5	1142	1603
CF38.500.03.O.PE <sup>(1)</sup>	(3 x 50.0)C	32.0	1593	2216

<sup>(1)</sup> Delivery time upon inquiry

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow X = without earthed conductor



**Order example: CF38.25.04 – in your desired length (0.5 m steps)**

CF38 Chainflex® series .25 Code nominal cross section .04 Number of cores



Please use [www.chainflex.eu/en/CF38](http://www.chainflex.eu/en/CF38) for your online order.

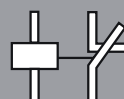


Delivery time 24h or today\*

\* Delivery time means time until shipping of goods

Power cable

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Fax +49-2203-96 49-222



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(for up to 10 cuts of the same type)



CF300.UL.D

TPE

7.5 x d

# TPE Power cable

## Chainflex® CF300.UL.D

- for maximum load requirements
- TPE outer jacket
- oil- and bio-oil-resistant
- flame-retardant
- UV-resistant
- hydrolysis-resistant and microbe-resistant



Highly flexible  
special conductor



Pressure extruded  
TPE blend



Pressure  
extruded  
TPE blend



Temperature range  
moved

-35 °C to +90 °C, minimum bending radius 7.5 x d



Temperature range  
fixed

-40 °C to +90 °C, minimum bending radius 4 x d



v max.

unsupported/gliding

10 m/s, 6 m/s



a max.

100 m/s<sup>2</sup>



Travel distance

Freely suspended and gliding travel distances up to 400 m and more, Class 4



UV-resistant

High



Nominal voltage

600/1000 V (following DIN VDE 0250).



Testing voltage

4000 V (following DIN VDE 0281-2).



Oil

Oil-resistant (following DIN EN 60811-2-1), bio-oil-resistant (following VDMA 24568), Class 4



Flame-retardant

According to IEC 332-1, CEI 20-35, FT1.



Silicon-free

Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).



Conductor

Conductor cable consisting of pre-leads (following EN 60228).



Core insulation

Mechanically high-quality TPE mixture.



Outer jacket

Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in Energy Chains®.

Colour: black (similar to RAL 9005)



CE

Following 2006/95/EG



UL/CSA

Style 10492 and 21184, 1000 V, 80 °C



CEI

Following CEI 20-35



Lead free

Following EU guideline (RoHS) 2002/95/EC.



Clean room

According to ISO Class 1. Outer jacket material complies with CF34.25.04, tested by IPA according to standard 14644-1

Class 6.4.4



IGUS CHAINFLEX® CF300.UL

... no minimum order quantity  
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## Typical application area

- for maximum load requirements
- almost unlimited resistance to oil, also with bio-oils
- indoor and outdoor applications, UV-resistant
- especially for freely suspended and gliding travel distances up to 400 m and more
- storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, clean room, semiconductor insertion, ship to shore, outdoor cranes, low-temperature applications

Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
CF300.UL.60.01.D	1x6.0	7.0	56	77
CF300.UL.100.01.D	1x10.0	8.0	96	119
CF300.UL.160.01.D	1x16.0	9.5	151	183
CF300.UL.250.01.D	1x25.0	11.5	239	281
CF300.UL.350.01.D	1x35.0	12.5	333	377
CF300.UL.500.01.D	1x50.0	14.5	479	525
CF300.UL.700.01.D	1x70.0	16.0	623	676
CF300.UL.950.01.D	1x95.0	19.0	848	927
CF300.UL.1200.01.D	1x120.0	21.5	1059	1145
CF300.UL.1500.01.D	1x150.0	23.0	1318	1411
CF300.UL.1850.01.D	1x185.0	27.0	1890	2014

Note: The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
 G = with earthed conductor green-yellow    x = without earthed conductor



Order example: **CF300.UL.950.01.D** – in your desired length (0.5 m steps)

**CF300.UL.D** Chainflex® series **.950** Code nominal cross section **.01** Number of cores



Please use [www.chainflex.eu/en/CF300](http://www.chainflex.eu/en/CF300) for your online order.



Delivery time 24h or today\*

\* Delivery time means time until shipping of goods

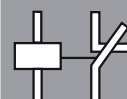


STS cranes in Antwerp with igus® Energy Chain Systems® for energy and data supplies to centenary and main trolley.

Power cable

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**850 types from stock no cutting costs ...**

... and order online ► [www.igus.eu/en/CF300](http://www.igus.eu/en/CF300)

(for up to 10 cuts of the same type)

CFPE  
TPE  
7.5 x d

# TPE Power cable Chainflex® CFPE

- for maximum load requirements
- TPE outer jacket
- oil- and bio-oil-resistant
- flame-retardant
- UV-resistant
- hydrolysis-resistant and microbe-resistant























Highly flexible  
special conductor



Pressure extruded  
TPE blend



Pressure  
extruded,  
flame-retard  
TPE blend

	Temperature range moved	-35 °C to +90 °C, minimum bending radius 7.5 x d
	Temperature range fixed	-40 °C to +90 °C, minimum bending radius 4 x d
	v max. unsupported/gliding	10 m/s, 6 m/s
	a max.	100 m/s <sup>2</sup>
	Travel distance	Freely suspended and gliding travel distances up to 400 m and more, Class 4
	UV-resistant	High
	Nominal voltage	600/1000 V (following DIN VDE 0250).
	Testing voltage	4000 V (following DIN VDE 0281-2).
	Oil	Oil-resistant (following DIN EN 60811-2-1), bio-oil-resistant (following VDMA 24568), Class 4
	Flame-retardant	According to IEC 332-1, CEI 20-35, FT1.
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
	Conductor	Conductor cable consisting of pre-leads (following EN 60228).
	Core insulation	Mechanically high-quality TPE mixture.
	Core identification	green-yellow
	Outer jacket	Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in Energy Chains®. Colour: black (similar to RAL 9005)
	UL/CSA	Style 10492 and 21184, 1000 V, 80 °C
	CEI	Following CEI 20-35
	CE	Following 2006/95/EG
	Lead free	Following EU guideline (RoHS) 2002/95/EC.
	Clean room	According to ISO Class 1. Outer jacket material complies with CF34.25.04, tested by IPA according to standard 14644-1

Class 6.4.4



IGUS CHAINFLEX® CFPE

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## Typical application area

- for maximum load requirements
- almost unlimited resistance to oil, also with bio-oils
- indoor and outdoor applications, UV-resistant
- especially for freely suspended and gliding travel distances up to 400 m and more
- storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, clean room, semiconductor insertion, ship to shore, outdoor cranes, low-temperature applications

Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
CFPE.15.01	1 G 1.5	5.0	15	35
CFPE.25.01	1 G 2.5	5.5	25	46
CFPE.40.01	1 G 4.0	6.0	38	61
CFPE.60.01	1 G 6.0	7.5	56	81
CFPE.100.01	1 G 10.0	8.0	96	123
CFPE.160.01	1 G 16.0	9.5	151	191
CFPE.250.01	1 G 25.0	11.5	239	291
CFPE.350.01	1 G 35.0	13.0	333	387

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
G = with earthed conductor green-yellow X = without earthed conductor



**Order example: CFPE.15.01 – in your desired length (0.5 m steps)**  
CFPE Chainflex® series .15 Code nominal cross section .01 Number of cores



Please use [www.chainflex.eu/en/CFPE](http://www.chainflex.eu/en/CFPE) for your online order.



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\* Delivery time means time until shipping of goods

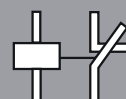


Chainflex® CFPE for machining units. E-Chain®: Series E2 medium

**850 types from stock no cutting costs ...**  
... and order online ► [www.igus.eu/en/CFPE](http://www.igus.eu/en/CFPE) (for up to 10 cuts of the same type)

Power cable

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CF310.UL

TPE

7.5 x d

# TPE Power cable Chainflex® CF310.UL

- for maximum load requirements
- TPE outer jacket
- shielded
- oil- and bio-oil-resistant
- flame-retardant
- UV-resistant
- hydrolysis-resistant and microbe-resistant



Highly flexible special conductor



Pressure extruded TPE blend



Highly flexible braided copper shield



Pressure extruded TPE blend



Temperature range moved

-35 °C to +90 °C, minimum bending radius 7.5 x d



Temperature range fixed

-40 °C to +90 °C, minimum bending radius 4 x d



v max.

unsupported/gliding 10 m/s, 6 m/s



a max.

100 m/s<sup>2</sup>



Travel distance

Freely suspended and gliding travel distances up to 400 m and more, Class 4



UV-resistant

High



Nominal voltage

600/1000 V (following DIN VDE 0250).



Testing voltage

4000 V (following DIN VDE 0281-2).



Oil

Oil-resistant (following DIN EN 60811-2-1), bio-oil-resistant (following VDMA 24568), Class 4



Flame-retardant

According to IEC 332-1, CEI 20-35, FT1.



Silicon-free

Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).



Conductor

Conductor cable consisting of pre-leads (following EN 60228).



Core insulation

Mechanically high-quality TPE mixture.



Overall shield

Extremely bending-resistant, tinned braided copper shield. Coverage approx. 70% linear, approx. 90% optical.



Outer jacket

Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in Energy Chains®.

Colour: black (similar to RAL 9005)



UL/CSA

Style 10492 and 21184, 1000 V, 80 °C



CEI

Following CEI 20-35



CE

Following 2006/95/EG



Lead free

Following EU guideline (RoHS) 2002/95/EC.

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Class 6.4.4



IGUS CHAINFLEX® CF310.UL



Clean room

According to ISO Class 1. Outer jacket material complies with CF34.25.04, tested by IPA according to standard 14644-1

## Typical application area

- for maximum load requirements
- almost unlimited resistance to oil, also with bio-oils
- indoor and outdoor applications, UV-resistant
- especially for freely suspended and gliding travel distances up to 400 m and more
- storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, clean room, semiconductor insertion, ship to shore, outdoor cranes, low-temperature applications

### Delivery program

Part No.

Number of cores and conductor nominal cross section [mm<sup>2</sup>]

External diameter approx. [mm]

Copper index [kg/km]

Weight [kg/km]

Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
CF310.UL.40.01	(1x4.0)C	6.5	55	74
CF310.UL.60.01	(1x6.0)C	7.5	75	97
CF310.UL.100.01	(1x10.0)C	8.5	120	144
CF310.UL.160.01	(1x16.0)C	10.0	178	210
CF310.UL.250.01	(1x25.0)C	11.5	272	314
CF310.UL.350.01	(1x35.0)C	13.5	380	423
CF310.UL.500.01	(1x50.0)C	15.0	524	568
CF310.UL.700.01	(1x70.0)C	17.5	689	748
CF310.UL.950.01	(1x95.0)C	20.5	920	997
CF310.UL.1200.01	(1x120.0)C	22.0	1140	1233
CF310.UL.1500.01	(1x150.0)C	24.0	1436	1549
CF310.UL.1850.01	(1x185.0)C	28.0	2020	2147

Note: The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor



Order example: **CF310.UL.40.01** – in your desired length (0.5 m steps)

**CF310.UL** Chainflex® series **.40** Code nominal cross section **.01** Number of cores



Please use [www.chainflex.eu/en/CF310](http://www.chainflex.eu/en/CF310) for your online order.



Delivery time 24h or today\*

\* Delivery time means time until shipping of goods

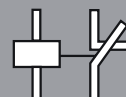


Chainflex® CF310.UL for outdoor crane systems. E-Chain®: Series E4/00

Power cable

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(for up to 10 cuts of the same type)

CF330.D

TPE

7.5 x d

# TPE power cable

## Chainflex® CF330.D

- for maximum load requirements
- TPE outer jacket
- oil- and bio-oil-resistant
- **PVC-free/halogen-free**
- UV-resistant
- hydrolysis-resistant and microbe-resistant



Highly flexible  
special conductor



Pressure extruded  
TPE blend



Pressure extruded  
TPE blend

	Temperature range moved	-35 °C to +90 °C, minimum bending radius 7.5 x d
	Temperature range fixed	-40 °C to +90 °C, minimum bending radius 4 x d
	v max. unsupported/gliding	10 m/s, 6 m/s
	a max.	100 m/s <sup>2</sup>
	Travel distance	Freely suspended and gliding travel distances up to 400 m and more, Class 4
	UV-resistant	High
	Nominal voltage	600/1000 V (following DIN VDE 0250).
	Testing voltage	4000 V (following DIN VDE 0281-2).
	Oil	Oil-resistant (following DIN EN 60811-2-1), bio-oil-resistant (following VDMA 24568), Class 4
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
	Halogen-free	Following EN 50267-2-1.
	Conductor	Conductor cable consisting of pre-leads (following EN 60228).
	Core insulation	Mechanically high-quality TPE mixture.
	Outer jacket	Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in Energy Chains®. Colour: black (similar to RAL 9005)
	CE	Following 2006/95/EG
	DESINA	According to VDW, DESINA standardisation
	Lead free	Following EU guideline (RoHS) 2002/95/EC.
	Clean room	According to ISO Class 1. Outer jacket material complies with CF34.25.04, tested by IPA according to standard 14644-1

Class 7.4.4



**... no minimum order quantity**  
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## Typical application area

- for maximum load requirements
- almost unlimited resistance to oil, also with bio-oils
- indoor and outdoor applications, UV-resistant
- especially for freely suspended and gliding travel distances up to 400 m and more
- Storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, clean room, semiconductor insertion, ship to shore, outdoor cranes, low-temperature applications

Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
CF330.60.01.D	1x6.0	7.0	56	77
CF330.100.01.D	1x10.0	8.0	96	119
CF330.160.01.D	1x16.0	9.5	151	183
CF330.250.01.D <sup>(1)</sup>	1x25.0	11.5	239	281
CF330.350.01.D	1x35.0	12.5	333	377
CF330.500.01.D <sup>(1)</sup>	1x50.0	14.5	479	525
CF330.700.01.D	1x70.0	16.0	623	676
CF330.950.01.D	1x95.0	19.0	848	927
CF330.1200.01.D	1x120.0	21.5	1059	1145
CF330.1500.01.D <sup>(1)</sup>	1x150.0	23.0	1318	1411
CF330.1850.01.D <sup>(1)</sup>	1x185.0	27.0	1890	2014

<sup>(1)</sup> Delivery time upon inquiry

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

**G** = with earthed conductor green-yellow    **X** = without earthed conductor



**Order example: CF330.160.01.D – in your desired length (0.5 m steps)**  
**CF330.D** Chainflex® series **.160** Code nominal cross section **.01** Number of cores



Please use [www.chainflex.eu/en/CF330](http://www.chainflex.eu/en/CF330) for your online order.

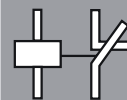


Delivery time 24h or today\*

\* Delivery time means time until shipping of goods

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**850 types from stock no cutting costs ...**

... and order online ► [www.igus.eu/en/CF330](http://www.igus.eu/en/CF330)


(for up to 10 cuts of the same type)



CF340  
TPE  
7.5 x d

# TPE power cable Chainflex® CF340

- for maximum load requirements
- TPE outer jacket
- shielded
- oil- and bio-oil-resistant
- **PVC-free/halogen-free**
- UV-resistant
- hydrolysis-resistant and microbe-resistant



Highly flexible  
special conductor





















Pressure extruded  
TPE blend



Highly flexible  
braided copper  
shield



Pressure extruded  
TPE blend

	Temperature range moved	-35 °C to +90 °C, minimum bending radius 7.5 x d
	Temperature range fixed	-40 °C to +90 °C, minimum bending radius 4 x d
	v max. unsupported/gliding	10 m/s, 6 m/s
	a max.	100 m/s <sup>2</sup>
	Travel distance	Freely suspended and gliding travel distances up to 400 m and more, Class 4
	UV-resistant	High
	Nominal voltage	600/1000 V (following DIN VDE 0250).
	Testing voltage	4000 V (following DIN VDE 0281-2).
	Oil	Oil-resistant (following DIN EN 60811-2-1), bio-oil-resistant (following VDMA 24568), Class 4
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
	Halogen-free	Following EN 50267-2-1.
	Conductor	Conductor cable consisting of pre-leads (following EN 60228).
	Core insulation	Mechanically high-quality TPE mixture.
	Overall shield	Extremely bending-resistant, tinned braided copper shield. Coverage approx. 70% linear, approx. 90% optical.
	Outer jacket	Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in Energy Chains®. Colour: black (similar to RAL 9005)
	CE	Following 2006/95/EG
	Lead free	Following EU guideline (RoHS) 2002/95/EC.
	Clean room	According to ISO Class 1. Outer jacket material complies with CF34.25.04, tested by IPA according to standard 14644-1

Class 7.4.4

Clean-Room

RoHS

CE

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## Typical application area

- for maximum load requirements
- almost unlimited resistance to oil, also with bio-oils
- indoor and outdoor applications, UV-resistant
- especially for freely suspended and gliding travel distances up to 400 m and more
- Storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, clean room, semiconductor insertion, ship to shore, outdoor cranes, low-temperature applications

Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
CF340.40.01	(1x4.0)C	6.5	55	74
CF340.60.01 <sup>(1)</sup>	(1x6.0)C	7.5	75	97
CF340.100.01 <sup>(1)</sup>	(1x10.0)C	8.5	120	144
CF340.160.01	(1x16.0)C	10.0	178	210
CF340.250.01 <sup>(1)</sup>	(1x25.0)C	11.5	272	314
CF340.350.01 <sup>(1)</sup>	(1x35.0)C	13.5	380	423
CF340.500.01	(1x50.0)C	15.0	524	568
CF340.700.01	(1x70.0)C	17.5	689	748
CF340.950.01 <sup>(1)</sup>	(1x95.0)C	20.5	920	997
CF340.1200.01 <sup>(1)</sup>	(1x120.0)C	22.0	1140	1233
CF340.1500.01 <sup>(1)</sup>	(1x150.0)C	24.0	1436	1549
CF340.1850.01	(1x185.0)C	28.0	2020	2147

<sup>(1)</sup> Delivery time upon inquiry

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

**G** = with earthed conductor green-yellow    **x** = without earthed conductor



**Order example: CF340.100.01 – in your desired length (0.5 m steps)**

**CF340** Chainflex® series **.100** Code nominal cross section **.01** Number of cores



Please use [www.chainflex.eu/en/CF340](http://www.chainflex.eu/en/CF340) for your online order.



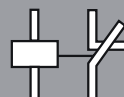
Delivery time 24h or today\*

\* Delivery time means time until shipping of goods

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**850 types from stock no cutting costs ...**

... and order online ► [www.igus.eu/en/CF340](http://www.igus.eu/en/CF340)

(for up to 10 cuts of the same type)

CFBRAID

TPE

7.5 x d

# TPE Power cable Chainflex® CF BRAID

- for maximum load requirements
- TPE outer jacket
- unshielded/shielded
- oil- and bio-oil-resistant
- flame-retardant
- UV-resistant
- hydrolysis-resistant and microbe-resistant



Highly flexible special conductor



Cores braided together using a special technique



TPE Inner jacket



Highly flexible braided copper shield



Pressure extruded TPE blend



Temperature range moved

-35 °C to +70 °C, minimum bending radius 7.5 x d



Temperature range fixed

-40 °C to +70 °C, minimum bending radius 4 x d



v max.

unsupported/gliding 10 m/s, 6 m/s



a max.

80 m/s<sup>2</sup>



Travel distance

Freely suspended and gliding travel distances up to 400 m and more, Class 4



UV-resistant

High



Nominal voltage

600/1000 V (following DIN VDE 0250).



Testing voltage

4000 V (following DIN VDE 0281-2).



Oil

Oil-resistant (following DIN EN 60811-2-1), bio-oil-resistant (following VDMA 24568), Class 4



Flame-retardant

According to IEC 332-1, CEI 20-35, FT1.



Silicon-free

Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).



Conductor

Fine-wire stranded conductor in especially bending-resistant version consisting of bare copper wires (following EN 60228).



Core insulation

Mechanically high-quality TPE mixture (following DIN VDE 0207 Part 4).



Core stranding

Cores braided together using a special technique.



Core identification

Cores black with white numerals, one core green-yellow.



Inner jacket

TPE mixture adapted to suit the requirements in Energy Chains® (for shielded types).



Overall shield

Extremely bending-resistant, tinned braided copper shield. Coverage approx. 70% linear, approx. 90% optical (for shielded types).



Outer jacket

Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in Energy Chains®.

Colour: black (similar to RAL 9005)

Class 6.4.4



## ... no minimum order quantity

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CE

Following 2006/95/EG



CEI

Following CEI 20-35



Lead free

Following EU guideline (RoHS) 2002/95/EC.



Clean room

According to ISO Class 1. Outer jacket material complies with CF34.25.04, tested by IPA according to standard 14644-1

Power cable

## Typical application area

- for maximum load requirements
- almost unlimited resistance to oil, also with bio-oils
- indoor and outdoor applications, UV-resistant
- especially for freely suspended and gliding travel distances up to 400 m and more
- Storage and retrieval units for high-bay warehouses, quick handling, in- and outdoor cranes, low-temperature applications

## What is special about CF BRAID?

Due to their unique type of design and especially in the case of cross-sections  $\geq 2.5 \text{ mm}^2$  and long distances of travel with large numbers of cycles, cables with 7 cores have an increased tendency toward the formation of corkscrews. Due to the special design of the CF BRAID with 8 braided cores, corkscrews can be completely ruled out.

Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
CFBRAID.25.08	8 G 2.5	20.0	192	398
CFBRAID.25.08.C <sup>(®)</sup>	(8 G 2.5)C	23.5	320	625

<sup>(®)</sup> without Desina

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor



**Order example: CFBRAID.25.08 – in your desired length (0.5 m steps)**

**CFBRAID** Chainflex<sup>®</sup> series **.25** Code nominal cross section **.08** Number of cores

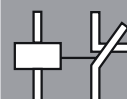


Please use [www.chainflex.eu/en/CFBRAID](http://www.chainflex.eu/en/CFBRAID) for your online order.



Delivery time 24h or today\*

\* Delivery time means time until shipping of goods



**850 types from stock no cutting costs ...**

... and order online ► [www.igus.eu/en/CFBRAID](http://www.igus.eu/en/CFBRAID)

(for up to 10 cuts of the same type)

# igupren Power cable

## Chainflex® CF CRANE

- for maximum voltages and outputs
- iguprene outer jacket
- oil-resistant
- flame-retardant



Highly flexible  
special conductor



Extruded EPR  
insulation over  
conductive rubber



Highly flexible  
overall copper  
shield



Extruded, highly  
abrasion-  
resistant  
iguprene  
jacket blend



Temperature range  
moved

-25 °C to +80 °C, minimum bending radius 10 x d



Temperature range  
fixed

-30 °C to +80 °C, minimum bending radius 7.5 x d



v max.  
unsupported/gliding

10 m/s, 6 m/s



a max.

50 m/s<sup>2</sup>



Travel distance

Freely suspended and gliding travel distances up to 500 m and more, Class 4



UV-resistant

High



Nominal voltage

6/10 kV (following DIN VDE 0250),  
other voltages upon inquiry.



Testing voltage

17 kV (following DIN VDE 0250, part 813).



Oil

Oil-resistant (following EN 60811-2-1), Class 3



Flame-retardant

According to IEC 332-1, CEI 20-35, FT1.



Silicon-free

Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).



Conductor

Highly flexible cable consisting of tinned copper wires (following VDE 0295).



Core insulation

Inner and outer semiconducting layer made of conductive rubber. Insulating sheath made of high-quality, heat-resistant and ozone-proof ethylene propylene rubber (EPR).



Overall shield

Extremely bending-resistant, tinned copper shield.



Outer jacket

Low-adhesion mixture on the basis of iguprene, especially abrasion-resistant and highly flexible, adapted to suit the requirements in Energy Chains® (following DIN VDE 0207 Part 21).  
Colour: red



CE

Following 2006/95/EG



Lead free

Following EU guideline (RoHS) 2002/95/EC.

## Typical application area

- for maximum load requirements
- almost unlimited resistance to oil
- indoor and outdoor applications, UV-resistant
- especially for freely suspended and gliding travel distances up to 500 m and more
- outdoor ship to shore, crane applications, conveyer technology

Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
CFCRANE1x25/16-6/10kV <sup>(1)</sup>	(1x25/16)C	27.0	468	940
CFCRANE1x35/16-6/10kV <sup>(1)</sup>	(1x35/16)C	29.0	576	1110
CFCRANE1x50/16-6/10kV <sup>(1)</sup>	(1x50/16)C	30.0	712	1350
CFCRANE1x70/16-6/10kV <sup>(1)</sup>	(1x70/16)C	32.0	912	1550
CFCRANE1x95/16-6/10kV <sup>(1)</sup>	(1x95/16)C	34.0	1145	1820

<sup>(1)</sup> Delivery time upon inquiry

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor



**Order example: CFCRANE1x25/16-6/10kV – in your desired length (0.5 m steps)**  
CFCRANE Chainflex® series .1 x 25/16 Code nominal cross section -6/10 Nominal voltage



Please use [www.chainflex.eu/en/CFCRANE](http://www.chainflex.eu/en/CFCRANE) for your online order.



Delivery time 24h or today\*

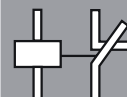
\* Delivery time means time until shipping of goods



Chainflex® CFCRANE for 500 m and more of travel. E-Chain®: igus® Rol E-Chain®

Power cable

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... and order online ► [www.igus.eu/en/CFCRANE](http://www.igus.eu/en/CFCRANE)

(for up to 10 cuts of the same type)












CFAIR  
PU  
10 x d



# Pneumatic hose

## Chainflex® CFAIR

- for maximum load requirements
- PU hose
- oil-resistant and coolant-resistant
- abrasion-resistant
- outside-toleranced
- halogen-free

	Temperature range moved	-20 °C to +80 °C, minimum bending radius 10 x d
	Temperature range fixed	-40 °C to +85 °C, minimum bending radius 8 x d
	v max. unsupported/gliding	10 m/s, 6 m/s
	a max.	50 m/s <sup>2</sup>
	Dimensions	Outside-toleranced
	Operating pressure	12 bar at 20 °C
	Vacuum	-1 bar at 20 °C
	Oil	Oil-resistant.
	Halogen-free	Following EN 50267-2-1.
	Material	Abrasion-resistant on the basis of Polyurethan adapted to suit the requirements in Energy Chains®. Colour: blue
	Lead free	Following EU guideline (RoHS) 2002/95/EC.

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Delivery program Part No.	Max. package length [km]	Internal diameter approx. [mm]	Wall thickness approx. [mm]	External diameter approx. [mm]	Weight [g/m]
CA PU.A.04.0	2.0	2.7	0.65	4	8
CA PU.A.06.0	1.5	4.0	1.00	6	19
CA PU.A.08.0	1.0	5.7	1.15	8	30
CA PU.A.10.0	1.0	7.0	1.50	10	48
CA PU.A.12.0	0.5	8.0	2.00	12	76
CA PU.A.16.0	0.1	11.0	2.50	16	127



**Order example: CA PU.A.04.0 – in your desired length (0.5 m steps)**

CA PU Chainflex® series .A Code material .04 Code Ø .0 Special identification



Please use [www.chainflex.eu/en/CAPU](http://www.chainflex.eu/en/CAPU) for your online order.



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igus® Chainflex® CFAIR pneumatic hoses were tested over several million bending cycles in E-Chains®. Their outstanding features include flexibility, high abrasion resistance and very good resistance to oil and coolants.

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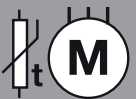
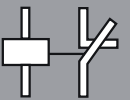
... and order online ► [www.igus.eu/en/CAPU](http://www.igus.eu/en/CAPU)

(for up to 10 cuts of the same type)

Pneumatic hose

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













CHAINFLEX CLEAN AIR

# Pneumatic hose

## Chainflex® CF Clean AIR

- for maximum load requirements
- PE hose
- oil-resistant and coolant-resistant
- highly abrasion-resistant
- outside-toleranced
- halogen-free

	Temperature range moved	-25 °C to +60 °C, minimum bending radius 10 x d
	Temperature range fixed	-30 °C to +65 °C, minimum bending radius 8 x d
	v max. unsupported/gliding	10 m/s, 6 m/s
	a max.	50 m/s <sup>2</sup>
	Dimensions	Outside-toleranced
	Operating pressure	10 bar at 20 °C
	Vacuum	-0.95 bar at 20 °C
	Oil	Oil-resistant.
	Halogen-free	Following EN 50267-2-1.
	Material	Highly abrasion-resistant on the basis of Polyethylen adapted to suit the requirements in Energy Chains®. Colour: white
	Lead free	Following EU guideline (RoHS) 2002/95/EG.
	Clean room	According to ISO Class 1, material/cable tested by IPA according to ISO standard 14644-1

### Typical application area

- for especially high abrasion resistance
- clean room, semi-conductor industry, handling



igus® material abrasion test

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Delivery program Part No.	Max. package length [km]	Internal diameter approx. [mm]	Wall thickness approx. [mm]	External diameter approx. [mm]	Weight [g/m]
CA PE.A.04.0	2.0	2.7	0.65	4	6
CA PE.A.06.0	1.5	4.0	1.00	6	15
CA PE.A.08.0	1.0	5.7	1.15	8	21
CA PE.A.10.0	1.0	7.0	1.50	10	38
CA PE.A.12.0	0.5	8.0	2.00	12	54
CA PE.A.16.0	0.1	11.0	2.50	16	90



Order example: **CA PE.A.04.0** – in your desired length (0.5 m steps)

**CA PE** Chainflex® series **.A** Code material **.04** Code Ø **.0** Special identification



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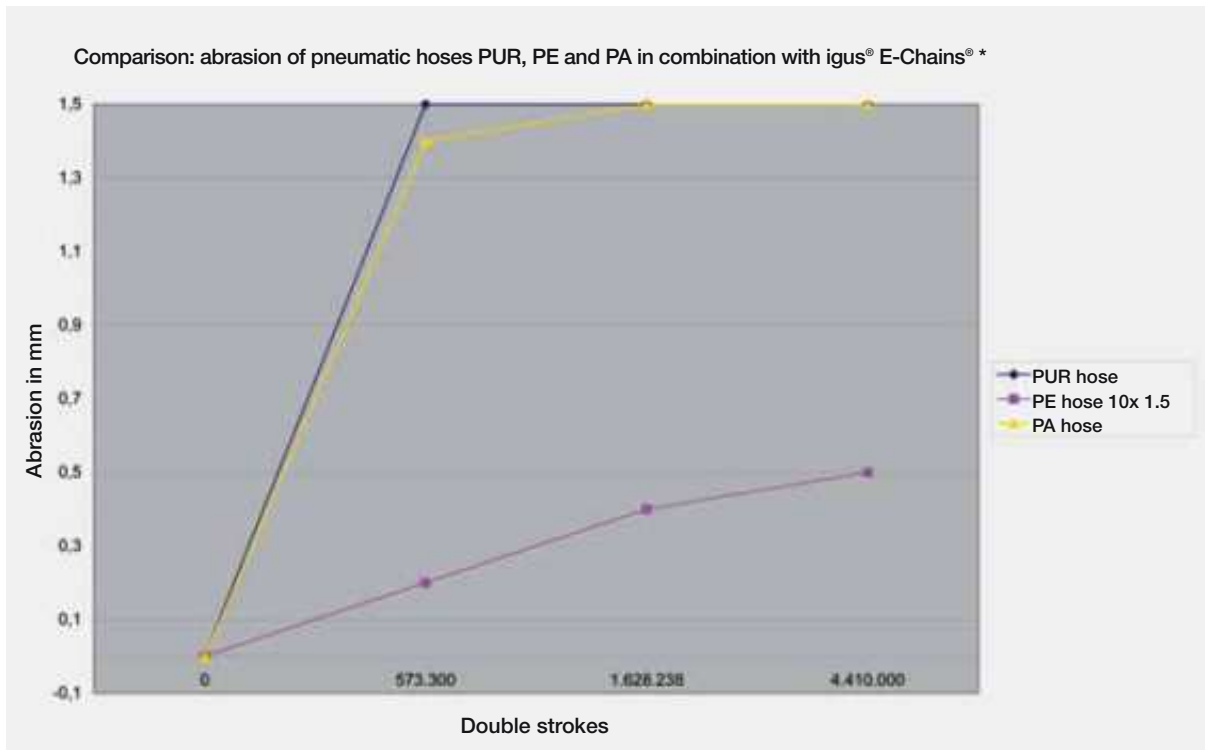
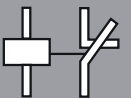
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Pneumatic hose

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\* igus® E-Chain® with opening link 450.30

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(for up to 10 cuts of the same type)















# Robot

Twistable cables



# Chainflex® Typen



Chainflex® cable	Jacket	Shield	Minimum bending radius, moved [factor x d]	Temperature moved from/to [°C]	Approvals and standards	Oil-resistant	Torsion resistant	v max. [m/s] unsupported	v max. [m/s] gliding	a max. [m/s <sup>2</sup> ]	Page
<b>Twistable cables</b>											
CFROBOT9	PUR		10,0	-25/ +80	CE  	✓	✓	10	10	214	
CFROBOT8	PUR	✓	10,0	-20/ +70	CE  	✓	✓	10	10	216	
CFROBOT6	PUR		10,0	-25/ +80	CE  	✓	✓	10	10	218	
CFROBOT7	PUR	✓	10,0	-25/ +80	CE  	✓	✓	10	10	218	
CFROBOT5	TPE		12,5	-20/ +60	CE  	✓	✓	10	10	220	
CFROBOT	TPE	✓	10,0	-35/ +100	CE    	✓	✓	10	10	222	

## Chainflex® cables for robots

Ever more complex sequences of movements in industrial applications demand twistable and/or three-dimensional flexible cables with a long service life similar to the classic Chainflex® cables for use in linear E-ChainSystems®.

Wires, stranded, shields and sheathing materials must compensate both major changes in bending load and changes in diameter due to torsional movements. For this purpose, different "soft" structural elements e.g. rayon fibres, PTFE elements or filling elements that absorb torsion forces are used in Chainflex® ROBOT cables.

Special demands are made on the braided shielding in torsion cables. Torsion-optimised shield structures are chosen that can carry out the necessary compensatory movements thanks to special PTFE gliding films.

With twistable bus cables in particular, the transmission characteristics such as attenuation, cable capacity and signal quality must remain within very tight tolerance ranges over the whole service life.

This is achieved through the use of particularly torsion-optimised insulating materials and mechanical attenuation elements with matching capacity values.

The highly abrasion-resistant, halogen-free and flame-resistant PUR sheathing mixture in motor, hybrid/control cables and bus cables protects the torsion-optimised stranded elements from possible damage.

The highly abrasion-resistant, halogen-free TPE-sheath mixture matches the special requirements of the twistable FOC and individual wires, and also protects the stranded elements.

Unlike cables for linear E-ChainSystems®, the "mechanical stress" for these cables is in the combination of bending, torsion and centrifugal forces that cannot usually be determined by design in advance or during use by means of measurement.

For this reason, and unlike the situation with linear E-Chain® applications, a clear "yes/no" statement cannot be made about the possibility of using a certain cable in torsion applications.

To enable evaluation to take place nevertheless, based on sensible and comparable test results, the igus® "torsion test standard" was developed.



According to this standard, all Chainflex® ROBOT cables of a Triflex® R Energy Chain® are twisted with a fixed-point distance of one metre and a torsion of +/- 180° at least 3 million times. In addition, a test is carried out on a test bench with a chain length of approx. 2500 mm with 270° torsion with an extreme load through centrifugal forces and heavy blows such as those that can occur with an industrial robot.

All the non-shielded, gusset-filling extruded standard Chainflex® control cables of the series CF5, CF77.UL.D and CF 9 correspond to the above-mentioned igus® standard and have been approved for use in torsion applications.

The following twistable CF ROBOT cable types are currently available:

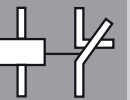
- Hybrid/control cables
- Motor/servo cables
- Bus/data cables
- FOC cables

We can also offer you Chainflex® ROBOT cables pre-fitted with the plug-in connectors of your choice as ReadyCable®, or as a ready-to-install ReadyChain® cable assembly.

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(for up to 10 cuts of the same type)


CFROBOT9

PUR

10 x d

# New! PUR Hybrid cable, twistable Chainflex® CF ROBOT9


- for twistable loads
- PUR outer jacket
- unshielded/shielded
- oil-resistant and coolant-resistant
- notch-resistant
- flame-retardant
- hydrolysis-resistant and microbe-resistant



Highly flexible special conductor



Conductor twisted with dampening elements






















Extremely torsion resistant copper shield



PTFE gliding foil



Pressure extruded PUR blend

	Temperature range moved	-25 °C to +80 °C, minimum bending radius twisted 10 x d
	Temperature range fixed	-40 °C to +80 °C, minimum bending radius 4 x d
	v max. twisted	10 m/s
	a max.	10 m/s <sup>2</sup>
	Travel distance	Robots and movements in the 3D range, Class 1
	Torsion	± 180°, with 1 m cable length
	UV-resistant	High
	Nominal voltage	300/500 V (following DIN VDE 0245).
	Testing voltage	2000 V (following DIN VDE 0281-2).
	Oil	Oil-resistant (following DIN EN 60811-2-1, DIN EN 50363 -10-2), Class 3.
	Flame-retardant	According to IEC 332-1, CEI 20-35, FT1.
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 192).
	Conductor	Extremely bend-resistant cable
	Core insulation	Mechanically high-quality TPE mixture.
	Element shield	Extremely torsion resistant, tinned braided copper shield. Coverage approx. 85% optical.
	Outer jacket	Low-adhesion, halogen-free, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in Energy Chains® (following DIN VDE 0282 Part 10). Colour: dark-blue (similar to RAL 5011) Following CEI 20-35
	CEI	Following CEI 20-35
	CE	Following 2006/95/EG
	Lead free	Following EU guideline (RoHS) 2002/95/EG.

IGUS CHAINFLEX CFROBOT9

Image exemplary.

Class 6.1.3



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Clean room

According to ISO Class 1. Outer jacket material complies with CF27.07.05.02.01.D, tested by IPA according to standard 14644-1

## Typical application area

- for maximum load requirements with torsion movements
- almost unlimited resistance to oil
- indoor and outdoor applications, UV-resistant
- especially for robots and movements in the 3D range
- Robots, handling, spindle drives

Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]	
CFROBOT9.001 <sup>(1)</sup>	5 G 1.0 + (2 x 1.0)C	9.5	75	129	New
CFROBOT9.002 <sup>(1)</sup>	6 G 0.75 + (3 x 0.75)C	12.0	76	143	New
CFROBOT9.003 <sup>(1)</sup>	2 G 0.5 + (2 x 0.5)C	10.0	27	75	New
CFROBOT9.004 <sup>(1)</sup>	16 G 1.0 + (2 x 1.0)C	16.5	177	326	New
CFROBOT9.005 <sup>(1)</sup>	23 G 1.0 + (2 x 1.0)C	19.5	241	478	New
CFROBOT9.006 <sup>(1)</sup>	24 G 1.0 + (2 x 1.0)C	20.0	251	484	New

<sup>(1)</sup> Delivery time upon inquiry

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with green-yellow earth core    x = without earth core



**Order example: CFROBOT9.001 – in your desired length (0.5 m steps)**

**CFROBOT9** Chainflex® series **.001** Code nominal cross section



Please use [www.chainflex.eu/en/CFROBOT](http://www.chainflex.eu/en/CFROBOT) for your online order.



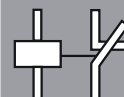
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CFROBOT8

PUR


10 x d

# New! PUR Bus cable, twistable Chainflex® CF ROBOT8

- for twistable loads
- PUR outer jacket
- shielded
- oil-resistant
- notch-resistant
- flame-retardant
- hydrolysis-resistant and microbe-resistant




Especially bending-resistant fine-wire stranded conductor



Cores each stranded in especially short optimized pitch




GRP core element




Gusset-filled extruded dampening elements























PTFE gliding foil



Torsion resistant copper shield



Highly abrasion-resistant PUR jacket blend

	Temperature range moved	-20 °C to +70 °C, minimum bending radius twisted 10 x d
	Temperature range fixed	-25 °C to +70 °C, minimum bending radius 7,5 x d
	v max. twisted	10 m/s
	a max.	10 m/s <sup>2</sup>
	Travel distance	Robots and movements in the 3D range, Class 1
	Torsion	± 180 °, with 1 m cable length
	UV-resistant	High
	Nominal voltage	30 V
	Testing voltage	500 V
	Oil	Oil-resistant (following DIN EN 60811-2-1, DIN EN 50363 -10-2), Class 3.
	Flame-retardant	According to IEC 332-1, CEI 20-35, FT1.
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 192).
	Conductor	Fine-wire stranded conductor in especially bending-resistant version consisting of bare copper wires (following EN 60228).
	Core insulation	According to bus specification
	Core stranding	According to bus specification
	Core identification	According to bus specification ▶ Delivery program
	Innenmantel	TPE mixture adapted to suit the requirements in Energy Chains®.
	Overall shield	Torsion resistant tinned braided copper shield. Coverage approx. 80% optical.
	Outer jacket	Low-adhesion, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in Energy Chains®. Colour: dark-blue (similar to RAL 5011)
	CEI	Following CEI 20-35

Class 6.1.3



## ... no minimum order quantity

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CE Following 2006/95/EG



Lead free Following EU guideline (RoHS) 2002/95/EG.



Clean room According to ISO Class 1. material/cable tested by IPA according to ISO standard 14644-1

## Typical application area

- for maximum load requirements with torsion movements
- almost unlimited resistance to oil, also with bio-oils
- indoor and outdoor applications, UV-resistant
- especially for robots and movements in the 3D range
- Robots, handling, spindle drives

Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]	
CFROBOT8.001 (Profibus)	(2 x 0.35)C	8.0	22	57	New
CFROBOT8.022 (Can-Bus)	(4 x 0.5)C	7.0	39	65	New
CFROBOT8.045 (GigE)	4 x (2 x 0.14)C	9.5	35	65	New

Note: The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
G = with green-yellow earth core x = without earth core

Delivery program Part No.	Characteristic wave impedan- ce approx. [Ω]	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	Colour code
CFROBOT8.001	150	(2 x 0.35)C	red, green
CFROBOT8.022	120	(4 x 0.5)C	white, green, brown, yellow (star-quad stranding)
CFROBOT8.045	100	4 x (2 x 0.14)C	white-blue/blue, whiteorange/orange, white-green/green, white-brown/brown



Order example: **CFROBOT8.001** – in your desired length (0.5 m steps)  
**CFROBOT8** Chainflex® series **.001** Code nominal cross section



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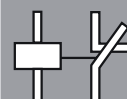


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\* Delivery time means time until shipping of goods

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


















CFROBOT6/7

PUR

12,5 x d

# New! PUR Motor cable, twistable Chainflex® CF ROBOT6/7

- for twistable loads
- PUR outer jacket
- unshielded/shielded
- oil-resistant and coolant-resistant
- notch-resistant
- flame-retardant
- hydrolysis-resistant and microbe-resistant

	Temperature range moved	-25 °C to +80 °C, minimum bending radius twisted 10 x d
	Temperature range fixed	-40 °C to +80 °C, minimum bending radius 4 x d
	v max. twisted	10 m/s
	a max.	10 m/s <sup>2</sup>
	Travel distance	Robots and movements in the 3D range, Class 1
	Torsion	± 180 °, with 1 m cable length
	UV-resistant	High
	Nominal voltage	600/1000 V (following DIN VDE 0250).
	Testing voltage	4000 V (following DIN VDE 0281-2).
	Oil	Oil-resistant (following DIN EN 60811-2-1, DIN EN 50363 -10-2), Class 3.
	Flame-retardant	According to IEC 332-1, CEI 20-35, FT1.
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 192).
	Conductor	Extremely bend-resistant cable
	Core insulation	Mechanically high-quality TPE mixture.
	Overall shield	Extremely torsion resistant, tinned braided copper shield. Coverage approx. 85% optical.
	Outer jacket	Low-adhesion, halogen-free, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in Energy Chains® (following DIN VDE 0282 Part 10). Colour: dark-blue (similar to RAL 5011) Following CEI 20-35
	CEI	Following CEI 20-35
	CE	Following 2006/95/EG
	Lead free	Following EU guideline (RoHS) 2002/95/EG.

Highly flexible special conductor

Conductor twisted with dampening elements

Extremely torsion resistant copper shield

PTFE gliding foil

Pressure extruded PUR blend

Class 6.1.3

Clean-Room



IGUS CHAINFLEX CFROBOT6

IGUS CHAINFLEX CFROBOT7

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Clean room

According to ISO Class 1. Outer jacket material complies with CF27.07.05.02.01.D, tested by IPA according to standard 14644-1

## Typical application area

- for maximum load requirements with torsion movements
- almost unlimited resistance to oil
- indoor and outdoor applications, UV-resistant
- especially for robots and movements in the 3D range
- Robots, handling, spindle drives

Delivery program Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]	
CFROBOT6.100.03 <sup>(1)</sup>	3 G 10	16.5	287	404	New
CFROBOT6.160.03 <sup>(1)</sup>	3 G 16	19.0	459	601	New
CFROBOT6.250.03 <sup>(1)</sup>	3 G 25	23.5	722	926	New
CFROBOT6.350.03 <sup>(1)</sup>	3 G 35	26.0	1020	1233	New
CFROBOT7.15.03.C <sup>(1)</sup>	(3 G 1.5)/D	8.0	58	95	New
CFROBOT7.25.03.C <sup>(1)</sup>	(3 G 2.5)/D	9.5	89	137	New
CFROBOT7.15.04.C <sup>(1)</sup>	(4 G 1.5)/D	8.5	74	121	New
CFROBOT7.25.04.C <sup>(1)</sup>	(4 G 2.5)/D	10.5	115	171	New

<sup>(1)</sup> Delivery time upon inquiry

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with green-yellow earth core    x = without earth core



**Order example: CFROBOT6.100.03 – in your desired length (0.5 m steps)**  
CFROBOT6 Chainflex® series .100 Code nominal cross section .03 Number of cores



Please use [www.chainflex.eu/en/CFROBOT](http://www.chainflex.eu/en/CFROBOT) for your online order.

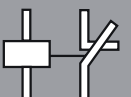


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
















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# TPE-Fibre optic cable, twistable Chainflex® CF ROBOT5

- for twistable loads
- TPE outer jacket
- oil-resistant
- bio-oil-resistant
- UV-resistant
- low-temperature-flexible
- hydrolysis-resistant and microbe-resistant

	Temperature range moved	-20 °C to +60 °C, minimum bending radius twisted 12,5 x d
	Temperature range fixed	-25 °C to +60 °C, minimum bending radius 7,5 x d
	v max. twisted	10 m/s
	a max.	10 m/s <sup>2</sup>
	Travel distance	Robots and movements in the 3D range, Class 1
	Torsion	± 180 °, with 1 m cable length
	UV-resistant	High
	Oil	Oil-resistant (following DIN EN 60811-2-1), bio-oil-resistant (following VDMA 24568), Class 4.
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 192).
	Fibre optic cable	50/125 µm, 62.5/125 µm special fixed wire elements with aramide strain relief.
	Core stranding	FOC wires stranded with high-tensile aramide dampers around the GRP central element.
	Outer jacket	Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in Energy Chains®.
	CE	following 2006/95/EG
	Lead free	Following EU guideline (RoHS) 2002/95/EG.
	Clean room	According to ISO Class 1. Outer jacket material complies with CF9.15.07, tested by IPA according to standard 14644-1

## Typical application area

- for maximum load requirements with torsion movements
- almost unlimited resistance to oil, also with bio-oils
- indoor and outdoor applications, UV-resistant
- especially for robots and movements in the 3D range
- Robots, handling

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FOC cores with high-tensile aramide fibres

GRP core element

FOC wires stranded with dampers around the GRP core

Pressure extruded, halogen-free TPE blend

# Class 7.1.4

Price index



igus®

CFROBOT5

TPE

12,5 x d

Delivery program Part No.	Number of fibres	Fibre diameter approx. [µm]	External diameter approx. [mm]	Weight [kg/km]
CFROBOT.500 <sup>(1)</sup>	2	62.5/125	8.5	87
CFROBOT.501	2	50/125	8.5	87

<sup>(1)</sup> Delivery time upon inquiry

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

Delivery program Part No.	Bandwidth with 850 nm [MHz x km]	Attenuation with 850 nm [dB/km]	Bandwidth with 1300 nm [MHz x km]	Attenuation with 1300 nm [dB/km]	Colour code
CFROBOT.500	160 - 200	3.2	200 - 500	0,9	blue with white numbers
CFROBOT.501	200 - 600	2.5 - 3.5	600 - 1200	0.7 - 1.5	blue with white numbers



**Order example: CFROBOT5.001 – in your desired length (0.5 m steps)**  
CFROBOT5 Chainflex® series .001 Code type of fibres



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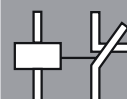
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


















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# TPE-Robot cable

## Chainflex® CF ROBOT

- for twistable loads
- TPE outer jacket, shielded
- oil-resistant
- bio-oil-resistant
- PVC-free
- UV-resistant
- flame-retardant
- hydrolysis-resistant and microbe-resistant

	Temperature range moved	-35 °C to +100 °C, minimum bending radius twisted 10 x d
	Temperature range fixed	-40 °C to +100 °C, minimum bending radius 4 x d
	v max. twisted	10 m/s
	a max.	10 m/s <sup>2</sup>
	Travel distance	Robots and movements in the 3D range, Class 1
	Torsion	± 90°, with 1 m cable length
	UV-resistant	High
	Nominal voltage	600/1000 V (following DIN VDE 0250).
	Testing voltage	4000 V (following DIN VDE 0281-2).
	Oil	Oil-resistant (following DIN EN 60811-2-1), bio-oil-resistant (following VDMA 24568), Class 4.
	Flame-retardant	According to IEC 332-1, CEI 20-35, FT1.
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 192).
	Conductor	Extremely bend-resistant cable
	Core insulation	Mechanically high-quality TPE mixture.
	Overall shield	Extremely torsion resistant tinned braided copper shield. Coverage approx. 90% optical.
	Outer jacket	Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in Energy Chains®. Colour: black (similar to RAL 9005) Style 10258 and 21387, 1000 V, 90 °C
	UL/CSA	
	CEI	Following CEI 20-35
	CE	Following 2006/95/EG

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Lead free

Following EU guideline (RoHS) 2002/95/EG.



Clean room

According to ISO Class 1. Outer jacket material complies with CF34.25.04, tested by IPA according to standard 14644-1

## Typical application area

- for maximum load requirements with torsion movements
- almost unlimited resistance to oil, also with bio-oils
- indoor and outdoor applications, UV-resistant
- especially for robots and movements in the 3D range
- Robots, handling, spindle drives

### Delivery program

Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
CFROBOT.035 <sup>(1)</sup>	(1 x 10.0)C	10.5	121	197
CFROBOT.036	(1 x 16.0)C	11.5	183	274
CFROBOT.037	(1 x 25.0)C	14.0	289	425
CFROBOT.038 <sup>(1)</sup>	(1 x 35.0)C	15.5	391	534
CFROBOT.039	(1 x 50.0)C	17.5	546	726

<sup>(1)</sup> Delivery time upon inquiry

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with green-yellow earth core    x = without earth core



**Order example: CFROBOT.035 – in your desired length (0.5 m steps)**  
CFROBOT Chainflex® series .035 Code nominal cross section



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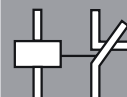


igus® Chainflex® cables in application of a multi-dimensional moving energy chain Triflex® R for production robots.

Robot cable

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# Camera

Video-, vision engineering/bus technology



# Chainflex® ReadyCable®

	Cable type	Jacket	Page
Video-, vision engineering/bus technology (with camera reference list ► page 224)			
	<b>FireWire</b>	FireWire special cable	TPE 226
	<b>USB</b>	USB special cable	TPE 230
	<b>GigE</b>	GigE special cable	TPE 232
	<b>FOC</b>	FOC special cable	PUR 234
	<b>FOC</b>	FOC special cable for robotic	TPE 238
	<b>Koax</b>	Koax special cable TPE	TPE 240


# TPE Bus cable

## Chainflex® FireWire

- FireWire cable (IEEE 1394a)
- for maximum load requirements
- TPE outer jacket
- oil-resistant
- flame-retardant



Especially bending-resistant fine-wire stranded conductor



















Extremely bending-resistant, tinned copper shield



Cores and pairs stranded with an especially short pitch length



Gusset-filled extruded, flame-retardant TPE mixture

	Temperature range moved	-35 °C to +70 °C, minimum bending radius 12,5 x d
	Temperature range fixed	-40 °C to +70 °C, minimum bending radius 5 x d
	v max. unsupported/gliding	10 m/s, 6 m/s
	a max.	100 m/s <sup>2</sup>
	UV-resistant	Medium
	Nominal voltage	30 V
	Testing voltage	500 V
	Oil	Oil-resistant (following DIN EN 60811-2-1), bio-oil-resistant (following VDMA 24568)
	Flame-retardant	According to IEC 332-1, CEI 20-35, FT1
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
	Conductor	Fine-wire stranded conductor in especially bending-resistant version consisting of bare copper wires (following EN 60228).
	Core insulation	Mechanically high-quality PE mixture.
	Core stranding	Cores and pairs stranded with an especially short pitch length.
	Core identification	<b>Core 0,15 mm<sup>2</sup>:</b> orange/blue, green/red. <b>Core 0,34 mm<sup>2</sup>:</b> black, white.
	Element shield	Extremely flexible, tinned copper shield over foil taping. Coverage approx. 70% linear, approx. 90% optical.
	Outer jacket	Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in Energy Chains®. Colour: violet (similar to RAL 4001)

## ... no minimum order quantity

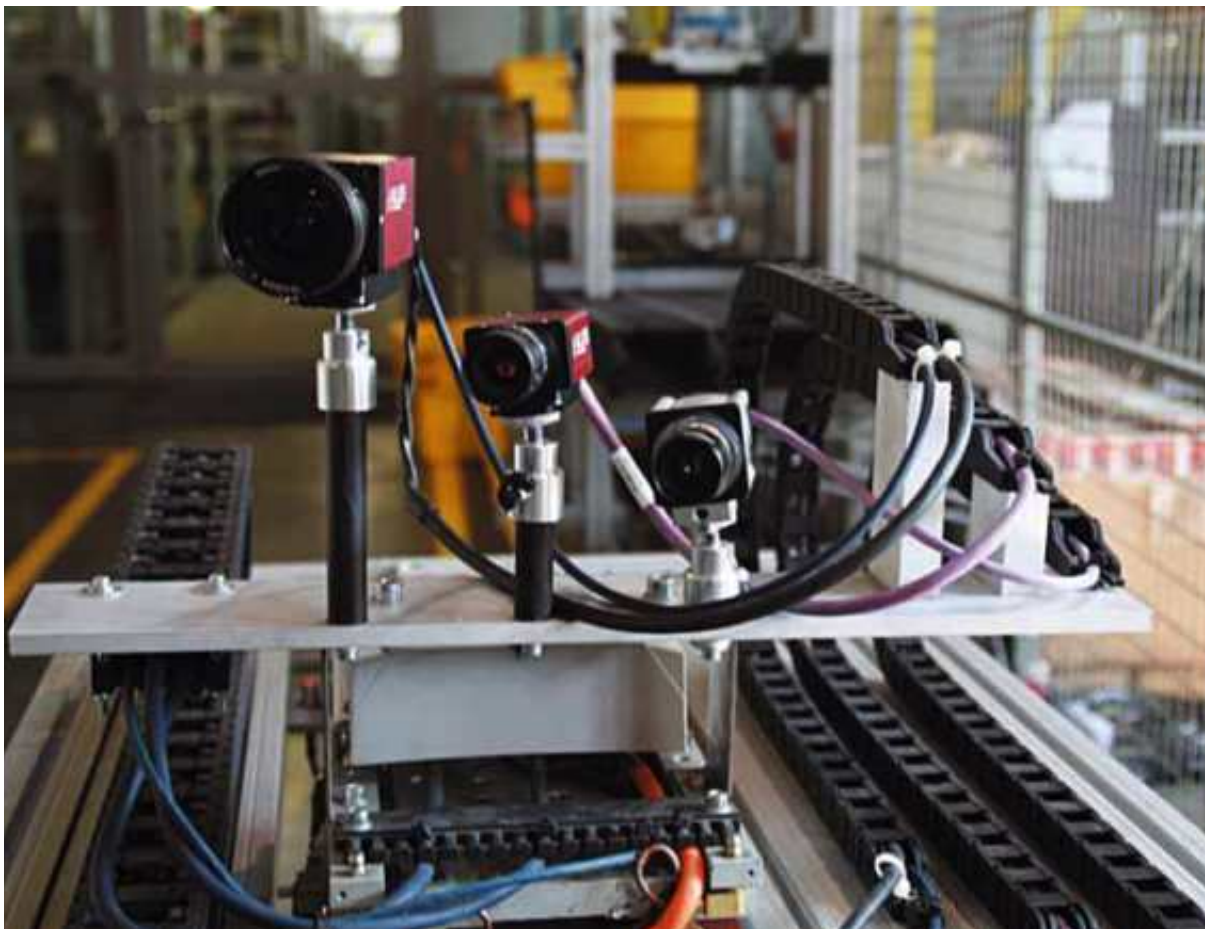
	UL/CSA	Style 1589 and 21371, 30 V, 80 °C
	DESINA	According to VDW, DESINA standardisation
	CE	Following 2006/95/EG
	Lead free	Following EU guideline (RoHS) 2002/95/EC.
	Clean room	According to ISO Class 1, material/cable tested by IPA according to ISO standard 14644-1

### Typical application area

- FireWire cable for use in E-Chains® in industrial environments (Technical note ► page 466)
- Transmission lengths of up to 10 m

### Test data ► page 40

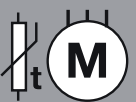
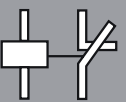
### Camera reference list ► page 244



More than 6.0 million movements have been successfully tested with the CFBUS.055 in E-Chains® with 10 m cable length.

Chainflex®  
FireWire

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**850 types from stock no cutting costs ...**  
(for up to 10 cuts of the same type)

# TPE Bus cable

## Chainflex® FireWire

- FireWire cable (IEEE 1394a)
- for maximum load requirements
- TPE outer jacket
- oil-resistant
- flame-retardant

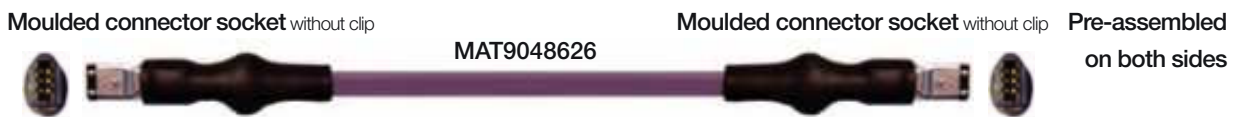
As well available on the roll, in the lengths you require.

Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
CFBUS.055	2 (2 x 0.15) C+2 x (0.34) C	7.5	42	118

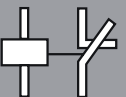
Choose from the following plug-cable combinations

Connector body with clip	Part No.: MAT9048160	Connector body with clip	Pre-assembled on both sides
Connector body with clip	MAT9048621	Pin body without clip	Pre-assembled on both sides
Connector body with clip	MAT9048623	Moulded connector socket without clip	Pre-assembled on both sides
Connector body with clip	MAT9048625	Formschrumpfteil Sift without clip	Pre-assembled on both sides
Moulded connector pin without clip	MAT9048627	Moulded connector pin without clip	Pre-assembled on both sides

... no minimum order quantity



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**850 types from stock no cutting costs ...**  
(for up to 10 cuts of the same type)

USB  
TPE  
12.5 x d

# TPE Bus cable

## Chainflex® USB

- USB cable 2.0
- for maximum load requirements
- TPE outer jacket
- oil-resistant
- flame-retardant



Especially bending-resistant fine-wire stranded conductor



Cores and pairs stranded with an especially short pitch length



Extremely bending-resistant, tinned copper shield



Pressure extruded, flame-retardant TPE blend



Temperature range moved

-35 °C to +70 °C, minimum bending radius 12.5 x d



Temperature range fixed

-40 °C to +70 °C, minimum bending radius 5 x d



v max. unsupported/gliding

10 m/s, 6 m/s



a max.

100 m/s<sup>2</sup>



UV-resistant

Medium



Nominal voltage

30 V



Testing voltage

500 V



Oil

Oil-resistant (following DIN EN 60811-2-1), bio-oil-resistant (following VDMA 24568)



Flame-retardant

According to IEC 332-1, CEI 20-35, FT1



Silicon-free

Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).



Conductor

Fine-wire stranded conductor in especially bending-resistant version consisting of bare copper wires (following EN 60228).



Core insulation

Mechanically high-quality PE mixture.



Core stranding

Cores and pairs stranded with an especially short pitch length



Core identification

Core 0.5 mm<sup>2</sup>: red, black

Core 0.08 mm<sup>2</sup>: white, green (CFBUS.065).

Core 0.24 mm<sup>2</sup>: white, green (CFBUS.066).



Overall shield

Extremely bending-resistant, tinned braided copper shield.

Coverage approx. 70% linear, approx. 90% optical.



Outer jacket

Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in Energy Chains®. Colour: violet (similar to RAL 4001)



UL/CSA

Style 1589 and 21371, 30 V, 80 °C



DESINA

According to VDW, DESINA standardisation



CE

Following 2006/95/EG

USB



... no minimum order quantity



Lead free

Following EU guideline (RoHS) 2002/95/EC.



Clean room

According to ISO Class 1, material/cable tested by IPA according to ISO standard 14644-1

## Typical application area

- USB 2.0 cable for use in E-Chains® in industrial environments (Technical note ► page 466)
- Transmission lengths of up to 6 m (CFBUS.065)
- Transmission lengths of up to 10 m (CFBUS.066)

## Camera reference list ► page 244

As well available on the roll, in the lengths you require.

Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
CFBUS.065	(2 x 0.5+1 x (2 x 0.08))C	5.0	26	45
CFBUS.066*	(2 x 0.5+1 x (2 x 0.24))C	6.0	32	56

\* CFBUS.066 is delivered with form shrink hose over USB housing

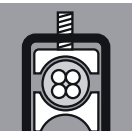
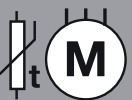
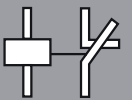
Note: The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

## Choose from the following plug-cable combinations

USB Type A	Part No.:	open end of cable	Pre-assembled at one end
	USB9040001		
USB Type A	Part No.:	USB Type A	Pre-assembled on both sides
	USB9040010		
USB Type B	Part No.:	open end of cable	Pre-assembled at one end
	USB9040020		
USB Type B	Part No.:	USB Type B	Pre-assembled on both sides
	USB9040030		
USB Type A	Part No.:	USB Type B	Pre-assembled on both sides
	USB9040040		

Chainflex®  
USB

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**850 types from stock no cutting costs ...**  
(for up to 10 cuts of the same type)



# TPE Bus cable Chainflex® GigE

- GigE cable
- Ethernet special cable for heavy-duty use
- TPE outer jacket
- oil-resistant
- flame-retardant



Especially bending-resistant fine-wire stranded conductor



Cores and pairs stranded with an especially short pitch length

















Gusset-filled extruded



Extremely bending-resistant, tinned copper shield



Pressure extruded, flame-retard TPE blend

	Temperature range moved	-35 °C to +70 °C, minimum bending radius 12.5 x d
	Temperature range fixed	-40 °C to +70 °C, minimum bending radius 7.5 x d
	v max.	10 m/s, 6 m/s
	unsupported/gliding	
	a max.	100 m/s <sup>2</sup>
	UV-resistant	Medium
	Nominal voltage	30 V
	Testing voltage	500 V
	Oil	Oil-resistant (following DIN EN 60811-2-1), bio-oil-resistant (following VDMA 24568)
	Flame-retardant	According to IEC 332-1, CEI 20-35, FT1.
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
	Conductor	Fine-wire stranded conductor in especially bending-resistant version consisting of bare copper wires (following EN 60228).
	Core insulation	Special PP-isolating mixture
	Core stranding	2 cores each stranded in pairs with short pitch lengths, core pairs also stranded with short pitch lengths.
	Core identification	Farbcode nach DIN 47100
	Inner jacket	TPE mixture adapted to suit the requirements in Energy Chains®.
	Overall shield	Extremely bending-resistant, tinned braided copper shield. Coverage approx. 70% linear, approx. 90% optical.
	Outer jacket	Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in Energy Chains®. Colour: violet (similar to RAL 4001)
	UL/CSA	Style 1589 and 21371, 30 V, 80 °C
	CE	Following 2006/95/EG
	DESINA	According to VDW, DESINA standardisation

... no minimum order quantity



Lead free

Following EU guideline (RoHS) 2002/95/EC.



Clean room

According to ISO Class 1, material/cable tested by IPA according to ISO standard 14644-1

## Typical application area

- Ethernet cable for use in E-Chains® in industrial environments (Technical note ► page 466)
- Transmission lengths of up to 50 m

## Camera reference list ► page 244

As well available on the roll, in the lengths you require.

Part No.:	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	External diameter approx. [mm]	Copper index [kg/km]	Weight [kg/km]
CFBUS.044	4x (2 x 0,15) C	8,0	35	79

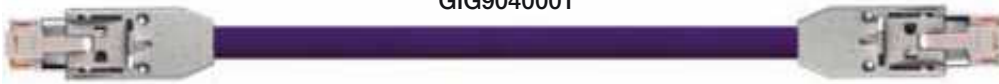
### Choose from the following plug-cable combinations

Connector RJ45 Metall, 8 poles

Part No.:  
GIG9040001

Connector RJ45 Metall, 8 poles

Pre-assembled  
on both sides



Connector RJ45 Metall, 8 poles

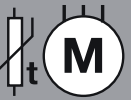
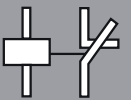
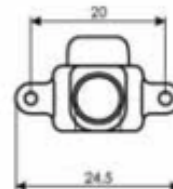
Part No.:  
GIG9040002

Plug made of RJ45 plastic with knurled screws

Pre-assembled  
on both sides

















**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.




**850 types from stock no cutting costs ...**  
(for up to 10 cuts of the same type)


# PUR Fibre optic cable (FOC) Chainflex® Glass fibre


- Gradient glass fibre cable 50/125 µm, 62.5/125 µm
- PUR outer jacket
- oil-resistant
- UV-resistant


	Temperature range moved	-20 °C to +60 °C, minimum bending radius 12.5 x d
	Temperature range fixed	-25 °C to +60 °C, minimum bending radius 7.5 x d
	v max. unsupported/gliding	10 m/s, 6 m/s
	a max.	20 m/s <sup>2</sup>
	UV-resistant	High
	Oil	Oil-resistant (following DIN EN 60811-2-1)
	Offshore	MUD-resistant following NEK 606
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
	Fibre cables	50/125 µm, 62.5/125 µm fibres in gel-filled hollow cores.
	Core stranding	Hollow cores with integrated FOC-fibres stranded with two strain relief elements.
	Core identification	Cores black with white numerals.
	Outer jacket	Low-adhesion mixture on the basis of PUR, adapted to suit the requirements in Energy Chains® (following DIN VDE 0282 Part 10). Colour: black (similar to RAL 9005)
	CE	Following 2006/95/EG
	Lead free	Following EU guideline (RoHS) 2002/95/EC.

FOC  
PUR  
12.5 x d

 Gradient fibers

 Plastic covered special fiber

 Gel-filled, armored hollow core

 Armored hollow cores with optimized pitch length stranded around a strain relief element

 Gusset-filled extruded PUR mixture

IGUS® CHAINFLEX® CFLG.2HG.MF

FOC



... no minimum order quantity

## Typical application area

- Fiber optic cable for use in E-Chains® in industrial environments
- Transmission lengths of up to 500 m

Test data ▶ page 38

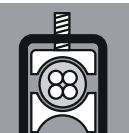
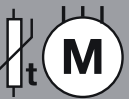
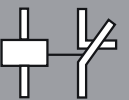
Camera reference list ▶ page 244

Chainflex®  
LWL

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Harnessed igus® E6 system on a camera application.



**850 types from stock** no cutting costs ...  
(for up to 10 cuts of the same type)

# PUR Fibre optic cable (FOC) Chainflex<sup>®</sup> Glass fibre

- Gradient glass fibre cable 50/125  $\mu\text{m}$ , 62.5/125  $\mu\text{m}$
- PUR outer jacket
- oil-resistant
- UV-resistant

As well available on the roll, in the lengths you require.

Part No.	Number of fibers	Fibre diameter approx. [ $\mu\text{m}$ ]	External diameter approx. [mm]	Weight [kg/km]
CFLG.2HG.MF.50/125	2	50/125	9.0	85



CFLG.2HG.MF.62.5/125	2	62.5/125	9.0	85
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\* 2 ST coupling pieces needed to be ordered extra, if used as extension cable (MAT0176314).

### FOC patch cables for static installation:

(Note: FOC patch cable extensions are for protected installation only)

Part No.	Number of fibers	Fibre diameter approx. [µm]	External diameter approx. [mm]	Weight [kg/km]
FFLG.2G.50/125	2	50/125	6.5	27

Connector ST LWL90412399 Connector LC Pre-assembled on both sides\*

Connector ST LWL90412400 Connector ST Pre-assembled on both sides

Connector LC LWL90412401 Connector LC Pre-assembled on both sides

FFLG.2G.62.5/125	2	62.5/125	6.5	27
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Connector ST LWL90412402 Connector LC Pre-assembled on both sides\*

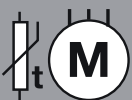
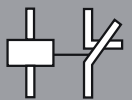
Connector ST LWL90412403 Connector ST Pre-assembled on both sides

Connector LC LWL90412404 Connector LC Pre-assembled on both sides

\* 2 ST coupling pieces needed to be ordered extra, if used as extension cable (MAT0176314).

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















**850 types from stock no cutting costs ...**  
(for up to 10 cuts of the same type)

# TPE Fibre optic cables, twistable

## Chainflex® CF ROBOT-LWL


- for twistable loads
- TPE outer jacket
- oil-resistant
- bio-oil-resistant
- UV-resistant
- low-temperature-flexible

	Temperature range moved	-20 °C to +60 °C, minimum bending radius twisted 12.5 x d
	Temperature range fixed	-25 °C to +60 °C, minimum bending radius twisted 7.5 x d
	v max. twisted	10 m/s
	a max.	10 m/s <sup>2</sup>
	Torsion	±180 °, with 2 m cable length
	UV-resistant	High
	Oil	Oil-resistant (following DIN EN 60811-2-1), bio-oil-resistant (following VDMA 24568)
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
	Fibre Cables	50/125 µm, 62.5/125 µm special fixed wire elements with aramide strain relief.
	Core stranding	FOC wires stranded with high-tensile aramide dampers around the GRP central element.
	Outer jacket	Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in Energy Chains®.
	CE	Following 2006/95/EG
	Lead free	Following EU guideline (RoHS) 2002/95/EC
	Clean room	According to ISO Class 1. Outer jacket material complies with CF9.15.07, tested by IPA according to standard 14644-1

### Typical application area

- for maximum load requirements with torsion movements
- almost unlimited resistance to oil, also with bio-oils
- indoor and outdoor applications, UV-resistant
- especially for robots and movements in the 3D range
- Robots, handling

## ... no minimum order quantity

 FOC wires with high-tensile aramide fibres

 GRP core element

 FOC wires stranded with dampers around the GRP core

 Pressure extruded, halogen-free TPE blend

As well available on the roll, in the lengths you require.

Part No.	Number of fibers	Fibre diameter approx. [µm]	External diameter approx. [mm]	Weight [kg/km]
CFROBOT.501	2	50/125	8.5	87

Connector ST LWL90422491 Connector LC Pre-assembled on both sides\*

Connector ST LWL90422492 Connector ST Pre-assembled on both sides

Connector LC LWL90422493 Connector LC Pre-assembled on both sides

CFROBOT.500	2	62.5/125	8.5	87
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Connector ST LWL90422494 Connector LC Pre-assembled on both sides\*

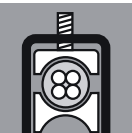
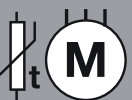
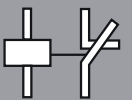
Connector ST LWL90422495 Connector ST Pre-assembled on both sides

Connector LC LWL90422496 Connector LC Pre-assembled on both sides

\* 2 ST coupling pieces needed to be ordered extra, if used as extension cable (MAT0176314).

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FOC

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**850 types from stock no cutting costs ...**  
 (for up to 10 cuts of the same type)



# TPE Koax cable

## Chainflex® CF Koax 1

- 75 Ω koax cable for maximum load requirements
- TPE outer jacket
- oil-resistant
- bio-oil-resistant
- UV-resistant
- hydrolysis-resistant and microbe-resistant



Especially bending-resistant special conductor




















Highly flexible braided copper shield



Elements stranded with short pitch, FEP special insulation



Gusset-filled extruded, halogen-free TPE mixture

	Temperature range moved	-35 °C to +100 °C, minimum bending radius 10 x d
	Temperature range fixed	-40 °C to +100 °C, minimum bending radius 7.5 x d
	v max.	10 m/s, 5 m/s
	a max.	100 m/s <sup>2</sup>
	Travel distance	Freely suspended and gliding travel distances up to 400 m, Class 4
	UV-resistant	High
	Nominal voltage	300/300 V (following DIN VDE 0245).
	Testing voltage	1500 V
	Oil	Oil-resistant (following DIN EN 60811-2-1), bio-oil-resistant (following VDMA 24568), Class 4
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
	Conductor	Multi-wire; adapted in single-wire diameter and pitch length to suit the requirements in Energy Chains®.
	Core insulation	Special FEP-isolating mixture.
	Core stranding	Cores stranded in one layer with especially short pitch length.
	Core identification	► Schedule delivery program
	Element shield	Extremely bending-resistant, tinned braided copper shield. Coverage approx. 70% linear, approx. 90% optical.
	Element jacket	TPE mixture adapted to suit the requirements in Energy Chains®.
	Outer jacket	Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in Energy Chains®. Colour: dark-blue (similar to RAL 5011)



CE

Following 2006/95/EG



Lead free

Following EU guideline (RoHS) 2002/95/EC.



Clean room

According to ISO Class 1. Outer jacket material complies with CF9.15.07, tested by IPA according to standard 14644-1



Info

The coax elements used in cables of the CF Koax1 series are comparable with a HF75-0.3/1.6 according to MIL-C-17/94-RG179 and thus fit in an RG179 plug!

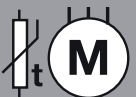
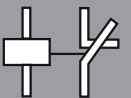
Koax cable

## Typical application area

- for maximum load requirements
- almost unlimited resistance to oil, also with bio-oils
- indoor and outdoor applications, UV-resistant
- especially for freely suspended and gliding travel distances up to 400 m
- storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, clean room, semiconductor insertion, outdoor cranes, low-temperature applications

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# 850 types from stock no cutting costs ...

 ... and order online ► [www.igus.eu/en/CFKOAX1](http://www.igus.eu/en/CFKOAX1)

(for up to 10 cuts of the same type)

# TPE Koax cable Chainflex® CF Koax 1

- 75 Ω koax cable for maximum load requirements
- TPE outer jacket
- oil-resistant
- bio-oil-resistant
- UV-resistant
- hydrolysis-resistant and microbe-resistant

As well available on the roll, in the lengths you require.

Part No.	Number of fibers	External diameter approx. [µm]	Copper index [kg/km]	Weight [kg/km]
CFKoax1.01	1 coaxial element	4,5	9,0	25

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
G = with green-yellow earth core    x = without earth core

Choose from the following plug-cable combinations

Connector MAT90423400 Socket Pre-assembled on both sides



Connector MAT90423401 Connector Pre-assembled on both sides



Socket MAT90423402 Socket Pre-assembled on both sides



Connector MAT90423403 open end of cable Pre-assembled on one side



Socket MAT90423404 open end of cable Pre-assembled on one side





As well available on the roll, in the lengths you require.

Part No.	Number of fibers	External diameter approx. [µm]	Copper index [kg/km]	Weight [kg/km]
CFKoax1.05	5 coaxial elements	10,0	47	135

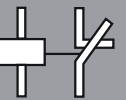
Note: The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
G = with green-yellow earth core    x = without earth core

Choose from the following plug-cable combinations



Koax cable

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**850 types from stock no cutting costs ...**

... and order online ► [www.igus.eu/en/CFKOAX1](http://www.igus.eu/en/CFKOAX1) (for up to 10 cuts of the same type)

### Camera reference list – Selection chart

**CFBUS.065**  
**USB**  
up to 5 m

**CFBUS.066**  
**USB**  
up to 10 m

**CFBUS.055**  
**FireWire**  
up to 10 m

**CFLG.2HG**  
**LWL**  
up to 400 m

**CFBUS.044**  
**GigE**  
up to 50 m

Chainflex®



Tel. +49-2203-96 49-0  
Fax +49-2203-96 49-222

igus® GmbH  
51147 Köln, Germany

www.igus.eu  
info@igus.de



CFBUS.065 USB up to 5 m	CFBUS.066 USB up to 10 m	CFBUS.055 FireWire up to 10 m	CFLG.2HG LWL up to 400 m	CFBUS.044 GigE up to 50 m
		Guppy F-033B	Pike F-032B Fiber	GB650, GB650c
	Guppy F-033C	Pike F-032C Fiber	GB660, GB660c	
	Guppy F-036B	Pike F-100B Fiber	GB1380, GB1380c	
	Guppy F-036C	Pike F-100C Fiber	GB2450, GB2450c	
	Guppy F-038B	Pike F-145B Fiber	GC640, GC640c	
	Guppy F-038C	Pike F-145C Fiber	GC650, GC650c	
	Guppy F-038B NIR	Pike F-210B Fiber	GC655, GC655c	
	Guppy F-038C NIR	Pike F-210C Fiber	GC660, GC660c	
	Guppy F-044B	Pike F-421B Fiber	GC750, GC750c	
	Guppy F-044C	Pike F-421C Fiber	GC780, GC780c	
	Guppy F-044B NIR	Pike F-505B Fiber	GC1020, GC1020c	
	Guppy F-044C NIR	Pike F-505C Fiber	GC1280	
	Guppy F-046B	Stingray F-033B Fiber	GC1290, GC1290c	
	Guppy F-046C	Stingray F-033C Fiber	GC1350, GC1350c	
	Guppy F-080B	Stingray F-046B Fiber	GC1380, GC1380c	
	Guppy F-080C	Stingray F-046C Fiber	GC1380CH, GC1380H	
	Guppy F-146B	Stingray F-080B Fiber	GC1600, GC1600c	
	Guppy F-146C	Stingray F-080C Fiber	GC1600CH, GC1600H	
	Guppy F-503B	Stingray F-125B Fiber	GC2450, GC2450c	
	Guppy F-503C	Stingray F-125C Fiber	GE640, GE640c	
	Marlin F-033B	Stingray F-145B Fiber	GE650, GE650c	
	Marlin F-033C	Stingray F-145C Fiber	GE680, GE680c	
	Marlin F-046B	Stingray F-146B Fiber	GE1050, GE1050c	
	Marlin F-046C	Stingray F-146C Fiber	GE1350, GE1350c	
	Marlin F-080B	Stingray F-201B Fiber	GE1380, GE1380c	
	Marlin F-080C	Stingray F-201C Fiber	GE1600, GE1600c	
	Marlin F-080B 30fps	Stingray F-504B Fiber	GE1650, GE1650c	
	Marlin F-080C 30fps	Stingray F-504C Fiber	GE1660, GE1660c	
	Marlin F-131B		GE1900, GE1900c	
	Marlin F-131C		GE1910, GE1910c	
	Marlin F-131B NIR		GE2040, GE2040c	
	Marlin F-145B2		GE4000, GE4000c	
	Marlin F-145C2		GE4900, GE4900c	
	Marlin F-146B		GS650, GS650c	
	Marlin F-146C		GS660, GS660c	
	Marlin F-201B		GS1380, GS1380c	
	Marlin F-201C		GS2450, GS2450c	
	Oscar F-320C			
	Oscar F-510C			
	Oscar F-810C			
ARTCAM-... 640-THERMO 320-THERMO 150P4-HDMI 150P4-HDMI-BW 130MI-HDMI 130MI-HDMI-BW 150P4-MOUT-DUAL 150P4-MOUT-DUAL-BW 130MI-MOUT-DUAL 130MI-MOUT-DUAL-BW 625KY 625KY-BW 500P II 274KY 274KY-BW	ARTCAM-... 640-THERMO 320-THERMO 150P4-HDMI 150P4-HDMI-BW 130MI-HDMI 130MI-HDMI-BW 150P4-MOUT-DUAL 150P4-MOUT-DUAL-BW 130MI-MOUT-DUAL 130MI-MOUT-DUAL-BW 625KY 625KY-BW 500P II 274KY 274KY-BW			

# Camera reference list – Selection chart



**CFBUS.065**  
**USB**  
up to 5 m

**CFBUS.066**  
**USB**  
up to 10 m

**CFBUS.055**  
**FireWire**  
up to 10 m

**CFLG.2HG**  
**LWL**  
up to 400 m

**CFBUS.044**  
**GigE**  
up to 50 m

**ARTRAY**

CFBUS.065 USB up to 5 m	CFBUS.066 USB up to 10 m	CFBUS.055 FireWire up to 10 m	CFLG.2HG LWL up to 400 m	CFBUS.044 GigE up to 50 m
ARTCAM-...	ARTCAM-...			
150P III	150P III			
150P III -BW	150P III -BW			
445KY	445KY			
445KY-BW	445KY-BW			
098 II	098 II			
098 II -BW	098 II -BW			
900MI	900MI			
500MI	500MI			
500MI-BW	500MI-BW			
300MI	300MI			
130MI	130MI			
130MI-BW	130MI-BW			
036MI	036MI			
036MI-BW	036MI-BW			
900SS	900SS			
500SS	500SS			
500SS-BW	500SS-BW			
300SS	300SS			
130SS	130SS			
130SS-BW	130SS-BW			
036SS	036SS			
036SS-BW	036SS-BW			
022MINI	022MINI			
022MINI-BW	022MINI-BW			
		A102f		piA640-210gm/gc
		A102fc		piA1000-48gm/gc
		A311f		piA1600-35gm/gc
		A311fc		piA1900-32gm/gc
		A312f		piA2400-12gm/gc
		A312fc		ruL1024-19gm
		A601f		ruL1024-36gm
		A601fc		ruL1024-57gm
		A631f		ruL2048-10gm
		A631fc		ruL2048-19gm
		A641f		ruL2048-30gm
		A641fc		ruL2098-10gc
				scA640-70gm/gc
				scA640-74gm/gc
				scA750-60gm/gc
				scA780-54gm/gc
				scA1000-20gm/gc
				scA1000-30gm/gc
				scA1390-17gm/gc
				scA1400-17gm/gc
				scA1400-30gm/gc
				scA1600-14gm/gc
				scA1600-14gm/gc

Chainflex®

Tel. +49-2203-96 49-0  
Fax +49-2203-96 49-222

igus® GmbH  
51147 Köln, Germany

www.igus.eu  
info@igus.de



## Camera reference list – Selection chart

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up to 5 m

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up to 10 m

CFBUS.055  
FireWire  
up to 10 m

CFLG.2HG  
LWL  
up to 400 m

CFBUS.044  
GigE  
up to 50 m

Chainflex®



	FWX03		TXGC03	
	FWX03c		TXGC03c	
	FWX05c-II		TXG03 [-P]	
	FWX05-II		TXG03c [-P]	
	FWX06		TXG04 [-P]	
	FWX06c		TXG04c [-P]	
	FWX08		TXG06 [-P]	
	FWX08c		TXG06c [-P]	
	FWX131		TXG08 [-P]	
	FWX131c		TXG08c [-P]	
	FWX14		TXG13 [-P]	
	FWX14c		TXG13c [-P]	
	FWX20		TXG14 [-P]	
	FWX20c		TXG14c [-P]	
	FWXC03c		TXG14f [-P]	
	FWXC13c		TXG14cf [-P]	
	FWXC30c		TXG20 [-P]	
	FWL120		TXG20c [-P]	
	FQX50c		TXG50 [-P]	
	FQX80c		TXG50c [-P]	

UI-1220-M/C				UI-5220SE-M/C
UI-1540-M				UI-5540SE-M
UI-1640-C				UI-5640SE-C
UI-1550-C				UI-5550SE-C
UI-1460-C				UI-5460SE-C
UI-1480-M/C				UI-5480SE-M/C
UI-2210-M/C				UI-6210SE-M/C
UI-2410-M/C				UI-6410SE-M/C
UI-2220-M/C				UI-6220SE-M/C
UI-2230-M/C				UI-6230SE-M/C
UI-2240-M/C				UI-6240SE-M/C
UI-2250-M/C				UI-6250SE-M/C
UI-1220RE-M/C	UI-1220RE-M/C			UI-5220HE-M/C
UI-1540RE-M	UI-1540RE-M			UI-5540HE-M
UI-1640RE-C	UI-1640RE-C			UI-5640HE-C
UI-1550RE-C	UI-1550RE-C			UI-5550HE-C
UI-1460RE-C	UI-1460RE-C			UI-5460HE-C
UI-1480RE-M/C	UI-1480RE-M/C			UI-5480HE-M/C
UI-2210RE-M/C	UI-2210RE-M/C			UI-6210HE-M/C
UI-2410RE-M/C	UI-2410RE-M/C			UI-6410HE-M/C
UI-2220RE-M/C	UI-2220RE-M/C			UI-6220HE-M/C
UI-2230RE-M/C	UI-2230RE-M/C			UI-6230HE-M/C
UI-2240RE-M/C	UI-2240RE-M/C			UI-6240HE-M/C
UI-2250RE-M/C	UI-2250RE-M/C			UI-6250HE-M/C



Tel. +49-2203-96 49-0  
Fax +49-2203-96 49-222

igus® GmbH  
51147 Köln, Germany

www.igus.eu  
info@igus.de

# Camera reference list – Selection chart



**CFBUS.065**  
**USB**  
up to 5 m

**CFBUS.066**  
**USB**  
up to 10 m

**CFBUS.055**  
**FireWire**  
up to 10 m

**CFLG.2HG**  
**LWL**  
up to 400 m

**CFBUS.044**  
**GigE**  
up to 50 m

CFBUS.065 USB up to 5 m	CFBUS.066 USB up to 10 m	CFBUS.055 FireWire up to 10 m	CFLG.2HG LWL up to 400 m	CFBUS.044 GigE up to 50 m
DMK 21AU04	DMK 21AU04	DMK 21F04		
DFK 21AU04	DFK 21AU04	DFK 21F04		
DBK 21AU04	DBK 21AU04	DMK 21AF04		
DMK 31AU03	DMK 31AU03	DFK 21AF04		
DFK 31AU03	DFK 31AU03	DBK 21AF04		
DBK 31AU03	DBK 31AU03	DMK 31AF03		
DMK 41AU02	DMK 41AU02	DFK 31AF03		
DFK 41AU02	DFK 41AU02	DBK 31AF03		
DBK 41AU02	DBK 41AU02	DMK 41AF02		
DMK 21BU04	DMK 21BU04	DFK 41AF02		
DFK 21BU04	DFK 21BU04	DBK 41AF02		
DBK 21BU04	DBK 21BU04	DMK 21BF04		
DMK 31BU03	DMK 31BU03	DFK 21BF04		
DFK 31BU03	DFK 31BU03	DBK 21BF04		
DBK 31BU03	DBK 31BU03	DMK 31BF03		
DMK 41BU02	DMK 41BU02	DFK 31BF03		
DFK 41BU02	DFK 41BU02	DBK 31BF03		
DBK 41BU02	DBK 41BU02	DMK 41BF02		
DMK 21BU04.H	DMK 21BU04.H	DFK 41BF02		
DFK 21BU04.H	DFK 21BU04.H	DBK 41BF02		
DBK 21BU04.H	DBK 21BU04.H	DMK 21BF04.H		
DMK 31BU03.H	DMK 31BU03.H	DFK 21BF04.H		
DFK 31BU03.H	DFK 31BU03.H	DBK 21BF04.H		
DBK 31BU03.H	DBK 31BU03.H	DMK 31BF03.H		
DMK 41BU02.H	DMK 41BU02.H	DFK 31BF03.H		
DFK 41BU02.H	DFK 41BU02.H	DBK 31BF03.H		
DBK 41BU02.H	DBK 41BU02.H	DMK 41BF02.H		
		DFK 41BF02.H		
		DBK 41BF02.H		
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		DFK 21AF04-Z		
		DBK 21AF04-Z		
		DMK 31AF03-Z		
		DFK 31AF03-Z		
		DBK 31AF03-Z		
		DMK 21BF04-Z		
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		DMK 31BF03-Z.H		
		DFK 31BF03-Z.H		
		DBK 31BF03-Z.H		



Chainflex®

Tel. +49-2203-96 49-0  
Fax +49-2203-96 49-222

igus® GmbH  
51147 Köln, Germany

www.igus.eu  
info@igus.de







# Network

Network-/Ethernet-/FOC-cable



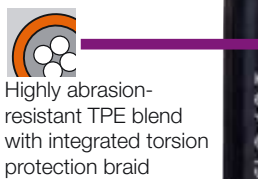
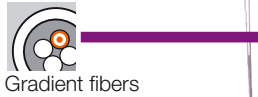
# Chainflex<sup>®</sup> ReadyCable<sup>®</sup>

	Cable type	Jacket	Page
Network-/Ethernet-/FOC-cable			
	<b>CFLG.6G</b> Gradient fiber glass cable	TPE	250
	<b>CFLG.12G</b> Gradient fiber glass cable	TPE	252
	<b>CAT5</b> Ethernet special cable	TPE	254
	<b>CAT6</b> Ethernet special cable	TPE	256

# TPE Fibre optic cable

## Chainflex® Fibre Optic

- Gradient glass-fiber cable for heavy-duty use
- TPE outer jacket
- halogen-free
- low-temperature-flexible up to -40 °C



	Temperature range moved	-40 °C to +60 °C, minimum bending radius 15 x d
	Temperature range fixed	-40 °C to +60 °C, minimum bending radius 8.5 x d
	v max. unsupported/gliding	10 m/s, 6 m/s
	a max.	20 m/s <sup>2</sup>
	UV-resistant	High
	Oil	Oil-resistant (following DIN EN 60811-2-1), bio-oil-resistant (following VDMA 24568)
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
	Halogen-free	Following EN 50267-2-1.
	Fibre cables	50/125 µm, 62.5/125 µm fibres in gel-filled hollow cores.
	Core stranding	Stranded GRP rods with integrated torsion protection braid in the outer jacket over gel-filled fiber sheath.
	Outer jacket	Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in Energy Chains®. Colour: black (similar to RAL 9005)
	CE	Following 2006/95/EG
	Lead free	Following EU guideline (RoHS) 2002/95/EC.

### Typical application area

- for maximum load requirements
- Maximum EMC protection, with high transmission qualities in terms of glass-specific requirements
- almost unlimited resistance to oil, also with bio-oils
- Indoor and outdoor applications
- only for freely suspended and gliding travel distances up to 500 m and more
- Outdoor ship to shore, crane applications, conveyer technology

... no minimum order quantity



Price index



CFLG.6G  
TPE  
15 x d

## Test data ▶ page 38

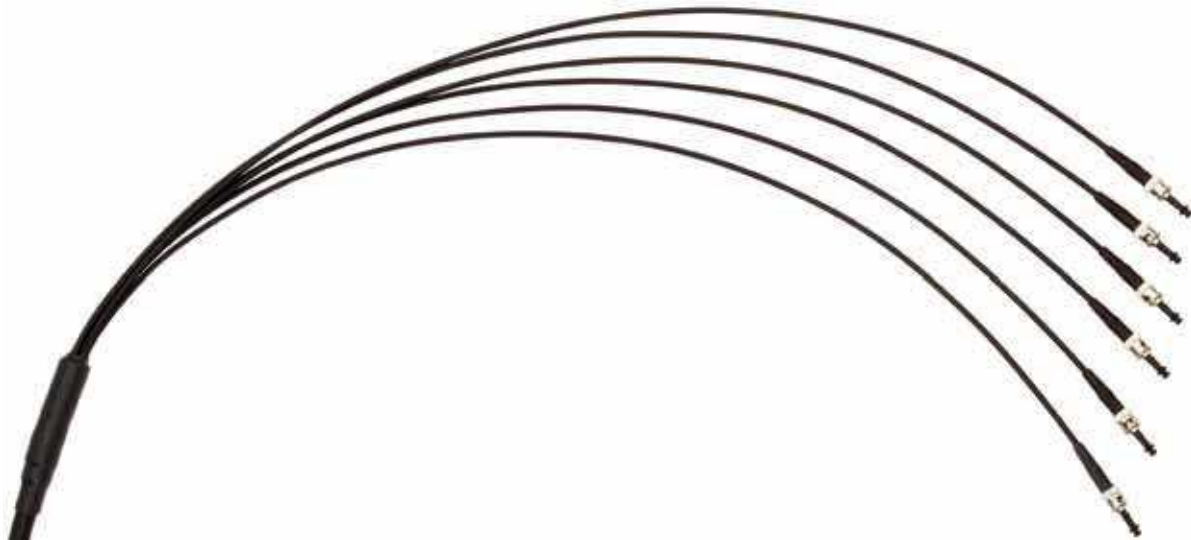
### Chainflex® TPE gradient glass-fiber cable

Delivery program

igus®  
Part No.

Number of cores and  
conductor nominal  
cross section [mm²]

∅  
[mm]

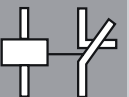


On both ends BFOC(ST) connectors	LWL9040030	6x50/125	11.5
On both ends BFOC(ST) connectors incl. conversion to SC	LWL9040031	6x50/125	11.5
On both ends BFOC(ST) connectors incl. conversion to LC	LWL9040032	6x50/125	11.5
On both ends BFOC(ST) connectors	LWL9040045	6x62.5/125	11.5
On both ends BFOC(ST) connectors incl. conversion to SC	LWL9040046	6x62.5/125	11.5
On both ends BFOC(ST) connectors incl. conversion to LC	LWL9040047	6x62.5/125	11.5

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

Chainflex®  
Fibre Optic

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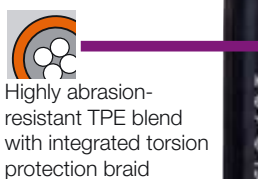
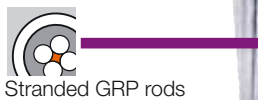
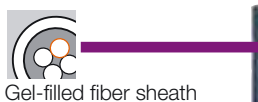
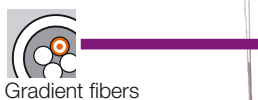


**850 types from stock no cutting costs ...**  
(for up to 10 cuts of the same type)

# TPE Fibre optic cable

## Chainflex® Fibre Optic

- Gradient glass-fiber cable for heavy-duty use
- TPE outer jacket
- halogen-free
- low-temperature-flexible up to -40 °C



	Temperature range moved	-40 °C to +60 °C, minimum bending radius 15 x d
	Temperature range fixed	-40 °C to +60 °C, minimum bending radius 8.5 x d
	v max. unsupported/gliding	10 m/s, 6 m/s
	a max.	20 m/s <sup>2</sup>
	UV-resistant	High
	Oil	Oil-resistant (following DIN EN 60811-2-1), bio-oil-resistant (following VDMA 24568)
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992).
	Halogen-free	Following EN 50267-2-1.
	Fibre cables	50/125 µm, 62.5/125 µm fibres in gel-filled hollow cores.
	Core stranding	Stranded GRP rods with integrated torsion protection braid in the outer jacket over gel-filled fiber sheath.
	Outer jacket	Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in Energy Chains®. Colour: black (similar to RAL 9005)
	CE	Following 2006/95/EG
	Lead free	Following EU guideline (RoHS) 2002/95/EC.

### Typical application area

- for maximum load requirements
- Maximum EMC protection, with high transmission qualities in terms of glass-specific requirements
- almost unlimited resistance to oil, also with bio-oils
- Indoor and outdoor applications
- only for freely suspended and gliding travel distances up to 500 m and more
- Outdoor ship to shore, crane applications, conveyer technology



Price index



CFLG.12G

TPE

15 x d

# Test data ▶ page 38

## Chainflex® TPE gradient glass-fiber cable

Delivery program

igus®  
Part No.

Number of cores and  
conductor nominal  
cross section [mm²]

∅  
[mm]

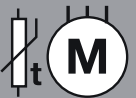
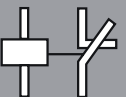


On both ends BFOC(ST) connectors	LWL9040060	12x50/125	11.5
On both ends BFOC(ST) connectors incl. conversion to SC	LWL9040061	12x50/125	11.5
On both ends BFOC(ST) connectors incl. conversion to LC	LWL9040062	12x50/125	11.5
On both ends BFOC(ST) connectors	LWL9040075	12x62.5/125	11.5
On both ends BFOC(ST) connectors incl. conversion to SC	LWL9040076	12x62.5/125	11.5
On both ends BFOC(ST) connectors incl. conversion to LC	LWL9040077	12x62.5/125	11.5

Note: The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

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**850 types from stock no cutting costs ...**  
(for up to 10 cuts of the same type)







# Chainflex® network technique

## CAT5 cables harnessed

### Technical information

- oil-resistant
- UV-resistant
- halogen-free
- external jacket on the basis of TPE
- **Shield:** extremely bending-resistant copper shield with greatest possible coverage over aluminium-coated plastic foil.
- **Temperature range (moved):** -35 °C to +70 °C

### Chainflex®-TPE Energy Chains® Ethernet special cable

Delivery program	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø [mm]	Bending radius
				
CAT5 – 4 pole Straight	CAT9040001	(2x2x0.25)C	7.0	12.5 x d
				
CAT5 – 8 pole Straight	CAT9040020	(4x2x0.15)C	8.0	12.5 x d
				
CAT5 – 8 pole Straight	CAT9040060	(4x2x0.15)C	8.0	12.5 x d
				
CAT5 – 8 pole Straight	CAT9040100	(4x2x0.15)C	8.0	12.5 x d
				
CAT5 – 8 pole Straight	CAT9040140	(4x2x0.15)C	8.0	12.5 x d
				
CAT5 – 8 pole Straight	CAT9040180	(4x2x0.15)C	8.0	12.5 x d

Note: The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
G = with green-yellow earth core    x = without earth core



## ... no minimum order quantity



- Minimum bending radius for use in Energy Chains®: 12.5 x cable diameter
- Colour: violet (similar to RAL 4001)

## Chainflex®-TPE Energy Chains® Ethernet special cable

Delivery program	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø [mm]	Bending radius
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CAT5 – 8 pole Cross-Over	CAT9040040	(4x2x0.15)C	8.0	12.5 x d
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CAT5 – 8 pole Cross-Over	CAT9040080	(4x2x0.15)C	8.0	12.5 x d
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CAT5 – 8 pole Cross-Over	CAT9040120	(4x2x0.15)C	8.0	12.5 x d
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CAT5 – 8 pole Cross-Over	CAT9040160	(4x2x0.15)C	8.0	12.5 x d
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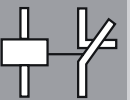


CAT5 – 8 pole Cross-Over	CAT9040200	(4x2x0.15)C	8.0	12.5 x d
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**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
 G = with green-yellow earth core    x = without earth core

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 (for up to 10 cuts of the same type)



# Chainflex® network technique

## CAT6 cables harnessed

### Technical information

- oil-resistant
- UV-resistant
- halogen-free
- external jacket on the basis of TPE
- **Shield:** extremely bending-resistant copper shield with greatest possible coverage over aluminium-coated plastic foil.
- **Temperature range (moved):** -35 °C to +70 °C

### Chainflex®-TPE Energy Chains® Ethernet special cable

Delivery program	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø [mm]	Bending radius
------------------	----------------	---	--------	----------------



CAT6 – 8 pole Straight	CAT9040600	(4x(2x0.14)C)C	10.0	12.5 x d
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CAT6 – 8 pole Straight	CAT9040640	(4x(2x0.14)C)C	10.0	12.5 x d
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CAT6 – 8 pole Straight	CAT9040680	(4x(2x0.14)C)C	10.0	12.5 x d
---------------------------	------------	----------------	------	----------

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
 G = with green-yellow earth core    x = without earth core



- Minimum bending radius for use in Energy Chains®:  
12.5 x cable diameter
- Colour: violet (similar to RAL 4001)

## Chainflex®-TPE Energy Chains® Ethernet special cable

Delivery program	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø [mm]	Bending radius
------------------	-------------------	--	--------	-------------------



CAT6 – 8 pole Cross-Over	CAT9040620	(4x(2x0.14)C)C	10.0	12.5 x d
-----------------------------	------------	----------------	------	----------



CAT6 – 8 pole Cross-Over	CAT9040660	(4x(2x0.14)C)C	10.0	12.5 x d
-----------------------------	------------	----------------	------	----------

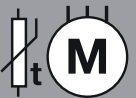
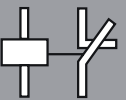


CAT6 – 8 pole Cross-Over	CAT9040700	(4x(2x0.14)C)C	10.0	12.5 x d
-----------------------------	------------	----------------	------	----------

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
G = with green-yellow earth core    x = without earth core

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(for up to 10 cuts of the same type)

# CF.INI

Initiators



# Chainflex® ReadyCable®

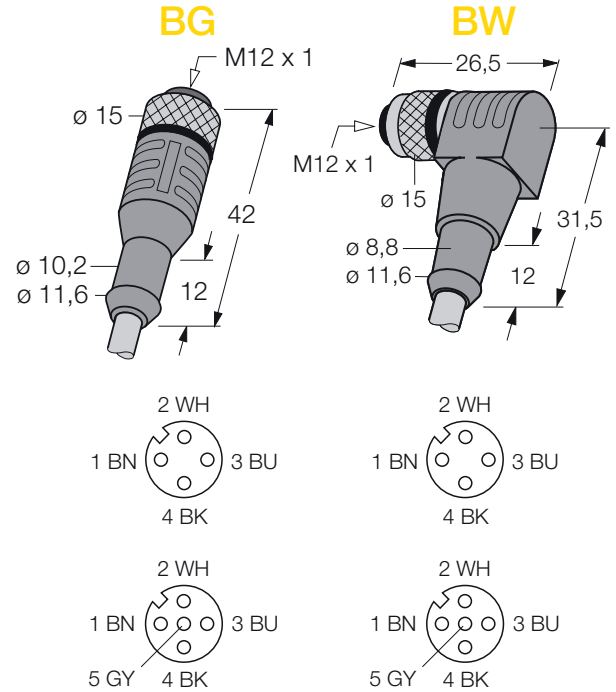
		Cable type	Jacket	Page
<b>Initiators CF9 - CF.INI (minimum bending radius 5 x d)</b>				
		Direct line M12 x 1, straight/angled	TPE	260
		Direct line M12 x 1, straight/angled, LED	TPE	261
		Connecting cable M12 x 1, straight/angled	TPE	262
		Direct line M8 x 1, straight/angled	TPE	263
		Direct line M8 x 1, angled, LED	TPE	264
		Connecting cable M8 x 1, straight/angled	TPE	265
<b>Initiators CF10 – CF.INI (minimum bending radius 5 x d) 360° shielded</b>				
		Direct line M12 x 1, straight/angled	TPE	266
		Connecting cable M12 x 1, straight/angled	TPE	267
<b>Initiators CF98 - CF.INI (minimum bending radius 4 x d)</b>				
		Direct line M12 x 1, straight/angled	TPE	268
		Connecting cable M12 x 1, straight/angled	TPE	269
		Direct line M8 x 1, straight/angled	TPE	270
		Connecting cable M8 x 1, straight/angled	TPE	271

## Chainflex® Sensor/actuator cables with 5xd for Energy Chains®

### Direct line M12 x 1:

### Socket with free cable end

Plug-type connector	Coupling, M12 x 1
Handle base	Plastic, PP, black
Union nut/screw	Metal, CuZn, nickel-plated
Contact base	Plastic, PP, black
Contacts	Metal, CuZn, gold-plated
Seal	Plastic, FPM (Viton)
Number of poles	4-pole
Ampacity	4 A
Rated voltage of a winding	max. 250 V
Number of poles	5-pole (4-pole + PE)
Ampacity	4 A
Rated voltage of a winding	max. 60 V
Insulation resistance	$\geq 10^9 \Omega$
Contact resistance	$\leq 5 \text{ m}\Omega$
Degree of soiling	3/2
Ambient temperature of plug-type connector	-40... +105 °C
Protection class	IP69K, in screwed state
Mechanical service life	max. 100 insertion cycles



CF9.03.04.INI* (4 x 0.34)	Part No.	Number of poles	Cable length [m]
Type			
CF.INI-P4-M12-BG-3	MAT9043700	4	3.0
CF.INI-P4-M12-BG-5	MAT9043701	4	5.0
CF.INI-P4-M12-BG-7	MAT9043702	4	7.0
CF.INI-P4-M12-BG-10	MAT9043703	4	10.0
CF.INI-P4-M12-BG-15	MAT9049426	4	15.0
CF9.03.05.INI* (5 x 0.34)			
CF.INI-P5-M12-BG-3	MAT9043737	5	3.0
CF.INI-P5-M12-BG-5	MAT9043738	5	5.0
CF.INI-P5-M12-BG-7	MAT9043739	5	7.0
CF.INI-P5-M12-BG-10	MAT9043740	5	10.0
CF.INI-P5-M12-BG-15	MAT90410077	5	15.0
CF9.03.04.INI* (4 x 0.34)			
CF.INI-P4-M12-BW-3	MAT9043704	4	3.0
CF.INI-P4-M12-BW-5	MAT9043705	4	5.0
CF.INI-P4-M12-BW-7	MAT9043706	4	7.0
CF.INI-P4-M12-BW-10	MAT9043707	4	10.0
CF.INI-P4-M12-BW-15	MAT9049430	4	15.0
CF9.03.05.INI* (5 x 0.34)			
CF.INI-P5-M12-BW-3	MAT9043742	5	3.0
CF.INI-P5-M12-BW-5	MAT9043743	5	5.0
CF.INI-P5-M12-BW-7	MAT9043744	5	7.0
CF.INI-P5-M12-BW-10	MAT9043745	5	10.0
CF.INI-P5-M12-BW-15	MAT90410078	5	15.0

\* Technical information ► page 78

**... no minimum order quantity**  
eplan download, configurator, PDF catalogues, lifetime ...



## Direct line M12 x 1: Socket with LED and free cable end

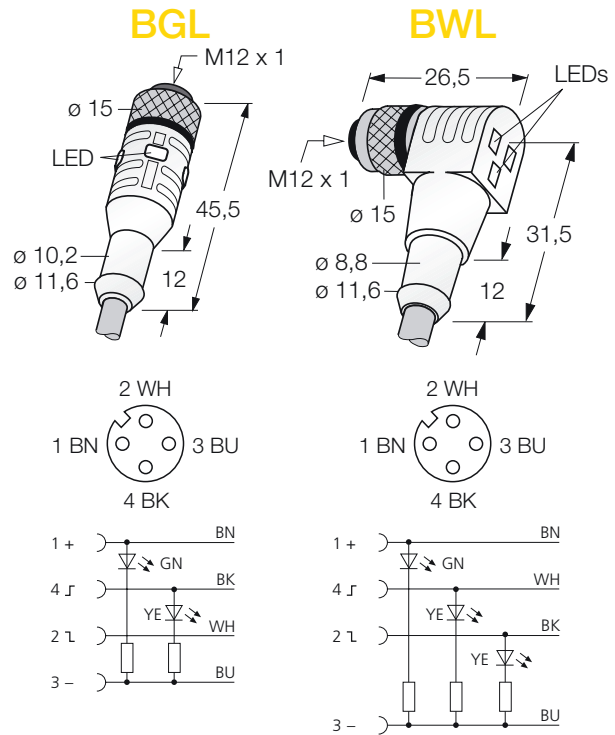
Plug-type connector	Coupling, M12 x 1
Handle base	Plastic, TPU, transparent
Union nut/screw	Metal, CuZn, nickel-plated
Contact base	Plastic, PA6GF, transparent
Contacts	Metal, CuZn, gold-plated
Seal	Plastic, FPM (Viton)

Number of poles	4-pole
Ampacity	4 A
Rated voltage of a winding	10...30 V

Insulation resistance	≥ 10 <sup>9</sup> Ω
Contact resistance	≤ 5 mΩ
Degree of soiling	3/2

Operating voltage display	LED green
Switching state display	LED yellow/yellow
Switching function	pnp

Ambient temperature of plug-type connector	-40... +105 °C
Protection class	IP66, in screwed state
Mechanical service life	max. 100 insertion cycles



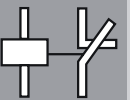
CF9.03.04.INI* (4 x 0.34) Type	Part No.	Number of poles	Cable length [m]
CF.INI-P4-M12-BGL2-3	MAT9043708	4	3.0
CF.INI-P4-M12-BGL2-5	MAT9043709	4	5.0
CF.INI-P4-M12-BGL2-7	MAT9043710	4	7.0
CF.INI-P4-M12-BGL2-10	MAT9043711	4	10.0
CF.INI-P4-M12-BGL2-15	MAT90410087	4	15.0



CF9.03.04.INI* (4 x 0.34) Type	Part No.	Number of poles	Cable length [m]
CF.INI-P4-M12-BWL3-3	MAT9043712	4	3.0
CF.INI-P4-M12-BWL3-5	MAT9043713	4	5.0
CF.INI-P4-M12-BWL3-7	MAT9043714	4	7.0
CF.INI-P4-M12-BWL3-10	MAT9043715	4	10.0
CF.INI-P4-M12-BWL3-15	MAT90410088	4	15.0



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## Chainflex® Sensor/actuator cables with 5xd for Energy Chains®

### Connection cable M12 x 1: Socket, cable end with pin

Plug-type connector  
Handle base  
Union nut/screw  
Contact base  
Contacts  
Seal

Coupling, M12 x 1  
Plastic, PP, black  
Metal, CuZn, nickel-plated  
Plastic, PP, black  
Metal, CuZn, gold-plated  
Plastic, FPM (Viton)

Plug-type connector  
Handle base  
Union nut/screw  
Contact base  
Contacts

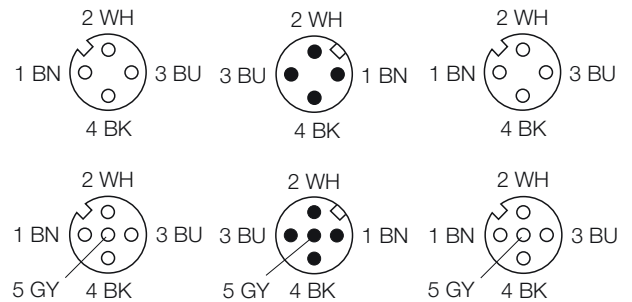
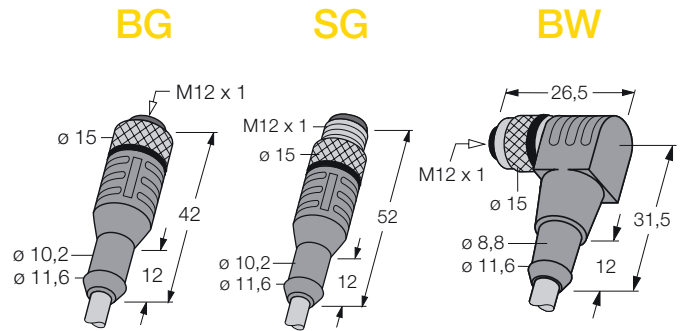
Connector, M12 x 1  
Plastic, PP, black  
Metal, CuZn, nickel-plated  
Plastic, TPU, black  
Metal, CuZn, gold-plated

Rated voltage of a winding  
Ampacity  
Insulation resistance  
Contact resistance  
Degree of soiling

4-pole: max. 250 V  
5-pole (4-pole+PE): max. 60 V  
4 A  
 $\geq 10^9 \Omega$   
 $\leq 5 \text{ m}\Omega$   
3/2

Ambient temperature of  
plug-type connector  
Protection class  
Mechanical service life

-40 ... +105 °C  
IP69K, in screwed state  
max. 100 insertion cycles



CF9.03.04.INI* (4 x 0.34)	Part No.	Number of poles	Cable length [m]
CF.INI-P4-M12-BG / M12-SG-2	MAT90410312	4	2.0
CF.INI-P4-M12-BG / M12-SG-5	MAT90410313	4	5.0
CF.INI-P4-M12-BG / M12-SG-10	MAT90410314	4	10.0

CF9.03.05.INI* (5 x 0.34)	Part No.	Number of poles	Cable length [m]
CF.INI-P5-M12-BG / M12-SG-2	MAT90410339	5	2.0
CF.INI-P5-M12-BG / M12-SG-5	MAT90410340	5	5.0
CF.INI-P5-M12-BG / M12-SG-10	MAT90410341	5	10.0



CF9.03.04.INI* (4 x 0.34)	Part No.	Number of poles	Cable length [m]
CF.INI-P4-M12-BW / M12-SG-2	MAT90410315	4	2.0
CF.INI-P4-M12-BW / M12-SG-5	MAT90410316	4	5.0
CF.INI-P4-M12-BW / M12-SG-10	MAT90410317	4	10.0

CF9.03.05.INI* (5 x 0.34)	Part No.	Number of poles	Cable length [m]
CF.INI-P5-M12-BW / M12-SG-2	MAT90410342	5	2.0
CF.INI-P5-M12-BW / M12-SG-5	MAT90410343	5	5.0
CF.INI-P5-M12-BW / M12-SG-10	MAT90410344	5	10.0

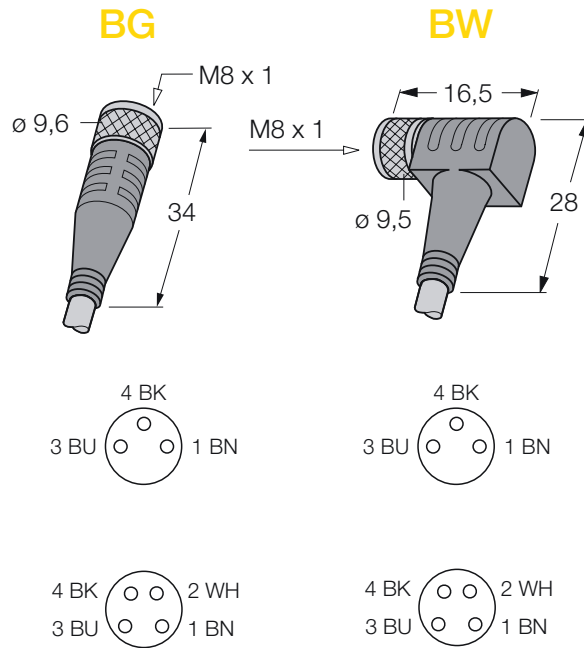
\* Technical information ► page 78





## Direct line M8 x 1: Socket with free cable end

Plug-type connector	Coupling, M8 x 1
Handle base	Plastic, PP, black
Union nut/screw	Metal, CuZn, nickel-plated
Contact base	Plastic, PP, black
Contacts	Metal, CuZn, gold-plated
Seal	Plastic, FPM (Viton)
Number of poles	3-pole
Ampacity	4 A
Rated voltage of a winding	max. 60 V
Number of poles	4-pole
Ampacity	4 A
Rated voltage of a winding	max. 30 V
Insulation resistance	≥ 10 <sup>9</sup> Ω
Contact resistance	≤ 5 mΩ
Degree of soiling	3/2
Ambient temperature of plug-type connector	-40 ... +105 °C
Protection class	IP69K, in screwed state
Mechanical service life	max. 100 insertion cycles



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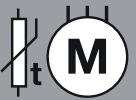
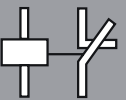
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Type	Part No.	Number of poles	Cable length [m]
<b>CF9.02.03.INI* (3 x 0.25)</b>			
CF.INI-P3-M8-BG-3	MAT9043716	3	3.0
CF.INI-P3-M8-BG-5	MAT9043717	3	5.0
CF.INI-P3-M8-BG-7	MAT9043718	3	7.0
CF.INI-P3-M8-BG-10	MAT9043719	3	10.0
CF.INI-P3-M8-BG-15	MAT9049416	3	15.0
<b>CF9.03.04.INI* (4 x 0.34)</b>			
CF.INI-P4-M8-BG-3	MAT9043728	4	3.0
CF.INI-P4-M8-BG-5	MAT9043729	4	5.0
CF.INI-P4-M8-BG-7	MAT9043730	4	7.0
CF.INI-P4-M8-BG-10	MAT9043731	4	10.0
CF.INI-P4-M8-BG-15	MAT9049466	4	15.0
<b>CF9.02.03.INI* (3 x 0.25)</b>			
CF.INI-P3-M8-BW-3	MAT9043724	3	3.0
CF.INI-P3-M8-BW-5	MAT9043725	3	5.0
CF.INI-P3-M8-BW-7	MAT9043726	3	7.0
CF.INI-P3-M8-BW-10	MAT9043727	3	10.0
CF.INI-P3-M8-BW-15	MAT9049419	3	15.0
<b>CF9.03.04.INI* (4 x 0.34)</b>			
CF.INI-P4-M8-BW-3	MAT9043732	4	3.0
CF.INI-P4-M8-BW-5	MAT9043733	4	5.0
CF.INI-P4-M8-BW-7	MAT9043734	4	7.0
CF.INI-P4-M8-BW-10	MAT9043735	4	10.0
CF.INI-P4-M8-BW-15	MAT9049467	4	15.0

\* Technical information ► page 78

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... and order online ► [www.igus.eu/en/CFINI](http://www.igus.eu/en/CFINI) (for up to 10 cuts of the same type)





## Chainflex® Sensor/actuator cables with 5xd for Energy Chains®

### Direct line M8 x 1:

### Socket with LED and free cable end

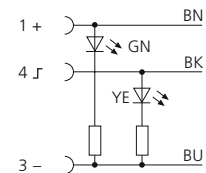
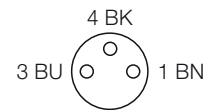
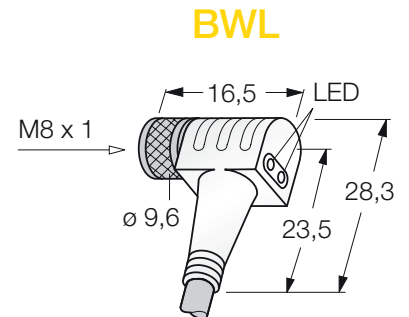
Plug-type connector	Coupling, M8 x 1
Handle base	Plastic, TPU, transparent
Union nut/screw	Metal, CuZn, nickel-plated
Contact base	Plastic, PA6GF, black
Contacts	Metal, CuZn, gold-plated
Seal	Plastic, FPM (Viton)

Number of poles	3-pole
Ampacity	4 A
Rated voltage of a winding	10...30 V

Insulation resistance	$\geq 10^9 \Omega$
Contact resistance	$\leq 5 \text{ m}\Omega$
Degree of soiling	3/2

Operating voltage display	LED green
Switching state display	LED yellow
Switching function	pnp

Ambient temperature of plug-type connector	-40... +105 °C
Protection class	IP66K, in screwed state
Mechanical service life	max. 100 insertion cycles



CF9.02.03.INI* (3 x 0.25)	Part No.	Number of poles	Cable length [m]
<b>Type</b>			
CF.INI-P3-M8-BWL2-3	MAT9043720	3	3.0
CF.INI-P3-M8-BWL2-5	MAT9043721	3	5.0
CF.INI-P3-M8-BWL2-7	MAT9043722	3	7.0
CF.INI-P3-M8-BWL2-10	MAT9043723	3	10.0
CF.INI-P3-M8-BWL2-15	MAT90410196	3	15.0

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## Connection cable M8 x 1: Socket, cable end with pin

Plug-type connector  
 Handle base  
 Union nut/screw  
 Contact base  
 Contacts  
 Seal

Coupling, M8 x 1  
 Plastic, PP, black  
 Metal, CuZn, nickel-plated  
 Plastic, PP, black  
 Metal, CuZn, gold-plated  
 Plastic, FPM (Viton)

Plug-type connector  
 Handle base  
 Union nut/screw  
 Contact base  
 Contacts

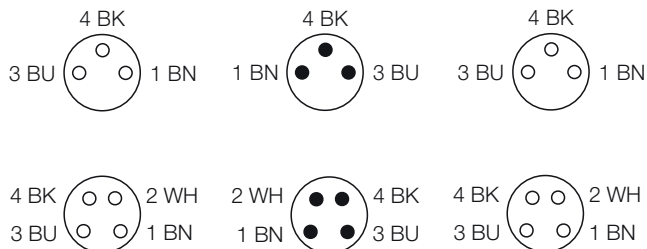
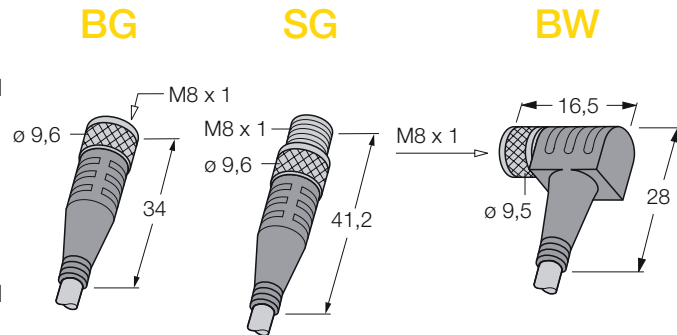
Connector, M8 x 1  
 Plastic, PP, black  
 Metal, CuZn, nickel-plated  
 Plastic, PP, black  
 Metal, CuZn, gold-plated

Rated voltage of a winding  
 Ampacity  
 Insulation resistance  
 Contact resistance  
 Degree of soiling

3-pole: max. 60 V  
 4-pole: max. 30 V  
 4 A  
 $\geq 10^9 \Omega$   
 $\leq 5 m\Omega$   
 3/2

Ambient temperature of  
 plug-type connector  
 Protection class  
 Mechanical service life

-40... +105 °C  
 IP69K, in screwed state  
 max. 100 insertion cycles

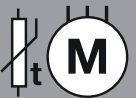
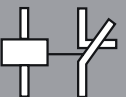


Type	Part No.	Number of poles	Cable length [m]
<b>CF9.02.03.INI* (3 x 0.25)</b>			
CF.INI-P3-M8-BG / M8-SG-2	MAT90410324	3	2.0
CF.INI-P3-M8-BG / M8-SG-5	MAT90410325	3	5.0
CF.INI-P3-M8-BG / M8-SG-10	MAT90410326	3	10.0
<b>CF9.03.04.INI* (4 x 0.34)</b>			
CF.INI-P4-M8-BG / M8-SG-2	MAT90410333	4	2.0
CF.INI-P4-M8-BG / M8-SG-5	MAT90410334	4	5.0
CF.INI-P4-M8-BG / M8-SG-10	MAT90410335	4	10.0
<b>CF9.02.03.INI* (3 x 0.25)</b>			
CF.INI-P3-M8-BW / M8-SG-2	MAT90410330	3	2.0
CF.INI-P3-M8-BW / M8-SG-5	MAT90410331	3	5.0
CF.INI-P3-M8-BW / M8-SG-10	MAT90410332	3	10.0
<b>CF9.03.04.INI* (4 x 0.34)</b>			
CF.INI-P4-M8-BW / M8-SG-2	MAT90410336	4	2.0
CF.INI-P4-M8-BW / M8-SG-5	MAT90410337	4	5.0
CF.INI-P4-M8-BW / M8-SG-10	MAT90410338	4	10.0

\* Technical information ► page 78

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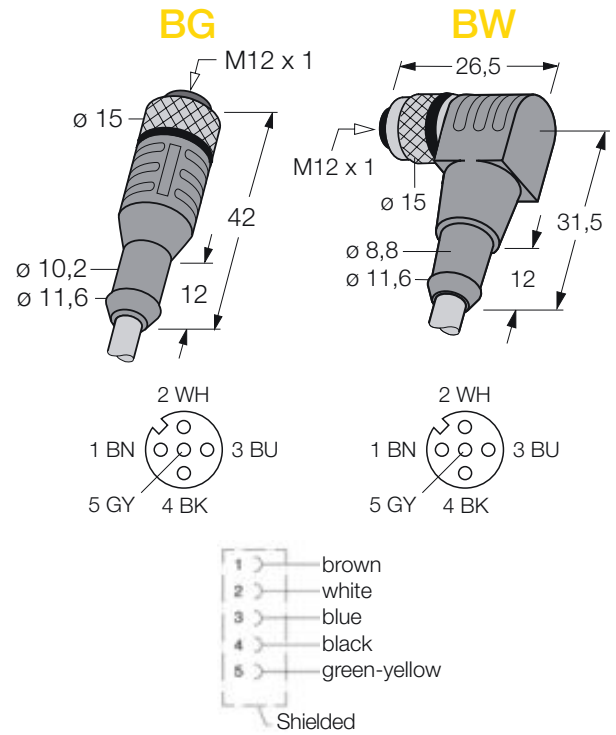


## Chainflex® Sensor/actuator cables with 5xd for Energy Chains®

Direct line 360° shielded, M12 x 1:

Socket with free cable end

Plug-type connector	Coupling, M12 x 1
Handle base	Plastic, PP, black
Union nut/screw	Metal, CuZn, nickel-plated
Contact base	Plastic, PP, black
Contacts	Metal, CuZn, gold-plated
Seal	Plastic, FPM (Viton)
Number of poles	5-pole (4-pole + PE)
Ampacity	4 A
Rated voltage of a winding	max. 60 V
Insulation resistance	$\geq 10^9 \Omega$
Contact resistance	$\leq 5 \text{ m}\Omega$
Degree of soiling	3/2
Ambient temperature of plug-type connector	-40... +105 °C
Protection class	IP69K, in screwed state
Mechanical service life	max. 100 insertion cycles



### CF10.03.05.INI\* (5 x 0,34)C

Type

Type	Part No.	Number of poles	Cable length [m]
CF10.INI-P5-C-M12-BG-3	MAT90424072	5	3,0
CF10.INI-P5-C-M12-BG-5	MAT90424073	5	5,0
CF10.INI-P5-C-M12-BG-7	MAT90424074	5	7,0
CF10.INI-P5-C-M12-BG-10	MAT90424075	5	10,0
CF10.INI-P5-C-M12-BG-15	MAT90424076	5	15,0



### CF10.03.05.INI\* (5 x 0,34)C

CF10.INI-P5-C-M12-BW-3	MAT90424077	5	3,0
CF10.INI-P5-C-M12-BW-5	MAT90424078	5	5,0
CF10.INI-P5-C-M12-BW-7	MAT90424079	5	7,0
CF10.INI-P5-C-M12-BW-10	MAT90424080	5	10,0
CF10.INI-P5-C-M12-BW-15	MAT90424081	5	15,0

\* Technical information ► page 82



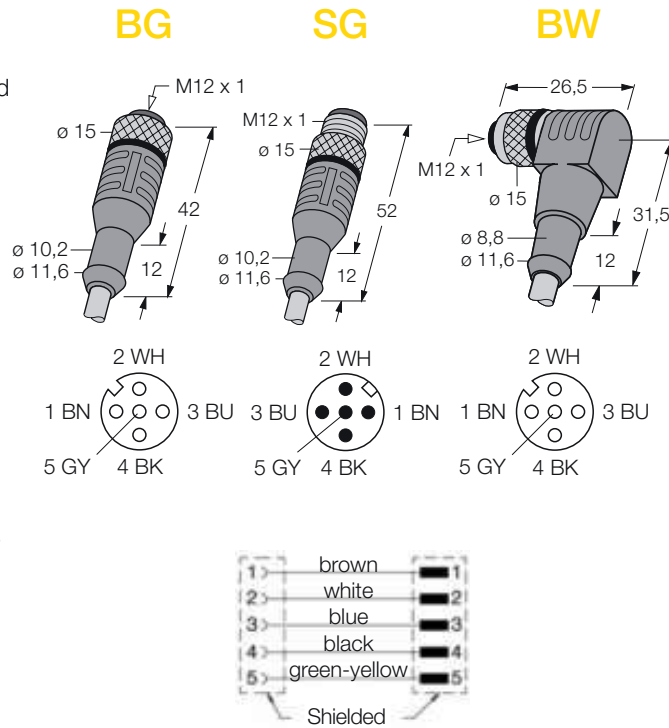


## Chainflex® Sensor/actuator cables with 5xd for Energy Chains®

Connection cable 360° shielded, M12 x 1:

Socket, cable end with pin

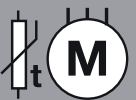
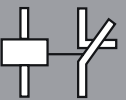
Plug-type connector	Coupling, M12 x 1
Handle base	Plastic, PP, black
Union nut/screw	Metal, CuZn, nickel-plated
Contact base	Plastic, PP, black
Contacts	Metal, CuZn, gold-plated
Seal	Plastic, FPM (Viton)
Number of poles	5-pole (4-pole + PE)
Ampacity	4 A
Rated voltage of a winding	max. 60 V
Insulation resistance	≥ 10 <sup>9</sup> Ω
Contact resistance	≤ 5 mΩ
Degree of soiling	3/2
Ambient temperature of plug-type connector	-40... +105 °C
Protection class	IP69K, in screwed state
Mechanical service life	max. 100 insertion cycles



CF10.03.05.INI* (5 x 0,34)C Type	Part No.	Number of poles	Cable length [m]
CF10.INI-P5-C-M12-BG/ M12-SG-2	MAT90424082	5	2,0
CF10.INI-P5-C-M12-BG/M12-SG-5	MAT90424083	5	5,0
CF10.INI-P5-C-M12-BG/M12-SG-10	MAT90424084	5	10,0

CF10.03.05.INI* (5 x 0,34)C Type	Part No.	Number of poles	Cable length [m]
CF10.INI-P5-C-M12-BW/M12-SG-2	MAT90424085	5	2,0
CF10.INI-P5-C-M12-BW/M12-SG-5	MAT90424086	5	5,0
CF10.INI-P5-C-M12-BW/M12-SG-10	MAT90424087	5	10,0

\* Technical information ► page 82



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(for up to 10 cuts of the same type)

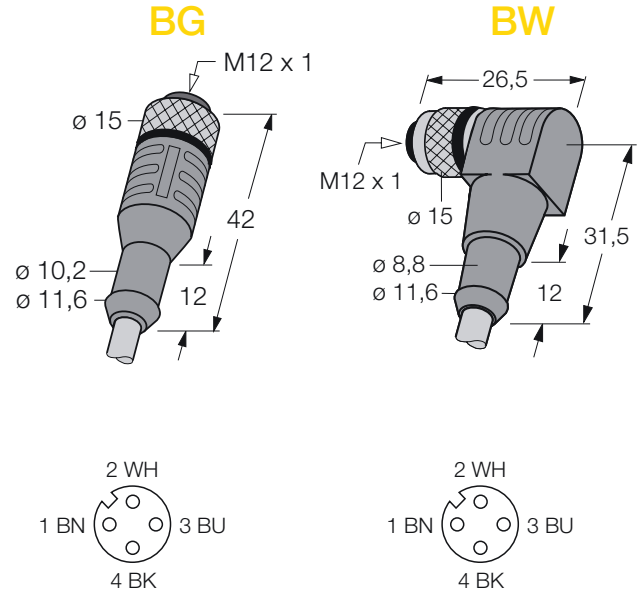
# CF.INI

## Chainflex® Sensor/actuator cables with 4xd for Energy Chains®

### Direct line M12 x 1:

### Socket with free cable end

Plug-type connector	Coupling, M12 x 1
Handle base	Plastic, PP, black
Union nut/screw	Metal, CuZn, nickel-plated
Contact base	Plastic, PP, black
Contacts	Metal, CuZn, gold-plated
Seal	Plastic, FPM (Viton)
Number of poles	4-pole
Ampacity	4 A
Rated voltage of a winding	max. 250 V
Insulation resistance	$\geq 10^9 \Omega$
Contact resistance	$\leq 5 \text{ m}\Omega$
Degree of soiling	3/2
Ambient temperature of plug-type connector	-40 ... +105 °C
Protection class	IP69K, in screwed state
Mechanical service life	max. 100 insertion cycles



CF98.03.04.INI* (4 x 0.34) Type	Part No.	Number of poles	Cable length [m]
CF98.INI-P4-M12-BG-3	MAT90410235	4	3.0
CF98.INI-P4-M12-BG-5	MAT90410236	4	5.0
CF98.INI-P4-M12-BG-7	MAT90410237	4	7.0
CF98.INI-P4-M12-BG-10	MAT90410238	4	10.0
CF98.INI-P4-M12-BG-15	MAT90410239	4	15.0



CF98.03.04.INI* (4 x 0.34) Type	Part No.	Number of poles	Cable length [m]
CF98.INI-P4-M12-BW-3	MAT90410240	4	3.0
CF98.INI-P4-M12-BW-5	MAT90410241	4	5.0
CF98.INI-P4-M12-BW-7	MAT90410242	4	7.0
CF98.INI-P4-M12-BW-10	MAT90410243	4	10.0
CF98.INI-P4-M12-BW-15	MAT90410244	4	15.0

\* Technical information ► page 94





## Connection cable M12 x 1: Socket, cable end with pin

Plug-type connector  
 Handle base  
 Union nut/screw  
 Contact base  
 Contacts  
 Seal

Coupling, M12 x 1  
 Plastic, PP, black  
 Metal, CuZn, nickel-plated  
 Plastic, TPU, black  
 Metal, CuZn, gold-plated  
 Plastic, FPM (Viton)

Plug-type connector  
 Handle base  
 Union nut/screw  
 Contact base  
 Contacts

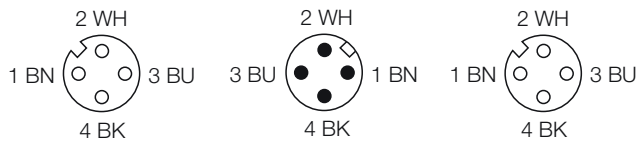
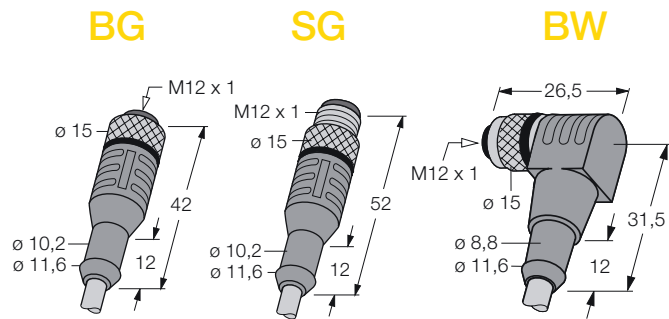
Connector, M12x1  
 Plastic, PP, black  
 Metal, CuZn, nickel-plated  
 Plastic, TPU, black  
 Metal, CuZn, gold-plated

Rated voltage of a winding  
 Ampacity  
 Insulation resistance  
 Contact resistance  
 Degree of soiling

4-pole: max. 250V  
 4A  
 $\geq 10^9 \Omega$   
 $\leq 5 \text{ m}\Omega$   
 3/2

Ambient temperature of  
 plug-type connector  
 Protection class  
 Mechanical service life

-40...+105 °C  
 IP69K, in screwed state  
 max. 100 insertion cycles



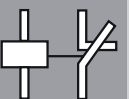
CF98.03.04.INI* (4 x 0.34) Type	Part No.	Number of poles	Cable length [m]
CF98.INI-P4-M12-BG / M12-SG-2	MAT90410300	4	2.0
CF98.INI-P4-M12-BG / M12-SG-5	MAT90410301	4	5.0
CF98.INI-P4-M12-BG / M12-SG-10	MAT90410302	4	10.0

CF98.03.04.INI* (4 x 0.34)	Part No.	Number of poles	Cable length [m]
CF98.INI-P4-M12-BW / M12-SG-2	MAT90410303	4	2.0
CF98.INI-P4-M12-BW / M12-SG-5	MAT90410304	4	5.0
CF98.INI-P4-M12-BW / M12-SG-10	MAT90410305	4	10.0

\* Technical information ► page 94

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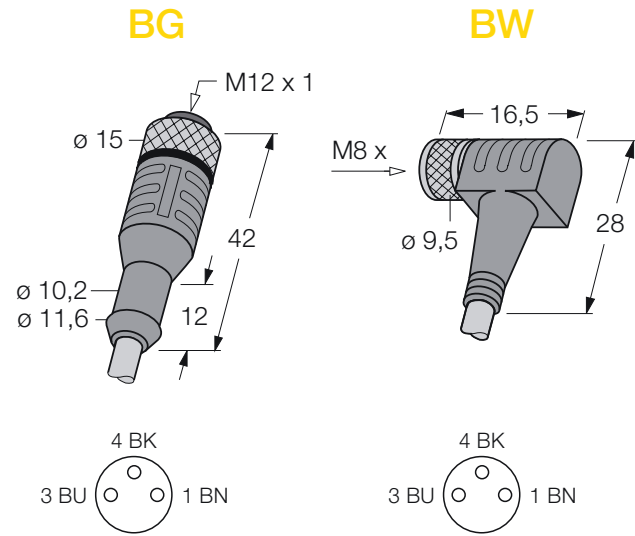
# CF.INI

## Chainflex® Sensor/actuator cables with 4xd for Energy Chains®

### Direct line M8 x 1:

### Socket with free cable end

Plug-type connector	Coupling, M8 x 1
Handle base	Plastic, PP, black
Union nut/screw	Metal, CuZn, nickel-plated
Contact base	Plastic, PP, black
Contacts	Metal, CuZn, gold-plated
Seal	Plastic, FPM (Viton)
Number of poles	3-pole
Ampacity	4 A
Rated voltage of a winding	max. 60 V
Insulation resistance	≥10 <sup>9</sup> Ω
Contact resistance	≤5 mΩ
Degree of soiling	3/2
Ambient temperature of plug-type connector	-40 ... +105 °C
Protection class	IP69K, in screwed state
Mechanical service life	max. 100 insertion cycles



CF98.02.03.INI* (3 x 0.25) Type	Part No.	Number of poles	Cable length [m]
CF98.INI-P3-M8-BG-3	MAT90410245	3	3.0
CF98.INI-P3-M8-BG-5	MAT90410246	3	5.0
CF98.INI-P3-M8-BG-7	MAT90410247	3	7.0
CF98.INI-P3-M8-BG-10	MAT90410248	3	10.0
CF98.INI-P3-M8-BG-15	MAT90410249	3	15.0



CF98.02.03.INI* (3 x 0.25)	Part No.	Number of poles	Cable length [m]
CF98.INI-P3-M8-BW-3	MAT90410250	3	3.0
CF98.INI-P3-M8-BW-5	MAT90410251	3	5.0
CF98.INI-P3-M8-BW-7	MAT90410252	3	7.0
CF98.INI-P3-M8-BW-10	MAT90410253	3	10.0
CF98.INI-P3-M8-BW-15	MAT90410254	3	15.0

\* Technical information ► page 94



... no minimum order quantity

eplan download, configurator, PDF catalogues, lifetime ...



## Connection cable M8 x 1: Socket, cable end with pin

Plug-type connector  
Handle base  
Union nut/screw  
Contact base  
Contacts  
Seal

Coupling, M8 x 1  
Plastic, PP, black  
Metal, CuZn, nickel-plated  
Plastic, TPU, black  
Metal, CuZn, gold-plated  
Plastic, FPM (Viton)

Plug-type connector  
Handle base  
Union nut/screw  
Contact base  
Contacts

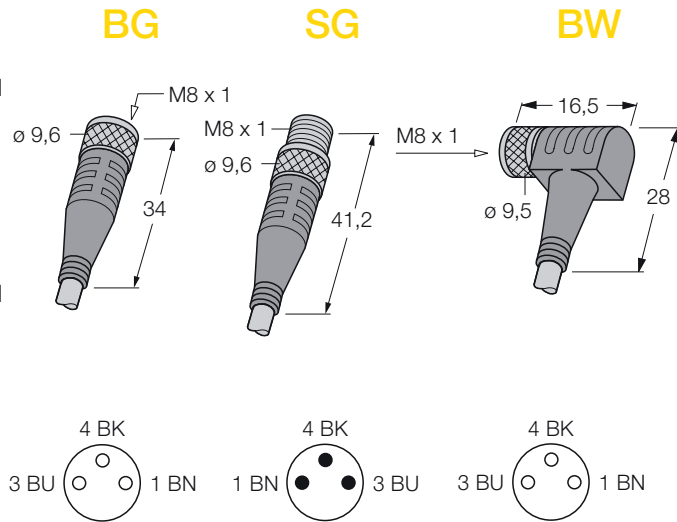
Connector, M8 x 1  
Plastic, PP, black  
Metal, CuZn, nickel-plated  
Plastic, PP, black  
Metal, CuZn, gold-plated

Rated voltage of a winding  
Ampacity  
Insulation resistance  
Contact resistance  
Degree of soiling

3-pole: max. 60 V  
4A  
 $\geq 10^9 \Omega$   
 $\leq 5 \text{ m}\Omega$   
3/2

Ambient temperature of  
plug-type connector  
Protection class  
Mechanical service life

-40...+105 °C  
IP69K, in screwed state  
max. 100 insertion cycles

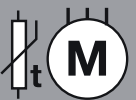
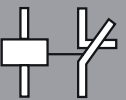


CF98.02.03.INI* (3 x 0.25) Type	Part No.	Number of poles	Cable length [m]
CF98.INI-P3-M8-BG / M8-SG-2	MAT90410306	3	2.0
CF98.INI-P3-M8-BG / M8-SG-5	MAT90410307	3	5.0
CF98.INI-P3-M8-BG / M8-SG-10	MAT90410308	3	10.0



CF98.02.03.INI* (3 x 0.25) Type	Part No.	Number of poles	Cable length [m]
CF98.INI-P3-M8-BW / M8-SG-2	MAT90410309	3	2.0
CF98.INI-P3-M8-BW / M8-SG-5	MAT90410310	3	5.0
CF98.INI-P3-M8-BW / M8-SG-10	MAT90410311	3	10.0

\* Technical information ► page 94







# Drive technology





Harnessed according to standard      Cable type      Jacket      Page

## Cables for Drive Technology

		<b>Siemens – Selection for part no. and material</b>	276
	Siemens	Servo cable	PUR/PVC 278
	Siemens	Power cable	TPE/PVC 282
	Siemens	Signal cables/encoder	TPE/PVC 286
		<b>Lenze – Selection for part no. and material</b>	294
	Lenze	Servo cable	PUR/PVC 296
	Lenze	Power cable	PUR/PVC 300
	Lenze	Signal cables/encoder (Resolver)	TPE/PVC 304
	Lenze	Signal cables/encoder (Encoder)	TPE/PVC 308
	Lenze	Signal cables/encoder (Feedback)	TPE/PVC 312
	Lenze	Signal cables/encoder (Decoder)	TPE/PVC 316
	Lenze	Control cable (Fan)	TPE/PVC 320
		<b>Rexroth – Selection for part no. and material</b>	324
	Rexroth	Servo cable	PUR/PVC 326
	Rexroth	Signal cables/encoder	TPE/PVC 334
		<b>Fanuc – Selection for part no. and material</b>	338
	Fanuc	Servo cable	PUR 340
	Fanuc	Signal cables/encoder	TPE 344
		<b>SEW – Selection for part no. and material</b>	348
	SEW	Servo cable	PUR/PVC 350
	SEW	Power cable	TPE/PVC 354
	SEW	Signal cables/encoder	TPE/PVC 358

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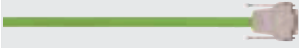
# Chainflex<sup>®</sup> ReadyCable<sup>®</sup>



Harnessed  
according to standard      Cable type      Jacket      Page

## Cables for Drive Technology

**Heidenhain – Selection for part no. and material** 362

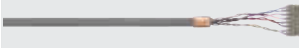


**Heidenhain**      Signal cables/encoder      PUR/TPE      364

**ELAU – Selection for part no. and material** 368

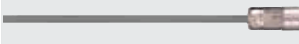


**ELAU**      Servo cable      PVC/PUR      370



**ELAU**      Signal cables/encoder      PVC/TPE      372

**Danaher Motion – Selection for part no. and material** 374



**Danaher Motion**      Signal cables/encoder      PVC/TPE      376

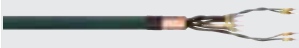


**Danaher Motion**      Servo cable      PVC/PUR      380

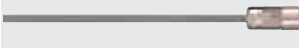


**Danaher Motion**      Power cable      PVC/TPE      384

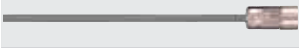
**B&R – Selection for part no. and material** 388



**B&R**      Servo cable      PVC/PUR      390



**B&R**      Signal cables/encoder (Resolver)      PVC/TPE      392



**B&R**      Signal cables/encoder (EnDat)      PVC/TPE      394

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# Chainflex® ReadyCable®



SIEMENS – Selection table according to Siemens part numbers and sheath materials. You will find your basic cable in the left column, the respective extension on the right.

Basic cable	Outer jacket material on page				Extension cable	Outer jacket material on page		
	PVC	PUR	TPE			PVC	PUR	TPE
6FX8002-1DC00			288					
6FX8002-2AD00	290		286	▶	6FX8002-2AD04	293		289
6FX8002-2AH00	292		288	▶	6FX8002-2AH04	293		289
6FX8002-2CA11	290		286	▶	6FX8002-2CB54	293		289
6FX8002-2CA15	290		286	▶	6FX8002-2CA54	293		289
6FX8002-2CA31	290		286	▶	6FX8002-2CA34	293		289
6FX8002-2CA51	290		286	▶	6FX8002-2CA54	293		289
6FX8002-2CA71	290		286					
6FX8002-2CB31			286	▶	6FX8002-2CB34			289
6FX8002-2CB51	290		287	▶	6FX8002-2CC14	293		289
6FX8002-2CC11	290		287	▶	6FX8002-2CB54	293		289
6FX8002-2CD01	290		287	▶	6FX8002-2CB54	293		289
6FX8002-2CF01	291		287					
6FX8002-2CF02	291		287	▶	6FX8002-2CF04	293		289
6FX8002-2CG00	291		287	▶	6FX8002-2CB54	293		289
6FX8002-2CH00	291		287	▶	6FX8002-2AD04	293		289
6FX8002-2CK00	291		287					
6FX8002-2CL00	291		288					
6FX8002-2DC10			288					
6FX8002-2DC20			288					
6FX8002-2EQ00	292		288					
6FX8002-2EQ10	292		288	▶	6FX8002-2EQ14	293		289
6FX8002-5CA01	284		282	▶	6FX8002-5CA05	285		283
6FX8002-5CA11	284		282	▶	6FX8002-5CA15	285		283
6FX8002-5CA21	284		282	▶	6FX8002-5CA28	285		283
6FX8002-5CA23	284		282	▶	6FX8002-5CX28	285		283
6FX8002-5CA31	284		282	▶	6FX8002-5CA38	285		283
6FX8002-5CA41	284		282	▶	6FX8002-5CA48	285		283
6FX8002-5CA51	284		282	▶	6FX8002-5CA58	285		283
6FX8002-5CA61	284		282	▶	6FX8002-5CA68	285		283
6FX8002-5CS01	284		282					
6FX8002-5CS21	284		282					
6FX8002-5CS31	284		282					
6FX8002-5DA01	280	278		▶	6FX8002-5DA05	281	279	
6FX8002-5DA11	280	278		▶	6FX8002-5DA15	281	279	
6FX8002-5DA21	280	278		▶	6FX8002-5DA28	281	279	
6FX8002-5DA23	280	278		▶	6FX8002-5DX28	281	279	
6FX8002-5DA31	280	278		▶	6FX8002-5DA38	281	279	
6FX8002-5DA33	280	278		▶	6FX8002-5DX38	281	279	
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6FX8002-5DA61	280	278		▶	6FX8002-5DA68	281	279	
6FX8002-5DS01	280	278						
6FX8002-5DS21	280	278						
6FX8002-5DS61	280	278						

# Chainflex® ReadyCable®



## SIEMENS



**Chainflex® PVC cables for the woodworking industry, for example**

### Typical application area – PVC

- for high load requirements
- light oil influence
- preferably indoor applications, but also outdoor ones at temperatures > 5 °C
- especially for freely suspended and gliding travel distances up to 100 m
- Storage and retrieval units for high-bay warehouses, machining units/packaging machines, quick handling, indoor cranes, timber processing



**Chainflex® PUR cables for the tooling machine industry, for example**

### Typical application area – PUR

- for maximum load requirements
- almost unlimited resistance to oil
- Indoor and outdoor applications, UV-resistant
- especially for freely suspended and gliding travel distances up to 100 m
- Storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, clean room, semiconductor insertion, outdoor cranes, low-temperature applications



**Chainflex® TPE cables for outdoor use, for example**

### Typical application area – TPE

- for maximum load requirements
- almost unlimited resistance to oil, also with bio-oils
- Indoor and outdoor applications, UV-resistant
- especially for freely suspended and gliding travel distances up to 400 m and more
- Storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, clean room, semiconductor insertion, ship to shore, outdoor cranes, low-temperature applications

Our product engineers will be happy to advise you in your choice of application-specific cables.

# Chainflex® servo cable

## harnessed according to Siemens standard

### Technical information

- Oil-resistant and coolant-resistant, shielded
- Notch-resistant, hydrolysis-resistant and microbe-resistant
- Intermediate jacket on the basis of PUR
- **Signal pairs:** pair shielding of extremely readily bending/firm cooper shield, coverage approx. 70% linear, 90% optical, and metal foil
- **Nominal voltage:** 600/1000 V

### Chainflex® PUR servo cable: Basic cables

Siemens Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	ø mm	Bending radius
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6FX8002-5DA01	MAT9060001	(4 G 1.5+(2x1.0)C)C	12.5	7.5 x d
6FX8002-5DA11	MAT9060002	(4 G 2.5+(2x1.0)C)C	13.5	7.5 x d



6FX8002-5DA21	MAT9060003	(4 G 1.5+(2x1.0)C)C	12.5	7.5 x d
6FX8002-5DA31	MAT9060004	(4 G 2.5+(2x1.0)C)C	13.5	7.5 x d
6FX8002-5DA41	MAT9060005	(4 G 4.0+(2x1.0)C)C	15.5	7.5 x d
6FX8002-5DA51	MAT9060006	(4 G 6.0+(2x1.0)C)C	17.5	7.5 x d
6FX8002-5DA61	MAT9060007	(4 G 10.0+(2x1.0)C)C	20.5	7.5 x d



6FX8002-5DA23	MAT9060008	(4 G 16.0+(2x1.0)C)C	24.0	7.5 x d
6FX8002-5DA33	MAT9060009	(4 G 25.0+(2x1.5)C)C	28.5	7.5 x d
6FX8002-5DA43	MAT9060010	(4 G 35.0+(2x1.5)C)C	32.5	7.5 x d



6FX8002-5DS01	MAT9060020	(4G1.5+(2x1.0)C)C	12.5	7.5 x d
6FX8002-5DS21	MAT9060021	(4G1.5+(2x1.0)C)C	12.5	7.5 x d
6FX8002-5DS21	MAT9060022	(4G10.0+(2x1.0)C)C	20.5	7.5 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
G = with earthed conductor green-yellow    x = without earthed conductor



- **Overall shield:** extremely readily bending/solid copper shield, coverage approx. 70% linear, approx. 90% optical
- **Temperature range (moved):** -20 °C to +80 °C
- **Minimum bending radius for use in Energy Chains®:** 7.5 x cable diameter
- **Colour:** orange (similar to RAL 2003)

## Chainflex® PUR servo cable: Extension cables

Siemens Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø mm	Bending radius
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6FX8002-5DA05	MAT9061001	(4 G 1.5+(2x1.0)C)C	12.5	7.5 x d
6FX8002-5DA15	MAT9061002	(4 G 2.5+(2x1.0)C)C	13.5	7.5 x d



6FX8002-5DA28	MAT9061003	(4 G 1.5+(2x1.0)C)C	12.5	7.5 x d
6FX8002-5DA38	MAT9061004	(4 G 2.5+(2x1.0)C)C	13.5	7.5 x d
6FX8002-5DA48	MAT9061005	(4 G 4.0+(2x1.0)C)C	15.5	7.5 x d
6FX8002-5DA58	MAT9061006	(4 G 6.0+(2x1.0)C)C	17.5	7.5 x d
6FX8002-5DA68	MAT9061007	(4 G 10.0+(2x1.0)C)C	20.5	7.5 x d

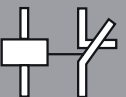


6FX8002-5DX28	MAT9061008	(4 G 16.0+(2x1.0)C)C	24.0	7.5 x d
6FX8002-5DX38	MAT9061009	(4 G 25.0+(2x1.5)C)C	28.5	7.5 x d
6FX8002-5DX48	MAT9061010	(4 G 35.0+(2x1.5)C)C	32.5	7.5 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
 G = with earthed conductor green-yellow    x = without earthed conductor

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# Chainflex<sup>®</sup> servo cable

## harnessed according to Siemens standard

### Technical information

- Oil-resistant
- Flame-retardant, shielded
- Intermediate jacket on the basis of PVC
- **Temperature range (moved):** -5 °C to +70 °C
- **Nominal voltage:** 600/1000 V
- **Signal pairs:** pair shielding of extremely readily bending/firm cooper shield, coverage approx. 70% linear, 90% optical, and metal foil

### Chainflex<sup>®</sup> PVC servo cable, oil-resistant: Basic cables

Siemens Part No.	igus <sup>®</sup> Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	ø mm	Bending radius
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6FX8002-5DA01	MAT9160001	(4 G 1.5+(2x1.0)C)C	12.5	7.5 x d
6FX8002-5DA11	MAT9160002	(4 G 2.5+(2x1.0)C)C	13.5	7.5 x d



6FX8002-5DA21	MAT9160003	(4 G 1.5+(2x1.0)C)C	12.5	7.5 x d
6FX8002-5DA31	MAT9160004	(4 G 2.5+(2x1.0)C)C	13.5	7.5 x d
6FX8002-5DA41	MAT9160005	(4 G 4.0+(2x1.0)C)C	15.5	7.5 x d
6FX8002-5DA51	MAT9160006	(4 G 6.0+(2x1.0)C)C	18.0	7.5 x d
6FX8002-5DA61	MAT9160007	(4 G 10.0+(2x1.0)C)C	22.0	7.5 x d



6FX8002-5DA23	MAT9160008	(4 G 16.0+(2x1.0)C)C	24.5	7.5 x d
6FX8002-5DA33	MAT9160009	(4 G 25.0+(2x1.5)C)C	29.5	7.5 x d
6FX8002-5DA43	MAT9160010	(4 G 35.0+(2x1.5)C)C	33.0	7.5 x d



6FX8002-5DS01	MAT9160020	(4G1.5+(2x1.0)C)C	12.5	7.5 x d
6FX8002-5DS21	MAT9160021	(4G1.5+(2x1.0)C)C	12.5	7.5 x d
6FX8002-5DS61	MAT9160022	(4G10.0+(2x1.5)C)C	22.5	7.5 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
G = with earthed conductor green-yellow    x = without earthed conductor



- **Overall shield:** extremely readily bending/solid copper shield, coverage approx. 70% linear, 90% optical
- **Minimum bending radius for use in Energy**  
Chains®: 7.5 x cable diameter
- **Colour:** green (similar to RAL 6005)

## Chainflex® PVC servo cable, oil-resistant: Extension cables

Siemens Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø mm	Bending radius
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6FX8002-5DA05	MAT9161001	(4 G 1.5+(2x1.0)C)C	12.5	7.5 x d
6FX8002-5DA15	MAT9161002	(4 G 2.5+(2x1.0)C)C	13.5	7.5 x d

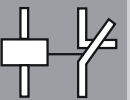


6FX8002-5DA28	MAT9161003	(4 G 1.5+(2x1.0)C)C	12.5	7.5 x d
6FX8002-5DA38	MAT9161004	(4 G 2.5+(2x1.0)C)C	13.5	7.5 x d
6FX8002-5DA48	MAT9161005	(4 G 4.0+(2x1.0)C)C	15.5	7.5 x d
6FX8002-5DA58	MAT9161006	(4 G 6.0+(2x1.0)C)C	18.0	7.5 x d
6FX8002-5DA68	MAT9161007	(4 G 10.0+(2x1.0)C)C	22.0	7.5 x d



6FX8002-5DX28	MAT9161008	(4 G 16.0+(2x1.0)C)C	24.5	7.5 x d
6FX8002-5DX38	MAT9161009	(4 G 25.0+(2x1.5)C)C	29.5	7.5 x d
6FX8002-5DX48	MAT9161010	(4 G 35.0+(2x1.5)C)C	33.0	7.5 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
G = with earthed conductor green-yellow    x = without earthed conductor



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# Chainflex® power cable

## harnessed according to Siemens standard

### Technical information

- Oil-resistant and coolant-resistant
- Flame-retardant
- Shielded
- **Temperature range (moved):** -35 °C to +90 °C
- For maximum load requirements
- Intermediate jacket on the basis of TPE
- **Overall shield:** extremely readily bending/solid copper shield, coverage approx. 70% linear, approx. 90% optical

### Chainflex® TPE power cable: Basic cables

Siemens Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	ø mm	Bending radius
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6FX8002-5CA01	MAT9050001	(4 G 1.5)C	10.0	7.5 x d
6FX8002-5CA11	MAT9050002	(4 G 2.5)C	11.5	7.5 x d



6FX8002-5CA21	MAT9050003	(4 G 1.5)C	10.0	7.5 x d
6FX8002-5CA31	MAT9050004	(4 G 2.5)C	11.5	7.5 x d
6FX8002-5CA41	MAT9050005	(4 G 4.0)C	13.0	7.5 x d
6FX8002-5CA51	MAT9050006	(4 G 6.0)C	15.0	7.5 x d
6FX8002-5CA61	MAT9050007	(4 G 10.0)C	20.0	7.5 x d



6FX8002-5CA23	MAT9050008	(4 G 16.0)C	22.0	7.5 x d
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6FX8002-5CS01	MAT9050020	(4 G 1.5)C	9.5	7.5 x d
6FX8002-5CS21	MAT9050021	(4 G 1.5)C	9.5	7.5 x d
6FX8002-5CS31	MAT9050022	(4 G 2.5)C	11.0	7.5 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
G = with earthed conductor green-yellow    x = without earthed conductor



- **Nominal voltage:** 600/1000 V
- **Minimum bending radius for use in Energy**  
Chains®: 7.5 x cable diameter
- **Colour:** black (similar to RAL 9005)

## Chainflex® TPE power cable: Extension cables

Siemens Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø mm	Bending radius
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6FX8002-5CA05	MAT9051001	(4 G 1.5)C	10.0	7.5 x d
6FX8002-5CA15	MAT9051002	(4 G 2.5)C	11.5	7.5 x d



6FX8002-5CA28	MAT9051003	(4 G 1.5)C	10.0	7.5 x d
6FX8002-5CA38	MAT9051004	(4 G 2.5)C	11.5	7.5 x d
6FX8002-5CA48	MAT9051005	(4 G 4.0)C	13.0	7.5 x d
6FX8002-5CA58	MAT9051006	(4 G 6.0)C	15.0	7.5 x d
6FX8002-5CA68	MAT9051007	(4 G 10.0)C	20.0	7.5 x d

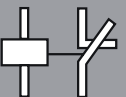


6FX8002-5CX28	MAT9051008	(4 G 16.0)C	22.0	7.5 x d
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**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
**G** = with earthed conductor green-yellow    **x** = without earthed conductor

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# Chainflex® power cable

## harnessed according to Siemens standard

### Technical information

- Oil-resistant
- Flame-retardant
- Shielded
- Intermediate jacket on the basis of PVC
- **Overall shield:** extremely readily bending/solid copper shield, coverage approx. 70% linear, approx. 90% optical
- **Temperature range (moved):** -5 °C to +70 °C

### Chainflex® PVC power cable, oil-resistant: Basic cables

Siemens Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	ø mm	Bending radius
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6FX8002-5CA01	MAT9150001	(4 G 1.5)C	12.5	7.5 x d
6FX8002-5CA11	MAT9150002	(4 G 2.5)C	15.0	7.5 x d



6FX8002-5CA21	MAT9150003	(4 G 1.5)C	12.5	7.5 x d
6FX8002-5CA31	MAT9150004	(4 G 2.5)C	15.0	7.5 x d
6FX8002-5CA41	MAT9150005	(4 G 4.0)C	16.0	7.5 x d
6FX8002-5CA51	MAT9150006	(4 G 6.0)C	19.0	7.5 x d
6FX8002-5CA61	MAT9150007	(4 G 10.0)C	24.0	7.5 x d



6FX8002-5CA23	MAT9150008	(4 G 16.0)C	27.0	7.5 x d
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6FX8002-5CS01	MAT9150020	(4 G 1.5)C	10.5	7.5 x d
6FX8002-5CS21	MAT9150021	(4 G 1.5)C	10.5	7.5 x d
6FX8002-5CS31	MAT9150022	(4 G 2.5)C	12.5	7.5 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
G = with earthed conductor green-yellow    x = without earthed conductor



- **Nominal voltage:** 600/1000 V
- **Minimum bending radius for use in Energy**  
Chains®: 7.5 x cable diameter
- **Colour:** anthracite-gray (similar to RAL 7016)

## Chainflex® PVC power cable, oil-resistant: Extension cables

Siemens Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø mm	Bending radius
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6FX8002-5CA05	MAT9151001	(4 G 1.5)C	12.5	7.5 x d
6FX8002-5CA15	MAT9151002	(4 G 2.5)C	15.0	7.5 x d



6FX8002-5CA28	MAT9151003	(4 G 1.5)C	12.5	7.5 x d
6FX8002-5CA38	MAT9151004	(4 G 2.5)C	15.0	7.5 x d
6FX8002-5CA48	MAT9151005	(4 G 4.0)C	16.0	7.5 x d
6FX8002-5CA58	MAT9151006	(4 G 6.0)C	19.0	7.5 x d
6FX8002-5CA68	MAT9151007	(4 G 10.0)C	24.0	7.5 x d

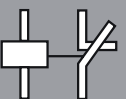


6FX8002-5CX28	MAT9151008	(4 G 16.0)C	27.0	7.5 x d
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**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
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# Chainflex® signal cable


## harnessed according to Siemens standard

### Technical information


- Oil-resistant and coolant-resistant, shielded
- Thin-walled, halogen-free
- **Minimum bending radius for use in Energy**  
Chains®: 10 x cable diameter
- **Overall shield:** extremely readily bending/solid copper shield, coverage approx. 70% linear, approx. 90% optical
- **Temperature range (moved):** -35 °C to +100 °C

### Chainflex® TPE signal/encoder cable, oil-resistant: Basic cables


Siemens Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	∅ mm	Bending radius
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6FX8002-2AD00	MAT9070001	(3x(2x0.14)C+(4x0.14)+(2x0.5))C	10.5	10 x d
6FX8002-2CA11	MAT9070002	(4x(2x0.34)+4x0.5)C	9.5	10 x d
6FX8002-2CA15	MAT9070003	(3x(2x0.14)C+(4x0.14)+(2x0.5))C	10.5	10 x d



6FX8002-2CA31	MAT9070004	(3x(2x0.14)C+2x0.5+4x0.14+4x0.23)C	11.5	10 x d
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6FX8002-2CA51	MAT9070005	(3x(2x0.14)C+(4x0.14)+(2x0.5))C	10.5	10 x d
6FX8002-2CA71	MAT9070006	(4x(2x0.34)+4x0.5)C	9.5	10 x d



6FX8002-2CB31	MAT9070007	(12x0.25)C	9.0	10 x d
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**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
G = with earthed conductor green-yellow    x = without earthed conductor



- **Nominal voltage:** 30 V
- **Colour:** green (similar to RAL 6018)

## Chainflex® TPE signal/encoder cable, oil-resistant: Basic cables

Siemens Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	∅ mm	Bending radius
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6FX8002-2CB51	MAT9070008	(4x(2x0.34)+4x0.5)C	9.5	10 x d
6FX8002-2CC11	MAT9070009	(4x(2x0.34)+4x0.5)C	9.5	10 x d
6FX8002-2CD01	MAT9070010	(4x(2x0.34)+4x0.5)C	9.5	10 x d



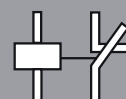
6FX8002-2CF01	MAT9070021	(3x(2x0.14)C+(4x0.14)+(2x0.5))C	10.5	10 x d
6FX8002-2CF02	MAT9070011	(3x(2x0.14)C+(4x0.14)+(2x0.5))C	10.5	10 x d
6FX8002-2CG00	MAT9070012	(4x(2x0.34)+4x0.5)C	9.5	10 x d
6FX8002-2CH00	MAT9070013	(3x(2x0.14)C+(4x0.14)+(2x0.5))C	10.5	10 x d



6FX8002-2CK00	MAT9070014	(3x(2x0.14)C+(2x0.5C))C	10.5	10 x d
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**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

**G** = with earthed conductor green-yellow    **x** = without earthed conductor



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# Chainflex<sup>®</sup> signal cable

## harnessed according to Siemens standard

### Technical information

- Oil-resistant and coolant-resistant, shielded
- Thin-walled, halogen-free
- **Minimum bending radius for use in Energy Chains<sup>®</sup>:** 10 x cable diameter
- **Overall shield:** extremely readily bending/solid copper shield, coverage approx. 70% linear, approx. 90% optical
- **Intermediate jacket on the basis of TPE**

### Chainflex<sup>®</sup> TPE signal/encoder cable, oil-resistant: Basic cables

Siemens Part No.	igus <sup>®</sup> Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	∅ mm	Bending radius
				
6FX8002-2CL00	MAT9070015	(3x(2x0.14)C)+(2x0.5C)C	10.5	10 x d
6FX8002-2EQ00	MAT9070016	(3x(2x0.14)C)+2x0.5+4x0.14+4x0.23)C	11.5	10 x d
6FX8002-2EQ10	MAT9070017	(3x(2x0.14)C)+2x0.5+4x0.14+4x0.23)C	11.5	10 x d
6FX8002-2AH00	MAT9070018	(4x(2x0.34)+4x0.5)C	9.5	10 x d
6FX8002-2DC10	MAT9070030	(2x(2x0.15)+2x0.38)C	7.5	12 x d
6FX8002-2DC20	MAT9070031	(2x(2x0.15)+2x0.38)C	7.5	12 x d
6FX8002-1DC00	MAT9070032	(2x(2x0.15)+2x0.38)C	7.5	12 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

**G** = with earthed conductor green-yellow    **x** = without earthed conductor



- Temperature range (moved): -35 °C to +100 °C
- Nominal voltage: 30 V
- Colour: green (similar to RAL 6018)

## Chainflex® TPE signal/encoder cable, oil-resistant: Extension cables

Siemens Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø mm	Bending radius
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6FX8002-2AD04	MAT9071001	(3x(2x0.14)C+(4x0.14)+(2x0.5))C	10.5	10 x d
6FX8002-2CB54	MAT9071002	(4x(2x0.34)+4x0.5)C	9.5	10 x d
6FX8002-2CA54	MAT9071003	(3x(2x0.14)C+(4x0.14)+(2x0.5))C	10.5	10 x d
6FX8002-2CA34	MAT9071004	(3x(2x0.14)C+2x0.5+4x0.14+4x0.23)C	11.5	10 x d

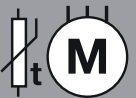
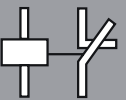


6FX8002-2CB34	MAT9071007	(12x0.25)C	9.0	10 x d
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6FX8002-2CC14	MAT9071009	(4x(2x0.34)+4x0.5)C	9.5	10 x d
6FX8002-2CF04	MAT9071011	(3x(2x0.14)C+(4x0.14)+(2x0.5))C	10.5	10 x d
6FX8002-2EQ14	MAT9071017	(3x(2x0.14)C+2x0.5+4x0.14+4x0.23)C	11.5	10 x d
6FX8002-2AH04	MAT9071018	(4x(2x0.34)+4x0.5)C	9.5	10 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
**G** = with earthed conductor green-yellow    **x** = without earthed conductor



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(for up to 10 cuts of the same type)

# Chainflex® signal cable

## harnessed according to Siemens standard

### Technical information

- Oil-resistant
- Flame-retardant
- Shielded
- Temperature range (moved): -5 °C to +70 °C
- Overall shield: extremely readily bending/solid copper shield, coverage approx. 70% linear, 90% optical
- Nominal voltage: 30 V

### Chainflex® PVC signal/encoder cable, oil-resistant: Basic cables

Siemens Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	ø mm	Bending radius
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6FX8002-2AD00	MAT9170001	(3x(2x0.14)C+(4x0.14)+(2x0.5))C	9.0	10 x d
6FX8002-2CA11	MAT9170002	(4x(2x0.34)+4x0.5)C	9.0	10 x d
6FX8002-2CA15	MAT9170003	(3x(2x0.14)C+(4x0.14)+(2x0.5))C	9.0	10 x d



6FX8002-2CA31	MAT9170004	(3x(2x0.14)C+2x0.5+4x0.14+4x0.23)C	9.5	10 x d
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6FX8002-2CA51	MAT9170005	(3x(2x0.14)C+2x0.5+4x0.14+4x0.23)C	9.5	10 x d
6FX8002-2CA71	MAT9170006	(4x(2x0.34)+4x0.5)C	9.0	10 x d
6FX8002-2CB51	MAT9170008	(4x(2x0.34)+4x0.5)C	9.0	10 x d
6FX8002-2CC11	MAT9170009	(4x(2x0.34)+4x0.5)C	9.0	10 x d
6FX8002-2CD01	MAT9170010	(4x(2x0.34)+4x0.5)C	9.0	10 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor



- Minimum bending radius for use in Energy Chains®:  
10 x cable diameter
- Colour: gray (similar to RAL 7001)

## Chainflex® PVC signal/encoder cable, oil-resistant: Basic cables

Siemens Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø mm	Bending radius
---------------------	-------------------	--	---------	-------------------



6FX8002-2CF01	MAT9170021	(3x(2x0.14)C+(4x0.14)+(2x0.5))C	9.0	10 x d
6FX8002-2CF02	MAT9170011	(3x(2x0.14)C+(4x0.14)+(2x0.5))C	9.0	10 x d
6FX8002-2CG00	MAT9170012	(4x(2x0.34)+4x0.5)C	9.0	10 x d



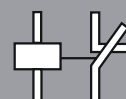
6FX8002-2CH00	MAT9170013	(3x(2x0.14)C+2x0.5+4x0.14+4x0.23)C	9.5	10 x d
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6FX8002-2CK00	MAT9170014	(3x(2x0.14)C+(2x0.5C))C	9.0	10 x d
6FX8002-2CL00	MAT9170015	(3x(2x0.14)C+(2x0.5C))C	9.0	10 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor



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(for up to 10 cuts of the same type)

# Chainflex<sup>®</sup> signal cable

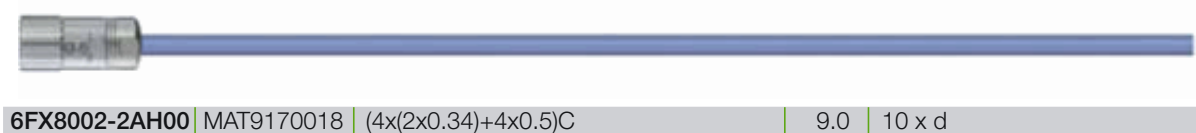
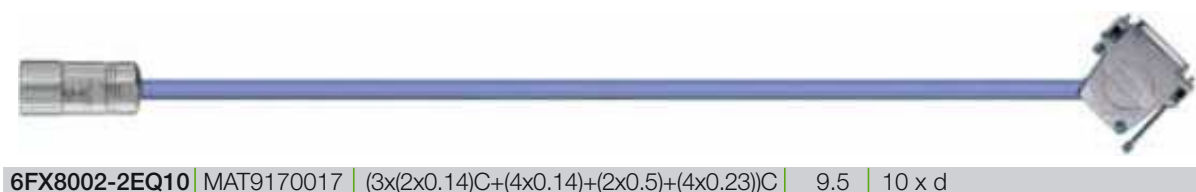
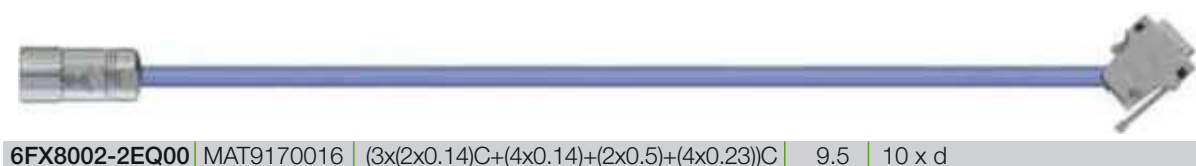
## harnessed according to Siemens standard

### Technical information

- Oil-resistant
- Flame-retardant
- Shielded
- Temperature range (moved): -5 °C to +70 °C
- Overall shield: extremely readily bending/solid copper shield, coverage approx. 70% linear, 90% optical
- Nominal voltage: 30 V

### Chainflex<sup>®</sup> PVC signal/encoder cable, oil-resistant: Basic cables

Siemens Part No.	igus <sup>®</sup> Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	∅ mm	Bending radius
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**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

**G** = with earthed conductor green-yellow    **x** = without earthed conductor



- Minimum bending radius for use in Energy Chains®:  
10 x cable diameter
- Colour: gray (similar to RAL 7001)

## Chainflex® PVC signal/encoder cable, oil-resistant: Extension cables

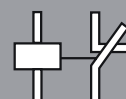
Siemens Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø mm	Bending radius
---------------------	-------------------	--	---------	-------------------



6FX8002-2AD04	MAT9171001	(3x(2x0.14)C+(4x0.14)+(2x0.5)+(4x0.23))C	9.5	10 x d
6FX8002-2CB54	MAT9171002	(4x(2x0.34)+4x0.5)C	9.0	10 x d
6FX8002-2CA54	MAT9171003	(3x(2x0.14)C+(4x0.14)+(2x0.5)+(4x0.23))C	9.5	10 x d
6FX8002-2CA34	MAT9171004	(3x(2x0.14)C+(4x0.14)+(2x0.5)+(4x0.23))C	9.5	10 x d
6FX8002-2CC14	MAT9171009	(4x(2x0.34)+4x0.5)C	9.0	10 x d
6FX8002-2CF04	MAT9171011	(3x(2x0.14)C+(4x0.14)+(2x0.5)+(4x0.23))C	9.5	10 x d
6FX8002-2EQ14	MAT9171017	(3x(2x0.14)C+(4x0.14)+(2x0.5)+(4x0.23))C	9.5	10 x d
6FX8002-2AH04	MAT9171018	(4x(2x0.34)+4x0.5)C	9.0	10 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor



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# Chainflex® ReadyCable®



LENZE – Selection table according to Lenze part numbers and sheath materials. You will find your basic cable in the left column, the respective extension on the right.

Basic cable	Outer jacket material on page			▶	Linking cable	Outer jacket material on page		
	PVC	PUR	TPE			PVC	PUR	TPE
EWLExxxGM-T	310		308	▶	EWLExxxZMST	311		309
EWLLxxxGMS	322		320	▶	EWLLxxxZM	323		321
EWLMxxxGMS-015C	298/302	296/300		▶	EWLMxxxZM-015C	299/303	297/301	
EWLMxxxGMS-025	298/302	296/300		▶	EWLMxxxZM-025	299/303	297/301	
EWLRxxxGM-T	306		304	▶	EWLRxxxZMST	307		305
EYF0018AxxxxA00S03	313		315					
EYF0018AxxxxA00W02	312		314					
EYF0018AxxxxF02S03	312		314	▶	EYF0019VxxxxF02G02	313		315
EYF0018AxxxxF02W02	312		314	▶	EYF0019VxxxxF02G02	313		315
EYF0019VxxxxA00G02	312		314	▶	EYF0019VxxxxF02G02	313		315
EYF0020AxxxxA00S04	312		314					
EYF0020AxxxxA00S05	313		315					
EYF0020AxxxxF01S04	312		314	▶	EYF0020VxxxxF01G01	313		315
EYF0020AxxxxF01S05	312		314	▶	EYF0020VxxxxF01G01	313		315
EYF0020VxxxxA00G01	312		314	▶	EYF0020VxxxxF01G01	313		315
EYF0021AxxxxA00S03	313		315					
EYF0021AxxxxF03S03	312		314	▶	EYF0022VxxxxF03G03	313		315
EYF0022VxxxxA00G03	312		314	▶	EYF0022VxxxxF03G03	313		315
EYL002AxxxxL01A00	322		320	▶	EYL002VxxxxL01J01	323		321
EYL002AxxxxL02A00	322		320	▶	EYL002VxxxxL02J02	323		321
EYL002VxxxxA00J01	322		320	▶	EYL002VxxxxL01J01	323		321
EYL002VxxxxA00J02	322		320	▶	EYL002VxxxxL02J02	323		321
EYP0010AxxxxA00P01	298	296		▶	EYP0010AxxxxM01P01	299	297	
EYP0010AxxxxM01A00	298	296		▶	EYP0010AxxxxM01P01	299	297	
EYP0011AxxxxA00P01	298	296		▶	EYP0011AxxxxM01P01	299	297	
EYP0011AxxxxM01A00	298	296		▶	EYP0011AxxxxM01P01	299	297	
EYP0012AxxxxA00P01	298	296		▶	EYP0012AxxxxM01P01	299	297	
EYP0012AxxxxA00P02	298	296		▶	EYP0012AxxxxM02P02	299	297	
EYP0012AxxxxM01A00	298	296		▶	EYP0012AxxxxM01P01	299	297	
EYP0012AxxxxM02A00	298	296		▶	EYP0012AxxxxM02P02	299	297	
EYP0013AxxxxA00P02	298	296		▶	EYP0013AxxxxM02P02	299	297	
EYP0013AxxxxM02A00	298	296		▶	EYP0013AxxxxM02P02	299	297	
EYP0014AxxxxA00P03	298	296		▶	EYP0014AxxxxM03P03	299	297	
EYP0014AxxxxM03A00	298	296		▶	EYP0014AxxxxM03P03	299	297	
EYP0015AxxxxA00P03	298	296		▶	EYP0015AxxxxM03P03	299	297	
EYP0015AxxxxM03A00	298	296		▶	EYP0015AxxxxM03P03	299	297	
EYP0016AxxxxA00P03	298	296		▶	EYP0016AxxxxM03P03	299	297	
EYP0016AxxxxM03A00	298	296		▶	EYP0016AxxxxM03P03	299	297	
Terminal box connection cable								
EWLExxxGX-T	311		309					
EWLRxxxGX-T	307		305					
Connecting cable								
EYD0017AxxxxW01S01	316		318					
EYD0017AxxxxW01S02	316		318					
EYD0017AxxxxW03S01	316		318					
EYD0017AxxxxW03S02	316		318					



## LENZE



**Chainflex® PVC cables for the woodworking industry, for example**

### Typical application area – PVC

- for high load requirements
- light oil influence
- preferably indoor applications, but also outdoor ones at temperatures  $> 5\text{ }^{\circ}\text{C}$
- especially for freely suspended and gliding travel distances up to 100 m
- Storage and retrieval units for high-bay warehouses, machining units/packages machines, quick handling, indoor cranes, timber processing



**Chainflex® PUR cables for the tooling machine industry, for example**

### Typical application area – PUR

- for maximum load requirements
- almost unlimited resistance to oil
- Indoor and outdoor applications, UV-resistant
- especially for freely suspended and gliding travel distances up to 100 m
- Storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, clean room, semiconductor insertion, outdoor cranes, low-temperature applications



**Chainflex® TPE cables for outdoor use, for example**

### Typical application area – TPE

- for maximum load requirements
- almost unlimited resistance to oil, also with bio-oils
- Indoor and outdoor applications, UV-resistant
- especially for freely suspended and gliding travel distances up to 400 m and more
- Storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, clean room, semiconductor insertion, ship to shore, outdoor cranes, low-temperature applications

Our product engineers will be happy to advise you in your choice of application-specific cables.



# Chainflex® servo cable

## harnessed according to Lenze standard

### Technical information

- Oil-resistant and coolant-resistant
- Shielded
- Notch-resistant, hydrolysis-resistant and microbe-resistant
- Intermediate jacket on the basis of PUR
- **Signal pairs:** pair shielding of extremely readily bending/firm cooper shield, coverage approx. 70% linear, 90% optical, and metal foil

### Chainflex® PUR servo cable: Basic cables

Lenze Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø mm	Bending radius
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EWLMxxxGMS-015C	MAT9120001	(4 G 1.5+(2x1.0)C)C	12.5	7.5 x d
EWLMxxxGMS-025	MAT9120002	(4 G 2.5+(2x1.0)C)C	13.5	7.5 x d
EYP0010AxxxxM01A00	MAT9120050	(4 G 1.5+(2x1.0)C)C	12.5	7.5 x d
EYP0011AxxxxM01A00	MAT9120051	(4 G 1.5+(2x1.0)C)C	12.5	7.5 x d
EYP0012AxxxxM01A00	MAT9120052	(4 G 2.5+(2x1.0)C)C	13.5	7.5 x d
EYP0012AxxxxM02A00	MAT9120053	(4 G 2.5+(2x1.0)C)C	13.5	7.5 x d
EYP0013AxxxxM02A00	MAT9120054	(4 G 4.0+(2x1.0)C)C	15.5	7.5 x d
EYP0014AxxxxM03A00	MAT9120055	(4 G 6.0+(2x1.0)C)C	17.5	7.5 x d
EYP0015AxxxxM03A00	MAT9120056	(4 G 10.0+(2x1.0)C)C	20.5	7.5 x d
EYP0016AxxxxM03A00	MAT9120057	(4 G 16.0+(2x1.0)C)C	23.0	7.5 x d
EYP0012AxxxxA00P02	MAT9120058	(4 G 2.5+(2x1.0)C)C	13.5	7.5 x d
EYP0013AxxxxA00P02	MAT9120059	(4 G 4.0+(2x1.0)C)C	15.5	7.5 x d
EYP0014AxxxxA00P03	MAT9120060	(4 G 6.0+(2x1.0)C)C	20.5	7.5 x d
EYP0015AxxxxA00P03	MAT9120061	(4 G 10.0+(2x1.0)C)C	20.5	7.5 x d
EYP0016AxxxxA00P03	MAT9120062	(4 G 16.0+(2x1.0)C)C	23.0	7.5 x d
EYP0010AxxxxA00P01	MAT9120063	(4 G 1.5+(2x1.0)C)C	12.5	7.5 x d
EYP0011AxxxxA00P01	MAT9120064	(4 G 1.5+(2x1.0)C)C	12.5	7.5 x d
EYP0012AxxxxA00P01	MAT9120065	(4 G 2.5+(2x1.0)C)C	13.5	7.5 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

\* igus® gladly pre-harnesses the cable end according to your technical guidelines.

G = with earthed conductor green-yellow    x = without earthed conductor



- **Overall shield:** extremely readily bending/solid copper shield, coverage approx. 70% linear, 90% optical
- **Temperature range (moved):** -20 °C to +80 °C
- **Nominal voltage:** 600/1000 V
- **Minimum bending radius for use in Energy Chains®:** 7.5 x cable diameter
- **Colour:** orange (similar to RAL 2003)

## Chainflex® PUR servo cable: Linking cables

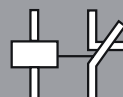
Lenze Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	ø mm	Bending radius
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EWLMxxxZM-015C	MAT9120006	(4 G 1.5+(2x1.0)C)C	12.5	7.5 x d
EWLMxxxZM-025	MAT9120007	(4 G 2.5+(2x1.0)C)C	13.5	7.5 x d
EYP0012AxxxxM02P02	MAT9120066	(4 G 2.5+(2x1)C)C	13.5	7.5 x d
EYP0013AxxxxM02P02	MAT9120067	(4 G 4.0+(2x1)C)C	15.5	7.5 x d
EYP0014AxxxxM03P03	MAT9120068	(4 G 6.0+(2x1)C)C	17.5	7.5 x d
EYP0015AxxxxM03P03	MAT9120069	(4 G 10.0+(2x1)C)C	20.5	7.5 x d
EYP0016AxxxxM03P03	MAT9120070	(4 G 16.0+(2x1)C)C	23.0	7.5 x d
EYP0010AxxxxM01P01	MAT9120071	(4 G 1.5+(2x1)C)C	12.5	7.5 x d
EYP0011AxxxxM01P01	MAT9120072	(4 G 1.5+(2x1)C)C	12.5	7.5 x d
EYP0012AxxxxM01P01	MAT9120073	(4 G 2.5+(2x1)C)C	13.5	7.5 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor



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(for up to 10 cuts of the same type)

# Chainflex® servo cable

## harnessed according to Lenze standard

### Technical information

- Oil-resistant
- Flame-retardant
- Shielded
- Intermediate jacket on the basis of PVC
- **Signal pairs:** pair shielding of extremely readily bending/firm cooper shield, coverage approx. 70% linear, 90% optical, and metal foil
- **Temperature range (moved):** -5 °C to +70 °C

### Chainflex® PVC servo cable, oil-resistant: Basic cables

Lenze Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø mm	Bending radius
----------------	----------------	---	------	----------------



EWLMxxxGMS-015C	MAT9130001	(4 G 1.5+(2x1.0)C)C	12.5	7.5 x d
EWLMxxxGMS-025	MAT9130002	(4 G 2.5+(2x1.0)C)C	13.5	7.5 x d
EYP0010AxxxxM01A00	MAT9130050	(4 G 1.5+(2x1)C)C	12.5	7.5 x d
EYP0011AxxxxM01A00	MAT9130051	(4 G 1.5+(2x1)C)C	12.5	7.5 x d
EYP0012AxxxxM01A00	MAT9130052	(4 G 2.5+(2x1)C)C	13.5	7.5 x d
EYP0012AxxxxM02A00	MAT9130053	(4 G 2.5+(2x1)C)C	13.5	7.5 x d
EYP0013AxxxxM02A00	MAT9130054	(4 G 4.0+(2x1)C)C	15.5	7.5 x d
EYP0014AxxxxM03A00	MAT9130055	(4 G 6.0+(2x1)C)C	18.0	7.5 x d
EYP0015AxxxxM03A00	MAT9130056	(4 G 10.0+(2x1)C)C	22.0	7.5 x d
EYP0016AxxxxM03A00	MAT9130057	(4 G 16.0+(2x1)C)C	24.5	7.5 x d
EYP0012AxxxxA00P02	MAT9130058	(4 G 2.5+(2x1)C)C	13.5	7.5 x d
EYP0013AxxxxA00P02	MAT9130059	(4 G 4.0+(2x1)C)C	15.5	7.5 x d
EYP0014AxxxxA00P03	MAT9130060	(4 G 6.0+(2x1)C)C	22.0	7.5 x d
EYP0015AxxxxA00P03	MAT9130061	(4 G 10.0+(2x1)C)C	22.0	7.5 x d
EYP0016AxxxxA00P03	MAT9130062	(4 G 16.0+(2x1)C)C	24.5	7.5 x d
EYP0010AxxxxA00P01	MAT9130063	(4 G 1.5+(2x1)C)C	12.5	7.5 x d
EYP0011AxxxxA00P01	MAT9130064	(4 G 1.5+(2x1)C)C	12.5	7.5 x d
EYP0012AxxxxA00P01	MAT9130065	(4 G 2.5+(2x1)C)C	13.5	7.5 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

\* igus® gladly pre-harnesses the cable end according to your technical guidelines.

G = with earthed conductor green-yellow    x = without earthed conductor



- **Overall shield:** extremely readily bending/solid copper shield, coverage approx. 70% linear, approx. 90% optical
- **Nominal voltage:** 600/1000 V
- **Minimum bending radius for use in Energy Chains®:** 7.5 x cable diameter
- **Colour:** green (similar to RAL 6005)

## Chainflex® PVC servo cable, oil-resistant: Linking cables

Lenze Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø mm	Bending radius
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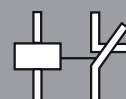


EWLMxxxZM-015C	MAT9130006	(4 G 1.5+(2x1.0)C)C	12.5	7.5 x d
EWLMxxxZM-025	MAT9130007	(4 G 2.5+(2x1.0)C)C	13.5	7.5 x d
EYP0012AxxxxM02P02	MAT9130066	(4 G 2.5+(2x1)C)C	13.5	7.5 x d
EYP0013AxxxxM02P02	MAT9130067	(4 G 4.0+(2x1)C)C	15.5	7.5 x d
EYP0014AxxxxM03P03	MAT9130068	(4 G 6.0+(2x1)C)C	18.0	7.5 x d
EYP0015AxxxxM03P03	MAT9130069	(4 G 10.0+(2x1)C)C	22.0	7.5 x d
EYP0016AxxxxM03P03	MAT9130070	(4 G 16.0+(2x1)C)C	24.5	7.5 x d
EYP0010AxxxxM01P01	MAT9130071	(4 G 1.5+(2x1)C)C	12.5	7.5 x d
EYP0011AxxxxM01P01	MAT9130072	(4 G 1.5+(2x1)C)C	12.5	7.5 x d
EYP0012AxxxxM01P01	MAT9130073	(4 G 2.5+(2x1)C)C	13.5	7.5 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
 G = with earthed conductor green-yellow    x = without earthed conductor

Chainflex® Systems  
for Drive Technology

Tel. +49-2203-96 49-0  
Fax +49-2203-96 49-222



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# Chainflex® power cable

## harnessed according to Lenze standard

### Technical information

- Oil-resistant and coolant-resistant
- Shielded
- Notch-resistant, hydrolysis-resistant and microbe-resistant
- Intermediate jacket on the basis of PUR
- **Signal pairs:** pair shielding of extremely readily bending/firm cooper shield, coverage approx. 70% linear, 90% optical, and metal foil

### Chainflex® PUR power cable: Basic cables

Lenze Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø mm	Bending radius
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<b>EWLMxxxGMS-015C</b>	MAT9120011	(4 G 1.5)C	10.5	7.5 x d
<b>EWLMxxxGMS-025</b>	MAT9120012	(4 G 2.5)C	12.0	7.5 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

\* igus® gladly pre-harnesses the cable end according to your technical guidelines.

G = with earthed conductor green-yellow    x = without earthed conductor



- **Overall shield:** extremely readily bending/solid copper shield, coverage approx. 70% linear, 90% optical
- **Temperature range (moved):** -20 °C to +80 °C
- **Nominal voltage:** 600/1000 V
- **Minimum bending radius for use in Energy Chains®:** 7.5 x cable diameter
- **Colour:** orange (similar to RAL 2003)

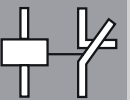
## Chainflex® PUR power cable: Linking cables

Lenze Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	ø mm	Bending radius
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<b>EWLMxxxZM-015C</b>	MAT9120016	(4 G 1.5)C	10.5	7.5 x d
<b>EWLMxxxZM-025</b>	MAT9120017	(4 G 2.5)C	12.0	7.5 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
**G** = with earthed conductor green-yellow    **x** = without earthed conductor



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# Chainflex® power cable

## harnessed according to Lenze standard

### Technical information

- oil-resistant
- Flame-retardant
- Shielded
- Intermediate jacket on the basis of PVC
- **Overall shield:** extremely readily bending/solid copper shield, coverage approx. 70% linear, approx. 90% optical
- **Temperature range (moved):** -5 °C to +70 °C

### Chainflex® PVC power cable, oil-resistant: Basic cables

Lenze Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	∅ mm	Bending radius
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<b>EWLMxxxGMS-015C</b>	MAT9130011	(4 G 1.5)C	12.5	7.5 x d
<b>EWLMxxxGMS-025</b>	MAT9130012	(4 G 2.5)C	15.0	7.5 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

\* igus® gladly pre-harnesses the cable end according to your technical guidelines.

**G** = with earthed conductor green-yellow    **x** = without earthed conductor



- **Nominal voltage:** 600/1000 V
- **Minimum bending radius for use in Energy**  
Chains®: 7.5 x cable diameter
- **Colour:** anthracite-gray (similar to RAL 7016)

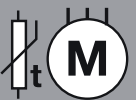
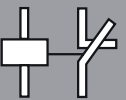
## Chainflex® PVC power cable, oil-resistant: Linking cables

Lenze Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø mm	Bending radius
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EWLMxxxZM-015C	MAT9130016	(4 G 1.5)C	12.5	7.5 x d
EWLMxxxZM-025	MAT9130017	(4 G 2.5)C	15.0	7.5 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
**G** = with earthed conductor green-yellow    **x** = without earthed conductor



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(for up to 10 cuts of the same type)



# Chainflex<sup>®</sup> resolver cable

## harnessed according to Lenze standard

### Technical information

- Oil-resistant and coolant-resistant
- Shielded
- Thin-walled, halogen-free
- **Temperature range (moved):** -35 °C to +100 °C
- **Overall shield:** extremely readily bending/solid copper shield, coverage approx. 70% linear, approx. 90% optical
- **Nominal voltage:** 30 V

### Chainflex<sup>®</sup> TPE signal/encoder cable, oil-resistant: Basic cables

Lenze Part No.	igus <sup>®</sup> Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	∅ mm	Bending radius
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EWLRxxxGM-T	MAT9120021	(3x(2x0.14)C)+(2x0.5C)C	12.5	10 x d
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**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
**G** = with earthed conductor green-yellow    **x** = without earthed conductor



- **Minimum bending radius for use in Energy**  
Chains®: 10 x cable diameter
- Colour: green (similar to RAL 6018)

## Chainflex® TPE signal/encoder cable, oil-resistant: Linking cables

Lenze Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	∅ mm	Bending radius
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<b>EWLRxxxZMST</b>	MAT9120022	(3x(2x0.14)C+2x0.5)C	12.5	10 x d
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**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
G = with earthed conductor green-yellow    x = without earthed conductor

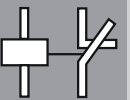
## Chainflex® TPE signal/encoder cable, oil-resistant: Terminal box connection cable

Lenze Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	∅ mm	Bending radius
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<b>EWLRxxxGX-T</b>	MAT9120023	(3x(2x0.14)C+2x0.5)C	12.5	10 x d
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**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
\* igus® gladly pre-harnesses the cable end according to your technical guidelines.  
G = with earthed conductor green-yellow    x = without earthed conductor



# Chainflex<sup>®</sup> resolver cable

## harnessed according to Lenze standard

### Technical information

- oil-resistant
- Flame-retardant
- Shielded
- Temperature range (moved): -5 °C to +70 °C
- Overall shield: extremely readily bending/solid copper shield, coverage approx. 70% linear, approx. 90% optical
- Nominal voltage: 30 V

### Chainflex<sup>®</sup> PVC signal/encoder cable, oil-resistant: Basic cables

Lenze Part No.	igus <sup>®</sup> Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	∅ mm	Bending radius
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EWLRxxxGM-T	MAT9130021	(3x(2x0.14)C)+(2x0.5C)C	9.0	10 x d
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**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
G = with earthed conductor green-yellow    x = without earthed conductor



- Minimum bending radius for use in Energy  
Chains®: 10 x cable diameter
- Colour: gray (similar to RAL 7001)

## Chainflex® PVC signal/encoder cable, oil-resistant: Linking cables

Lenze Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	∅ mm	Bending radius
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<b>EWLRxxxZMST</b>	MAT9130022	(3x(2x0.14)C+(2x0.5C))C	9.0	10 x d
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**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
G = with earthed conductor green-yellow    x = without earthed conductor

## Chainflex® PVC signal/encoder cable, oil-resistant: Terminal box connection cable

Lenze Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	∅ mm	Bending radius
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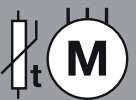
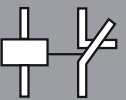


<b>EWLRxxxGX-T</b>	MAT9130023	(3x(2x0.14)C+(2x0.5C))C	9.0	10 x d
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**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
\* igus® gladly pre-harnesses the cable end according to your technical guidelines.  
G = with earthed conductor green-yellow    x = without earthed conductor

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Fax +49-2203-96 49-222



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# Chainflex® encoder cable

## harnessed according to Lenze standard

### Technical information

- Oil-resistant and coolant-resistant
- Shielded
- Thin-walled, halogen-free
- **Temperature range (moved):** -35 °C to +100 °C
- **Overall shield:** extremely readily bending/solid copper shield, coverage approx. 70% linear, approx. 90% optical
- **Nominal voltage:** 30 V

### Chainflex® TPE signal/encoder cable, oil-resistant: Basic cables

Lenze Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	∅ mm	Bending radius
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EWLExxGM-T	MAT9120026	(4x(2x0.25)+2x1.0)C	9.5	10 x d
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**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

**G** = with earthed conductor green-yellow    **x** = without earthed conductor



- **Minimum bending radius for use in Energy**  
Chains®: 10 x cable diameter
- Colour: green (similar to RAL 6018)

## Chainflex® TPE signal/encoder cable, oil-resistant: Linking cables

Lenze Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø mm	Bending radius
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EWLExxxZMST	MAT9120027	(4x(2x0.25)+2x1.0)C	9.5	10 x d
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**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
G = with earthed conductor green-yellow    x = without earthed conductor

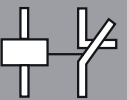
## Chainflex® TPE signal/encoder cable, oil-resistant: Terminal box connection cable

Lenze Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø mm	Bending radius
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EWLExxxGX-T	MAT9120028	(4x(2x0.25)+(2x1.0))C	9.5	10 x d
-------------	------------	-----------------------	-----	--------

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
\* igus® gladly pre-harnesses the cable end according to your technical guidelines.  
G = with earthed conductor green-yellow    x = without earthed conductor



# Chainflex<sup>®</sup> encoder cable

## harnessed according to Lenze standard

### Technical information

- oil-resistant
- Flame-retardant
- Shielded
- Temperature range (moved): -5 °C to +70 °C
- Overall shield: extremely readily bending/solid copper shield, coverage approx. 70% linear, approx. 90% optical
- Nominal voltage: 30 V

### Chainflex<sup>®</sup> PVC signal/encoder cable, oil-resistant: Basic cables

Lenze Part No.	igus <sup>®</sup> Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	∅ mm	Bending radius
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EWLExxGM-T	MAT9130026	(4x(2x0.25)+2x1.0)C	9.5	10 x d
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**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

**G** = with earthed conductor green-yellow    **x** = without earthed conductor



- Minimum bending radius for use in Energy  
Chains®: 10 x cable diameter
- Colour: gray (similar to RAL 7001)

## Chainflex® PVC signal/encoder cable, oil-resistant: Linking cables

Lenze Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	∅ mm	Bending radius
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EWLExxxZMST	MAT9130027	(4x(2x0.25)+2x1.0)C	9.5	10 x d
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**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
G = with earthed conductor green-yellow    x = without earthed conductor

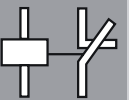
## Chainflex® PVC signal/encoder cable, oil-resistant: Terminal box connection cable

Lenze Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	∅ mm	Bending radius
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EWLExxxGX-T	MAT9130028	(4x(2x0.25)+(2x1.0))C	9.5	10 x d
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**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
\* igus® gladly pre-harnesses the cable end according to your technical guidelines.  
G = with earthed conductor green-yellow    x = without earthed conductor






# Chainflex® feedback cable harnessed according to Lenze standard

## Technical information


- oil-resistant
- Flame-retardant
- Shielded
- Temperature range (moved): -5 °C to +70 °C
- Overall shield: extremely readily bending/solid copper shield, coverage approx. 70% linear, approx. 90% optical
- Nominal voltage: 30 V

## Chainflex® PVC signal/encoder cable, oil-resistant: Basic cables


Lenze Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	∅ mm	Bending radius
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EYF0020VxxxxA00G01	MAT9130080	3(2x0.14)C+(3x0.14)C	9.5	10 x d
EYF0019VxxxxA00G02	MAT9130081	4(2x0.14)C+(2x1.0)C	11.0	10 x d
EYF0022VxxxxA00G03	MAT9130082	3(2x0.14)C+(4x0.14)C+2(2x0.5)C	11.0	10 x d



EYF0021AxxxxF03S03	MAT9130086	3(2x0.14)C+(4x0.14)C+2(2x0.5)C	11.0	10 x d
EYF0018AxxxxF02S03	MAT9130088	4(2x0.14)C+(2x1.0)C	11.0	10 x d
EYF0020AxxxxF01S05	MAT9130090	3(2x0.14)C+(3x0.14)C	9.5	10 x d



EYF0018AxxxxF02W02	MAT9130087	4(2x0.14)C+(2x1.0)C	11.0	10 x d
EYF0020AxxxxF01S04	MAT9130089	3(2x0.14)C+(3x0.14)C	9.5	10 x d



EYF0018AxxxxA00W02	MAT9130091	4(2x0.14)C+(2x1.0)C	11.0	10 x d
EYF0020AxxxxA00S04	MAT9130092	3(2x0.14)C+(3x0.14)C	9.5	10 x d

Note: The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

\* igus® gladly pre-harnesses the cable end according to your technical guidelines.

G = with earthed conductor green-yellow    x = without earthed conductor



- Minimum bending radius for use in Energy  
Chains®: 10 x cable diameter
- Colour: gray (similar to RAL 7001)

## Chainflex® PVC signal/encoder cable, oil-resistant: Basic cables

Lenze Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø mm	Bending radius
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EYF0020AxxxxA00S05	MAT9130093	3(2x0.14)C+(3x0.14)C	9.5	10 x d
EYF0021AxxxxA00S03	MAT9130094	3(2x0.14)C+(4x0.14)C+2(2x0.5)C	11.0	10 x d
EYF0018AxxxxA00S03	MAT9130095	4(2x0.14)C+(2x1.0)C	11.0	10 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

\* igus® gladly pre-harnesses the cable end according to your technical guidelines.

G = with earthed conductor green-yellow    x = without earthed conductor

## Chainflex® PVC signal/encoder cable, oil-resistant: Linking cables

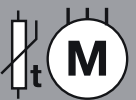
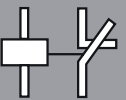
Lenze Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø mm	Bending radius
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EYF0020VxxxxF01G01	MAT9130083	3(2x0.14)C+(3x0.14)C	9.5	10 x d
EYF0019VxxxxF02G02	MAT9130084	4(2x0.14)C+(2x1.0)C	11.0	10 x d
EYF0022VxxxxF03G03	MAT9130085	3(2x0.14)C+(4x0.14)C+2(2x0.5)C	11.0	10 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor



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# Chainflex® feedback cable


## harnessed according to Lenze standard

### Technical information


- Oil-resistant and coolant-resistant
- Shielded
- Thin-walled, halogen-free
- Temperature range (moved): -35 °C to +100 °C
- Overall shield: extremely readily bending/solid copper shield, coverage approx. 70% linear, approx. 90% optical
- Nominal voltage: 30 V

### Chainflex® TPE signal/encoder cable, oil-resistant: Basic cables


Lenze Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	∅ mm	Bending radius
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EYF0020VxxxxA00G01	MAT9120080	3(2x0.14)C + (3x0.14)C	9.5	10 x d
EYF0019VxxxxA00G02	MAT9120081	4(2x0.14)C + (2x1.0)C	11.0	10 x d
EYF0022VxxxxA00G03	MAT9120082	3(2x0.14)C + (4x0.14)C + 2(2x0.5)C	12.0	10 x d



EYF0021AxxxxF03S03	MAT9120086	3(2x0.14)C + (4x0.14)C + 2(2x0.5)C	12.0	10 x d
EYF0018AxxxxF02S03	MAT9120088	4(2x0.14)C + (2x1.0)C	11.0	10 x d
EYF0020AxxxxF01S05	MAT9120090	3(2x0.14)C + (3x0.14)C	9.5	10 x d



EYF0018AxxxxF02W02	MAT9120087	4(2x0.14)C + (2x1.0)C	11.0	10 x d
EYF0020AxxxxF01S04	MAT9120089	3(2x0.14)C + (3x0.14)C	9.5	10 x d



EYF0018AxxxxA00W02	MAT9120091	4(2x0.14)C + (2x1.0)C	11.0	10 x d
EYF0020AxxxxA00S04	MAT9120092	3(2x0.14)C + (3x0.14)C	9.5	10 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

\* igus® gladly pre-harnesses the cable end according to your technical guidelines.

G = with earthed conductor green-yellow    x = without earthed conductor



- **Minimum bending radius for use in Energy**  
Chains®: 10 x cable diameter
- Colour: green (similar to RAL 6018)

## Chainflex® TPE signal/encoder cable, oil-resistant: Basic cables

Lenze Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø mm	Bending radius
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EYF0020AxxxxA00S05	MAT9120093	3(2x0.14)C + (3x0.14)C	9.5	10 x d
EYF0021AxxxxA00S03	MAT9120094	3(2x0.14)C + (4x0.14)C + 2(2x0.5)C	12.0	10 x d
EYF0018AxxxxA00S03	MAT9120095	4(2x0.14)C + (2x1.0)C	11.0	10 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

\* igus® gladly pre-harnesses the cable end according to your technical guidelines.

G = with earthed conductor green-yellow    x = without earthed conductor

## Chainflex® TPE signal/encoder cable, oil-resistant: Linking cables

Lenze Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø mm	Bending radius
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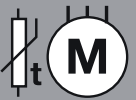
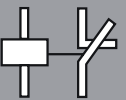
EYF0020VxxxxF01G01	MAT9120083	3(2x0.14)C + (3x0.14)C	9.5	10 x d
EYF0019VxxxxF02G02	MAT9120084	4(2x0.14)C + (2x1.0)C	11.0	10 x d
EYF0022VxxxxF03G03	MAT9120085	3(2x0.14)C + (4x0.14)C + 2(2x0.5)C	12.0	10 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor

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(for up to 10 cuts of the same type)

# Chainflex<sup>®</sup> decoder cable

## harnessed according to Lenze standard

### Technical information

- oil-resistant
- Flame-retardant
- Shielded
- Temperature range (moved): -5 °C to +70 °C
- Overall shield: extremely readily bending/solid copper shield, coverage approx. 70% linear, approx. 90% optical
- Nominal voltage: 30 V

### Chainflex<sup>®</sup> PVC signal/encoder cable, oil-resistant: Connection cables

Lenze Part No.	igus <sup>®</sup> Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	∅ mm	Bending radius
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EYD0017AxxxxW01S01	MAT9130100	3(2x0.14)C+(3x0.14)C	9.5	10 x d
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EYD0017AxxxxW01S02	MAT9130101	3(2x0.14)C+(3x0.14)C	9.5	10 x d
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EYD0017AxxxxW03S01	MAT9130102	3(2x0.14)C+(3x0.14)C	9.5	10 x d
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EYD0017AxxxxW03S02	MAT9130103	3(2x0.14)C+(3x0.14)C	9.5	10 x d
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**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
G = with earthed conductor green-yellow    x = without earthed conductor

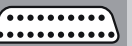
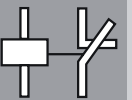


Decoder  
PVC

- Minimum bending radius for use in Energy  
Chains®: 10 x cable diameter
- Colour: gray (similar to RAL 7001)

Chainflex® Systems  
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**850 types from stock no cutting costs ...**

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(for up to 10 cuts of the same type)

# Chainflex® decoder cable

## harnessed according to Lenze standard

### Technical information

- Oil-resistant and coolant-resistant
- Shielded
- Thin-walled, halogen-free
- **Temperature range (moved):** -35 °C to +100 °C
- **Overall shield:** extremely readily bending/solid copper shield, coverage approx. 70% linear, approx. 90% optical
- **Nominal voltage:** 30 V

### Chainflex® TPE signal/encoder cable, oil-resistant: Connection cables

Lenze Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	∅ mm	Bending radius
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EYD0017AxxxxW01S01	MAT9120100	3(2x0.14)C + (3x0.14)C	9.5	10 x d
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EYD0017AxxxxW01S02	MAT9120101	3(2x0.14)C + (3x0.14)C	9.5	10 x d
--------------------	------------	------------------------	-----	--------



EYD0017AxxxxW03S01	MAT9120102	3(2x0.14)C + (3x0.14)C	9.5	10 x d
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EYD0017AxxxxW03S02	MAT9120103	3(2x0.14)C + (3x0.14)C	9.5	10 x d
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**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
G = with earthed conductor green-yellow    x = without earthed conductor

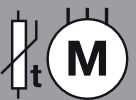
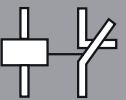


Decoder  
TPE

- Minimum bending radius for use in Energy  
Chains®: 10 x cable diameter
- Colour: green (similar to RAL 6018)

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(for up to 10 cuts of the same type)



# Chainflex<sup>®</sup> fan cable

## harnessed according to Lenze standard

### Technical information

- Oil-resistant and coolant-resistant
- PVC-free/halogen-free
- For maximum load requirements
- **Temperature range (moved):** -35 °C to +100 °C
- **Nominal voltage:** 300/500 V
- **Minimum bending radius for use in Energy**  
**Chains<sup>®</sup>:** 5 x cable diameter
- Colour: dark-blue (similar to RAL 5011)

### Chainflex<sup>®</sup> TPE control cable: Basic cables

Lenze Part No.	igus <sup>®</sup> Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	∅ mm	Bending radius
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\*

<b>EWLLxxxGMS</b>	MAT9120031	3 G 1.0	6.0	5 x d
<b>EYL002AxxxxL01A00</b>	MAT9120040	5 G 1.0	7.0	5 x d
<b>EYL002AxxxxL02A00</b>	MAT9120041	5 G 1.0	7.0	5 x d
<b>EYL002VxxxxA00J01</b>	MAT9120042	5 G 1.0	7.0	5 x d
<b>EYL002VxxxxA00J02</b>	MAT9120043	5 G 1.0	7.0	5 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

\* igus<sup>®</sup> gladly pre-harnesses the cable end according to your technical guidelines.

G = with earthed conductor green-yellow    x = without earthed conductor



## Chainflex® TPE control cable: Linking cables

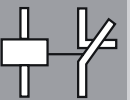
Lenze Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	ø mm	Bending radius
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EWLLxxxZM	MAT9120032	3 G 1.0	6.0	5 x d
EYL002VxxxxL01J01	MAT9120044	5 G 1.0	7.0	5 x d
EYL002VxxxxL02J02	MAT9120045	5 G 1.0	7.0	5 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
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(for up to 10 cuts of the same type)

# Chainflex® fan cable

## harnessed according to Lenze standard

### Technical information

- Oil-resistant
- Flame-retardant
- Temperature range (moved): -5 °C to +70 °C
- Nominal voltage: 300/500 V
- Minimum bending radius for use in Energy  
Chains®: 7.5 x cable diameter
- Colour: green (similar to RAL 6005)

### Chainflex® PVC control cable, oil-resistant: Basic cables

Lenze Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø mm	Bending radius
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EWLLxxxGMS	MAT9130031	3 G 1.0	7.0	7.5 x d
EYL002AxxxxL01A00	MAT9130040	5 G 1.0	8.5	7.5 x d
EYL002AxxxxL02A00	MAT9130041	5 G 1.0	8.5	7.5 x d
EYL002VxxxxA00J01	MAT9130042	5 G 1.0	8.5	7.5 x d
EYL002VxxxxA00J02	MAT9130043	5 G 1.0	8.5	7.5 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

\* igus® gladly pre-harnesses the cable end according to your technical guidelines.

G = with earthed conductor green-yellow    x = without earthed conductor



## Chainflex® PVC control cable, oil-resistant: Linking cables

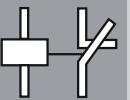
Lenze Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	ø mm	Bending radius
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EWLLxxxZM	MAT9130032	3 G 1.0	7.0	7.5 x d
EYL002VxxxxL01J01	MAT9130044	5 G 1.0	8.5	7.5 x d
EYL002VxxxxL02J02	MAT9130045	5 G 1.0	8.5	7.5 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
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(for up to 10 cuts of the same type)

# Chainflex® ReadyCable®



REXROTH – Selection table according to Rexroth part numbers and sheath materials. You will find your basic cable in the left column, the respective extension on the right.

Basic cable	Outer jacket material on page			Connection cable with adapter plug		
	PVC	PUR	TPE	PVC	PUR	TPE
IKG0001	330	326				
IKG0011	330	326				
IKG0021	330	326				
IKG0041	330	326				
IKG0061	330	326				
IKG0081	330	326		▶ IKG0089	331	327
IKG0101	330	326				
IKG0121	330	326				
IKG0161	330	326		▶ IKG0168	331	327
IKG0331	330	326				
IKG0332	330	326				
IKG4009	330	326		▶ IKG4006	328	327
IKG4017	330	326		▶ IKG4006	331	327
IKG4018	330	326				
IKG4020	330	326				
IKG4055	330	326				
IKG4060	330	326				
IKG4067	330	326				
IKG4070	330	326				
IKG4087	330	326				
IKG4090	330	326				
IKG4100	330	326				
IKG4107	330	326				
IKG4119	330	326				
IKG4150	330	326		▶ IKG4141	331	327
IKG4155	330	326				
IKG4164	330	326				
IKG4167	330	326		▶ IKG4161	331	327
IKG4186	330	326				
IKG4200	330	326				
IKG4204	330	326				
IKS0230	336		334			
IKS0232	336		334			
IKS0251			334	▶ IKS0255		335
IKS0253			334	▶ IKS0255		335
IKS0262			334			
IKS0301	336		334	▶ IKS0303	337	335
IKS0315	336		334			
IKS0374	336		334			
IKS4002	336		334			
IKS4020	336		334			
IKS4042	336		334	IKS4376	337	335
IKS4103	336		334	▶ IKS4151 / IKS 4153	337	335
IKS4142	336		334			
IKS4314	336		334	▶ IKS4322	337	335
IKS4374	336		334	▶ IKS4376	337	335
IKS4375	336		334			

# Chainflex® ReadyCable®



REXROTH – Selection table according to Rexroth part numbers and sheath materials. You will find your basic cable in the left column, the respective extension on the right.

Basic cable	Outer jacket material on page			Connection cable with adapter plug				
	PVC	PUR	TPE	Outer jacket material on page			TPE	
				PVC	PUR	TPE		
IKS4384	336		334					
RKG4200	308		306	▶	RKG4201	335		337
RKL4301	332	328		▶	RKL4304	333	329	
RKL4302	332	328		▶	RKL4305	333	329	
RKL4303	332	328		▶	RKL4305	333	329	
RKL4306	332	328		▶	RKL4311	333	329	
RKL4307	332	328		▶	RKL4311	333	329	
RKL4308	332	328		▶	RKL4312	333	329	
RKL4309	332	328		▶	RKL4312	333	329	
RKL4310	332	328		▶	RKL4312	333	329	
RKL4313	332	328		▶	RKL4316	333	329	
RKL4314	332	328		▶	RKL4316	333	329	
RKL4315	332	328		▶	RKL4316	333	329	
RKL4317	332	328		▶	RKL4319	333	329	
RKL4318	332	328		▶	RKL4319	333	329	
RKL4325	332	328						
RKL4327	332	328						
RKL4329	332	328						



## Chainflex® PVC cables for the woodworking industry, for example Typical application area – PVC

- for high load requirements
- light oil influence
- preferably indoor applications, but also outdoor ones at temperatures > 5 °C
- especially for freely suspended and gliding travel distances up to 100 m
- Storage and retrieval units for high-bay warehouses, machining units/package machines, quick handling, indoor cranes, timber processing



## Chainflex® PUR cables for the tooling machine industry, for example Typical application area – PUR

- for maximum load requirements
- almost unlimited resistance to oil
- Indoor and outdoor applications, UV-resistant
- especially for freely suspended and gliding travel distances up to 100 m
- Storage and retrieval units for high-bay warehouses, machining units/ machine tools, quick handling, clean room, semiconductor insertion, outdoor cranes, low-temperature applications



## Chainflex® TPE cables for outdoor use, for example Typical application area – TPE

- for maximum load requirements
- almost unlimited resistance to oil, also with bio-oils
- Indoor and outdoor applications, UV-resistant
- especially for freely suspended and gliding travel distances up to 400 m and more
- Storage and retrieval units for high-bay warehouses, machining units/ machine tools, quick handling, clean room, semiconductor insertion, ship to shore, outdoor cranes, low-temperature applications

Our product engineers will be happy to advise you in your choice of application-specific cables.

# Chainflex® power cable

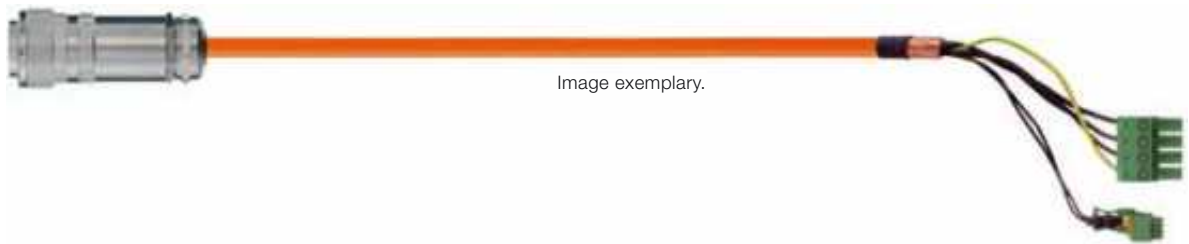
## harnessed according to Rexroth standard

### Technical information

- Oil-resistant and coolant-resistant, shielded
- Notch-resistant, hydrolysis-resistant and microbe-resistant
- Intermediate jacket on the basis of PUR
- **Temperature range (moved):** -20 °C to +80 °C
- **Signal pairs:** pair shielding of extremely readily bending/firm cooper shield, coverage approx. 70% linear, 90% optical, and metal foil

### Chainflex® PUR servo cable: Basic cables

Rexroth Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	∅ mm	Bending radius
------------------	----------------	---	------	----------------



IKG0001	MAT9090022	(4G1.0+2x(2x0.75)C)C	13.5	7.5 x d
IKG0011	MAT9090023	(4G1.0+2x(2x0.75)C)C	13.5	7.5 x d
IKG0021	MAT9090024	(4G2.5+2x(2x1.5)C)C	16.0	7.5 x d
IKG0041	MAT9090017	(4G2.5+2x(2x1.5)C)C	16.0	7.5 x d
IKG0061	MAT9090018	(4G4.0+2x(2x1.5)C)C	18.0	7.5 x d
IKG0081	MAT9090030	(4G6.0+2x(2x1.5)C)C	19.5	7.5 x d
IKG0101	MAT9090025	(4G6.0+2x(2x1.5)C)C	19.5	7.5 x d
IKG0121	MAT9090019	(4G10.0+2x(2x1.5)C)C	23.5	7.5 x d
IKG0161	MAT9090063	(4G25.0+2x(2x1.5)C)C	30.0	7.5 x d
IKG0331	MAT9090014	(4 G 0.75+(2x0.5)C)C	11.5	7.5 x d
IKG0332	MAT9090015	(4 G 0.75+(2x0.5)C)C	11.5	7.5 x d
IKG4009	MAT9090001	(4 G 1.0+2x(2x0.75)C)C	13.5	7.5 x d
IKG4017	MAT9090002	(4 G 1.0+2x(2x0.75)C)C	13.5	7.5 x d
IKG4018	MAT9090003	(4 G 1.0+2x(2x0.75)C)C	13.5	7.5 x d
IKG4020	MAT9090004	(4 G 1.0+2x(2x0.75)C)C	13.5	7.5 x d
IKG4055	MAT9090005	(4 G 1.5+2x(2x0.75)C)C	14.5	7.5 x d
IKG4060	MAT9090006	(4 G 1.5+2x(2x0.75)C)C	14.5	7.5 x d
IKG4067	MAT9090007	(4 G 2.5+2x(2x1.5)C)C	16.0	7.5 x d
IKG4070	MAT9090008	(4 G 2.5+2x(2x1.5)C)C	16.0	7.5 x d
IKG4087	MAT9090009	(4 G 4.0+2x(2x1.5)C)C	18.0	7.5 x d
IKG4090	MAT9090010	(4 G 4.0+2x(2x1.5)C)C	18.0	7.5 x d
IKG4100	MAT9090020	(4G1.0+2x(2x0.75)C)C	13.5	7.5 x d
IKG4107	MAT9090011	(4 G 6.0+2x(2x1.5)C)C	19.5	7.5 x d
IKG4119	MAT9090027	(4G1.0+2x(2x0.75)C)C	13.5	7.5 x d
IKG4150	MAT9090012	(4 G 6.0+2x(2x1.5)C)C	19.5	7.5 x d
IKG4155	MAT9090028	(4G6.0+2x(2x1.5)C)C	19.5	7.5 x d
IKG4164	MAT9090035	(4G10.0+2x(2x1.5)C)C	23.5	7.5 x d
IKG4167	MAT9090013	(4 G 10.0+2x(2x1.5)C)C	23.5	7.5 x d
IKG4186	MAT9090021	(4G16.0+2x(2x1.5)C)C	26.0	7.5 x d
IKG4200	MAT9090032	(4G16.0+2x(2x1.5)C)C	26.0	7.5 x d
IKG4204	MAT9090052	(4G25.0+2x(2x1.5)C)C	30.0	7.5 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
G = with earthed conductor green-yellow    x = without earthed conductor



- **Overall shield:** extremely readily bending/solid copper shield, coverage approx. 70% linear, approx. 90% optical
- **Nominal voltage:** 600/1000 V
- **Minimum bending radius for use in Energy Chains®:** 7.5 x cable diameter
- **Colour:** orange (similar to RAL 2003)

## Chainflex® PUR servo cable: Connection cables with adapter plugs

Rexroth Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	ø mm	Bending radius
------------------	----------------	--	------	----------------



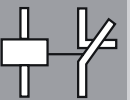
IKG0089	MAT9091005	(4G6.0+2x(2x1.5)C)C	19.5	7.5 x d
IKG0168	MAT9091006	(4G25.0+2x(2x1.5)C)C	30.0	7.5 x d
IKG4006	MAT9091001	(4 G 1.0+2x(2x0.75)C)C	13.5	7.5 x d
IKG4016	MAT9091002	(4 G 1.0+2x(2x0.75)C)C	13.5	7.5 x d
IKG4141	MAT9091003	(4G6.0+2x(2x1.5)C)C	19.5	7.5 x d
IKG4161	MAT9091004	(4G10.0+2x(2x1.5)C)C	23.5	7.5 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor

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# Chainflex® power cable

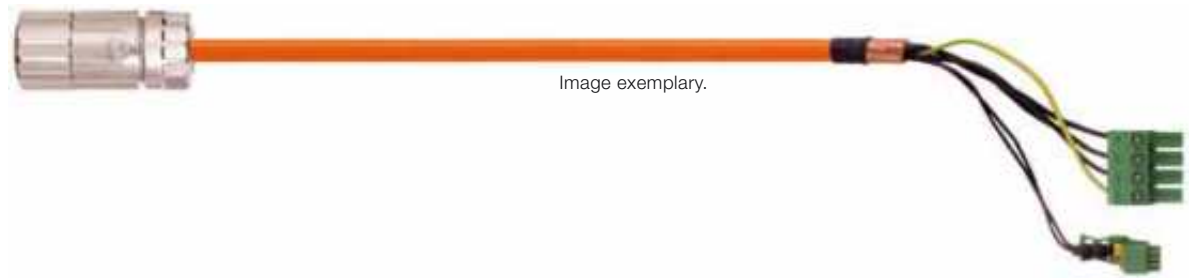
## harnessed according to Rexroth standard

### Technical information

- Oil-resistant and coolant-resistant, shielded
- Notch-resistant, hydrolysis-resistant and microbe-resistant
- Intermediate jacket on the basis of PUR
- **Temperature range (moved):** -20 °C to +80 °C
- **Signal pairs:** pair shielding of extremely readily bending/firm cooper shield, coverage approx. 70% linear, 90% optical, and metal foil

### Chainflex® PUR servo cable: Basic cables

Rexroth Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø mm	Bending radius
------------------	----------------	---	------	----------------



RKL4301	MAT9090037	(4G1.5+2x(2x0.75)C)C	14.5	7.5 x d
RKL4302	MAT9090026	(4G1.0+2x(2x0.75)C)C	13.5	7.5 x d
RKL4303	MAT9090029	(4G1.0+2x(2x0.75)C)C	13.5	7.5 x d
RKL4306	MAT9090040	(4G1.5+2x(2x0.75)C)C	14.5	7.5 x d
RKL4307	MAT9090041	(4G1.5+2x(2x0.75)C)C	14.5	7.5 x d
RKL4308	MAT9090033	(4G2.5+2x(2x1.5)C)C	16.0	7.5 x d
RKL4309	MAT9090042	(4G2.5+2x(2x1.5)C)C	16.0	7.5 x d
RKL4310	MAT9090043	(4G2.5+2x(2x1.5)C)C	16.0	7.5 x d
RKL4313	MAT9090062	(4G4.0+2x(2x1.5)C)C	18.0	7.5 x d
RKL4314	MAT9090060	(4G4.0+2x(2x1.5)C)C	18.0	7.5 x d
RKL4315	MAT9090059	(4G4.0+2x(2x1.5)C)C	18.0	7.5 x d
RKL4317	MAT9090061	(4G6.0+2x(2x1.5)C)C	19.5	7.5 x d
RKL4318	MAT9090047	(4G6.0+2x(2x1.5)C)C	19.5	7.5 x d
RKL4325	MAT9090049	(4G1.5+2x(2x0.75)C)C	14.5	7.5 x d
RKL4327	MAT9090050	(4G4.0+2x(2x1.5)C)C	18.0	7.5 x d
RKL4329	MAT9090051	(4G10.0+2x(2x1.5)C)C	23.5	7.5 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor



- **Overall shield:** extremely readily bending/solid copper shield, coverage approx. 70% linear, approx. 90% optical
- **Nominal voltage:** 600/1000 V
- **Minimum bending radius for use in Energy Chains®:** 7.5 x cable diameter
- **Colour:** orange (similar to RAL 2003)

## Chainflex® PUR servo cable: Connection cables with adapter plugs

Rexroth Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø mm	Bending radius
------------------	----------------	---	------	----------------



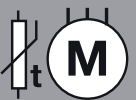
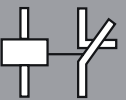
RKL4304	MAT9091007	(4G1.5+2x(2x0.75)C)C	14.5	7.5 x d
RKL4305	MAT9091008	(4G1.0+2x(2x0.75)C)C	13.5	7.5 x d
RKL4311	MAT9091009	(4G1.5+2x(2x0.75)C)C	14.5	7.5 x d
RKL4312	MAT9091010	(4G2.5+2x(2x1.5)C)C	16.0	7.5 x d
RKL4316	MAT9091011	(4G4.0+2x(2x1.5)C)C	18.0	7.5 x d
RKL4319	MAT9091012	(4G6.0+2x(2x1.5)C)C	19.5	7.5 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor

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# Chainflex® power cable

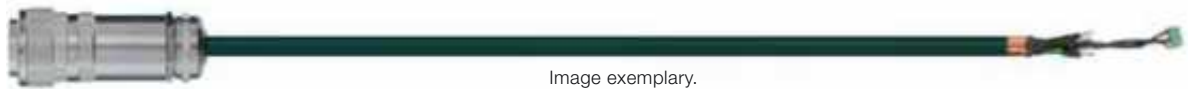
## harnessed according to Rexroth standard

### Technical information

- oil-resistant
- Flame-retardant
- Shielded
- Intermediate jacket on the basis of PVC
- **Temperature range (moved):** -5 °C to +70 °C
- **Signal pairs:** pair shielding of extremely readily bending/firm cooper shield, coverage approx. 70% linear, 90% optical, and metal foil

### Chainflex® PVC servo cable, oil-resistant: Basic cables

Rexroth Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	ø mm	Bending radius
---------------------	-------------------	---	---------	-------------------



IKG0001	MAT9190022	(4G1.0+2x(2x0.75)C)C	13.5	7.5 x d
IKG0011	MAT9190023	(4G1.0+2x(2x0.75)C)C	13.5	7.5 x d
IKG0021	MAT9190024	(4G2.5+2x(2x1.5)C)C	16.0	7.5 x d
IKG0041	MAT9190017	(4G2.5+2x(2x1.5)C)C	16.0	7.5 x d
IKG0061	MAT9190018	(4G4.0+2x(2x1.5)C)C	18.0	7.5 x d
IKG0081	MAT9190030	(4G6.0+2x(2x1.5)C)C	19.5	7.5 x d
IKG0101	MAT9190025	(4G6.0+2x(2x1.5)C)C	19.5	7.5 x d
IKG0121	MAT9190019	(4G10.0+2x(2x1.5)C)C	23.5	7.5 x d
IKG0161	MAT9190063	(4G25.0+2x(2x1.5)C)C	30.0	7.5 x d
IKG0331	MAT9190014	(4 G 0.75+(2x0.5)C)C	11.0	7.5 x d
IKG0332	MAT9190015	(4 G 0.75+(2x0.5)C)C	11.0	7.5 x d
IKG4009	MAT9190001	(4 G 1.5+2x(2x0.75)C)C	14.5	7.5 x d
IKG4017	MAT9190002	(4 G 1.5+2x(2x0.75)C)C	14.5	7.5 x d
IKG4018	MAT9190003	(4 G 1.5+2x(2x0.75)C)C	14.5	7.5 x d
IKG4020	MAT9190004	(4 G 1.5+2x(2x0.75)C)C	14.5	7.5 x d
IKG4055	MAT9190005	(4 G 1.5+2x(2x0.75)C)C	14.5	7.5 x d
IKG4060	MAT9190006	(4 G 1.5+2x(2x0.75)C)C	14.5	7.5 x d
IKG4067	MAT9190007	(4 G 2.5+2x(2x1.5)C)C	16.5	7.5 x d
IKG4070	MAT9190008	(4 G 2.5+2x(2x1.5)C)C	16.5	7.5 x d
IKG4087	MAT9190009	(4 G 4.0+2x(2x1.5)C)C	18.5	7.5 x d
IKG4090	MAT9190010	(4 G 4.0+2x(2x1.5)C)C	18.5	7.5 x d
IKG4100	MAT9190020	(4G1.0+2x(2x0.75)C)C	13.5	7.5 x d
IKG4107	MAT9190011	(4 G 6.0+2x(2x1.5)C)C	20.5	7.5 x d
IKG4119	MAT9190027	(4G1.0+2x(2x0.75)C)C	13.5	7.5 x d
IKG4150	MAT9190012	(4 G 6.0+2x(2x1.5)C)C	20.5	7.5 x d
IKG4155	MAT9190028	(4G6.0+2x(2x1.5)C)C	19.5	7.5 x d
IKG4164	MAT9190035	(4G10.0+2x(2x1.5)C)C	23.5	7.5 x d
IKG4167	MAT9190013	(4 G 10.0+2x(2x1.5)C)C	24.0	7.5 x d
IKG4186	MAT9190021	(4G16.0+2x(2x1.5)C)C	26.0	7.5 x d
IKG4200	MAT9190032	(4G16.0+2x(2x1.5)C)C	26.0	7.5 x d
IKG4204	MAT9190052	(4G25.0+2x(2x1.5)C)C	30.0	7.5 x d

Note: The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
G = with earthed conductor green-yellow    x = without earthed conductor



- **Overall shield:** extremely readily bending/solid copper shield, coverage approx. 70% linear, approx. 90% optical
- **Nominal voltage:** 600/1000 V
- **Minimum bending radius for use in Energy Chains®:** 7.5 x cable diameter
- **Colour:** green (similar to RAL 6005)

## Chainflex® PVC servo cable, oil-resistant: Connection cables with adapter plugs

Rexroth Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø mm	Bending radius
------------------	----------------	---	------	----------------



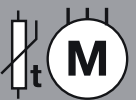
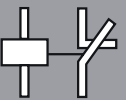
IKG0089	MAT9191005	(4G6.0+2x(2x1.5)C)C	19.5	7.5 x d
IKG0168	MAT9191006	(4G25.0+2x(2x1.5)C)C	30.0	7.5 x d
IKG4006	MAT9191001	(4 G 1.5+2x(2x0.75)C)C	14.5	7.5 x d
IKG4016	MAT9191002	(4 G 1.5+2x(2x0.75)C)C	14.5	7.5 x d
IKG4141	MAT9191003	(4G6.0+2x(2x1.5)C)C	19.5	7.5 x d
IKG4161	MAT9191004	(4G10.0+2x(2x1.5)C)C	23.5	7.5 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor

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# Chainflex<sup>®</sup> power cable

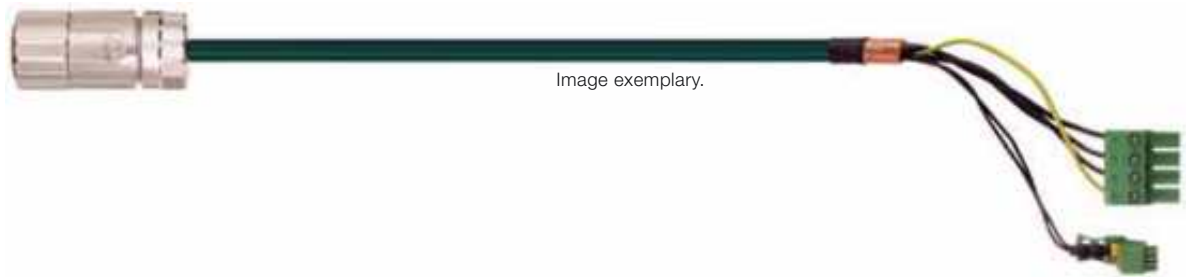
## harnessed according to Rexroth standard

### Technical information

- oil-resistant
- Flame-retardant
- Shielded
- Intermediate jacket on the basis of PVC
- Temperature range (moved): -5 °C to +70 °C
- Signal pairs: pair shielding of extremely readily bending/firm cooper shield, coverage approx. 70% linear, approx. 90% optical, and metal foil

### Chainflex<sup>®</sup> PVC servo cable, oil-resistant: Basic cables

Rexroth Part No.	igus <sup>®</sup> Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	∅ mm	Bending radius
------------------	----------------------------	--	------	----------------



RKL4301	MAT9190037	(4G1.5+2x(2x0.75)C)C	14.5	7.5 x d
RKL4302	MAT9190026	(4G1.0+2x(2x0.75)C)C	13.5	7.5 x d
RKL4303	MAT9190029	(4G1.0+2x(2x0.75)C)C	13.5	7.5 x d
RKL4306	MAT9190040	(4G1.5+2x(2x0.75)C)C	14.5	7.5 x d
RKL4307	MAT9190041	(4G1.5+2x(2x0.75)C)C	14.5	7.5 x d
RKL4308	MAT9190033	(4G2.5+2x(2x1.5)C)C	16.0	7.5 x d
RKL4309	MAT9190042	(4G2.5+2x(2x1.5)C)C	16.0	7.5 x d
RKL4310	MAT9190043	(4G2.5+2x(2x1.5)C)C	16.0	7.5 x d
RKL4313	MAT9190062	(4G4.0+2x(2x1.5)C)C	18.0	7.5 x d
RKL4314	MAT9190060	(4G4.0+2x(2x1.5)C)C	18.8	7.5 x d
RKL4315	MAT9190059	(4G4.0+2x(2x1.5)C)C	18.0	7.5 x d
RKL4317	MAT9190061	(4G6.0+2x(2x1.5)C)C	19.5	7.5 x d
RKL4318	MAT9190047	(4G6.0+2x(2x1.5)C)C	19.5	7.5 x d
RKL4325	MAT9190049	(4G1.5+2x(2x0.75)C)C	14.5	7.5 x d
RKL4327	MAT9190050	(4G4.0+2x(2x1.5)C)C	18.0	7.5 x d
RKL4329	MAT9190051	(4G10.0+2x(2x1.5)C)C	23.5	7.5 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor



- Overall shield: extremely readily bending/solid copper shield, coverage approx. 70% linear, approx. 90% optical
- Nominal voltage: 600/1000 V
- Minimum bending radius for use in Energy Chains®: 7.5 x cable diameter
- Colour: green (similar to RAL 6005)

## Chainflex® PVC servo cable, oil-resistant: Connection cables with adapter plugs

Rexroth Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø mm	Bending radius
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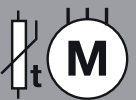
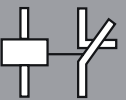
RKL4304	MAT9191007	(4G1.5+2x(2x0.75)C)C	14.5	7.5 x d
RKL4305	MAT9191008	(4G1.0+2x(2x0.75)C)C	13.5	7.5 x d
RKL4311	MAT9191009	(4G1.5+2x(2x0.75)C)C	14.5	7.5 x d
RKL4312	MAT9191010	(4G2.5+2x(2x1.5)C)C	16.0	7.5 x d
RKL4316	MAT9191011	(4G4.0+2x(2x1.5)C)C	18.0	7.5 x d
RKL4319	MAT9191012	(4G6.0+2x(2x1.5)C)C	19.5	7.5 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor

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# Chainflex<sup>®</sup> encoder cable

## harnessed according to Rexroth standard

### Technical information

- Oil-resistant and coolant-resistant
- Shielded
- Thin-walled, halogen-free
- Temperature range (moved): -35 °C to +100 °C
- Overall shield: extremely readily bending/solid copper shield, coverage approx. 70% linear, approx. 90% optical
- Nominal voltage: 30 V

### Chainflex<sup>®</sup> TPE signal/encoder cable, oil-resistant: Basic cables

Rexroth Part No.	igus <sup>®</sup> Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	∅ mm	Bending radius
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IKS0230	MAT9100008	(2x(2x0.25)+2x0.5)C	7.0	10 x d
IKS0232	MAT9100009	(2x(2x0.25)+2x0.5)C	7.0	10 x d
IKS0251	MAT9100014*	(12x0.5)C	11.5	10 x d
IKS0262	MAT9100016*	(12x0.5)C	11.5	10 x d
IKS0301	MAT9100015	(4x(2x0.25)+2x1.0)C	9.5	10 x d
IKS0315	MAT9100020	(4x(2x0.25)+2x1.0)C	9.5	10 x d
IKS0374	MAT9100011	(4x(2x0.25)+2x1.0)C	9.5	10 x d
IKS4002	MAT9100010	(3x0.25+3x(2x0.25)C+2x1.0)C	9.0	10 x d
IKS4020	MAT9100006	(4x2x0.14+4x1.0+(4x0.14)C)C	9.0	10 x d
IKS4042	MAT9100017	(4x(2x0.25)+2x0.5)C	9.0	10 x d
IKS4103	MAT9100001	(4x(2x0.25)+2x0.5)C	9.5	10 x d
IKS4142	MAT9100007	(4x2x0.14+4x1.0+(4x0.14)C)C	9.0	10 x d
IKS4314	MAT9100004	(4x(2x0.25)+(2x1.0))C	9.5	10 x d
IKS4374	MAT9100002	(4x(2x0.25)+2x0.5)C	9.5	10 x d
IKS4375	MAT9100003	(4x(2x0.25)+2x0.5)C	9.5	10 x d
IKS4384	MAT9100005	(3x0.25+3x(2x0.25)C+2x1.0)C	9.0	10 x d



RKG4200	MAT9100013	(4x(2x0.25)+2x0.5)C	9.5	10 x d
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\* without DESINA

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor



- Minimum bending radius for use in Energy  
Chains®: 10 x cable diameter
- Colour: green (similar to RAL 6018)

## Chainflex® TPE signal/encoder cable, oil-resistant: Connection cables with adapter plugs

Rexroth Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø mm	Bending radius
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Image exemplary.

IKS0255	MAT9100018	(12x0.5)C	11.5	10 x d
IKS0303	MAT9100019*	(4x(2x0.25)+2x1.0)C	9.5	10 x d
IKS4065	MAT9101001	(4x(2x0.25)+2x0.5)C	9.5	10 x d
IKS4151	MAT9101002	(4x(2x0.25)+2x0.5)C	9.5	10 x d
IKS4153	MAT9101003	(4x(2x0.25)+2x0.5)C	9.5	10 x d
IKS4376	MAT9101004	(4x(2x0.25)+2x0.5)C	9.5	10 x d
IKS4322	MAT9101005	(4x(2x0.25)+2x0.5)C	9.5	10 x d

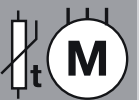
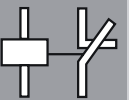
\* without DESINA

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# Chainflex<sup>®</sup> encoder cable

## harnessed according to Rexroth standard

### Technical information

- oil-resistant
- Flame-retardant
- Shielded
- Temperature range (moved): -5 °C to +70 °C
- Overall shield: extremely readily bending/solid copper shield, coverage approx. 70% linear, approx. 90% optical
- Nominal voltage: 30 V

### Chainflex<sup>®</sup> PVC signal/encoder cable, oil-resistant: Basic cables

Rexroth Part No.	igus <sup>®</sup> Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	∅ mm	Bending radius
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IKS0230	MAT9110008	(2x(2x0.25)+2x0.5)C	7.0	10 x d
IKS0232	MAT9110009	(2x(2x0.25)+2x0.5)C	7.0	10 x d
IKS0301	MAT9110015	(4x(2x0.25)+2x1.0)C	9.5	10 x d
IKS0315	MAT9110020	(4x(2x0.25)+2x1.0)C	9.5	10 x d
IKS0374	MAT9110011	(4x(2x0.25)+2x1.0)C	9.5	10 x d
IKS4002	MAT9110010	(3x0.25+3x(2x0.25)C+2x1.0)C	9.0	10 x d
IKS4020	MAT9110006	(4x2x0.14+4x1.0+(4x0.14)C)C	9.0	10 x d
IKS4042	MAT9110017	(4x(2x0.25)+2x0.5)C	9.0	10 x d
IKS4103	MAT9110001	(4x(2x0.25)+2x0.5)C	9.0	10 x d
IKS4142	MAT9110007	(4x2x0.14+4x1.0+(4x0.14)C)C	9.0	10 x d
IKS4314	MAT9110004	(4x(2x0.25)+2x0.5)C	9.0	10 x d
IKS4374	MAT9110002	(4x(2x0.25)+2x0.5)C	9.0	10 x d
IKS4375	MAT9110003	(4x(2x0.25)+2x0.5)C	9.0	10 x d
IKS4384	MAT9110005	(3x0.25+3x(2x0.25)C+2x1.0)C	9.0	10 x d



RKG4200	MAT9110013	(4x(2x0.25)+2x0.5)C	9.5	10 x d
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**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

**G** = with earthed conductor green-yellow    **x** = without earthed conductor



- **Minimum bending radius for use in Energy**  
Chains®: 10 x cable diameter
- Colour: gray (similar to RAL 7001)

## Chainflex® PVC signal/encoder cable, oil-resistant: Connection cables with adapter plugs

Rexroth Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø mm	Bending radius
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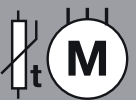
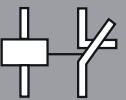
IKS0303	MAT9110019	(4x(2x0.25)+2x1.0)C	9.5	10 x d
IKS4065	MAT9111001	(4x(2x0.25)+2x0.5)C	9.0	10 x d
IKS4151	MAT9111002	(4x(2x0.25)+2x0.5)C	9.0	10 x d
IKS4153	MAT9111003	(4x(2x0.25)+2x0.5)C	9.0	10 x d
IKS4376	MAT9111004	(4x(2x0.25)+2x0.5)C	9.0	10 x d
IKS4322	MAT9111005	(4x(2x0.25)+2x0.5)C	9.0	10 x d

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# Chainflex® ReadyCable®



FANUC – Selection table according to Fanuc part numbers and sheath materials.

Basic cable – Premium Line				Basic cable – Economy Line				
Outer jacket material on page				Outer jacket material on page				
	PVC	PUR	TPE		PVC	PUR	TPE	
LX660-4077-T296			340	▶	LX660-4077-T296			340
LX660-4077-T297			340	▶	LX660-4077-T297			340
LX660-4077-T302			340	▶	LX660-4077-T302			340
LX660-4077-T303			340	▶	LX660-4077-T303			340
LX660-4077-T319			340	▶	LX660-4077-T319			341
LX660-8077-T261		341		▶	LX660-8077-T261		341	
LX660-8077-T264		341		▶	LX660-8077-T264		341	
LX660-8077-T265		341		▶	LX660-8077-T265		342	
LX660-8077-T266		342		▶	LX660-8077-T266		342	
LX660-8077-T267		342		▶	LX660-8077-T267		342	
LX660-8077-T270		342		▶	LX660-8077-T270		342	
LX660-8077-T271		342		▶	LX660-8077-T271		342	
LX660-8077-T272		343		▶	LX660-8077-T272		343	
LX660-8077-T273		343		▶	LX660-8077-T273		343	
LX660-8077-T291		343		▶	LX660-8077-T291		343	
LX660-8077-T292		344		▶	LX660-8077-T292		344	
LX660-8077-T293		344		▶	LX660-8077-T293		344	
LX660-8077-T296		346		▶	LX660-8077-T296		345	
LX660-8077-T298		346		▶	LX660-8077-T298		346	
LX660-8077-T300		347		▶	LX660-8077-T300		346	

## Premium Line

Energy Chain® cable for maximum stressing capacity, for unsupported and gliding applications exceeding 100 m distance of travel.

## Economy Line

Energy Chain® cable for light and medium stressing capacity, preferred for unsupported applications.



## FANUC



**Chainflex® PVC cables for the woodworking industry, for example**

### Typical application area – PVC

- for high load requirements
- light oil influence
- preferably indoor applications, but also outdoor ones at temperatures  $> 5\text{ }^{\circ}\text{C}$
- especially for freely suspended and gliding travel distances up to 100 m
- Storage and retrieval units for high-bay warehouses, machining units/packaging machines, quick handling, indoor cranes, timber processing



**Chainflex® PUR cables for the tooling machine industry, for example**

### Typical application area – PUR

- for maximum load requirements
- almost unlimited resistance to oil
- Indoor and outdoor applications, UV-resistant
- especially for freely suspended and gliding travel distances up to 100 m
- Storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, clean room, semiconductor insertion, outdoor cranes, low-temperature applications



**Chainflex® TPE cables for outdoor use, for example**

### Typical application area – TPE

- for maximum load requirements
- almost unlimited resistance to oil, also with bio-oils
- Indoor and outdoor applications, UV-resistant
- especially for freely suspended and gliding travel distances up to 400 m and more
- Storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, clean room, semiconductor insertion, ship to shore, outdoor cranes, low-temperature applications




Our product engineers will be happy to advise you in your choice of application-specific cables.

# Chainflex® power cable Premium harnessed according to Fanuc standard

## Technical information

- Oil-resistant and coolant-resistant
- Shielded
- Notch-resistant, hydrolysis-resistant and microbe-resistant
- Intermediate jacket on the basis of PUR
- **Signal pairs:** pair shielding of extremely readily bending/firm cooper shield, coverage approx. 70% linear, 90% optical, and metal foil

## Chainflex® PUR servo cable: Basic cables

Fanuc Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø mm	Bending radius
				
LX660-8077-T261	MAT9210061	(4 G 1.5)C	10.5	7.5 x d
				
LX660-8077-T264	MAT9210064	(4 G 2.5)C	12.0	7.5 x d
LX660-8077-T266	MAT9210066	(4 G 2.5)C	12.0	7.5 x d
				
LX660-8077-T265	MAT9210065	(4 G 2.5)C	12.0	7.5 x d
LX660-8077-T267	MAT9210067	(4 G 2.5)C	12.0	7.5 x d
				
LX660-8077-T270*	MAT9210070	(4 G 4.0)C	15.5	7.5 x d
LX660-8077-T272	MAT9210072	(4 G 10.0)C	20.5	7.5 x d
				
LX660-8077-T271*	MAT9210071	(4 G 4.0)C	15.5	7.5 x d
LX660-8077-T273	MAT9210073	(4 G 10.0)C	20.5	7.5 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

\* Delivery time upon inquiry

G = with earthed conductor green-yellow    x = without earthed conductor



- **Overall shield:** extremely readily bending/solid copper shield, coverage approx. 70% linear, 90% optical
- **Temperature range (moved):** -20 °C to +80 °C
- **Nominal voltage:** 600/1000 V
- **Minimum bending radius for use in Energy Chains®:** 7.5 x cable diameter
- **Colour:** orange (similar to RAL 2003)

## Chainflex® PUR servo cable: Basic cables

Fanuc Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø mm	Bending radius
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LX660-8077-T291	MAT9210091	(4 G 2.5)C	12.0	7.5 x d
LX660-8077-T293*	MAT9210093	(4 G 4.0)C	15.5	7.5 x d



LX660-8077-T292*	MAT9210092	(4 G 4.0)C	15.5	7.5 x d
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LX660-8077-T296	MAT9210096	(4 G 2.5)C	12.0	7.5 x d
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LX660-8077-T298*	MAT9210098	(4 G 4.0)C	15.5	7.5 x d
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LX660-8077-T300	MAT9210300	(4 G 2.5)C	12.0	7.5 x d
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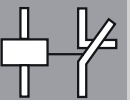
**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

\* Delivery time upon inquiry

G = with earthed conductor green-yellow    x = without earthed conductor

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# Chainflex<sup>®</sup> power cable Economy harnessed according to Fanuc standard

## Technical information

- oil-resistant
- Shielded
- Halogen-free
- Temperature range (moved): -20 °C to +80 °C
- Signal pairs: pair shielding of extremely readily bending/firm cooper shield, coverage approx. 70% linear, approx. 80% optical
- Nominal voltage: 600/1000 V

## Chainflex<sup>®</sup> PUR servo cable: Basic cables

Fanuc Part No.	igus <sup>®</sup> Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	ø mm	Bending radius
	LX660-8077-T261	MAT9200061 (4 G 1.5)C	8.5	10 x d
	LX660-8077-T264	MAT9200064 (4 G 2.5)C	10.5	10 x d
	LX660-8077-T266	MAT9200066 (4 G 2.5)C	10.5	10 x d
	LX660-8077-T265	MAT9200065 (4 G 2.5)C	10.5	10 x d
	LX660-8077-T267	MAT9200067 (4 G 2.5)C	10.5	10 x d
	LX660-8077-T270*	MAT9200070 (4 G 4.0)C	12.0	10 x d
	LX660-8077-T272	MAT9200072 (4 G 10.0)C	17.5	10 x d
	LX660-8077-T271*	MAT9200071 (4 G 4.0)C	12.0	10 x d
	LX660-8077-T273	MAT9200073 (4 G 10.0)C	17.5	10 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

\* Delivery time upon inquiry

G = with earthed conductor green-yellow    x = without earthed conductor



- **Overall shield:** extremely readily bending/solid copper shield, coverage approx. 70% linear, approx. 80% optical
- Colour: orange (similar to RAL 2003)
- **Minimum bending radius for use in Energy Chains®:** 10 x cable diameter
- Especially for freely suspended travel distances

## Chainflex® PUR servo cable: Basic cables

Fanuc Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø mm	Bending radius
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LX660-8077-T291	MAT9200091	(4 G 2.5)C	10.5	10 x d
LX660-8077-T293*	MAT9200093	(4 G 4.0)C	12.0	10 x d



LX660-8077-T292*	MAT9200092	(4 G 4.0)C	12.0	10 x d
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LX660-8077-T296	MAT9200096	(4 G 2.5)C	10.5	10 x d
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LX660-8077-T298*	MAT9200098	(4 G 4.0)C	15.5	10 x d
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LX660-8077-T300	MAT9200300	(4 G 2.5)C	12.0	10 x d
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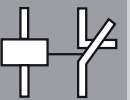
**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

\* Delivery time upon inquiry

G = with earthed conductor green-yellow    x = without earthed conductor

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(for up to 10 cuts of the same type)



# Chainflex<sup>®</sup> signal cable Premium

## harnessed according to Fanuc standard


### Technical information

- Oil-resistant and coolant-resistant
- Shielded
- Thin-walled, halogen-free
- Temperature range (moved): -35 °C to +100 °C
- Overall shield: extremely readily bending/solid copper shield, coverage approx. 70% linear, approx. 90% optical
- Nominal voltage: 30 V


### Chainflex<sup>®</sup> TPE signal/encoder cable, oil-resistant: Basic cables

Fanuc Part No.	igus <sup>®</sup> Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	ø mm	Bending radius
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	LX660-4077-T296	MAT9310296	(5x0.5+1x2x0.25)C	8.5	10 x d
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	LX660-4077-T297	MAT9310297	(5x0.5+1x2x0.25)C	8.5	10 x d
--	-----------------	------------	-------------------	-----	--------

	LX660-4077-T302	MAT9310302	((6x0.5)+5x(2x0.25))C	12.5	10 x d
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	LX660-4077-T303	MAT9310303	((6x0.5)+5x(2x0.25))C	12.5	10 x d
--	-----------------	------------	-----------------------	------	--------

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor



- Minimum bending radius for use in Energy  
Chains®: 10 x cable diameter
- Colour: green (similar to RAL 6018)

## Chainflex® TPE signal/encoder cable, oil-resistant: Basic cables

Fanuc Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	ø mm	Bending radius
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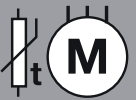
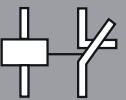
LX660-4077-T319	MAT9310319	(6x0.5+5x2x0.25)C	12.5	10 x d
-----------------	------------	-------------------	------	--------

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor

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# Chainflex<sup>®</sup> signal cable Economy

## harnessed according to Fanuc standard


### Technical information

- Oil-resistant and coolant-resistant
- Shielded
- Thin-walled
- Temperature range (moved): -35 °C to +100 °C
- Overall shield: extremely readily bending/solid copper shield, coverage approx. 70% linear, approx. 80% optical
- Nominal voltage: 30 V


### Chainflex<sup>®</sup> TPE signal/encoder cable, oil-resistant: Basic cables

Fanuc Part No.	igus <sup>®</sup> Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	ø mm	Bending radius
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	LX660-4077-T296	MAT9300296	(5x0.5+1x2x0.25)C	7.5	12 x d
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	LX660-4077-T297	MAT9300297	(5x0.5+1x2x0.25)C	7.5	12 x d
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	LX660-4077-T302	MAT9300302	((6x0.5)+5x(2x0.25))C	9.6	12 x d
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	LX660-4077-T303	MAT9300303	((6x0.5)+5x(2x0.25))C	9.6	12 x d
--	-----------------	------------	-----------------------	-----	--------

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor



- **Minimum bending radius for use in Energy**  
Chains<sup>®</sup>: 12 x cable diameter
- Colour: green (similar to RAL 6018)
- Especially for freely suspended travel distances

## Chainflex<sup>®</sup> TPE signal/encoder cable, oil-resistant: Basic cables

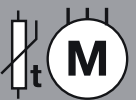
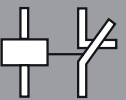
Fanuc Part No.	igus <sup>®</sup> Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	ø mm	Bending radius
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LX660-4077-T319	MAT9300319	(6x0.5+5x2x0.25)C	9.6	12 x d
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**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor



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(for up to 10 cuts of the same type)

# Chainflex<sup>®</sup> ReadyCable<sup>®</sup>



SEW – Selection table according to SEW part numbers and sheath materials. You will find your basic cable in the left column, the respective extension on the right.

Direct line	Outer jacket material on page				Extension cable	Outer jacket material on page		
	PVC	PUR	TPE			PVC	PUR	TPE
0590 477 3	357		355	▶	0590 361 0	357		355
1332 455 1	360		358	▶	199 540 5	361		359
1332 486 1	353	351		▶	0593 650 0	353	351	
1332 743 7	360		358	▶	199 541 3	361		359
198 930 8	360		358					
199 180 9	356		354	▶	199 550 2	356		354
199 182 5	356		354	▶	199 552 9	356		354
199 184 1	356		354	▶	199 554 5	356		354
199 186 8	356		354	▶	199 556 1	356		354
199 188 4	356		354	▶	199 558 8	356		354
199 190 6	352	350		▶	199 200 7	352	350	
199 192 2	352	350		▶	199 202 3	352	350	
199 194 9	352	350		▶	199 204 X	352	350	
199 196 5	352	350		▶	199 206 6	352	350	
199 198 1	352	350		▶	199 208 2	352	350	
199 319 4	360		358	▶	199 541 3	361		359

# Chainflex® ReadyCable®



## SEW



**Chainflex® PVC cables for the woodworking industry, for example**

### Typical application area – PVC

- for high load requirements
- light oil influence
- preferably indoor applications, but also outdoor ones at temperatures  $> 5\text{ }^{\circ}\text{C}$
- especially for freely suspended and gliding travel distances up to 100 m
- Storage and retrieval units for high-bay warehouses, machining units/packages machines, quick handling, indoor cranes, timber processing



**Chainflex® PUR cables for the tooling machine industry, for example**

### Typical application area – PUR

- for maximum load requirements
- almost unlimited resistance to oil
- Indoor and outdoor applications, UV-resistant
- especially for freely suspended and gliding travel distances up to 100 m
- Storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, clean room, semiconductor insertion, outdoor cranes, low-temperature applications



**Chainflex® TPE cables for outdoor use, for example**

### Typical application area – TPE

- for maximum load requirements
- almost unlimited resistance to oil, also with bio-oils
- Indoor and outdoor applications, UV-resistant
- especially for freely suspended and gliding travel distances up to 400 m and more
- Storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, clean room, semiconductor insertion, ship to shore, outdoor cranes, low-temperature applications

Our product engineers will be happy to advise you in your choice of application-specific cables.

# Chainflex<sup>®</sup> servo cable

## harnessed according to SEW standard (Amphenol)

### Technical information

- Oil-resistant and coolant-resistant, shielded
- Notch-resistant, hydrolysis-resistant and microbe-resistant
- Intermediate jacket on the basis of PUR
- **Signal pairs:** pair shielding of extremely readily bending/firm cooper shield, coverage approx. 70% linear, approx. 90% optical, and metal foil
- **Nominal voltage:** 600/1000 V

### Chainflex<sup>®</sup> PUR servo cable, oil-resistant: Direct lines

SEW Part No.	igus <sup>®</sup> Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	∅ mm	Bending radius
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199 190 6	MAT9400001	(4 G 1.5+2x(2x0.75)C)C	14.5	7.5 x d
199 192 2	MAT9400002	(4 G 2.5+2x(2x1.5)C)C	16.5	7.5 x d
199 194 9	MAT9400003	(4 G 4+2x(2x1.5)C)C	18.0	7.5 x d
199 196 5	MAT9400004	(4 G 6+2x(2x1.5)C)C	19.5	7.5 x d
199 198 1	MAT9400005	(4 G 10+2x(2x1.5)C)C	23.5	7.5 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
G = with earthed conductor green-yellow    x = without earthed conductor

### Chainflex<sup>®</sup> PUR servo cable, oil-resistant: Extension cables

SEW Part No.	igus <sup>®</sup> Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	∅ mm	Bending radius
-----------------	-------------------------------	---	---------	-------------------



199 200 7	MAT9401001	(4 G 1.5+2x(2x0.75)C)C	14.5	7.5 x d
199 202 3	MAT9401002	(4 G 2.5+2x(2x1.5)C)C	16.5	7.5 x d
199 204 X	MAT9401003	(4 G 4+2x(2x1.5)C)C	18.0	7.5 x d
199 206 6	MAT9401004	(4 G 6+2x(2x1.5)C)C	19.5	7.5 x d
199 208 2	MAT9401005	(4 G 10+2x(2x1.5)C)C	23.5	7.5 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
G = with earthed conductor green-yellow    x = without earthed conductor



- **Overall shield:** extremely readily bending/solid copper shield, coverage approx. 70% linear, 90% optical
- **Temperature range (moved):** -20 °C to +80 °C
- **Colour:** orange (similar to RAL 2003)
- **Minimum bending radius for use in Energy Chains®:** 7.5 x cable diameter

## Chainflex® PUR servo cable, oil-resistant: Direct lines

SEW Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	ø mm	Bending radius
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1332 486 1	MAT9400011	(4 G 1.5+1x(2x1.0)C)C	12.5	7.5 x d
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**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor

## Chainflex® PUR servo cable, oil-resistant: Extension cables

SEW Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	ø mm	Bending radius
--------------	----------------	--	------	----------------



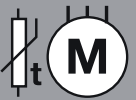
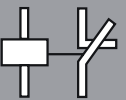
0593 650 0	MAT9401011	(4 G 1.5+1x(2x1.0)C)C	12.5	7.5 x d
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**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor

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(for up to 10 cuts of the same type)



# Chainflex<sup>®</sup> servo cable

## harnessed according to SEW standard (Amphenol)

### Technical information

- oil-resistant
- Flame-retardant
- Shielded
- Intermediate jacket on the basis of PVC
- **Signal pairs:** pair shielding of extremely readily bending/firm cooper shield, coverage approx. 70% linear, approx. 90% optical, and metal foil
- **Temperature range (moved):** -5 °C to +70 °C

### Chainflex<sup>®</sup> PVC servo cable, oil-resistant: Direct lines

SEW Part No.	igus <sup>®</sup> Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	∅ mm	Bending radius
-----------------	-------------------------------	---	---------	-------------------



199 190 6	MAT9410001	(4 G 1.5+2x(2x0.75)C)C	14.5	7.5 x d
199 192 2	MAT9410002	(4 G 2.5+2x(2x1.5)C)C	16.5	7.5 x d
199 194 9	MAT9410003	(4 G 4+2x(2x1.5)C)C	18.0	7.5 x d
199 196 5	MAT9410004	(4 G 6+2x(2x1.5)C)C	19.5	7.5 x d
199 198 1	MAT9410005	(4 G 10+2x(2x1.5)C)C	23.5	7.5 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
G = with earthed conductor green-yellow    x = without earthed conductor

### Chainflex<sup>®</sup> PVC servo cable, oil-resistant: Extension cables

SEW Part No.	igus <sup>®</sup> Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	∅ mm	Bending radius
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199 200 7	MAT9411001	(4 G 1.5+2x(2x0.75)C)C	14.5	7.5 x d
199 202 3	MAT9411002	(4 G 2.5+2x(2x1.5)C)C	17.0	7.5 x d
199 204 X	MAT9411003	(4 G 4+2x(2x1.5)C)C	18.5	7.5 x d
199 206 6	MAT9411004	(4 G 6+2x(2x1.5)C)C	20.5	7.5 x d
199 208 2	MAT9411005	(4 G 10+2x(2x1.5)C)C	24.0	7.5 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
G = with earthed conductor green-yellow    x = without earthed conductor



- **Overall shield:** extremely readily bending/solid copper shield, coverage approx. 70% linear, 90% optical
- **Nominal voltage:** 600/1000 V
- **Colour:** green (similar to RAL 6005)
- **Minimum bending radius for use in Energy Chains®:** 7.5 x cable diameter

## Chainflex® PVC servo cable, oil-resistant: Direct lines

SEW Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	ø mm	Bending radius
--------------	----------------	--	------	----------------



1332 486 1	MAT9410011	(4 G 1.5+1x(2x1.0)C)C	12.5	7.5 x d
------------	------------	-----------------------	------	---------

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor

## Chainflex® PVC servo cable, oil-resistant: Extension cables

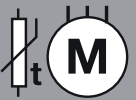
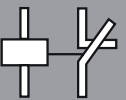
SEW Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	ø mm	Bending radius
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0593 650 0	MAT9411011	(4 G 1.5+1x(2x1.0)C)C	12.5	7.5 x d
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**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor



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# Chainflex® power cable

## harnessed according to SEW standard (Amphenol)

### Technical information

- Oil-resistant and coolant-resistant
- Flame-retardant
- Shielded
- Temperature range (moved): -35 °C to +90 °C
- Intermediate jacket on the basis of TPE
- **Overall shield:** extremely readily bending/solid copper shield, coverage approx. 70% linear, approx. 90% optical

### Chainflex® TPE power cable, oil-resistant: Direct lines

SEW Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	∅ mm	Bending radius
-----------------	-------------------	--	---------	-------------------



199 180 9	MAT9400006	(4 G 1.5)C	9.5	7.5 x d
199 182 5	MAT9400007	(4 G 2.5)C	11.0	7.5 x d
199 184 1	MAT9400008	(4 G 4.0)C	14.0	7.5 x d
199 186 8	MAT9400009	(4 G 6.0)C	15.5	7.5 x d
199 188 4	MAT9400010	(4 G 10.0)C	19.5	7.5 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
G = with earthed conductor green-yellow    x = without earthed conductor

### Chainflex® TPE power cable, oil-resistant: Extension cables

SEW Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	∅ mm	Bending radius
-----------------	-------------------	--	---------	-------------------



199 550 2	MAT9401006	(4 G 1.5)C	9.5	7.5 x d
199 552 9	MAT9401007	(4 G 2.5)C	11.0	7.5 x d
199 554 5	MAT9401008	(4 G 4.0)C	14.0	7.5 x d
199 556 1	MAT9401009	(4 G 6.0)C	15.5	7.5 x d
199 558 8	MAT9401010	(4 G 10.0)C	19.5	7.5 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
G = with earthed conductor green-yellow    x = without earthed conductor



- Colour: black (similar to RAL 9005)
- Minimum bending radius for use in Energy  
Chains®: 7.5 x cable diameter
- Nominal voltage: 600/1000 V
- For maximum load requirements

## Chainflex® TPE power cable, oil-resistant: Direct lines

SEW Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø mm	Bending radius
-----------------	-------------------	--	---------	-------------------



0590 477 3	MAT9400012	(4 G 1.5)C	9.5	7.5 x d
------------	------------	------------	-----	---------

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor

## Chainflex® TPE power cable, oil-resistant: Extension cables

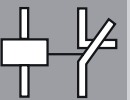
SEW Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø mm	Bending radius
-----------------	-------------------	--	---------	-------------------



0590 361 0	MAT9401012	(4 G 1.5)C	9.5	7.5 x d
------------	------------	------------	-----	---------

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor



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... and order online ► [www.igus.eu/en/CFSEW](http://www.igus.eu/en/CFSEW)

(for up to 10 cuts of the same type)

# Chainflex® power cable

## harnessed according to SEW standard (Amphenol)

### Technical information

- oil-resistant
- Flame-retardant
- Shielded
- Intermediate jacket on the basis of PVC
- **Overall shield:** extremely readily bending/solid copper shield, coverage approx. 70% linear, approx. 90% optical
- **Temperature range (moved):** -5 °C to +70 °C

### Chainflex® PVC power cable, oil-resistant: Direct lines

SEW Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø mm	Bending radius
--------------	----------------	---	------	----------------



199 180 9	MAT9410006	(4 G 1.5)C	10.5	7.5 x d
199 182 5	MAT9410007	(4 G 2.5)C	12.5	7.5 x d
199 184 1	MAT9410008	(4 G 4.0)C	14.0	7.5 x d
199 186 8	MAT9410009	(4 G 6.0)C	16.0	7.5 x d
199 188 4	MAT9410010	(4 G 10.0)C	20.5	7.5 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
G = with earthed conductor green-yellow    x = without earthed conductor

### Chainflex® PVC power cable, oil-resistant: Extension cables

SEW Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø mm	Bending radius
--------------	----------------	---	------	----------------



199 550 2	MAT9411006	(4 G 1.5)C	10.5	7.5 x d
199 552 9	MAT9411007	(4 G 2.5)C	12.5	7.5 x d
199 554 5	MAT9411008	(4 G 4.0)C	14.0	7.5 x d
199 556 1	MAT9411009	(4 G 6.0)C	16.0	7.5 x d
199 558 8	MAT9411010	(4 G 10.0)C	20.5	7.5 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
G = with earthed conductor green-yellow    x = without earthed conductor



- **Nominal voltage:** 600/1000 V
- **Minimum bending radius for use in Energy**  
Chains®: 7.5 x cable diameter
- **Colour:** anthracite-gray (similar to RAL 7016)

## Chainflex® PVC power cable, oil-resistant: Direct lines

SEW Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	ø mm	Bending radius
-----------------	-------------------	---	---------	-------------------



0590 477 3	MAT9410012	(4 G 1.5)C	10.5	7.5 x d
------------	------------	------------	------	---------

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor

## Chainflex® PVC power cable, oil-resistant: Extension cables

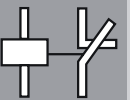
SEW Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	ø mm	Bending radius
-----------------	-------------------	---	---------	-------------------



0590 361 0	MAT9411012	(4 G 1.5)C	9.5	7.5 x d
------------	------------	------------	-----	---------

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor



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(for up to 10 cuts of the same type)

# Chainflex<sup>®</sup> encoder cable

## harnessed according to SEW standard

### Technical information

- Oil-resistant and coolant-resistant, shielded
- Thin-walled, halogen-free
- **Minimum bending radius for use in Energy**  
Chains<sup>®</sup>: 7.5 x cable diameter
- **Overall shield:** extremely readily bending/solid copper shield, coverage approx. 70% linear, approx. 90% optical
- **Intermediate jacket on the basis of TPE**

### Chainflex<sup>®</sup> TPE signal/encoder cable, oil-resistant: Direct lines

SEW Part No.	igus <sup>®</sup> Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	∅ mm	Bending radius
-----------------	-------------------------------	---	---------	-------------------



199 319 4	MAT9500001	(4x(2x0.25)+(2x0.5))C	9.5	7.5 x d
1332 743 7	MAT9500002	(4x(2x0.25)+(2x0.5))C	9.5	7.5 x d
1332 455 1	MAT9500003	(4x(2x0.25)+(2x0.5))C	9.5	7.5 x d
198 930 8	MAT9500004	(4x(2x0.25)+(2x0.5))C	9.5	7.5 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor



- Temperature range (moved): -35 °C to +100 °C
- Nominal voltage: 30 V
- Colour: green (similar to RAL 6018)

## Chainflex® TPE signal/encoder cable, oil-resistant: Extension cables

SEW Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	∅ mm	Bending radius
-----------------	-------------------	---	---------	-------------------

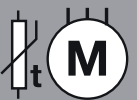
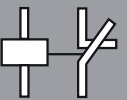


199 541 3	MAT9501001	(4x(2x0.25)+(2x0.5))C	9.5	7.5 x d
199 540 5	MAT9501002	(4x(2x0.25)+(2x0.5))C	9.5	7.5 x d
0593 968 2	MAT9501003	(4x(2x0.25)+(2x0.5))C	9.5	7.5 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
**G** = with earthed conductor green-yellow    **x** = without earthed conductor

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(for up to 10 cuts of the same type)



# Chainflex<sup>®</sup> encoder cable

## harnessed according to SEW standard

### Technical information

- oil-resistant
- Flame-retardant
- Shielded
- Temperature range (moved): -5 °C to +70 °C
- Overall shield: extremely readily bending/solid copper shield, coverage approx. 70% linear, 90% optical
- Nominal voltage: 30 V

### Chainflex<sup>®</sup> PVC signal/encoder cable, oil-resistant: Direct lines

SEW Part No.	igus <sup>®</sup> Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	∅ mm	Bending radius
-----------------	-------------------------------	---	---------	-------------------



199 319 4	MAT9510001	(4x(2x0.25)+(2x0.5))C	9.0	10 x d
1332 743 7	MAT9510002	(4x(2x0.25)+(2x0.5))C	9.0	10 x d
1332 455 1	MAT9510003	(4x(2x0.25)+(2x0.5))C	9.0	10 x d
198 930 8	MAT9510004	(4x(2x0.25)+(2x0.5))C	9.0	10 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor



- Minimum bending radius for use in Energy Chains®:  
10 x cable diameter
- Colour: gray (similar to RAL 7001)

## Chainflex® PVC signal/encoder cable, oil-resistant: Extension cables

SEW Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	∅ mm	Bending radius
-----------------	-------------------	--	---------	-------------------

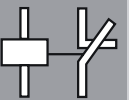


199 541 3	MAT9511001	(4x(2x0.25)+(2x0.5))C	9.0	10 x d
199 540 5	MAT9511002	(4x(2x0.25)+(2x0.5))C	9.0	10 x d
0593 968 2	MAT9511003	(4x(2x0.25)+(2x0.5))C	9.0	10 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
**G** = with earthed conductor green-yellow    **x** = without earthed conductor

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(for up to 10 cuts of the same type)

# Chainflex<sup>®</sup> ReadyCable<sup>®</sup>



Heidenhain – Selection table according to part numbers and sheath materials.

Direct line	Outer jacket material on page			Extension cable	Outer jacket material on page		
	PVC	PUR	TPE		PVC	PUR	TPE
298 399-xx		365	367				
309 738-xx		364	366				
309 774-xx		365	367				
309 777-xx		365	367				
309 778-xx		365	367				
310 193-xx		365	367				
310 197-xx		364	366				
310 199-xx		364	366				
324 544-xx		364	366				
332 115-xx		364	366				
354 411-xx		365	367				
355 398-xx		365	367				
360 472-xx		364	366				

# Chainflex® ReadyCable®



## Heidenhain



**Chainflex® PUR cables for the tooling machine industry, for example**

### Typical application area – PUR

- for maximum load requirements
- almost unlimited resistance to oil
- Indoor and outdoor applications, UV-resistant
- especially for freely suspended and gliding travel distances up to 100 m
- Storage and retrieval units for high-bay warehouses, machining units/ machine tools, quick handling, clean room, semiconductor insertion, outdoor cranes, low-temperature applications



**Chainflex® TPE cables for outdoor use, for example**

### Typical application area – TPE

- for maximum load requirements
- almost unlimited resistance to oil, also with bio-oils
- Indoor and outdoor applications, UV-resistant
- especially for freely suspended and gliding travel distances up to 400 m and more
- Storage and retrieval units for high-bay warehouses, machining units/ machine tools, quick handling, clean room, semiconductor insertion, ship to shore, outdoor cranes, low-temperature applications

Our product engineers will be happy to advise you in your choice of application-specific cables.

# Chainflex<sup>®</sup> adapter cable






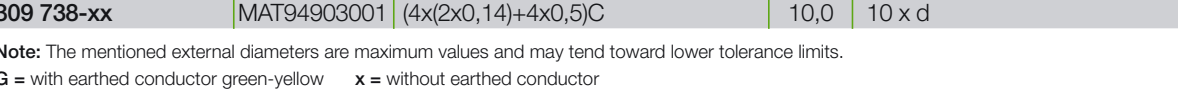
## harnessed according to Heidenhain standard

### Technical information

- Oil-resistant and coolant-resistant
- Shielded
- Notch-resistant, hydrolysis-resistant and microbe-resistant
- Flame-retardant
- **T/R (moved):** -20 °C to + 80°C
- **Nominal voltage:** 30 V
- **Total shield:** extremely readily bending/solid copper shield, coverage approx. 70% linear, approx. 90% optical

### Chainflex<sup>®</sup> PUR signal/encoder cable, oil-resistant: Connecting cable

Heidenhain Part No.	igus <sup>®</sup> Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	∅ mm	Bending radius
---------------------	----------------------------	--	------	----------------

	332 115-xx	MAT94901001	(4x(2x0,14)+(4x0,14)C+4x0,5)C	12,0	10 x d
	360 472-xx	MAT94901002	(4x(2x0,14)+(4x0,14)C+4x0,5)C	12,0	10 x d
	310 197-xx	MAT94902001	(3x(2x0,14)C+(2x0,5)C)C	12,0	10 x d
	324 544-xx	MAT94902002	(4x(2x0,14)+(4x0,14)C+4x0,5)C	12,0	10 x d
	310 199-xx	MAT94902003	(4x(2x0,14)+4x0,5)C	10,0	10 x d
	309 738-xx	MAT94903001	(4x(2x0,14)+4x0,5)C	10,0	10 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor



- Minimum bending radius for use in Energy Chains®:  
10 x cable diameter
- Colour: green (similar to RAL 6018)

### Chainflex® PUR signal/encoder cable, oil-resistant: Connecting cable

Heidenhain Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø mm	Bending radius
---------------------	----------------	---	------	----------------



354 411-xx	MAT94904001	(4x(2x0,14)+(4x0,14)C+4x0,5)C	12,0	10 x d
355 398-xx	MAT94904002	(4x(2x0,14)+(4x0,14)C+4x0,5)C	12,0	10 x d



298 399-xx	MAT94905001	(4x(2x0,14)+4x0,5)C	10,0	10 x d
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309 774-xx	MAT94906001	(4x(2x0,14)+4x0,5)C	10,0	10 x d
------------	-------------	---------------------	------	--------



309 777-xx	MAT94907001	(4x(2x0,14)+4x0,5)C	10,0	10 x d
309 778-xx	MAT94907002	(4x(2x0,14)+(4x0,14)C+4x0,5)C	12,0	10 x d

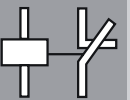


310 193-xx	MAT94907003	(3x(2x0,14)C+(2x0,5)C)C	12,0	10 x d
------------	-------------	-------------------------	------	--------

Note: The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
G = with earthed conductor green-yellow    x = without earthed conductor

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# Chainflex<sup>®</sup> adapter cable






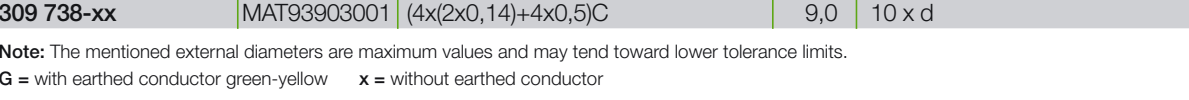
## harnessed according to Heidenhain standard

### Technical information

- Oil-resistant
- Shielded
- T/R (moved): -35 °C to + 100°C
- Nominal voltage: 30 V
- **Total shield:** extremely readily bending/solid copper shield, coverage approx. 70% linear, approx. 90% optical
- **Minimum bending radius for use in Energy Chains<sup>®</sup>:** 10 x cable diameter

### Chainflex<sup>®</sup> TPE signal/encoder cable, oil-resistant: Connecting cable

Heidenhain Part No.	igus <sup>®</sup> Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	∅ mm	Bending radius
---------------------	----------------------------	--	------	----------------

	332 115-xx	MAT93901001	(4x(2x0,14)+(4x0,14)C+4x0,5)C	12,0	10 x d
	360 472-xx	MAT93901002	(4x(2x0,14)+(4x0,14)C+4x0,5)C	12,0	10 x d
	310 197-xx	MAT93902001	(3x(2x0,14)C+(2x0,5)C)C	12,5	10 x d
	324 544-xx	MAT93902002	(4x(2x0,14)+(4x0,14)C+4x0,5)C	12,0	10 x d
	310 199-xx	MAT93902003	(4x(2x0,14)+4x0,5)C	9,0	10 x d
	309 738-xx	MAT93903001	(4x(2x0,14)+4x0,5)C	9,0	10 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor



● Colour: green (similar to RAL 6018)

## Chainflex® TPE signal/encoder cable, oil-resistant: Connecting cable

Heidenhain Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	ø mm	Bending radius
---------------------	----------------	--	------	----------------



354 411-xx	MAT93904001	(4x(2x0,14)+(4x0,14)C+4x0,5)C	12,0	10 x d
355 398-xx	MAT93904002	(4x(2x0,14)+(4x0,14)C+4x0,5)C	12,0	10 x d



298 399-xx	MAT93905001	(4x(2x0,14)+4x0,5)C	9,0	10 x d
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309 774-xx	MAT93906001	(4x(2x0,14)+4x0,5)C	9,0	10 x d
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309 777-xx	MAT93907001	(4x(2x0,14)+4x0,5)C	9,0	10 x d
309 778-xx	MAT93907002	(4x(2x0,14)+(4x0,14)C+4x0,5)C	12,0	10 x d

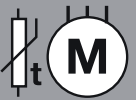
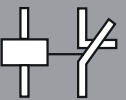


310 193-xx	MAT93907003	(3x(2x0,14)C+(2x0,5)C)C	12,5	10 x d
------------	-------------	-------------------------	------	--------

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
**G** = with earthed conductor green-yellow    **x** = without earthed conductor

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# Chainflex<sup>®</sup> ReadyCable<sup>®</sup>



ELAU – Selection table according to part numbers and sheath materials.

Direct line	Outer jacket material on page			Extension cable	Outer jacket material on page		
	PVC	PUR	TPE		PVC	PUR	TPE
E-MO-067	370	371					
E-MO-111 SH-Motor 1.5	370	371					
E-MO-087	370	371					
E-MO-092	370	371					
E-MO-113 SH-Motor 2.5	370	371					
E-FB-060	372		373				
E-FB-071	372		373				
E-FB-080	372		373				

# Chainflex® ReadyCable®



## ELAU



**Chainflex® PVC cables for the woodworking industry, for example**

### Typical application area – PVC

- for high load requirements
- light oil influence
- preferably indoor applications, but also outdoor ones at temperatures > 5 °C
- especially for freely suspended and gliding travel distances up to 100 m
- Storage and retrieval units for high-bay warehouses, machining units/packages machines, quick handling, indoor cranes, timber



**Chainflex® PUR cables for the tooling machine industry, for example**

### Typical application area – PUR

- for maximum load requirements
- almost unlimited resistance to oil
- Indoor and outdoor applications, UV-resistant
- especially for freely suspended and gliding travel distances up to 100 m
- Storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, clean room, semiconductor insertion, outdoor cranes, low-temperature applications



**Chainflex® TPE cables for outdoor use, for example**

### Typical application area – TPE

- for maximum load requirements
- almost unlimited resistance to oil, also with bio-oils
- Indoor and outdoor applications, UV-resistant
- especially for freely suspended and gliding travel distances up to 400 m and more
- Storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, clean room, semiconductor insertion, ship to shore, outdoor cranes, low-temperature applications

Our product engineers will be happy to advise you in your choice of application-specific cables.

# Chainflex® servo cable

## harnessed according to ELAU standard



### Technical information

- Oil-resistant
- Shielded
- Flame-retardant
- **T/R (moved):** -5 °C to + 70°C
- **Nominal voltage:** 600/1000 V
- **Total shield:** extremely readily bending/solid copper shield, coverage approx. 70% linear, approx. 90% optical
- **Minimum bending radius for use in Energy Chains®:** 7,5 x cable diameter
- Colour: green (similar to RAL 6005)

### Chainflex® PVC servo cable, oil-resistant

ELAU Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø mm	Bending radius
---------------	----------------	---	------	----------------



E-MO-067	MAT9470001	(4 G 1,5+2x(2x0,75)C)C	14,5	7,5 x d
E-MO-092	MAT9470004	(4 G 1,5+2x(2x0,75)C)C	14,5	7,5 x d



E-MO-111 SH-Motor 1.5	MAT9470002	(4 G 1,5+2x(2x0,75)C)C	14,5	7,5 x d
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E-MO-087	MAT9470003	(4 G 2,5+2x(2x1,5)C)C	17,0	7,5 x d
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E-MO-113 SH-Motor 2.5	MAT9470005	(4 G 2,5+2x(2x1,5)C)C	17,0	7,5 x d
-----------------------	------------	-----------------------	------	---------

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
G = with earthed conductor green-yellow    x = without earthed conductor

# Chainflex<sup>®</sup> servo cable

## harnessed according to ELAU standard



Servo  
PUR

### Technical information

- Oil-resistant and coolant-resistant
- Shielded
- Notch-resistant, hydrolysis-resistant and microbe-resistant
- Flame-retardant
- T/R (moved): -20 °C to + 80°C
- Nominal voltage: 600/1000 V
- Total shield: extremely readily bending/solid copper shield, coverage approx. 70% linear, approx. 90% optical
- Minimum bending radius for use in Energy Chains<sup>®</sup>: 7,5 x cable diameter
- Colour: orange (similar to RAL 2003)

### Chainflex<sup>®</sup> PUR servo cable, oil-resistant

ELAU Part No.	igus <sup>®</sup> Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	ø mm	Bending radius
---------------	----------------------------	--	------	----------------



E-MO-067	MAT9470101	(4G1,0+2x(2x0,75)C)C	14,5	7,5 x d
E-MO-092	MAT9470104	(4 G 1,5+2x(2x0,75)C)C	14,5	7,5 x d



E-MO-111 SH-Motor 1.5	MAT9470102	(4 G 1,5+2x(2x0,75)C)C	14,5	7,5 x d
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E-MO-087	MAT9470103	(4 G 2,5+2x(2x1,5)C)C	16,5	7,5 x d
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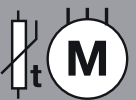
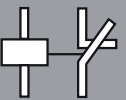
E-MO-113 SH-Motor 2.5	MAT9470105	(4 G 2,5+2x(2x1,5)C)C	16,5	7,5 x d
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Note: The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor

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(for up to 10 cuts of the same type)

# Chainflex<sup>®</sup> encoder cable

## harnessed according to ELAU standard



### Technical information

- Oil-resistant
- Shielded
- Flame-retardant
- **T/R (moved):** -5 °C to + 70°C
- **Nominal voltage:** 30 V
- **Total shield:** extremely readily bending/solid copper shield, coverage approx. 70% linear, approx. 90% optical
- **Minimum bending radius for use in Energy Chains<sup>®</sup>:** 10 x cable diameter
- Colour: gray (similar to RAL 7001)

### Chainflex<sup>®</sup> PVC signal/encoder cable, oil-resistant

ELAU Part No.	igus <sup>®</sup> Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	ø mm	Bending radius
---------------	----------------------------	--	------	----------------



E-FB-060	MAT9480001	(4x(2x0,25)+2x0,5)c	9,0	10 x d
E-FB-071	MAT9480002	(4x(2x0,25)+2x0,5)c	9,0	10 x d



E-FB-080	MAT9480003	(4x(2x0,25)+2x0,5)c	9,0	10 x d
----------	------------	---------------------	-----	--------

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

**G** = with earthed conductor green-yellow    **x** = without earthed conductor

# Chainflex<sup>®</sup> encoder cable harnessed according to ELAU standard



Encoder  
TPE

## Technical information

- Oil-resistant
- Shielded
- T/R (moved): -35 °C to + 100°C
- Total shield: extremely readily bending/solid copper shield, coverage approx. 70% linear, approx. 90% optical
- Nominal voltage: 30 V
- Minimum bending radius for use in Energy Chains<sup>®</sup>: 10 x cable diameter
- Colour: green (similar to RAL 6018)

## Chainflex<sup>®</sup> TPE signal/encoder cable, oil-resistant

ELAU Part No.	igus <sup>®</sup> Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	ø mm	Bending radius
---------------	----------------------------	--	------	----------------



E-FB-060	MAT9480101	(4x(2x0,25)+2x0,5)C	9,5	10 x d
E-FB-071	MAT9480102	(4x(2x0,25)+2x0,5)C	9,5	10 x d



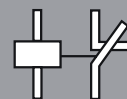
E-FB-080	MAT9480103	(4x(2x0,25)+2x0,5)C	9,5	10 x d
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Note: The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

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(for up to 10 cuts of the same type)

# Chainflex® ReadyCable®



Danaher Motion – Selection table according to part numbers and sheath materials.

Direct line	Outer jacket material on page			Extension cable	Outer jacket material on page		
	PVC	PUR	TPE		PVC	PUR	TPE
84972	376		378				
84973	376		378				
84974	376		378				
84975	376		378				
85034	377		379				
85035	377		379				
85036	377		379				
85037	377		379				
85039	377		379				
85040	377		379				
85041	377		379				
85042	377		379				
87655	376		378				
89918	382		386				
89952	382		386				
89953	382		386				
89954	386		386				
89956	382		386				
89957	380		384				
89959	383		387				
89960	383		387				
89961	380	384					
89962	383		387				
89963	380	384					
89964	383		387				
89965	380	384					
89966	383		387				
89967	380	384					
89968	381	385					
89969	381	385					
89970	381	385					
89971	381	385					
89972	381	385					
90083	382		386				
90084	382		386				
90085	382		386				
90086	382		386				
90087	382		386				
90088	380	384					
90089	380	384					
90090	380	384					
90091	380	384					
90092	380	384					
90287	376		378				
91019	376		378				
91807	376		378				
91811	376		378				
92205	376		378				
102575	382		386				
102576	382		386				
102579	380	384					
102580	380	384					
102806	382		386				
102807	382		386				
102808	382		386				
102809	380	384					
102810	380	384					

# Chainflex® ReadyCable®



Danaher Motion – Selection table according to part numbers and sheath materials.

Direct line	Outer jacket material on page			Extension cable	Outer jacket material on page		
	PVC	PUR	TPE		PVC	PUR	TPE
102811	380	384					
107473	382		386				
107474	382		386				
107475	382		386				
107476	382		386				
107477	382		386				
107479	380	384					
107480	380	384					
107481	380	384					
107482	380	384					
107483	380	384					
107485	382		386				
107486	382		386				
107487	382		386				
107488	382		386				
107489	382		386				
107491	380	384					
107492	380	384					
107493	380	384					
107494	380	384					
107495	380	384					
107915	376		380				
107916	376		378				
107917	376		378				
107918	376		378				
107919	376		378				
200456	383		387				
200457	383		387				
200458	383		387				
200459	383		387				
200460	383		387				
200462	381	381					
200463	381	385					
200464	381	385					
200465	381	385					
200466	381	385					
200468	383		387				
200469	383		387				
200470	383		387				
200471	383		387				
200472	383		387				
200474	381	385					
200475	381	385					
200476	381	385					
200477	381	385					
200478	381	385					
200618	383		387				
200619	383		387				
200620	383		387				
200621	383		387				
200622	383		387				
200623	381	385					
200624	381	385					
200625	381	385					
200626	381	385					
200627	381	385					



# Chainflex® signal cable

## harnessed according to Danaher Motion standard

### Technical information

- Oil-resistant
- Shielded
- Flame-retardant
- **T/R (moved):** -5 °C to + 70°C
- **Nominal voltage:** 300/300 V
- **Total shield:** extremely readily bending/solid copper shield, coverage approx. 70% linear, approx. 90% optical
- **Minimum bending radius for use in Energy Chains®:** 10 x cable diameter

### Chainflex® PVC signal/encoder cable, oil-resistant

Danaher Motion Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	ø mm	Bending radius
-------------------------	----------------	--	------	----------------



84972	MAT9320001	(4 x (2 x 0,25))C	8,0	10 x d
84973	MAT9320009	(4 x (2 x 0,25))C	8,0	10 x d
84974	MAT9320010	(4 x (2 x 0,25))C	8,0	10 x d
84975	MAT9320011	(4 x (2 x 0,25))C	8,0	10 x d
87655	MAT9320012	(4 x (2 x 0,25))C	8,0	10 x d
90287	MAT9320002	(8 x (2 x 0,25))C	11,5	10 x d
91019	MAT9320013	(8 x (2 x 0,25))C	11,5	10 x d
91811	MAT9320014	(8 x (2 x 0,25))C	11,5	10 x d
91807	MAT9320015	(8 x (2 x 0,25))C	11,5	10 x d
92205	MAT9320016	(8 x (2 x 0,25))C	11,5	10 x d
107915	MAT9320004	(8 x (2 x 0,25))C	11,5	10 x d
107916	MAT9320017	(8 x (2 x 0,25))C	11,5	10 x d
107917	MAT9320018	(8 x (2 x 0,25))C	11,5	10 x d
107918	MAT9320019	(8 x (2 x 0,25))C	11,5	10 x d
107919	MAT9320020	(8 x (2 x 0,25))C	11,5	10 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor



● Colour: gray (similar to RAL 7001)

### Chainflex® PVC signal/encoder cable, oil-resistant

Danaher Motion Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø mm	Bending radius
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85034	MAT9320007	(6 x (2 x 0,25))C	9,5	10 x d
85035	MAT9320021	(6 x (2 x 0,25))C	9,5	10 x d
85036	MAT9320022	(6 x (2 x 0,25))C	9,5	10 x d
85037	MAT9320023	(6 x (2 x 0,25))C	9,5	10 x d

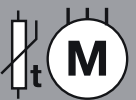
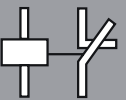


85039	MAT9320008	(6 x (2 x 0,25))C	9,5	10 x d
85040	MAT9320024	(6 x (2 x 0,25))C	9,5	10 x d
85041	MAT9320025	(6 x (2 x 0,25))C	9,5	10 x d
85042	MAT9320026	(6 x (2 x 0,25))C	9,5	10 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
G = with earthed conductor green-yellow    x = without earthed conductor

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# Chainflex<sup>®</sup> signal cable

## harnessed according to Danaher Motion standard

### Technical information

- Oil-resistant
- Shielded
- T/R (moved): -35 °C to + 100°C
- Nominal voltage: 300/300 V
- Total shield: extremely readily bending/solid copper shield, coverage approx. 70% linear, approx. 90% optical
- Minimum bending radius for use in Energy Chains<sup>®</sup>: 10 x cable diameter

### Chainflex<sup>®</sup> TPE signal/encoder cable, oil-resistant

Danaher Motion Part No.	igus <sup>®</sup> Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	∅ mm	Bending radius
-------------------------	----------------------------	--	------	----------------



84972	MAT9330001	(4 x (2 x 0,25))C	8,0	10 x d
84973	MAT9330009	(4 x (2 x 0,25))C	8,0	10 x d
84974	MAT9330010	(4 x (2 x 0,25))C	8,0	10 x d
84975	MAT9330011	(4 x (2 x 0,25))C	8,0	10 x d
87655	MAT9330012	(4 x (2 x 0,25))C	8,0	10 x d
90287	MAT9330002	(8 x (2 x 0,25))C	11,5	10 x d
91019	MAT9330013	(8 x (2 x 0,25))C	11,5	10 x d
91811	MAT9330014	(8 x (2 x 0,25))C	11,5	10 x d
91807	MAT9330015	(8 x (2 x 0,25))C	11,5	10 x d
92205	MAT9330016	(8 x (2 x 0,25))C	11,5	10 x d
107915	MAT9330004	(8 x (2 x 0,25))C	11,5	10 x d
107916	MAT9330017	(8 x (2 x 0,25))C	11,5	10 x d
107917	MAT9330018	(8 x (2 x 0,25))C	11,5	10 x d
107918	MAT9330019	(8 x (2 x 0,25))C	11,5	10 x d
107919	MAT9330020	(8 x (2 x 0,25))C	11,5	10 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor



● Colour: dark-blue (similar to RAL 5011)

## Chainflex® TPE signal/encoder cable, oil-resistant

Danaher Motion Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	ø mm	Bending radius
-------------------------	----------------	--	------	----------------



85034	MAT9330007	(6 x (2 x 0,25))C	9,5	10 x d
85035	MAT9330021	(6 x (2 x 0,25))C	9,5	10 x d
85036	MAT9330022	(6 x (2 x 0,25))C	9,5	10 x d
85037	MAT9330023	(6 x (2 x 0,25))C	9,5	10 x d



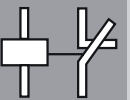
85039	MAT9330008	(6 x (2 x 0,25))C	9,5	10 x d
85040	MAT9330024	(6 x (2 x 0,25))C	9,5	10 x d
85041	MAT9330025	(6 x (2 x 0,25))C	9,5	10 x d
85042	MAT9330026	(6 x (2 x 0,25))C	9,5	10 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor

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# Chainflex<sup>®</sup> servo cable

## harnessed according to Danaher Motion standard

### Technical information

- Oil-resistant
- Shielded
- Flame-retardant
- **T/R (moved):** -5 °C to + 70°C
- **Total shield:** extremely readily bending/solid copper shield, coverage approx. 70% linear, approx. 90% optical
- **Minimum bending radius for use in Energy Chains<sup>®</sup>:** 7,5 x cable diameter

### Chainflex<sup>®</sup> PVC servo cable, oil-resistant

Danaher Motion Part No.	igus <sup>®</sup> Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	ø mm	Bending radius
-------------------------	----------------------------	--	------	----------------



107491	MAT9340001	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
107492	MAT9340005	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
107493	MAT9340006	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
107494	MAT9340007	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
107495	MAT9340008	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
107479	MAT9340009	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
107480	MAT9340010	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
107481	MAT9340011	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
107482	MAT9340012	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
107483	MAT9340013	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
102579	MAT9340014	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
102580	MAT9340015	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
102809	MAT9340016	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
102810	MAT9340017	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
102811	MAT9340018	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
90088	MAT9340019	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
90089	MAT9340020	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
90090	MAT9340021	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
90091	MAT9340022	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
90092	MAT9340023	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
89957	MAT9340024	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
89961	MAT9340025	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
89963	MAT9340026	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
89965	MAT9340027	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
89967	MAT9340028	(4 G 1,5+(2x1)C)C	12,5	7,5 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor



- Nominal voltage: 600/1000 V
- Colour: green (similar to RAL 6005)

## Chainflex® PVC servo cable, oil-resistant

Danaher Motion Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	ø mm	Bending radius
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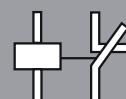


89968	MAT9340029	(4 G 2,5+(2x1)C)C	13,5	7,5 x d
89970	MAT9340030	(4 G 2,5+(2x1)C)C	13,5	7,5 x d
89971	MAT9340031	(4 G 2,5+(2x1)C)C	13,5	7,5 x d
89972	MAT9340032	(4 G 2,5+(2x1)C)C	13,5	7,5 x d
89969	MAT9340033	(4 G 2,5+(2x1)C)C	13,5	7,5 x d
200462	MAT9340034	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
200463	MAT9340035	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
200464	MAT9340036	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
200465	MAT9340037	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
200466	MAT9340038	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
200474	MAT9340039	(4 G 2,5+(2x1)C)C	13,5	7,5 x d
200475	MAT9340040	(4 G 2,5+(2x1)C)C	13,5	7,5 x d
200476	MAT9340041	(4 G 2,5+(2x1)C)C	13,5	7,5 x d
200477	MAT9340042	(4 G 2,5+(2x1)C)C	13,5	7,5 x d
200478	MAT9340043	(4 G 2,5+(2x1)C)C	13,5	7,5 x d
200623	MAT9340044	(4 G 4,0+(2x1)C)C	15,5	7,5 x d
200624	MAT9340045	(4 G 4,0+(2x1)C)C	15,5	7,5 x d
200625	MAT9340046	(4 G 4,0+(2x1)C)C	15,5	7,5 x d
200626	MAT9340047	(4 G 4,0+(2x1)C)C	15,5	7,5 x d
200627	MAT9340048	(4 G 4,0+(2x1)C)C	15,5	7,5 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
 G = with earthed conductor green-yellow    x = without earthed conductor

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# Chainflex<sup>®</sup> servo cable

## harnessed according to Danaher Motion standard

### Technical information

- Oil-resistant and coolant-resistant
- Shielded
- Notch-resistant, hydrolysis-resistant and microbe-resistant
- Flame-retardant
- **T/R (moved):** -20 °C to + 80 °C
- **Nominal voltage:** 600/1000 V
- **Total shield:** extremely readily bending/solid copper shield, coverage approx. 70% linear, approx. 90% optical

### Chainflex<sup>®</sup> PUR servo cable, oil-resistant

Danaher Motion Part No.	igus <sup>®</sup> Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	∅ mm	Bending radius
-------------------------	----------------------------	--	------	----------------



107491	MAT9440001	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
107492	MAT9440005	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
107493	MAT9440006	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
107494	MAT9440007	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
107495	MAT9440008	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
107479	MAT9440009	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
107480	MAT9440010	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
107481	MAT9440011	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
107482	MAT9440012	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
107483	MAT9440013	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
102579	MAT9440014	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
102580	MAT9440015	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
102809	MAT9440016	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
102810	MAT9440017	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
102811	MAT9440018	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
90088	MAT9440019	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
90089	MAT9440020	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
90090	MAT9440021	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
90091	MAT9440022	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
90092	MAT9440023	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
89957	MAT9440024	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
89961	MAT9440025	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
89963	MAT9440026	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
89965	MAT9440027	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
89967	MAT9440028	(4 G 1,5+(2x1)C)C	12,5	7,5 x d

Note: The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor



- Minimum bending radius for use in Energy Chains®:  
7,5 x cable diameter
- Colour: orange (similar to RAL 2003)

## Chainflex® PUR servo cable, oil-resistant

Danaher Motion Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø mm	Bending radius
-------------------------	----------------	---	------	----------------

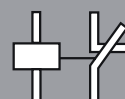


89968	MAT9440029	(4 G 2,5+(2x1)C)C	13,5	7,5 x d
89970	MAT9440030	(4 G 2,5+(2x1)C)C	13,5	7,5 x d
89971	MAT9440031	(4 G 2,5+(2x1)C)C	13,5	7,5 x d
89972	MAT9440032	(4 G 2,5+(2x1)C)C	13,5	7,5 x d
89969	MAT9440033	(4 G 2,5+(2x1)C)C	13,5	7,5 x d
200462	MAT9440034	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
200463	MAT9440035	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
200464	MAT9440036	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
200465	MAT9440037	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
200466	MAT9440038	(4 G 1,5+(2x1)C)C	12,5	7,5 x d
200474	MAT9440039	(4 G 2,5+(2x1)C)C	13,5	7,5 x d
200475	MAT9440040	(4 G 2,5+(2x1)C)C	13,5	7,5 x d
200476	MAT9440041	(4 G 2,5+(2x1)C)C	13,5	7,5 x d
200477	MAT9440042	(4 G 2,5+(2x1)C)C	13,5	7,5 x d
200478	MAT9440043	(4 G 2,5+(2x1)C)C	13,5	7,5 x d
200623	MAT9440044	(4 G 4,0+(2x1)C)C	16,0	7,5 x d
200624	MAT9440045	(4 G 4,0+(2x1)C)C	16,0	7,5 x d
200625	MAT9440046	(4 G 4,0+(2x1)C)C	16,0	7,5 x d
200626	MAT9440047	(4 G 4,0+(2x1)C)C	16,0	7,5 x d
200627	MAT9440048	(4 G 4,0+(2x1)C)C	16,0	7,5 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
G = with earthed conductor green-yellow    x = without earthed conductor

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# Chainflex® power cable

## harnessed according to Danaher Motion standard

### Technical information

- Oil-resistant
- Shielded
- Flame-retardant
- **T/R (moved):** -5 °C to + 70°C
- **Total shield:** extremely readily bending/solid copper shield, coverage approx. 70% linear, approx. 90% optical
- **Minimum bending radius for use in Energy Chains®:** 7,5 x cable diameter

### Chainflex® PVC power cable, oil-resistant

Danaher Motion Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø mm	Bending radius
-------------------------	----------------	---	------	----------------



107485	MAT9340002	(4 G 1,5)C	10,5	7,5 x d
107486	MAT9340049	(4 G 1,5)C	10,5	7,5 x d
107487	MAT9340050	(4 G 1,5)C	10,5	7,5 x d
107488	MAT9340051	(4 G 1,5)C	10,5	7,5 x d
107489	MAT9340052	(4 G 1,5)C	10,5	7,5 x d
107473	MAT9340053	(4 G 1,5)C	10,5	7,5 x d
107474	MAT9340054	(4 G 1,5)C	10,5	7,5 x d
107475	MAT9340055	(4 G 1,5)C	10,5	7,5 x d
107476	MAT9340056	(4 G 1,5)C	10,5	7,5 x d
107477	MAT9340057	(4 G 1,5)C	10,5	7,5 x d
102575	MAT9340058	(4 G 1,5)C	10,5	7,5 x d
102576	MAT9340059	(4 G 1,5)C	10,5	7,5 x d
102806	MAT9340060	(4 G 1,5)C	10,5	7,5 x d
102807	MAT9340061	(4 G 1,5)C	10,5	7,5 x d
102808	MAT9340062	(4 G 1,5)C	10,5	7,5 x d
90083	MAT9340063	(4 G 1,5)C	10,5	7,5 x d
90084	MAT9340064	(4 G 1,5)C	10,5	7,5 x d
90085	MAT9340065	(4 G 1,5)C	10,5	7,5 x d
90086	MAT9340066	(4 G 1,5)C	10,5	7,5 x d
90087	MAT9340067	(4 G 1,5)C	10,5	7,5 x d
89918	MAT9340068	(4 G 1,5)C	10,5	7,5 x d
89952	MAT9340069	(4 G 1,5)C	10,5	7,5 x d
89953	MAT9340070	(4 G 1,5)C	10,5	7,5 x d
89954	MAT9340071	(4 G 1,5)C	10,5	7,5 x d
89956	MAT9340072	(4 G 1,5)C	10,5	7,5 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
G = with earthed conductor green-yellow    x = without earthed conductor





- **Nominal voltage:** 600/1000 V
- **Colour:** black (similar to RAL 9005)

## Chainflex® PVC power cable, oil-resistant

Danaher Motion Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø mm	Bending radius
-------------------------	----------------	---	------	----------------

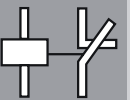


89959	MAT9340004	(4 G 2,5)C	12,5	7,5 x d
89960	MAT9340073	(4 G 2,5)C	12,5	7,5 x d
89962	MAT9340074	(4 G 2,5)C	12,5	7,5 x d
89964	MAT9340075	(4 G 2,5)C	12,5	7,5 x d
89966	MAT9340076	(4 G 2,5)C	12,5	7,5 x d
200456	MAT9340077	(4 G 1,5)C	10,5	7,5 x d
200457	MAT9340078	(4 G 1,5)C	10,5	7,5 x d
200458	MAT9340079	(4 G 1,5)C	10,5	7,5 x d
200459	MAT9340080	(4 G 1,5)C	10,5	7,5 x d
200460	MAT9340081	(4 G 1,5)C	10,5	7,5 x d
200468	MAT9340082	(4 G 2,5)C	12,5	7,5 x d
200469	MAT9340083	(4 G 2,5)C	12,5	7,5 x d
200470	MAT9340084	(4 G 2,5)C	12,5	7,5 x d
200471	MAT9340085	(4 G 2,5)C	12,5	7,5 x d
200472	MAT9340086	(4 G 2,5)C	12,5	7,5 x d
200618	MAT9340087	(4 G 4,0)C	14,0	7,5 x d
200619	MAT9340088	(4 G 4,0)C	14,0	7,5 x d
200620	MAT9340089	(4 G 4,0)C	14,0	7,5 x d
200621	MAT9340090	(4 G 4,0)C	14,0	7,5 x d
200622	MAT9340091	(4 G 4,0)C	14,0	7,5 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
 G = with earthed conductor green-yellow    x = without earthed conductor

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# Chainflex® power cable

## harnessed according to Danaher Motion standard

### Technical information

- Oil-resistant
- Shielded
- Hydrolysis-resistant and microbe-resistant
- Flame-retardant
- **T/R (moved):** -35 °C to + 90°C
- **Nominal voltage:** 600/1000 V
- **Total shield:** extremely readily bending/solid copper shield, coverage approx. 70% linear, approx. 90% optical

### Chainflex® TPE power cable, oil-resistant

Danaher Motion Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø mm	Bending radius
-------------------------	----------------	---	------	----------------



107485	MAT9440002	(4 G 1,5)C	9,5	7,5 x d
107486	MAT9440049	(4 G 1,5)C	9,5	7,5 x d
107487	MAT9440050	(4 G 1,5)C	9,5	7,5 x d
107488	MAT9440051	(4 G 1,5)C	9,5	7,5 x d
107489	MAT9440052	(4 G 1,5)C	9,5	7,5 x d
107473	MAT9440053	(4 G 1,5)C	9,5	7,5 x d
107474	MAT9440054	(4 G 1,5)C	9,5	7,5 x d
107475	MAT9440055	(4 G 1,5)C	9,5	7,5 x d
107476	MAT9440056	(4 G 1,5)C	9,5	7,5 x d
107477	MAT9440057	(4 G 1,5)C	9,5	7,5 x d
102575	MAT9440058	(4 G 1,5)C	9,5	7,5 x d
102576	MAT9440059	(4 G 1,5)C	9,5	7,5 x d
102806	MAT9440060	(4 G 1,5)C	9,5	7,5 x d
102807	MAT9440061	(4 G 1,5)C	9,5	7,5 x d
102808	MAT9440062	(4 G 1,5)C	9,5	7,5 x d
90083	MAT9440063	(4 G 1,5)C	9,5	7,5 x d
90084	MAT9440064	(4 G 1,5)C	9,5	7,5 x d
90085	MAT9440065	(4 G 1,5)C	9,5	7,5 x d
90086	MAT9440066	(4 G 1,5)C	9,5	7,5 x d
90087	MAT9440067	(4 G 1,5)C	9,5	7,5 x d
89918	MAT9440068	(4 G 1,5)C	9,5	7,5 x d
89952	MAT9440069	(4 G 1,5)C	9,5	7,5 x d
89953	MAT9440070	(4 G 1,5)C	9,5	7,5 x d
89954	MAT9440071	(4 G 1,5)C	9,5	7,5 x d
89956	MAT9440072	(4 G 1,5)C	9,5	7,5 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor



- Minimum bending radius for use in Energy Chains®:  
7,5 x cable diameter
- Colour: black (similar to RAL 9005)

### Chainflex® TPE power cable, oil-resistant

Danaher Motion Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø mm	Bending radius
-------------------------	----------------	---	------	----------------

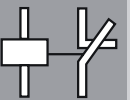


89959	MAT9440004	(4 G 2,5)C	11,0	7,5 x d
89960	MAT9440073	(4 G 2,5)C	11,0	7,5 x d
89962	MAT9440074	(4 G 2,5)C	11,0	7,5 x d
89964	MAT9440075	(4 G 2,5)C	11,0	7,5 x d
89966	MAT9440076	(4 G 2,5)C	11,0	7,5 x d
200456	MAT9440077	(4 G 1,5)C	9,5	7,5 x d
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200458	MAT9440079	(4 G 1,5)C	9,5	7,5 x d
200459	MAT9440080	(4 G 1,5)C	9,5	7,5 x d
200460	MAT9440081	(4 G 1,5)C	9,5	7,5 x d
200468	MAT9440082	(4 G 2,5)C	11,0	7,5 x d
200469	MAT9440083	(4 G 2,5)C	11,0	7,5 x d
200470	MAT9440084	(4 G 2,5)C	11,0	7,5 x d
200471	MAT9440085	(4 G 2,5)C	11,0	7,5 x d
200472	MAT9440086	(4 G 2,5)C	11,0	7,5 x d
200618	MAT9440087	(4 G 4,0)C	14,0	7,5 x d
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200620	MAT9440089	(4 G 4,0)C	14,0	7,5 x d
200621	MAT9440090	(4 G 4,0)C	14,0	7,5 x d
200622	MAT9440091	(4 G 4,0)C	14,0	7,5 x d

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
 G = with earthed conductor green-yellow    x = without earthed conductor

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# Chainflex<sup>®</sup> ReadyCable<sup>®</sup>



B&R – Selection table according to part numbers and sheath materials.

Direct line	Outer jacket material on page			Extension cable	Outer jacket material on page		
	PVC	PUR	TPE		PVC	PUR	TPE
i8CMxxx.12-1	390	391					
i8CMxxx.12-3	390	391					
i8CMxxx.12-5	390	391					
i8CRxxx.12-1	392		393				
i8CExxx.12-1	394		395				

# Chainflex® ReadyCable®



## B&R



**Chainflex® PVC cables for the woodworking industry, for example**

### Typical application area – PVC

- for high load requirements
- light oil influence
- preferably indoor applications, but also outdoor ones at temperatures > 5 °C
- especially for freely suspended and gliding travel distances up to 100 m
- Storage and retrieval units for high-bay warehouses, machining units/packages machines, quick handling, indoor cranes, timber processing



**Chainflex® PUR cables for the tooling machine industry, for example**

### Typical application area – PUR

- for maximum load requirements
- almost unlimited resistance to oil
- Indoor and outdoor applications, UV-resistant
- especially for freely suspended and gliding travel distances up to 100 m
- Storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, clean room, semiconductor insertion, outdoor cranes, low-temperature applications



**Chainflex® TPE cables for outdoor use, for example**

### Typical application area – TPE

- for maximum load requirements
- almost unlimited resistance to oil, also with bio-oils
- Indoor and outdoor applications, UV-resistant
- especially for freely suspended and gliding travel distances up to 400 m and more
- Storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, clean room, semiconductor insertion, ship to shore, outdoor cranes, low-temperature applications

Our product engineers will be happy to advise you in your choice of application-specific cables.

# Chainflex<sup>®</sup> servo cable

## harnessed according to B&R standard



### Technical information

- Oil-resistant
- Shielded
- Flame-retardant
- **T/R (moved):** -5 °C to + 70°C
- **Nominal voltage:** 600/1000 V
- **Total shield:** extremely readily bending/solid copper shield, coverage approx. 70% linear, approx. 90% optical
- **Minimum bending radius for use in Energy Chains<sup>®</sup>:** 7,5 x cable diameter
- Colour: green (similar to RAL 6005)

### Chainflex<sup>®</sup> PVC servo cable, oil-resistant

B&R Part No.	igus <sup>®</sup> Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	ø mm	Bending radius
-----------------	-------------------------------	---	---------	-------------------



i8CMxxx.12-1	MAT9610001	(4 G 1,5+2x(2x0,75)C)C	14,5	7,5 x d
i8CMxxx.12-3	MAT9610002	(4 G 4,0+2x(2x1,5)C)C	18,5	7,5 x d



i8CMxxx.12-5	MAT9610003	(4 G 10,0+2x(2x1,5)C)C	24,0	7,5 x d
--------------	------------	------------------------	------	---------

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.  
**G** = with earthed conductor green-yellow    **x** = without earthed conductor

# Chainflex<sup>®</sup> servo cable

## harnessed according to B&R standard



Servo  
PUR

### Technical information

- Oil-resistant and coolant-resistant
- Shielded
- Notch-resistant, hydrolysis-resistant and microbe-resistant
- Flame-retardant
- **T/R (moved):** -20 °C to + 80°C
- **Nominal voltage:** 600/1000 V
- **Total shield:** extremely readily bending/solid copper shield, coverage approx. 70% linear, approx. 90% optical
- **Minimum bending radius for use in Energy Chains<sup>®</sup>:** 7,5 x cable diameter
- **Colour:** orange (similar to RAL 2003)

### Chainflex<sup>®</sup> PUR servo cable, oil-resistant

B&R Part No.	igus <sup>®</sup> Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	ø mm	Bending radius
--------------	----------------------------	--	------	----------------



i8CMxxx.12-1	MAT9600001	(4 G 1,5+2x(2x0,75)C)C	14,5	7,5 x d
i8CMxxx.12-3	MAT9600002	(4 G 4,0+2x(2x1,5)C)C	18,0	7,5 x d



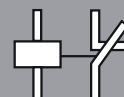
i8CMxxx.12-5	MAT9600003	(4 G 10,0+2x(2x1,5)C)C	23,5	7,5 x d
--------------	------------	------------------------	------	---------

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

**G** = with earthed conductor green-yellow    **x** = without earthed conductor

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(for up to 10 cuts of the same type)



# Chainflex<sup>®</sup> resolver cable

## harnessed according to B&R standard



### Technical information

- Oil-resistant
- Shielded
- Flame-retardant
- **T/R (moved):** -5 °C to + 70°C
- **Nominal voltage:** 300/300 V
- **Total shield:** extremely readily bending/solid copper shield, coverage approx. 70% linear, approx. 90% optical
- **Minimum bending radius for use in Energy Chains<sup>®</sup>:** 10 x cable diameter
- Colour: gray (similar to RAL 7001)

### Chainflex<sup>®</sup> PVC signal/encoder cable, oil-resistant

B&R Part No.	igus <sup>®</sup> Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	ø mm	Bending radius
--------------	----------------------------	--	------	----------------



i8CRxxx.12-1	MAT9640001	(3 x (2 x 0,25))C	7,0	10 x d
--------------	------------	-------------------	-----	--------

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor

# Chainflex<sup>®</sup> resolver cable harnessed according to B&R standard



Resolver  
TPE

## Technical information

- Oil-resistant
- Shielded
- **T/R (moved):** -35 °C to + 100°C
- **Total shield:** extremely readily bending/solid copper shield, coverage approx. 70% linear, approx. 90% optical
- **Nominal voltage:** 300/300 V
- **Minimum bending radius for use in Energy Chains<sup>®</sup>:** 10 x cable diameter
- **Colour:** dark-blue (similar to RAL 5011)

## Chainflex<sup>®</sup> TPE signal/encoder cable, oil-resistant

B&R Part No.	igus <sup>®</sup> Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	ø mm	Bending radius
--------------	----------------------------	--	------	----------------



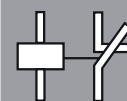
i8CRxxx.12-1	MAT9630001	(3 x (2 x 0,25))C	8,0	10 x d
--------------	------------	-------------------	-----	--------

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor

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Clean-Room

RoHS

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(for up to 10 cuts of the same type)

# Chainflex® EnDat cable

## harnessed according to B&R standard



### Technical information

- Oil-resistant
- Shielded
- Flame-retardant
- **T/R (moved):** -5 °C to + 70°C
- **Nominal voltage:** 30 V
- **Total shield:** extremely readily bending/solid copper shield, coverage approx. 70% linear, approx. 90% optical
- **Minimum bending radius for use in Energy Chains®:** 10 x cable diameter
- Colour: gray (similar to RAL 7001)

### Chainflex® PVC signal/encoder cable, oil-resistant

B&R Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø mm	Bending radius
--------------	----------------	---	------	----------------



i8CExx.12-1	MAT9670001	(5x(2x0,14)+2x0,5)C	9,0	10 x d
-------------	------------	---------------------	-----	--------

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor

# Chainflex® EnDat cable

## harnessed according to B&R standard



EnDat  
TPE

### Technical information

- Oil-resistant
- Shielded
- **T/R (moved):** -35 °C to + 100°C
- **Total shield:** extremely readily bending/solid copper shield, coverage approx. 70% linear, approx. 90% optical
- **Nominal voltage:** 30 V
- **Minimum bending radius for use in Energy Chains®:** 10 x cable diameter
- **Colour:** green (similar to RAL 6018)

### Chainflex® TPE signal/encoder cable, oil-resistant

B&R Part No.	igus® Part No.	Number of cores and conductor nominal cross section [mm²]	ø mm	Bending radius
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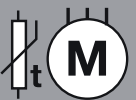
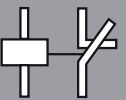
i8CExxx.12-1	MAT9660001	(5x(2x0,14)+2x0,5)C	9,5	10 x d
--------------	------------	---------------------	-----	--------

**Note:** The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

G = with earthed conductor green-yellow    x = without earthed conductor

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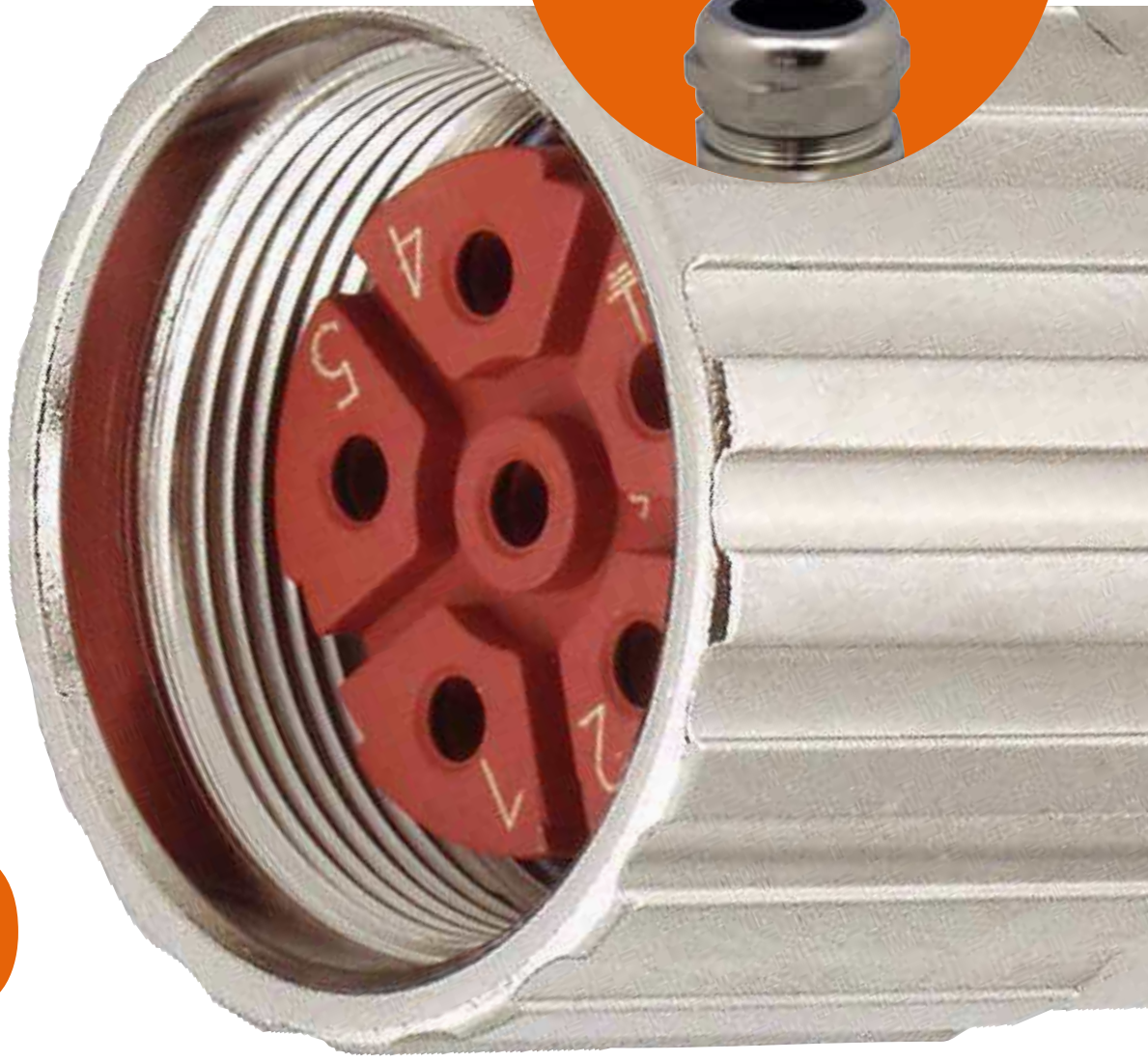


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# iglus<sup>®</sup> connectors



New:

Cable glands



# igus® connectors

igus® Connectors		Type	Page
<b>Connectors</b>			
	<b>SERIES A</b>	Signal connector M23 standard [6 to 19-pin]	398
	<b>SERIES B</b>	Power connector Size 1 [6, 8 and 9-pin]	402
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	<b>SERIES M17</b>	Signal and power connector M17 signal [17-pin] and power connector [4 to 9-pin]	405
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The package contains:  
Your ordered connector together with contacts,  
installation instructions and a faxback order form.

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# igus® connectors SERIES A

## according to Intercontec standard

### Signal connector M23 standard [6 to 19-pin]

#### Types

- Connector, standard and push-pull version, angular connector
- Lead-through
- Extension, standard or with central attachment
- PG 13.5-installation box
- Installation box straight with flange
- Installation box angled and turnable flexed with flange

#### Number of contacts

- 6, 7, [8+1], 9, 10, 12, 16, 17, [16+3]

#### Technical data of the SERIES A

Temperature range	-20 °C to 130 °C
Protection class	IP 66/67 [plugged]

#### Electrical data 6 to 12-pin

Max. rated current	10 A
Rated voltage	160 V (AC/DC)
Test voltage (L-L)	2500 V
Resistance	< 5 mΩ
Insertion cycles	> 50

#### Electrical data 16 to [16+3]-pin

Max. rated current	9 A
Rated voltage	125 V (AC/DC)
Test voltage (L-L)	2500 V
Resistance	< 5 mΩ
Insertion cycles	> 50

#### Data according to VDE 0110/EN 61984, Clause 6.19.2.2

Degree of pollution	3
Over-voltage category	III
Max. height of operation	2000 m






#### Used materials

Housing	Zinc die-casting/brass, nickel-plated
Connection nut	Brass, nickel-plated
Insulation insert	PA 6.6/PBT, UL 94/V0
Contacts	Brass, gold-plated
Seals	FPM/HNBR
Clamping ring	Brass, nickel-plated



Housing with SpeedTEC quick-release fastener ► [page 413](#)



<p>Signal plug 8+1 pin, nickel-plated Order no. <b>MAT0179600</b></p>	<p>P-Type [8+1]-pin, 3 coding slots</p>	<p>8 x female crimping contact 1.0 mm, slitted crimp area: 0.14-1.0 mm<sup>2</sup>, 1 x female crimping 2.0 mm, slitted crimp area: 0.35-2.5 mm<sup>2</sup></p>	<p>Crimp area: 9.0-13.2 mm</p>	<p>Metal construction, EMC shielding</p> 
<p>Signal plug 12 pin, nickel-plated Order no. <b>MAT0179601</b></p>	<p>E-Type 12-pin, 3 coding slots</p>	<p>Female crimping contact 1.0 mm, slitted crimp area: 0.14-1.0 mm<sup>2</sup></p>	<p>Crimp area: 9.0-13.2 mm</p>	<p>Metal construction, EMC shielding</p> 
<p>Signal plug 16 pin, nickel-plated Order no. <b>MAT0179602</b></p>	<p>P-Type 16-pin, 1 coding slot</p>	<p>Female crimping contact 1.0 mm, slitted crimp area: 0.14-1.0 mm<sup>2</sup></p>	<p>Crimp area: 9.0-13.2 mm</p>	<p>Metal construction, EMC shielding</p> 
<p>Signal plug 17 pin, nickel-plated Order no. <b>MAT0179603</b></p>	<p>P-Type 17-pin, 3 coding slots</p>	<p>Female crimping contact 1.0 mm, slitted crimp area: 0.14-1.0 mm<sup>2</sup></p>	<p>Crimp area: 9.0-13.2 mm</p>	<p>Metal construction, EMC shielding</p> 
<p>Signal plug 16+3 pin, nickel-plated Order no. <b>MAT0179604</b></p>	<p>P-Type [16+3]-pin, 1 coding slot</p>	<p>16 x female crimping contact 1.0 mm, slitted crimp area: 0.14-1.0 mm<sup>2</sup>, 3 x female crimping 1.5 mm, slitted crimp area: 0.14-1.0 mm<sup>2</sup></p>	<p>Crimp area: 9.0-13.2 mm</p>	<p>Metal construction, EMC shielding</p> 

Housing with SpeedTEC quick-release fastener ► page 413

... no minimum order quantity

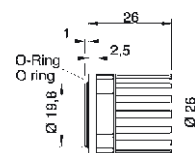



# igus® connectors SERIES A

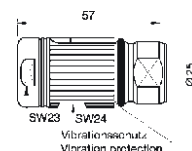
according to Intercontec standard




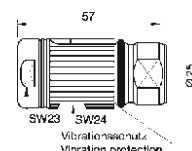
The straight signal receptacle is assembled with the contacts and insulation bodies.  
The technical specifications apply accordingly. A cable clamp is not required by virtue of the design.




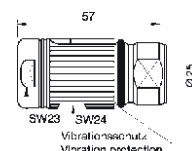
Lead-through, with connection nut Order no. 8+1 pin <b>MAT0179605</b>				Metal construction, axial seal	 <b>C1+4</b>
Order no. 12 pin <b>MAT0179606</b>					<b>C1</b>
Order no. 16 pin <b>MAT0179607</b>					<b>C1</b>
Order no. 17 pin <b>MAT0179608</b>					<b>C1</b>
Order no. 16+3 pin <b>MAT0179609</b>					<b>C1+5</b>




Signal extension 8+1 pin, nickel-plated Order no. <b>MAT0179610</b>	E-Type [8+1]-pin, 3 coding slots	8 x crimping contact 1.0 mm, crimp area: 0.14-1.0 mm <sup>2</sup> 1 x crimping contact 2.0 mm, crimp area: 0.35-2.5 mm <sup>2</sup>	Crimp area: 9.0-13.2 mm	Metal construction, EMC shielding	 <b>C1+4</b>
--	--	--	----------------------------	--------------------------------------	--



Signal extension 12 pin, nickel-plated Order no. <b>MAT0179611</b>	P-Type 12-pin, 3 coding slots	Crimping contact 1.0 mm, crimp area: 0.14-1.0 mm <sup>2</sup>	Crimp area: 9.0-13.2 mm	Metal construction, EMC shielding	 <b>C1</b>
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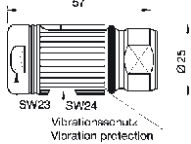


Signal extension 16 pin, nickel-plated Order no. <b>MAT0179612</b>	E-Type 16-pin, 1 coding slot	Crimping contact 1.0 mm, crimp area: 0.14-1.0 mm <sup>2</sup>	Crimp area: 9.,0-13.2 mm	Metal construction, EMC shielding	 <b>C1</b>
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Housing with SpeedTEC quick-release fastener ► page 413



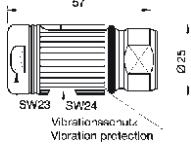
Signal extension 17 pin,  
nickel-plated  
Order no.  
**MAT0179613**

E-Type  
17-pin,  
3 coding slots


Crimping contact 1.0 mm,  
crimp area: 0.14-1.0 mm<sup>2</sup>

Crimp area:  
9.0-13.2 mm

Metal construction,  
EMC shielding



Vibrationsschutz  
Vibration protection



**C1**








Signal extension 16+3 pin,  
nickel-plated  
Order no.  
**MAT0179614**

E-Type  
[16+3]-pin,  
1 coding slot

16 x crimping contact 1.0 mm,  
crimp area: 0.14-1.0 mm<sup>2</sup>  
3 x crimping contact 1.5 mm,  
crimp area: 0.14-1.0 mm<sup>2</sup>

Crimp area:  
9.0-13.2 mm


Metal construction,  
EMC shielding



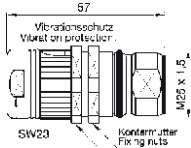
Vibrationsschutz  
Vibration protection



**C1+5**




The extension with a central attachment is assembled with the above-mentioned contacts, insulation bodies and cable clamp.  
The technical specifications apply accordingly.



Vibrationsschutz  
Vibration protection

Kondensator  
Fitting nuts

Extension with central attachment Order no. 8+1 pin <b>MAT0179615</b>				Metal construction, EMC shielding	 <b>C1+4</b>
Order no. 12 pin <b>MAT0179616</b>					<b>C1</b>
Order no. 16 pin <b>MAT0179617</b>					<b>C1</b>
Order no. 17 pin <b>MAT0179618</b>					<b>C1</b>
Order no. 16+3 pin <b>MAT0179619</b>					<b>C1+5</b>

Housing with SpeedTEC quick-release fastener ► page 413

... no minimum order quantity

# igus® connectors SERIES B

## according to Intercontec standard

### Power connector Size 1 [6, 8 and 9-pin]

#### Types

- Connector, short and long, push-pull version, angular connector
- Extension, standard or with central attachment
- Lead-through
- Installation box straight with flange
- Installation box angled and turnable flexed with flange

#### Number of contacts

- 6, 8, 9

#### Technical data of the SERIES B

Temperature range	-20 °C to 130 °C
Protection class	IP 66/67 [plugged]

#### Electrical data power contacts

Max. rated current	max. 28 A (6-pin) max. 30 A (8/9-pin)
Rated voltage	630 V (AC/DC)
Test voltage (L-L)	6000 V
Resistance	< 3 mΩ
Insertion cycles	> 50

#### Electrical data signal 8 u.9 pin

Max. rated current	10 A
Rated voltage	250 V (AC/DC)
Test voltage (L-L)	2500 V
Resistance	< 5 mΩ
Insertion cycles	> 50

#### Data according to VDE 0110/EN 61984, Clause 6.19.2.2

Degree of pollution	3
Over-voltage category	III
Max. height of operation	2000 m

#### Used materials

Housing	Zinc die-casting/brass, nickel-plated *
Connection nut	Brass, nickel-plated
Insulation insert	PA 6.6/PBT, UL 94/V0
Contacts	Brass, gold-plated
Seals	FPM/HNBR
Clamping ring	Brass, nickel-plated *optional: stainless steel



Housing with SpeedTEC quick-release fastener ► page 413



[www.igus.eu/quickpin](http://www.igus.eu/quickpin)  
igus® QuickPin – Configure ReadyCable® online







Signal plug 6 pin,  
nickel-plated  
Order no.  
**MAT0179620**

P-Type  
6-pin

6x HC-female crimping 2.0 mm,  
crimp area: 0.35-2.5 mm<sup>2</sup>

Crimp area:  
9.5-14.5 mm

Metal construction,  
EMC shielding

**C2**








Signal plug 8 pin,  
nickel-plated  
Order no.  
**MAT0179621**

P-Type  
8-pin

4 x HC-female crimping 2.0 mm,  
Crimp area: 0.35-2.5 mm<sup>2</sup>  
4 x HC-female crimping 1,0 mm,  
Crimp area: 0.14-1.0 mm<sup>2</sup>

Crimp area:  
9.5-14.5 mm

Metal construction,  
EMC shielding

**C1+2**








Signal plug 9 pin,  
nickel-plated  
Order no.  
**MAT0179622**


P-Type  
9-pin

4 x HC-female crimping 2.0 mm,  
crimp area: 0.35-2.5 mm<sup>2</sup>  
5 x HC-female crimping 1.0 mm,  
crimp area: 0.14-1.0 mm<sup>2</sup>

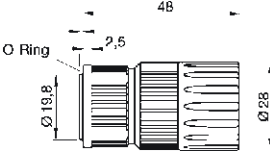
Crimp area:  
9.5-14.5 mm

Metal construction,  
EMC shielding

**C1+2**



The straight signal receptacle is assembled with above-mentioned contacts and insulation bodies. The technical specifications apply accordingly. A cable clamp is not required by virtue of the design.



Lead-through,  
with connection nut  
Order no. 6 pin  
**MAT0178406**

Order no. 8 pin  
**MAT0175661**

Order no. 9 pin  
**MAT0179033**

Metal construction, axial seal

**C2**

**C1+2**

**C1+2**





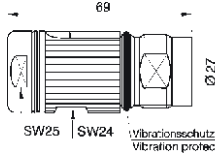




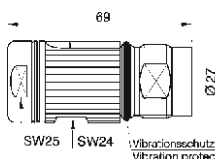




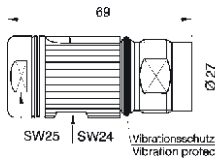

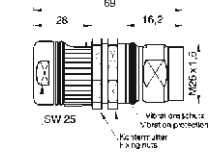
Housing with SpeedTEC quick-release fastener ► page 413

... no minimum order quantity

# igus® connectors SERIES B

## according to Intercontec standard

Power connector  
Size 1 [6, 8 and 9-pin]

					<p>Power extension 6 pin, nickel-plated Order no. <b>MAT0179623</b></p> <p>E-Type 6-pin</p> <p>6 x crimping contact 2.0 mm, crimp area: 0.35-2.5 mm<sup>2</sup></p> <p>Crimp area: 9.5-14.5 mm</p> <p>Metal construction, EMC shielding</p> <p><b>C2/C3</b></p>
					<p>Power extension 8 pin, nickel-plated Order no. <b>MAT0179624</b></p> <p>E-Type 8-pin</p> <p>4 x crimping contact 2.0 mm, crimp area: 0.35-2.5 mm<sup>2</sup> 4 x crimping contact 1.0 mm, crimp area: 0.14-1.0 mm<sup>2</sup></p> <p>Crimp area: 9.5-14.5 mm</p> <p>Metal construction, EMC shielding</p> <p><b>C3</b></p>
					<p>Power extension 9 pin, nickel-plated Order no. <b>MAT0179625</b></p> <p>E-Type 9-pin</p> <p>4 x crimping contact 2.0 mm, crimp area: 0.35-2.5 mm<sup>2</sup> 5 x crimping contact 1.0 mm, crimp area: 0.14-1.0 mm<sup>2</sup></p> <p>Crimp area: 9.5-14.5 mm</p> <p>Metal construction, EMC shielding</p> <p><b>C3</b></p>
	<p>The extension with central attachment is assembled with the above-mentioned contacts, insulation bodies and cable clamp. The technical specifications apply accordingly.</p>				<p>Extension with central attachment Order no. 6 pin <b>MAT0179626</b></p> <p>Order no. 8 pin <b>MAT0179627</b></p> <p>Order no. 9 pin <b>MAT0179628</b></p> <p>Metal construction, EMC shielding</p> <p><b>C2/C3</b></p> <p><b>C3</b></p> <p><b>C9</b></p>



# igus<sup>®</sup> connectors SERIES M17

## according to Intercontec standard

SERIES  
M17

Connector

### Signal-und Power connector M17 signal [17-pin] and power connector [4 to 9-pin]

#### Types

- Connector, standard and push-pull version
- Extension, standard or with central attachment
- Installation box straight with flange
- Installation box straight, connecting thread M17 x 0,75
- Installation box angled, turnable with flange
- Installation box angled and turnable flexed with flange

#### Number of contacts

- Signal: 17
- Power: 4, 7, 9

#### Technical data of the M17 SERIES

Temperature range -20 °C to 130 °C  
Protection class IP 67 [plugged]

#### Electrical data signal 17 pin

Max. rated current 3,6 A  
Rated voltage 63 V (AC /DC)  
Test voltage (L-L) 1500 V  
Resistance < 15 mΩ  
Insertion cycles > 50

#### Electrical data power

	4 pin	7 pin
Max. rated current	2,5mm <sup>2</sup> : 20 A	1 mm <sup>2</sup> : 10 A 1,5 mm <sup>2</sup> : 14 A
Rated voltage	630 V (AC /DC)	630 V (AC /DC)
Test voltage (L-L)	6000 V	6000 V
Resistance	< 5 mΩ	< 5 mΩ
Insertion cycles	> 50	> 50

#### Electrical data power 9 pin

Max. rated current	Signal: 3,6 A	Power: 14 A
Rated voltage	Signal: 63 V [AC/DC]	Power: 630 V [AC/DC]
Test voltage (L-L)	Signal: 1500 V	Power: 6000 V
Resistance	Signal: < 15 mΩ	Power: < 5 mΩ
Insertion cycles	> 50	

#### Data according to VDE 0110/EN 61984, Clause 6.19.2.2

Degree of pollution 3  
Over-voltage category III  
Max. height of operation 2000 m

#### Used materials

Housing Zinc die-casting/brass, nickel-plated	Connection nut Brass, nickel-plated
Insulation insert PBT, UL 94/V0	Contacts Brass, gold-plated
Seals FPM	Clamping ring Brass,nickel-plated

Housing with SpeedTEC quick-release fastener ► page 413

## ... no minimum order quantity

Tel. +49-2203-96 49-0  
Fax +49-2203-96 49-222

igus<sup>®</sup> GmbH  
51147 Köln, Germany

www.igus.eu  
info@igus.de

# igus® connectors SERIES M17

according to Intercontec standard

## Signal-und Power connector

### M17 signal [17-pin] and power connector [4 to 9-pin]



Signal plug 17 pin,  
nickel-plated  
Order no.

P-Type  
17-pin

Female crimping 0.6 mm,  
slitted crimp area: 0.14-0.5 mm<sup>2</sup>

Crown clamp,  
crimp area:  
9.5-12.0 mm

Metal construction,  
EMC shielding



**MAT0179639**

**B**



Signal plug 4 pin,  
nickel-plated  
Order no.

P-Type  
4-pin

Female crimping 1.5 mm,  
slitted crimp area: 0.35-2.5 mm<sup>2</sup>

Crown clamp,  
crimp area:  
9.5-12.0 mm

Metal construction,  
EMC shielding



**MAT0179641**

**C6**



Signal plug 7 pin,  
nickel-plated  
Order no.

P-Type  
7-pin

HC-female crimping 1.0 mm,  
Crimp area: 0.5-1.5 mm<sup>2</sup>

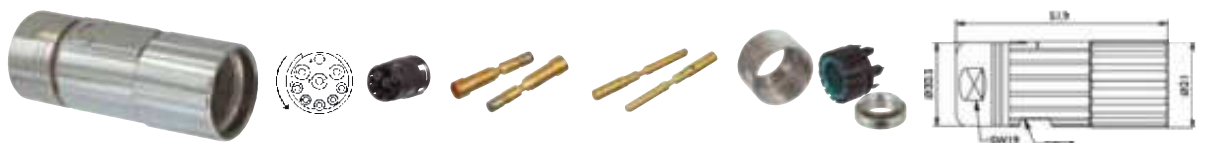
Crown clamp,  
crimp area:  
9.5-12.0 mm

Metal construction,  
EMC shielding



**MAT0179643**

**C1**



Signal plug 9 pin,  
nickel-plated  
Order no.

P-Type  
9-pin

4 x HC-female crimping 1.0 mm,  
Crimp area: 0.5-1.5 mm<sup>2</sup>  
5 x female crimping 0.6 mm,  
slitted crimp area: 0.14-0.5 mm<sup>2</sup>

Crown clamp,  
crimp area:  
9.5-12.0 mm

Metal construction,  
EMC shielding



**MAT0179645**

**C1+B**




Housing with SpeedTEC quick-release fastener ► page 413



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## Signal-und Power connector M17 signal [17-pin] and power connector [4 to 9-pin]



Signal extension 17 pin,  
nickel-plated  
Order no.  
**MAT0179640**

E-Type  
17-pin


Crimping contact 0.6 mm,  
crimp area: 0.14-0.5 mm<sup>2</sup>

Crown clamp,  
crimp area:  
9.5-12.0 mm

Metal construction,  
EMC shielding



**B**




Power extension 4 pin,  
nickel-plated  
Order no.  
**MAT0179642**

E-Type  
4-pin


Crimping contact 1.5 mm,  
crimp area: 0.35-2.5 mm<sup>2</sup>

Crown clamp,  
crimp area:  
9.5-12.0 mm

Metal construction,  
EMC shielding



**C6**




Power extension 7 pin,  
nickel-plated  
Order no.  
**MAT0179644**

E-Type  
7-pin

Crimping contact 1.0 mm,  
crimp area: 0.5-1.5 mm<sup>2</sup>

Crown clamp,  
crimp area:  
9.5-12.0 mm

Metal construction,  
EMC shielding



**C1**



Power extension 9 pin,  
nickel-plated  
Order no.  
**MAT0179646**

E-Type  
9-pin

4 x crimping contact 1.0 mm,  
Crimp area: 0.5-1.5 mm<sup>2</sup>  
5 x crimping contact 0.6 mm  
Crimp area: 0.14-0.5 mm<sup>2</sup>

Crown clamp,  
crimp area:  
9.5-12.0 mm

Metal construction,  
EMC shielding



**C1+B**

**Connector**
**Tel. +49-2203-96 49-0  
Fax +49-2203-96 49-222**
**igus® GmbH  
51147 Köln, Germany**
**Housing with SpeedTEC quick-release fastener ► page 413**

# ... no minimum order quantity

**www.igus.eu  
info@igus.de**



# igus® connectors SERIES C

## according to Intercontec standard

### Power connector

#### Size 1,5 [6, 8 and 9-pin]

#### Types

- Connector, angular connector
- Extension
- Lead-through
- Installation box straight with flange
- Installation box angled and turnable flexed with flange

#### Number of contacts

- 6, 8, 9

#### Technical data of the SERIES C

Temperature range	-20 °C to 130 °C
Protection class	IP 66/67 [plugged]

#### Electrical data power contacts

Max. rated current	75 A
Rated voltage	630 V (AC/DC)
Test voltage (L-L)	6000 V
Resistance	< 1 mΩ
Insertion cycles	> 50

#### Electrical data signal contacts

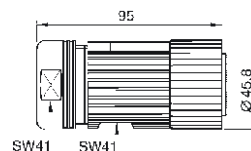
Max. rated current	30 A
Rated voltage	630 V (AC/DC)
Test voltage (L-L)	4000 V
Resistance	< 3 mΩ
Insertion cycles	> 50

#### Data according to VDE 0110/EN 61984, Clause 6.19.2.2

Degree of pollution	3
Over-voltage category	III
Max. height of operation	2000 m

#### Used materials

Housing	Magnesium die-casting/Aluminum
Connection nut	Brass, nickel-plated
Insulation insert	PA 6.6/PBT, UL 94/V0
Contacts	Brass, gold-plated
Seals	FPM/HNBR
Clamping ring	Brass, nickel-plated



Signal plug 6 pin,  
nickel-plated  
Order no.

MAT0179629

P-Type  
6-pin

4 x HC-female crimping 3.6 mm,  
crimp area: 1.5-10.0 mm<sup>2</sup>  
2 x HC-female crimping 2.0 mm,  
crimp area: 0.5-2.5 mm<sup>2</sup>

Crimp area:  
9,0-16,5 mm

Metal construction,  
EMC shielding



D9+C2



Signal plug 8 pin, nickel-plated Order no.	P-Type 8-pin	4 x HC-female crimping 3.6 mm, crimp area: 1.5-10.0 mm <sup>2</sup> 4 x HC-female crimping 2.0 mm, crimp area: 0.5-2.5 mm <sup>2</sup>		Crimp area: 9.0-16.5 mm	Metal construction, EMC shielding	
<b>MAT0179630</b>						<b>D9+C2</b>

Signal plug 9 pin, nickel-plated Order no.	P-Type 9-pin	4 x HC-female crimping 3.6 mm, crimp area: 1.5-10.0 mm <sup>2</sup> 5 x HC-female crimping 2.0 mm, crimp area: 0.5-2.5 mm <sup>2</sup>		Crimp area: 9.0-16.5 mm	Metal construction, EMC shielding	
<b>MAT0179631</b>						<b>D9+C2</b>

Power extension 6 pin, nickel-plated Order no.	E-Type 6-pin	4 x crimping contact 3.6 mm, crimp area: 1.5-10.0 mm <sup>2</sup> 2 x crimping contact 2.0 mm, crimp area: 0.5-2.5 mm <sup>2</sup>		Crimp area: 9.0-16.5 mm	Metal construction, EMC shielding	
<b>MAT0179632</b>						<b>D9+C3</b>

Power extension 8 pin, nickel-plated Order no.	E-Type 8-pin	4 x crimping contact 3.6 mm, crimp area: 1.5-10.0 mm <sup>2</sup> 4 x crimping contact 2.0 mm, crimp area: 0.5-2.5 mm <sup>2</sup>		Crimp area: 9.0-16.5 mm	Metal construction, EMC shielding	
<b>MAT0179633</b>						<b>D9+C3</b>

Power extension 9 pin, nickel-plated Order no.	E-Type 9-pin	4 x crimping contact 3.6 mm, crimp area: 1.5-10.0 mm <sup>2</sup> 5 x crimping contact 2.0 mm, crimp area: 0.5-2.5 mm <sup>2</sup>		Crimp area: 9.0-16.5 mm	Metal construction, EMC shielding	
<b>MAT0179634</b>						<b>D9+C3</b>

Tel. +49-2203-96 49-0  
Fax +49-2203-96 49-222

igus® GmbH  
51147 Köln, Germany

www.igus.eu  
info@igus.de

... no minimum order quantity

# igus® connectors SERIES D

## according to Intercontec standard

### Power connector Size 3 [6 und 8-pin]

#### Types

- Connector
- Extension
- Installation box straight with flange
- Installation box angled with flange

#### Number of contacts

- 68

#### Technical data of the SERIES C

Temperature range	-20 °C to 100 °C
Protection class	IP67 [plugged]

#### Electrical data power contacts

Max. rated current	max. 150 A
Rated voltage	60 V (C/D)
Test voltage $U_L$	600 V
Resistance	0 mΩ
Insertion cycles	> 50

#### Electrical data signal contacts

Max. rated current	12 A
Rated voltage	20 V (C/D)
Test voltage $U_L$	4000 V
Resistance	5 mΩ
Insertion cycles	> 50

#### Data according to VDE 0110/EN 61984, Clause 6.19.2.2

Degree of pollution	3
Over-voltage category	III
Max. height of operation	200 m

#### Used materials

Housing	Zn die-casting, nickel-plated
Connection nut	Brass, nickel-plated
Insulation insert	PA12/VO
Contacts	Brass, silver-/gold-plated
Seals	PI
Clamping ring	Aluminium, nickel-plated







**Signal plug 6 pin, nickel-plated**  
Order no.

P-Type  
6-pin

**Power:**  
4 x female crimping 10.0 mm,  
crimping range:  
10.0 mm<sup>2</sup>/AWG8  
**Signal:**  
2 x female crimping 1.6 mm,  
crimping range: 1.5 mm<sup>2</sup>

Crown clamp,  
crimp area:  
17.0-36.0 mm

Metal construction,  
EMC shielding

**E10+C7**





**Signal plug 8 pin, nickel-plated**  
Order no.


P-Type  
8-pin

**Power:**  
4 x female crimping 10.0 mm,  
crimping range:  
10.0 mm<sup>2</sup>/AWG8  
**Signal:**  
4 x female crimping 1.6 mm,  
crimping range: 1.5 mm<sup>2</sup>

Crown clamp,  
crimp area:  
17.0-36.0 mm

Metal construction,  
EMC shielding

**E10+C7**


**Power extension 6 pin, nickel-plated**  
Order no.

E-Type  
6-pin

**Power:**  
4 x crimping contact 10.0 mm  
crimping range:  
10.0 mm<sup>2</sup>/AWG8  
**Signal:**  
2 x crimping contact 1.6 mm  
crimping range: 1.5 mm<sup>2</sup>

Crown clamp,  
crimp area:  
17.0-36.0 mm

Metal construction,  
EMC shielding

**E10+C8**





**Power extension 8 pin, nickel-plated**  
Order no.

E-Type  
8-pin

**Power:**  
4 x crimping contact 10.0 mm  
crimping range:  
10.0 mm<sup>2</sup>/AWG8  
**Signal:**  
4 x crimping contact 1.6 mm  
crimping range: 1.5 mm<sup>2</sup>

Crown clamp  
Crimp area:  
17.0-36.0 mm

Metal construction,  
EMC shielding

**E10+C8**

... no minimum order quantity

# igus® connectors SERIES S

## according to Intercontec standard

### Power connector Single-pin

#### Types

- Connector
- Extension
- Installation box straight with flange

#### Number of contacts

- 1

#### Technical data of the SERIES S

Temperature range -20 °C to 130 °C  
 Protection class IP 66/67 [plugged]

#### Electrical data of the SERIES S

Rated voltage 630 V (AC/DC)  
 Test voltage (L-L) 8000 V  
 Resistance < 110 mΩ  
 Insertion cycles > 50  
 Max. rated current  
 for crimping range 10 mm<sup>2</sup>: 80 A  
 for crimping range 16 mm<sup>2</sup>: 100 A  
 for crimping range 25 mm<sup>2</sup>: 130 A  
 for crimping range 35 mm<sup>2</sup>: 160 A  
 for crimping range 50 mm<sup>2</sup>: 200 A

#### Data according to VDE 0110/EN 61984, Clause 6.19.2.2

Degree of pollution 3 [2]  
 Over-voltage category IV  
 Max. height of operation 2000 m

#### Used materials

Housing Zinc die-casting/brass, nickel-plated  
 Connection nut Brass, nickel-plated  
 Insulation insert PA 6.6mod., UL 94/V0  
 Contacts Brass, silver-plated  
 Seals FPM  
 Clamping ring Brass, nickel-plated



Signal plug 1 pin,  
 nickel-plated  
 On request  
**MAT0179669**

P-Type  
 1-pin

Female crimping 8.0 mm,  
 crimping range: 10.0 mm<sup>2</sup>

Crown clamp,  
 crimp area:  
 9.5-14.5 mm

Metal construction,  
 EMC shielding



**E10**



<b>Power extension 1 pin, nickel-plated</b>	E-Type 1-pin	Crimping contact 8.0 mm, crimping range: 10.0 mm <sup>2</sup>	Crown clamp, Crimp area: 9.5-14.5 mm		
<b>MAT0179670</b>					<b>E10</b>

<b>Power installation box straight, long, 1 pin, nickel-plated</b> On request	E-Type 1-pin	Crimping contact 8.0 mm, crimping range: 10.0 mm <sup>2</sup>	Not necessary		
					<b>E10</b>

Tel. +49-2203-96 49-0  
Fax +49-2203-96 49-222

igus® GmbH  
51147 Köln, Germany

www.igus.eu  
info@igus.de

## Connector – quick release fastener



The quick-release fastener SpeedTEC is available for the types plugs, extensions, straight mounting boxes and angled mounting boxes from the series A, B, C and M17.

The SpeedTEC connectors are sealed according to IP67 and conform to national and international certifications, including VDE, UL/CSA and CCC.

### Please note:

SpeedTEC extensions and installation boxes are compatible with the available screw solutions.

However, the type SpeedTEC plug housing can only be connected with other SpeedTEC types.



... no minimum order quantity

# igus® tools, accessories according to Intercontec standard

## Crimp pliers for SERIES A and B



**A**

**Hand-Crimp pliers**  
for Ø 1 mm contacts  
till core cross section 1 mm<sup>2</sup>  
complete with positioning insert  
On request

MAT01710294



**Positioning insert**  
for Ø 0.6 mm contacts

On request

MAT0179467

## Crimp pliers for SERIES M17



**B**

**Hand-Crimp pliers**  
for Ø 0.6 mm contacts  
till core cross section 0.5mm<sup>2</sup>  
complete with positioning insert  
On request

MAT0178919

## Alternative crimp pliers for A or C



**4-thorn crimp pliers**  
for Ø 0.14mm<sup>2</sup> to 6.0mm<sup>2</sup> contacts

delivered with locator  
On request

MAT01713970

## Crimp pliers for SERIES A, B, C, D and M17



**C**

**Hand-Crimp pliers**  
for Ø 1 mm contacts and Ø 2 mm  
contacts to core cross section 4 mm<sup>2</sup>  
inclusive positioning carrier  
On request

MAT0175736



**1**

**Positioning insert**  
for Ø 1 mm contacts

On request

MAT0178195



**2**

**Positioning insert**  
for Ø 2 mm contacts

On request

MAT0178196



**3**

**Positioning insert**  
for Ø 1 mm and Ø 2 mm  
contacts

On request

MAT0177855



**4**

**Positioning insert**  
for Ø 2 mm contacts

On request

MAT01714573



**5**

**Positioning insert**  
for Ø 1.5 mm contacts

On request

MAT01714574



**6**

**Positioning insert**  
for Ø 0.5-2.5 mm  
Contacts

On request

MAT0178920



**7**

**Positioning insert**  
for Ø 1.6 mm contacts

On request

MAT0177853



**8**

**Positioning insert**  
for Ø 1.6 mm contacts

On request

MAT01714575

## Crimp pliers for SERIES C


**D**

**Hand-Crimp pliers**  
for Ø 3.6 mm contacts  
till core cross section 16 mm<sup>2</sup>  
inclusive positioning carrier  
On request

**MAT0179194**

**9**

**Positioning insert**  
for Ø 3.6 mm contacts

On request

**MAT0179195**

## Crimp pliers for SERIES C



**Pneumatic Crimp pliers**  
for Ø 3.6 mm and  
Ø 2.0 mm contacts  
Core cross section 1.5-16 mm<sup>2</sup>  
On request

## Crimping insert for pneumatic crimp pliers



Contact	Pin Ø 2.0 mm Bush Ø 3.6 mm	Pin Ø 3.6 mm Bush Ø 3.6 mm	Pin Ø 3.6 mm Bush Ø 3.6 mm	Pin Ø 3.6 mm Bush Ø 3.6 mm
Crimp area	1.5/2.5 mm <sup>2</sup> 1.5/2.5 mm <sup>2</sup>	4.0/6.0 mm <sup>2</sup>	10.0 mm <sup>2</sup>	16.0 mm <sup>2</sup>
On request	On request	On request	On request	On request

## Locator for pneumatic crimp pliers



Contact	Pin Ø 2.0 mm Bush Ø 2.0 mm	Pin Ø 3.6 mm Bush Ø 3.6 mm	Pin Ø 3.6 mm Bush Ø 3.6 mm
Crimp area	1.5/2.5 mm <sup>2</sup> 1.5/2.5 mm <sup>2</sup>	1.5-10.0 mm <sup>2</sup>	1.5-16.0 mm <sup>2</sup>
On request	On request	On request	On request

## Crimping insert for SERIES S and D


**E**
**10**
**11**
**12**
**13**


Battery-powered Crimp pliers, B131-C	Crimping insert up to 10 mm <sup>2</sup> , 16 mm <sup>2</sup>	Crimping insert up to 25 mm <sup>2</sup>	Crimping insert up to 35 mm <sup>2</sup>	Crimping insert up to 50 mm <sup>2</sup>
On request	On request	On request	On request	On request
<b>MAT0177854</b>	<b>MAT01713679</b>	<b>MAT01713678</b>	<b>MAT01713677</b>	<b>MAT01713676</b>

Connector

 Tel. +49-2203-96 49-0  
Fax +49-2203-96 49-222

 igus® GmbH  
51147 Köln, Germany

 www.igus.eu  
info@igus.de



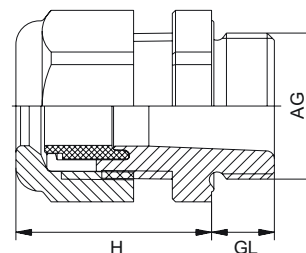
# igus® Cable glands HSK-K


**Material**  
**Shaped packing**  
**Protection class**

PA V0 according to UL 94  
NBR  
IP 68-10 bar / IP 69K  
within the specified clamping range only  
with optional O-Ring

**Continuous operating  
temperature**  
**Colour**

-40 °C-100 °C  
gray RAL 7035

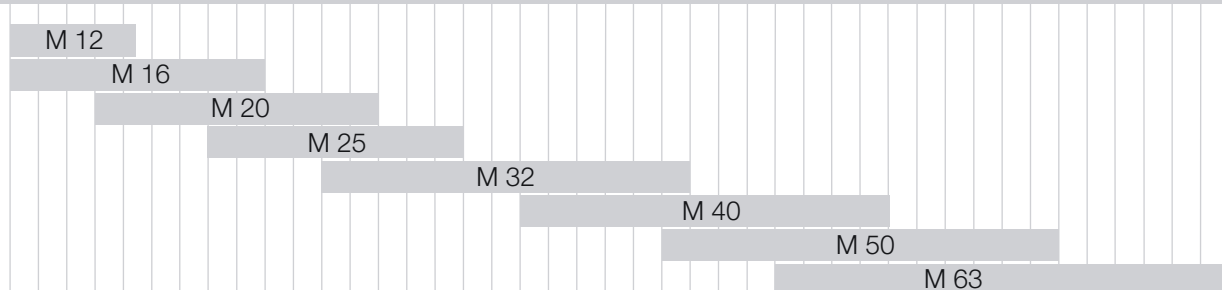


AG	$\varnothing$ mm	GL mm	H mm	 mm	Pack Size	Part No. gray	Order No.
M 12 x 1.5	3 - 6.5	8	21	15	5	1.209.1200.50	MAT0179492
M 12 x 1.5	2 - 5	8	21	15	5	1.209.1200.51	MAT01712319
M 16 x 1.5	4 - 8	8	22	19	5	1.209.1600.50	MAT0179493
M 16 x 1.5	2 - 6	8	22	19	5	1.209.1600.51	MAT01712320
M 16 x 1.5	5 - 10	8	25	22	5	1.219.1600.50	MAT01712321
M 20 x 1.5	6 - 12	9	27	24	5	1.209.2000.50	MAT0179494
M 20 x 1.5	5 - 9	9	27	24	5	1.209.2000.51	MAT01712322
M 20 x 1.5	10 - 14	9	28	27	5	1.219.2000.50	MAT0179563
M 25 x 1.5	13 - 18	11	31	33	5	1.209.2500.50	MAT0179495
M 25 x 1.5	9 - 16	11	31	33	5	1.209.2500.51	MAT01712323
M 32 x 1.5	18 - 25	11	39	42	5	1.209.3200.50	MAT0179496
M 32 x 1.5	13 - 20	11	39	42	5	1.209.3200.51	MAT01712324
M 40 x 1.5	22 - 32	13	48	53	5	1.209.4000.50	MAT0179497
M 40 x 1.5	20 - 26	13	48	53	5	1.209.4000.51	MAT01712325
M 50 x 1.5	32 - 38	13	49	60	5	1.209.5000.50	MAT0179498
M 50 x 1.5	25 - 31	13	49	60	5	1.209.5000.51	MAT01712326
M 63 x 1.5	37 - 44	14	49	65 / 68	5	1.209.6300.50	MAT0179499
M 63 x 1.5	29 - 35	14	49	65 / 68	5	1.209.6300.51	MAT01712327

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Cable diameters in mm

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45

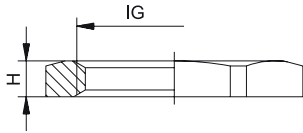



# K-Counter nuts



SERIES  
HSK-K

Material	SB / PA	
Continuous operating temperature	-20 °C-40 °C	(SB)
	-40 °C-100 °C	(PA)
Colour	gray	RAL 7035



IG	H mm	 mm	Pack Size	Part No.	Order No.
M 12 x 1.5	5	17	5	1.262.1200.50	MAT0179500
M 16 x 1.5	5	22	5	1.262.1600.50	MAT0179501
M 20 x 1.5	6	27	5	1.262.2000.50	MAT0179502
M 25 x 1.5	7	36	5	1.262.2500.50	MAT0179503
M 32 x 1.5	7	41	5	1.262.3200.50	MAT0179504
M 40 x 1.5	7	50	5	1.262.4000.50	MAT0179505
M 50 x 1.5	8	60	5	1.262.5000.50	MAT0179506
M 63 x 1.5	8	75	5	1.262.6300.50	MAT0179507

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Cable glands

Tel. +49-2203-96 49-0  
Fax +49-2203-96 49-222

igus® GmbH  
51147 Köln, Germany


www.igus.eu  
info@igus.de

... no minimum order quantity

# igus® Cable glands HSK-M

<b>Material</b>	Brass, nickel-plated
<b>Clamping insert</b>	PA
<b>Shaped packing</b>	NBR
<b>O-Ring</b>	NBR
<b>Protection class</b>	IP 68-10 bar / IP 69K within the specified clamping range only
<b>Continuous operating temperature</b>	-40 °C-100 °C

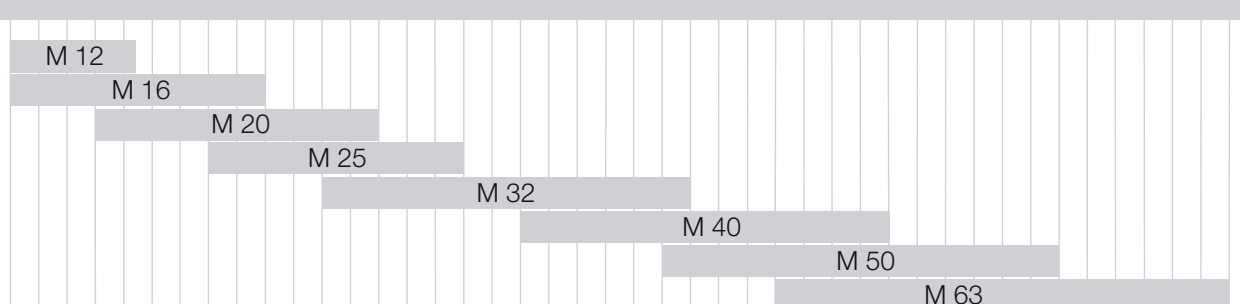


AG	∅ mm	GL mm	H mm	 mm	Pack Size	Part No. gray	Order No.
M 12 x 1.5	3 - 6.5	6.5	19	14	5	1.609.1200.50	MAT0179476
M 12 x 1.5	2 - 5	6.5	19	14	5	1.609.1200.51	MAT01712328
M 16 x 1.5	4 - 8	6	21	17 / 19	5	1.609.1600.50	MAT0179477
M 16 x 1.5	2 - 6	6	21	17 / 19	5	1.609.1600.51	MAT01712329
M 16 x 1.5	5 - 10	6	22	20	5	1.609.1611.50	MAT01712330
M 20 x 1.5	6 - 12	6	23	22	5	1.609.2000.50	MAT0179478
M 20 x 1.5	5 - 9	6	23	22	5	1.609.2000.51	MAT01712331
M 20 x 1.5	10 - 14	6	24	24	5	1.609.2016.50	MAT0179562
M 25 x 1.5	13 - 18	7	26	30	5	1.609.2500.50	MAT0179479
M 25 x 1.5	9 - 16	7	26	30	5	1.609.2500.51	MAT01711769
M 32 x 1.5	18 - 25	8	31	40	5	1.609.3200.50	MAT0179480
M 32 x 1.5	13 - 20	8	31	40	5	1.609.3200.51	MAT01712332
M 40 x 1.5	22 - 32	8	37	50	5	1.609.4000.50	MAT0179481
M 40 x 1.5	20 - 26	8	37	50	5	1.609.4000.51	MAT01712333
M 50 x 1.5	32 - 38	9	37	57	5	1.609.5000.50	MAT0179482
M 50 x 1.5	25 - 31	9	37	57	5	1.609.5000.51	MAT01712334
M 63 x 1.5	37 - 44	10	38	64 / 68	5	1.609.6300.50	MAT0179483
M 63 x 1.5	29 - 35	10	38	64 / 68	5	1.609.6300.51	MAT01712335

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Cable diameters in mm

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45

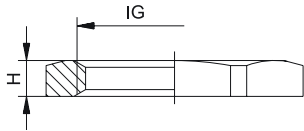



# M-Counter nuts



SERIES  
HSK-M

Material Brass, nickel-plated



IG	H mm	 mm	Pack Size	Part No.	Order No.
M 12 x 1.5	2,8	15	5	1.161.1200.50	MAT0179484
M 16 x 1.5	2,8	19	5	1.161.1600.50	MAT0179485
M 20 x 1.5	3,0	23	5	1.161.2000.50	MAT0179486
M 25 x 1.5	3,5	29	5	1.161.2500.50	MAT0179487
M 32 x 1.5	4,0	36	5	1.161.3200.50	MAT0179488
M 40 x 1.5	4,5	45	5	1.161.4000.50	MAT0179489
M 50 x 1.5	5,5	55	5	1.161.5000.50	MAT0179490
M 63 x 1.5	6,0	70	5	1.161.6300.50	MAT0179491

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Cable glands

Tel. +49-2203-96 49-0  
Fax +49-2203-96 49-222

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51147 Köln, Germany

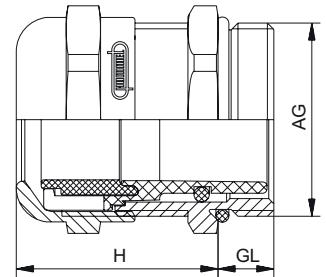
[www.igus.eu](http://www.igus.eu)  
[info@igus.de](mailto:info@igus.de)


... no minimum order quantity

# igus® Cable glands HSK-M-EMV

<b>Material</b>	Brass, nickel-plated
<b>Clamping insert</b>	PA
<b>Shaped packing</b>	NBR
<b>O-Ring</b>	NBR
<b>Protection class</b>	IP 68-10 bar / IP 69K within the specified clamping range only

**Continuous operating temperature** -40 °C-100 °C

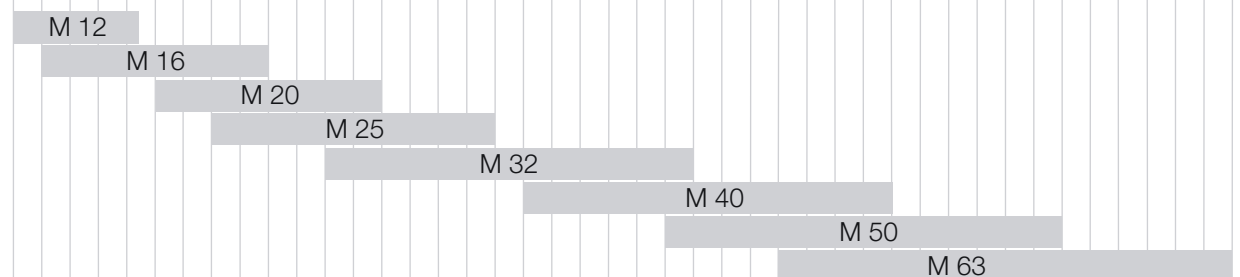


AG	∅ <sub>k</sub> mm	GL mm	H mm	 mm	Pack Size	Part No. gray	Order No.
M 12 x 1.5	3 - 6.5	6.5	19	14	5	1.691.1200.50	MAT0179508
M 12 x 1.5	2 - 5	6.5	19	14	5	1.691.1200.51	MAT01712336
M 16 x 1.5	5 - 10	6	22	20	5	1.691.1600.50	MAT0179509
M 16 x 1.5	3 - 7	6	22	20	5	1.691.1600.51	MAT01712337
M 20 x 1.5	10 - 14	6	23	24	5	1.691.2000.50	MAT0179510
M 20 x 1.5	7 - 12	6	23	24	5	1.691.2000.51	MAT01712338
M 25 x 1.5	13 - 18	7	24	30	5	1.691.2500.50	MAT0179511
M 25 x 1.5	9 - 16	7	24	30	5	1.691.2500.51	MAT01712339
M 32 x 1.5	18 - 25	8	31	40	5	1.691.3200.50	MAT0179512
M 32 x 1.5	13 - 20	8	31	40	5	1.691.3200.51	MAT01712340
M 40 x 1.5	22 - 32	8	37	50	5	1.691.4000.50	MAT0179513
M 40 x 1.5	20 - 26	8	37	50	5	1.691.4000.51	MAT01712341
M 50 x 1.5	32 - 38	9	37	57	5	1.691.5000.50	MAT0179514
M 50 x 1.5	25 - 31	9	37	57	5	1.691.5000.51	MAT01712342
M 63 x 1.5	37 - 44	10	38	64 / 68	5	1.691.6300.50	MAT0179515
M 63 x 1.5	29 - 35	10	38	64 / 68	5	1.691.6300.51	MAT01712343

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Cable diameters in mm

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45

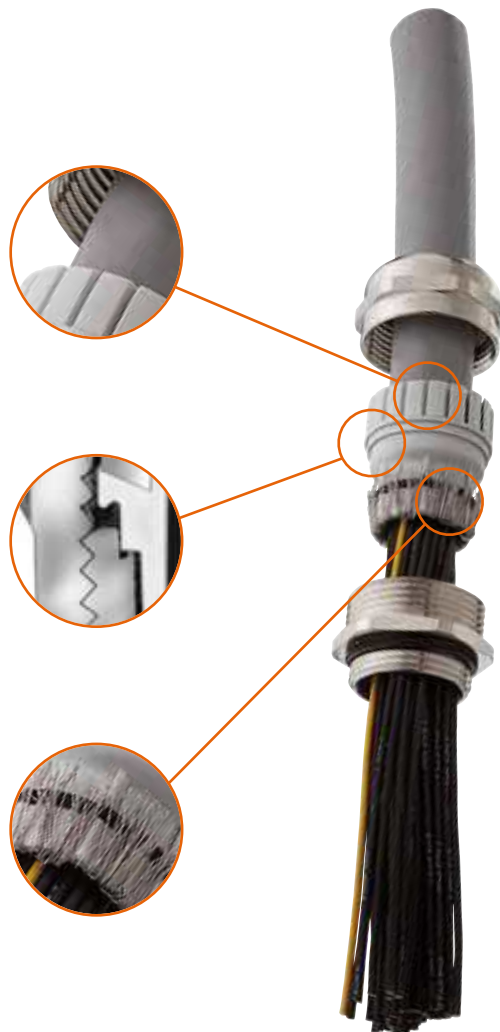


## EM

Flexible overlapping clamping splines prevent the form seal from being pulled out of the fitting.

The internal sealing edge results in a superior seal between the splined non clamping insert and the nickel plated brass body.

Patented 6° grounding due to the internal ring, which results in a perfect contact between braided shield of cable and fitting.



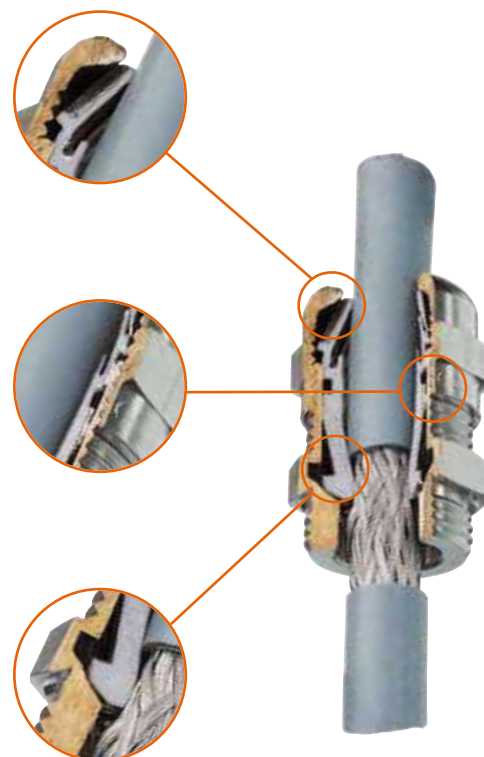
Cable glands

## EMD

Flexible overlapping clamping splines prevent the form seal from being pulled out of the fitting.

Milled spline insert provides electrical conductivity.

Flexible contact points allow contact with variable braid diameters.



Tel. 0-2200-0  
Fax 0-2200-222

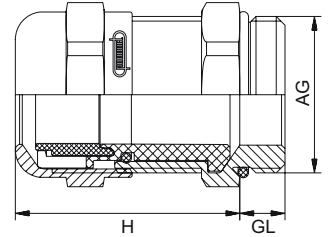
igus® GmbH  
5000, Germany

www.igus.eu  
info@igus.de

... no minimum order quantity

# igus® Cable glands HSK-M-EMV-D

<b>Material</b>	Brass, nickel-plated
<b>Clamping insert</b>	Metal coated PA
<b>Shaped packing</b>	NBR
<b>O-Ring</b>	NBR
<b>Protection class</b>	IP 68-10 bar / IP 69K within the specified clamping range only
<b>Continuous operating temperature</b>	-40 °C-100 °C

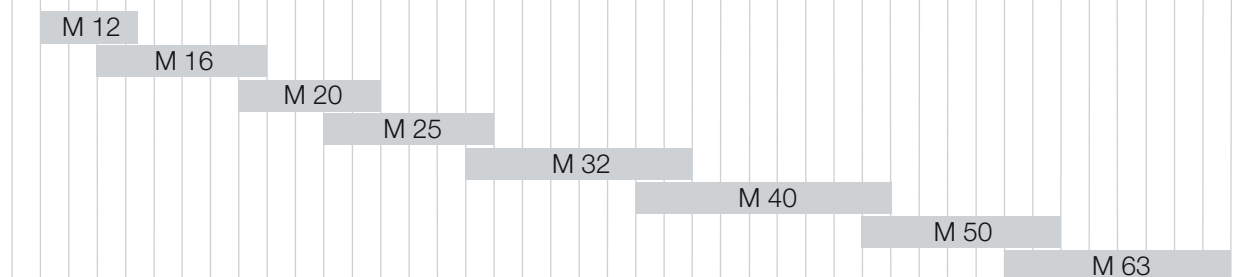


AG	$\varnothing$ mm	GL mm	H mm	 mm	Pack Size	Part No. gray	Order No.
M 12 x 1.5	3 - 6.5	6.5	25	14	5	1.631.1200.50	MAT0179524
M 16 x 1.5	5 - 10	6	32	20	5	1.631.1600.50	MAT0179525
M 20 x 1.5	10 - 14	6	33	24	5	1.631.2000.50	MAT0179526
M 25 x 1.5	13 - 18	7	39	30	5	1.631.2500.50	MAT0179527
M 32 x 1.5	18 - 25	8	45	40	5	1.631.3200.50	MAT0179528
M 40 x 1.5	24 - 32	8	51	50	5	1.631.4000.50	MAT0179529
M 50 x 1.5	32 - 38	9	57.5	57	5	1.631.5000.50	MAT0179530
M 63 x 1.5	37 - 44	10	52	64 / 68	5	1.631.6300.50	MAT0179531

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Cable diameters in mm

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45

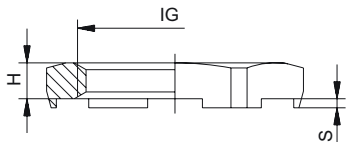



# EMV-Counter nuts



SERIES  
HSK-M-  
EMV-D

**Material** Brass, nickel-plated



IG	H mm	 mm	S mm	Pack Size	Part No.	Order No.
M 12 x 1.5	2.8	15	0.7	5	1.167.1200.50	MAT0179516
M 16 x 1.5	2.8	19	0.7	5	1.167.1600.50	MAT0179517
M 20 x 1.5	3.0	24	0.7	5	1.167.2000.50	MAT0179518
M 25 x 1.5	3.5	30	0.7	5	1.167.2500.50	MAT0179519
M 32 x 1.5	4.5	36	0.7	5	1.167.3200.50	MAT0179520
M 40 x 1.5	5.0	46	0.7	5	1.167.4000.50	MAT0179521
M 50 x 1.5	5.0	60	0.7	5	1.167.5000.50	MAT0179522
M 63 x 1.5	6.0	70	0.7	5	1.167.6300.50	MAT0179523

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Cable glands

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Fax +49-2203-96 49-222

igus® GmbH  
51147 Köln, Germany

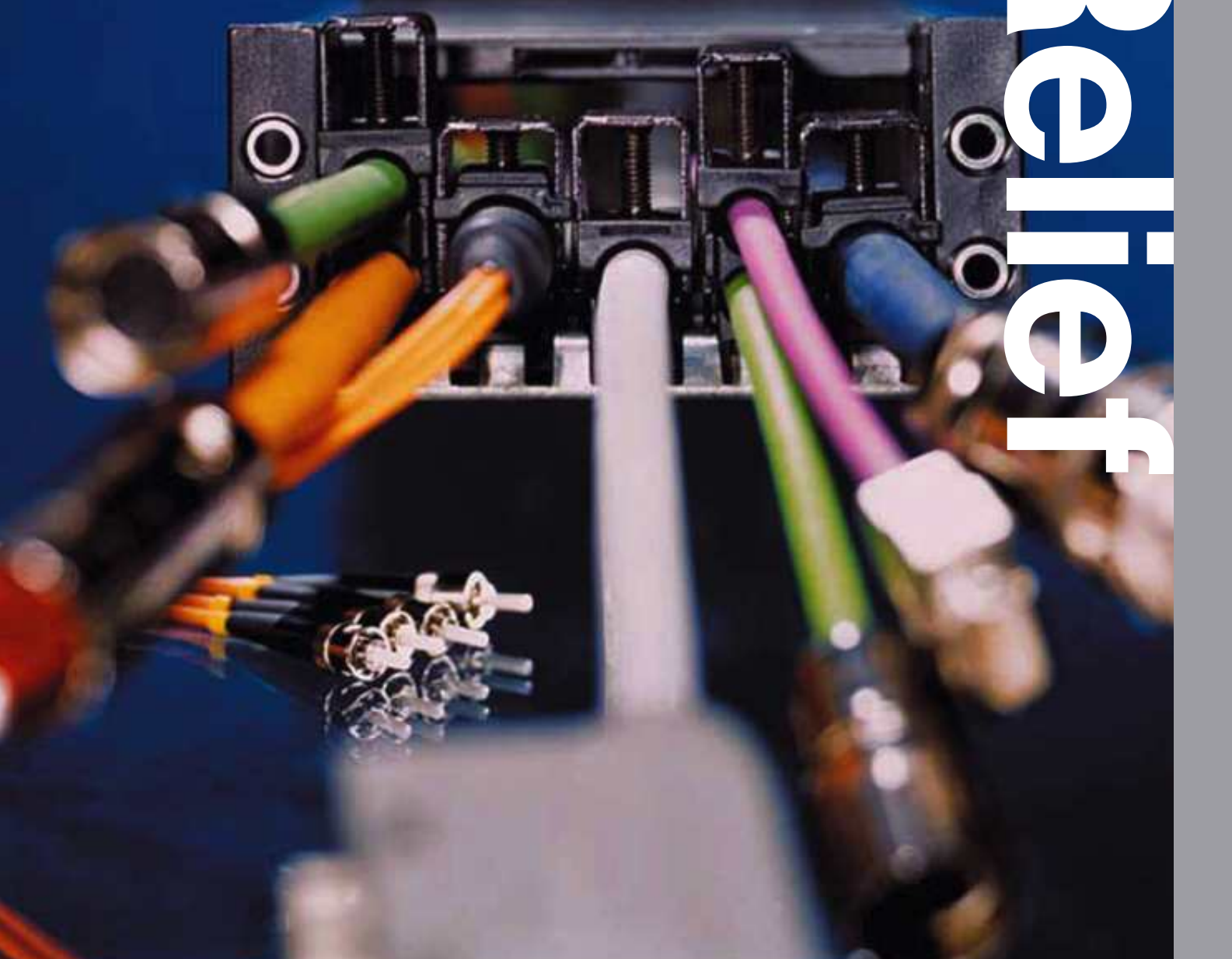
www.igus.eu  
info@igus.de

**... no minimum order quantity**



**VAKAT**

# Strain Relief



## Overview Strain Relief System



**Chainfix steel clamps and Chainfix stainless-steel clamps** – Max. pull forces, adjustable with hexagon socket

► Page 428



**Chainfix clips** – High pull forces, plug-in Modular snap-on strain relief device

► Page 430



**Chainfix Nugget** – Strain relief for small space and cables up to 20 mm o.d.

► Page 432



**Strain relief separator** – With integrated teeth

► Page 432



**Tiewrap plates** – For cable tiewrap universal, bolted or clip-on

► Page 433



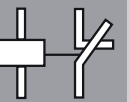
**Chainfix-tiewrap plates** – For strain relief with cable tiewraps for C-profile, clip-on

► Page 434



**igus® Blocks** – Special strain relief for hoses. A Modular, space-saving system

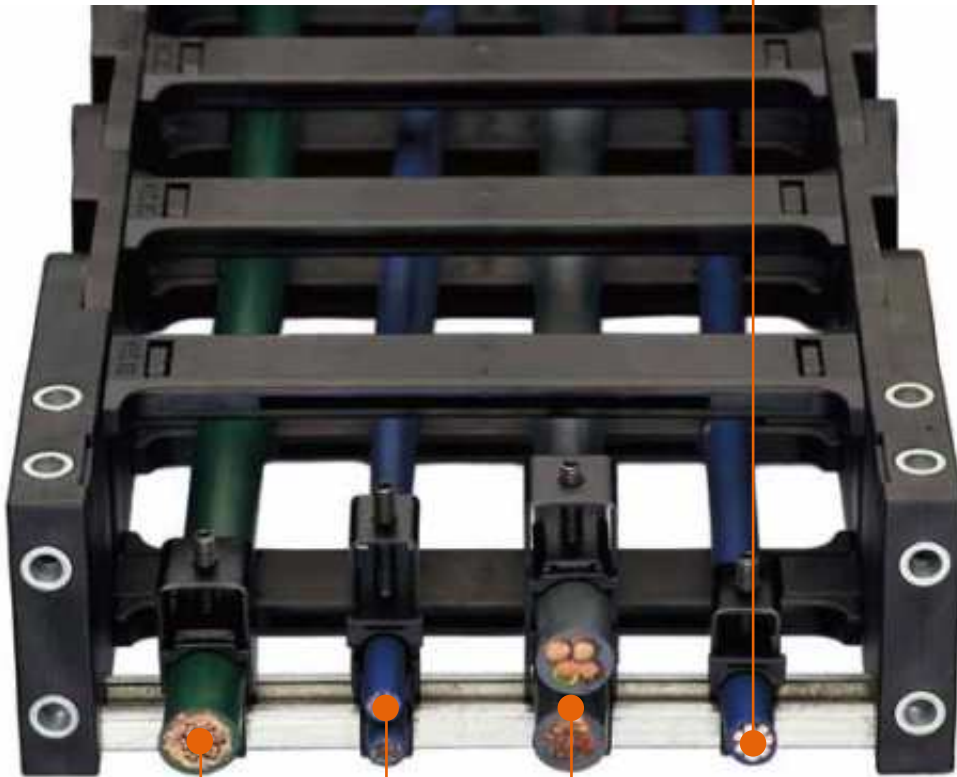
► Page 435



Reduced overall height

Space-saving

Long-term durability for dynamic application



Suitable for integration in the igus® connection element KMA (German abbr. = plastic-metal connection elements)

High tensile strength due to ribbed plastic troughs

For one cable, or for two or three cables on top of one another

Black painted or stainless steel from stock

### Strain relief devices for Energy Chains® with igus® strap clips and igus® press-fit elements

The principle of the strap clips has proved to be extremely reliable as a strain relief device for igus® Energy Chain Systems®.

**Important improvements** are characteristic features of the igus® own "Chainfix" product series:

- igus® Chainfix reduces the overall height due to optimum housing height
- Long-term durability for dynamic applications due to improved press-fit elements.
- Suitability for integration in the KMA connection element.
  - Space-saving and time-saving assembly
  - Possibility of delivery for complete systems with cables and assembled strain relief device.
- Improved foot for facilitated installation on the C profile.

Ideally, the cables must be fastened at both ends of the Energy Chains®. The cables must, however, at least be fastened to the moving mounting bracket of the Energy Chains®.

#### Characteristic features of the igus® Chainfix strap clips

- Optimized height due to newly developed housing.
- Improved foot for facilitated installation on the C profile.
- Good visual effects due to black housing body and black threaded setscrews.
- Easy to assemble due to setscrews that are screwed using an Allen key.

#### Characteristic features of the igus® press-fit elements

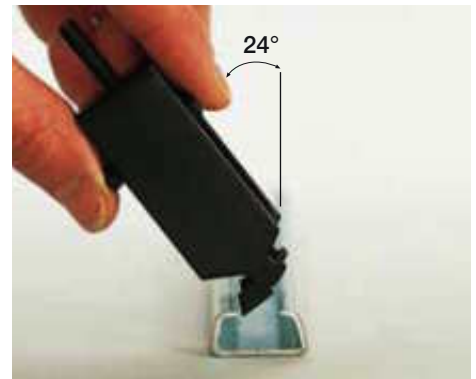
- Long supporting surface improves the stability of the strap clip.
- High inherent rigidity increases the operating safety.
- Integrated ribs prevent the cable from detaching itself from the strain relief device.

#### Overall height

When the Energy Chains® glide along on themselves in the case of long distances of travel, the screw heads of the strain relief device at the fixed point of the chain must possess a separating distance of at least 10 mm to the top edge of the Energy Chains®. Our newly developed clip housing with setscrews **reduce the overall height by as much as 15 mm** compared with conventional strap clips.



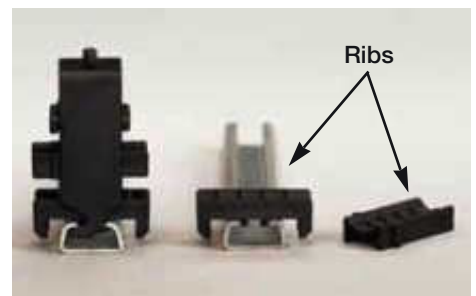
KMA connection element with integrated C profile and Chainfix



Easy installation of the strap clip due to improved foot



Reduced overall height due to setscrew and optimum housing height



New pressure trough, mating trough and press trough with ribs for better long-term durability

## Chainfix test results

### Three times higher tensile strength than with standard-type strap clips

- ❶ Standard-type strap clip made of hot-galvanized steel, double trough and press trough made of impact-resistant plastic (Art. no. CF14.1.Z, standard elements)
- ❷ Strap clip as described above, double trough and press trough made of igumid G (Art. no. CFY14.1)
- ❸ Strap clip "Chainfix", mating trough and press trough made of igumid G (Art. no. CFX14.1)

**Results:** Strain relief element ❶ saddle clamps loosen at 1.000 N of pull force. The resulting diagonal position of the saddle clamp distorts the screw. Strain relief element ❷ saddle clamps loosen at 1.750 N of pull force. The improved igumid G saddle clamps attempt to hold the cable, causing the outer jacket to "peel." Strain relief element (igus® Chainfix system) ❸ saddle clamps loosen and slant 5° at 1.750 N. At 2.500 N of pull force, the cable jacket bunches up behind the clamp and, at 3.500 N of pull force, the clamps loosen completely and the cable becomes inoperative.

**Final result: The tensile strength of the strap clip "Chainfix" developed by igus® is three times higher than the tensile strength of standard-type strain relief devices.**

#### Delivery program elements of the Chainfix strain relief devices:

- Chainfix strap clip with setscrew and press trough, double trough, mating trough ● C profile

**Materials:** igus® strap clip: black painted steel ● Setscrew: black steel ● igus® strap clip stainless steel\*: bare-metal, material 1.4301 ● Setscrew: bare-metal, material 1.4301 ● Press trough, double trough and mating trough: igumid G

### Tensile strength test example with cable Ø 10.5 mm

- Tiewrap plate 2070ZB with a cable tiewrap

**Result:** Tensile strength 290 N

- Chainfix clip CFC-12-M

**Result:** Tensile strength 350 N

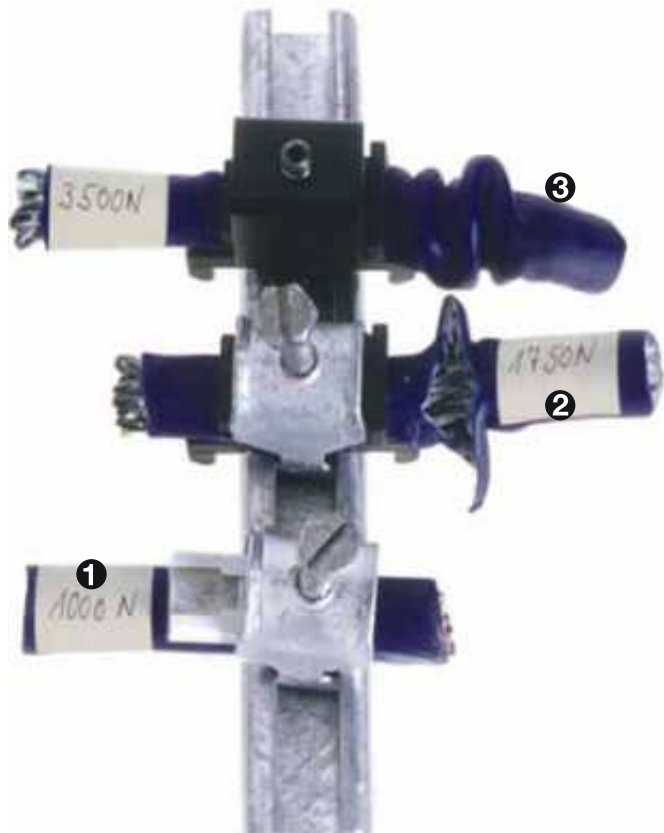
### Pull force test for igus® tiewrap plates with cable tiewraps

**Results:** Two tiewraps are more stable than one tiewrap.

If one cable tiewrap is used, the **breaking force is (approx.) 350 N**. If the cable is secured with two cable tiewraps, the **breaking force increases to 830 N**, i.e. pull force resistance more than doubles when using two cable tiewraps.

#### Technical data:

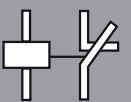
- Tiewrap plates: 2100.ZB/3100.ZB
- Cable: CF1.07.12
- Cable tiewraps: CFB.001



Strain relief devices

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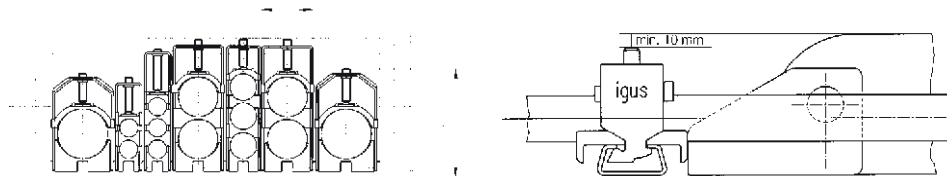
## igus® Chainfix Strain Relief



If the E-Chains® glide on themselves over long travels, the screw heads of the strain relief must be at least 10 mm away from the upper edge of the E-Chains® at the fixed end of the chain.

This restriction means that the strain relief elements described here may possibly not be able to be used on the fixed end of long E-Chains®.

Please note our clamps developed specifically for a low overall height. In the case of unsupported E-Chains®, the strain relief elements may be used with no problems.



The dimensions given for H in the tables are based on the maximum cable diameter. The use of thinner cables can result in deviating dimensions.

## Single clamp housing, including top/bottom saddle clamps



Steel clamp Part No.	Stainless steel clamp Part No.	ø [mm]	B	H
CFX12.1	CFX12.1.E	06 – 12	16	58
CFX14.1	CFX14.1.E	12 – 14	18	50
CFX16.1	CFX16.1.E	14 – 16	20	52
CFX18.1	CFX18.1.E	16 – 18	22	54
CFX20.1	CFX20.1.E	18 – 20	24	56
CFX22.1	CFX22.1.E	20 – 22	26	58
CFX26.1	CFX26.1.E	22 – 26	30	67
CFX30.1	CFX30.1.E	26 – 30	34	71
CFX34.1	CFX34.1.E	30 – 34	38	75
CFX38.1	CFX38.1.E	34 – 38	42	79
CFX42.1	CFX42.1.E	38 – 42	46	83



Improved housing foot clamp for easy fit into profile rail

## Double clamp housing, including top/bottom saddle clamps and one stacker saddle clamp



Setscrew and reduced optimal housing height for use in long/ gliding travel applications



Steel clamp Part No.	Stainless steel clamp Part No.	ø [mm]	B	H
CFX12.2	CFX12.2.E	06 – 12	16	72
CFX14.2	CFX14.2.E	12 – 14	18	74
CFX16.2	CFX16.2.E	14 – 16	20	78
CFX18.2	CFX18.2.E	16 – 18	22	82
CFX20.2	CFX20.2.E	18 – 20	24	86
CFX22.2	CFX22.2.E	20 – 22	26	90
CFX26.2	CFX26.2.E	22 – 26	30	109
CFX30.2	CFX30.2.E	26 – 30	34	117
CFX34.2	CFX34.2.E	30 – 34	38	125



When using Chainfix clamps on C-Profile in the mounting bracket for Series 280, 2828, 290, 2928, R770, R7728 and a shortened mating trough must be used. The Part No. for this is: CFX...K (add letter "K" to the above Part No.)

## Triple clamp housing, including top/bottom saddle clamps and two stacker saddle clamps

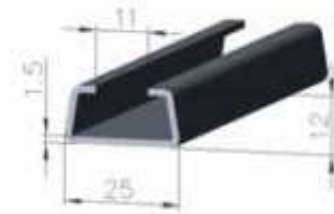


Steel clamp Part No.	Stainless steel clamp Part No.	ø [mm]	B	H
CFX12.3	–	06 – 12	16	100
CFX14.3	–	12 – 14	18	96
CFX16.3	–	14 – 16	20	102
CFX18.3	–	16 – 18	22	108
CFX20.3	–	18 – 20	24	114
CFX22.3	–	20 – 22	26	120

\* Material stainless steel: 1.4301

Bottom saddle clamps for single/double/triple clamp housings as separate part or insertion into C-profile

Part No.	ø [mm]
CG12	06 – 12
CG14	12 – 14
CG16	14 – 16
CG18	16 – 18
CG20	18 – 20
CG22	20 – 22
CG26	22 – 26
CG30	26 – 30
CG34	30 – 34
CG38	34 – 38
CG42	38 – 42

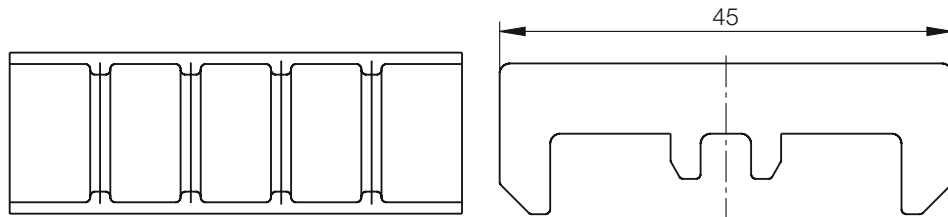


Stainless steel\* C profile for all clamps, also for assembly in the KMA connection element Series: 280, 2828, 28, 380, 3838, 38, 400, 4040, 40, 140, 142 and 5050, 50, 150,

**Part No. CF92.42 ..... E**

(specify length in mm)

**Material:** stainless steel\*

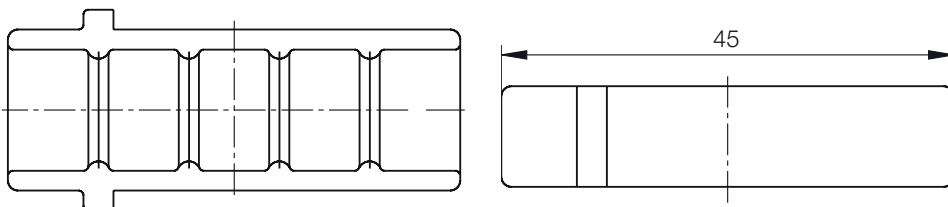


Stacker saddle clamps for double/triple clamp housings for placement between stacked cables

Part No.	ø [mm]
CD12	06 – 12
CD14	12 – 14
CD16	14 – 16
CD18	16 – 18
CD20	18 – 20
CD22	20 – 22
CD26	22 – 26
CD30	26 – 30
CD34	30 – 34

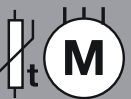
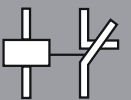


Ribbed strain relief saddle clamps withstands increased pull forces for long-term durability



Strain relief devices

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## Chainfix – Snap on Solutions



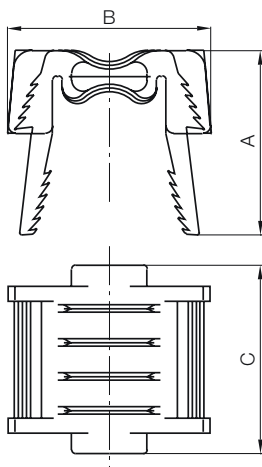
For the following  
E-Chains®:

### Chainfix Clip for C-profile:

For all KMA mounting brackets  
with C-profile-option!

### Chainfix Clip for crossbars:

For most E4 and  
E6 E-Chains®



### Chainfix Clip – Modular snap-on strain relief device

Available for all igus® E-ChainSystems® with C-profiles and also suitable for assembly in the KMA mounting brackets and Clip-on strain relief for crossbars

**Characteristic features:** ● Series of clamps and bottom parts made of plastic for cable diameters ranging from 4 mm to 24 mm ● Quick assembly without any tools ● 2 and 3 layers on top of one another possible ● Each layer can be detached and changed later on ● High tensile forces in case of single-layer installation, decreasing with the number of layers



ø Leitung [mm]	Part No. Clamps	Part No. Bottom Part	A [mm]	B [mm]	C [mm]
04 - 08 mm	CFC-08-M	CFC-08-C	13.0	14.5	30
08 - 12 mm	CFC-12-M	CFC-12-C	24.0	23.7	36
12 - 16 mm	CFC-16-M	CFC-16-C	32.1	32.4	42
16 - 20 mm	CFC-20-M	CFC-20-C	39.1	43.2	45
20 - 24 mm	CFC-24-M	CFC-24-C	50.0	54.0	50



For the following  
E-Chains®:

For all KMA mounting brackets  
with C-profile-option!

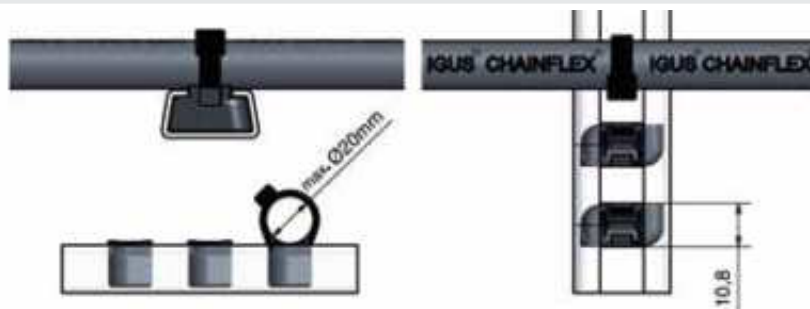


### Chainfix Nugget

**Characteristic features:** ● Very small strain relief for the fixation of cables up to diameter of 20 mm ●

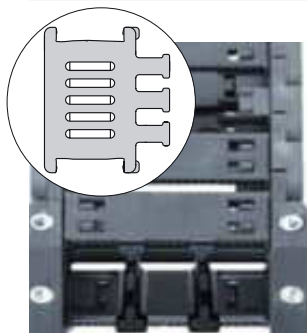
**Use:** ● Accessory for all KMA with integrated c-profile ● Easy to assemble, without any screws and tools ● Adjustable to every E-Chain® filling ● Very small space requirement ● Easy strain relief due to fixation with pre-assembled cable strap

Part No.	ø Leitung max. [mm]	Breite [mm]
CFN.20	20	10.8



For the following  
E-Chains®:

For more details  
see table!



### Strain relief separator

**Characteristic features:** ● Separator with integrated strain relief for the use in the first or last chain link

● **Use:** ● Individual part for the manufacturing of switchgear cabinets or for the assembly of machines ● Accessory for igus® E-ChainSystems® ● Easy to assemble without any screws

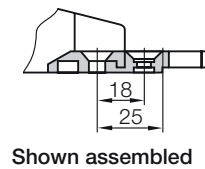
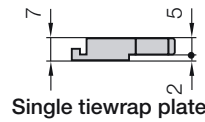
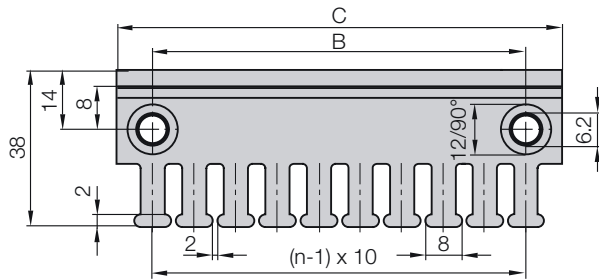
Part No.	Number of teeth	For Series
T2103.Z	2	210
E6.29.02Z	2	E6.29
2020.Z	2	2400/2500
262.Z	3	2600/2700

## Option 1: Chainfix tiewrap plates as individual parts

**Characteristic features:** ● As individual component screwed on KMA (plastic metal mounting brackets)  
 ● Can be plugged in the mounting brackets ● **Use:** ● Individual part for the manufacturing of switch-gear cabinets or for the assembly of machines ● Accessory for igus® E-ChainSystems®



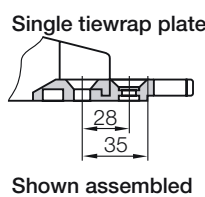
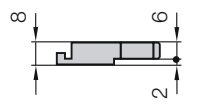
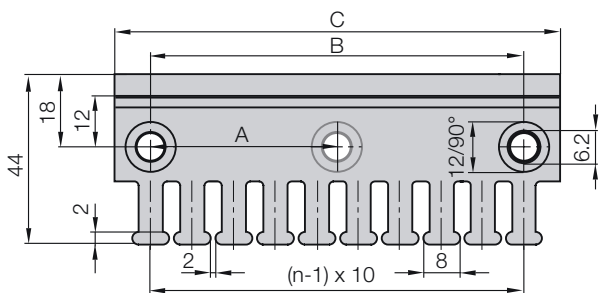
### Series 2000 – Tiewrap plate as individual part



Tiewrap plate	n Number of teeth	Dim. C [mm]	Dim. B [mm]	Center bore (- = no / + = yes)
2020.ZB	3	30	15	-
2030.ZB	4	40	20	-
2040.ZB	5	50	30	-
2050.ZB	6	60	40	-
2070.ZB	8	80	60	-
2090.ZB (= 2030.ZB + 2040.ZB)	9	90	-	-
2100.ZB	10	100	80	-
2125.ZB (= 2050.ZB + 2050.ZB)	12	120	-	-

Cable tiewraps (100-piece bag)	Width x length [mm]	Max. Ø	Pull force resistance
CFB.001	4.8 x 150	36	222 N

### Series 3000 – Tiewrap plate as individual part



Tiewrap plate	n Number of teeth	Dim. C [mm]	Dim. B [mm]	Center bore (- = no / + = yes)
3050.ZB	05	50	30	-
3075.ZB	07	75	55	-
3100.ZB	10	100	80	-
3115.ZB	11	115	95	-
3125.ZB	12	125	105	-
3150.ZB	15	150	130	-
3175.ZB	17	175	155	-
3200.ZB	20	200	180	+
3225.ZB	22	225	205	+
3250.ZB	25	250	230	+

Cable tiewraps (100-piece bag)	Width x length [mm]	Max. Ø	Pull force resistance
CFB.001	4.8 x 150	36	222N

For the following E-Chains®:

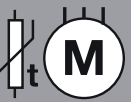
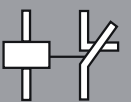
- Easy Chain® Series:
  - E200/Z200
- System E2/000 Series:
  - 2400/2500/2450
  - 2600/2700/2650
  - 255
- System E4 Series:
  - 220

For the following E-Chains®:

- Easy Chain® Series:
  - E26/Z26
  - E300/Z300
- System E2/000 Series:
  - 2600/2700/2650
  - 3400/3500/3450
- System E4 Series:
  - 280/290
  - 380/390
  - 400/410
  - 2828/2928
  - 3838/3938
  - 4040/4140
  - 1640

Strain relief devices

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For the following  
E-Chains®:

For all mounting brackets with  
C-Profil-option



## Chainfix Tiewrap Plates

### Option 2: Tiewrap plates with clip-on connection for the C-profile

**Characteristic features:** ● Can be plugged into the KMA c-profile ● Easy solvable with screwdriver  
● Easy to assemble without any screws. Easy solvable with screwdriver nevertheless safe stop ● **Use:**  
● Individual part for the manufacturing of switchgear cabinets or for the assembly of machines ● Acces-  
sory for igus® E-ChainSystems® ● For all E-Chains® with KMA and integrated C-profile

Part No.	Width [mm]	Number of teeth
3050.ZC	50	5
3075.ZC	75	7



For the following  
E-Chains®:

System E2/000 Series:

For more details see table!



### Option 3: Clip-on tiewrap plates for opening or fixed crossbars

**Characteristic features:** ● Can be plugged on the fixed crossbars ● In case of many harnessed cables with strain relief "over two floors" ● If the KMA is too small for the c-profile ● Easy to assemble without any screws ● **Use:** ● Individual part for the manufacturing of switchgear cabinets or for the assembly of machines ● Accessory for igus® E-ChainSystems®

Part No.	Width [mm]	Number of teeth	For Series
fixed crossbar			
2050.Z	60	6	2600/2700
3050.Z	50	5	3400/3500
Part No.	Width [mm]	Number of teeth	For Series
opening crossbar			
3035.ZS	35	3	3400/3500
3050.ZS	50	5	3400/3500
3075.ZS	75	7	3400/3500
3850.ZS	48	5	2828/280/38/3838/380/E6.62/142/14240
4550.ZS	48	5	4040/400/50/5050/E6.80/140/14040/ 15050
4575.ZS	74	7	4040/400/50/5050/E6.80/140/14040/ 15050



For the following  
E-Tubes:

System E2 Tubes Series:

● R58 ● R68



### Option 4: Integrated strain relief for E2 Tubes - Series R

**Characteristic features:** ● Strain relief disappears completely in the E-Tube ● Easy to assemble without any screws ● **Use:** ● Individual part for the manufacturing of switchgear cabinets or for the assembly of machines ● Accessory for igus® E-ChainSystems®

Part No.	Width [mm]	Number of teeth	For Series
3050.Z	50	6	R68
3075.Z	75	7	R68
5850.Z	47	4	R58

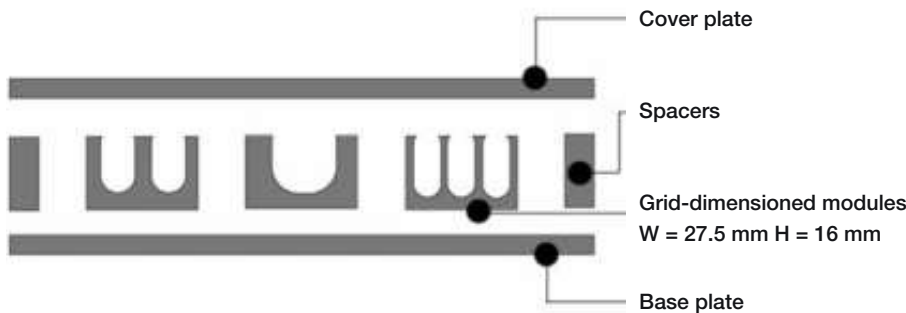


## igus® Strain Relief Block for Small Hoses and Cables

- Modular system for great adaptability
- No hose damage
- Easy installation - pressing the hose into the locating notch provides reliable fastening without hardware
- Hoses and cables can be installed together in the same E-Chain®
- Accommodation of hose diameters from 4.3 to 14 mm

## The Modular Elements of the igus® Strain Relief Block for Hoses

The modules accommodate hoses from 4.3 to 14 mm, 3 x 4.3 mm hoses can be fitted on top of each in module CFS 4.3 and 2 hoses can be fitted directly on top of each other in one notch using module CFS 6. The modules have a width of 27.5 mm, are inserted into the base plate and then fastened in position with M4 countersunk-head screws. The exception is module CFS 55.9 which offers the capacity for 5 x 9 mm hoses with twice the width. The base plate and cover plate are available in widths ranging from 75 to 240 mm. The height of the spacers and modules is 16 mm. Several layers can be installed directly above one another.



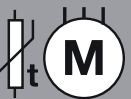
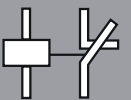
Part No.	Hose	Number	Width
Strain Relief Block	Ø [mm]	of hoses	[mm]
CFS 4.3	4.3	4 - 12	27.5
CFS 6	6.0	3 - 6	27.5
CFS 9	9.0	2	27.5
CFS 55.9	9.0	5	55.0
CFS 10	10.0	2	27.5
CFS 14	14.0	1	27.5

Part No.	Width
Base plate	[mm]
CFSU	75.0
CFSU	102.5
CFSU	130.0
CFSU	185.0
CFSU	212.0
CFSU	240.0
Part No.	Width
Spacer	Ø [mm]
CFSD	16.0
CFSD	12.0

Part No.	Width
Cover plate	[mm]
CFSP	75.0
CFSP	102.5
CFSP	130.0
CFSP	185.0
CFSP	212.0
CFSP	240.0

Strain relief devices

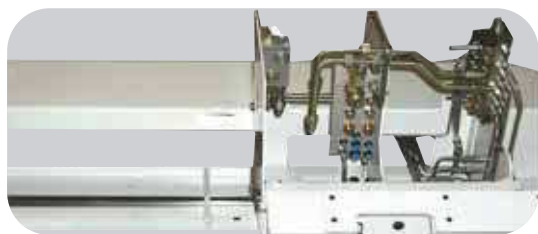
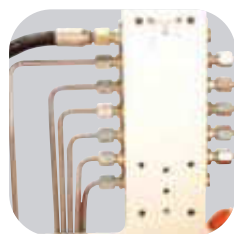
Tel. +49-2203-96 49-0  
Fax +49-2203-96 49-222



**VAKAT**

# ReadyChains® Ready-made Energy Chain Systems®

...all inclusive.

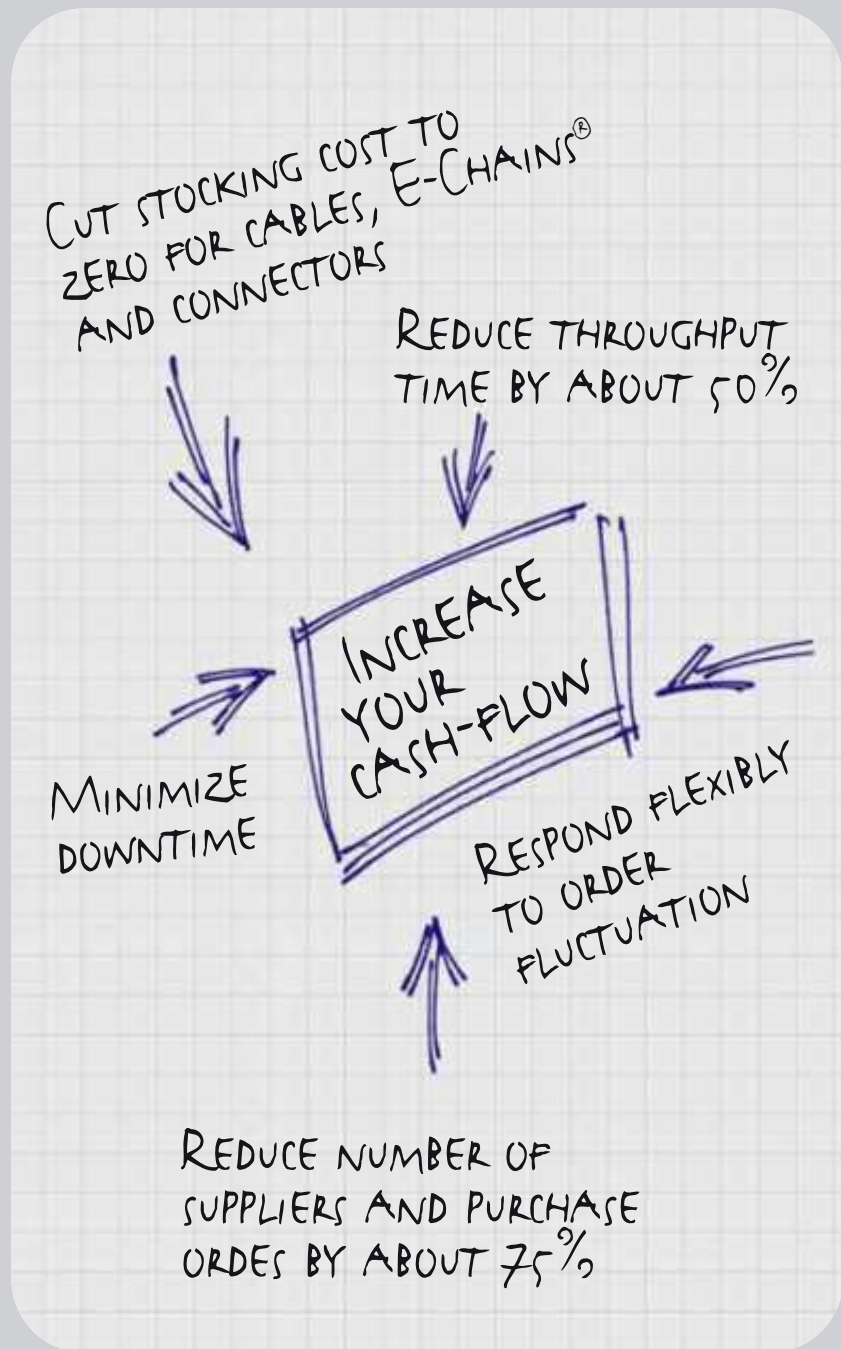


igus®

ReadyChain®

# Increase cash flow

Increase your cash-flow easily and smoothly even from batch size 1.



## Reduce storage costs for cables, Energy Chains® and plugs to zero

You can do without storage of high flexible cables, plugs and any other add-on pieces due to our rapid and guaranteed delivery times.

## Split in half flow times

Because of a polished logistic igus® delivers ready-made systems almost worldwide within 2-8 days on the guaranteed date.

## React flexible to contract fluctuations

With ReadyChains® you are always prepared for cyclical ups and downs. In this field you can pass the buck of capacity fluctuations to us.

## Minimize machine breakdown

Play it safe, it's the little things that always cause problems. Buying numerous single parts not only increases the risk of failure of your plants, it also complicates troubleshooting.

You will get a system solution with ReadyChains®. Any system is checked in our test centre. igus® is standardized according to ISO 9001.

## Reduce the number of suppliers and orders about 75%

► One order ► one invoice ► one delivery ► one partner. Don't care about looking for numerous parts from numerous suppliers. We have the knowledge to provide you quickly with the optimal parts.

+++++ We are professionals for Energy Chain® harnessing +++++





# igus<sup>®</sup> ReadyChain<sup>®</sup>

Increase cash-flow,  
reduce ordering and flow times

## Component part solution

Order, component parts  
Different suppliers  
Different delivery periods



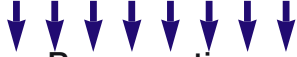
Goods received, structural components



Transport to stock



Outgoing stocks



Pre-mounting

Transport to machines, assembly and fitting of the component parts

## ReadyChain<sup>®</sup>-solution

Chain, cable, harnessing  
Ordering the structural component  
with an article number



Goods received, structural component



Transport to the machine  
and assembly - "ready for occupation"



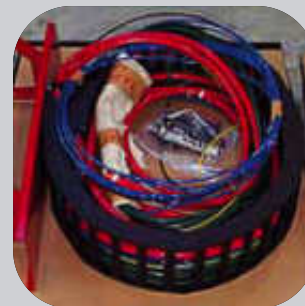
Textile machine, more than 50 modifications, delivered to the belt with three days of leading time.



Building machines, harnessed hydraulic hoses and fittings.



Crane travel up to 100 m, assembling from the roll.



Robots, inclusive media hoses and add-on pieces.

+++++ We are professionals for Energy Chain<sup>®</sup> harnessing +++++

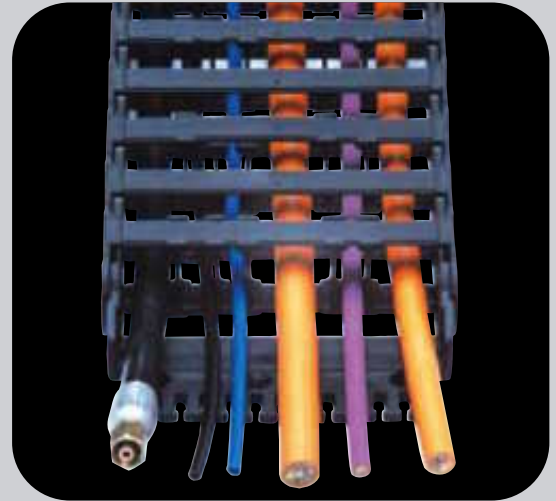
# ReadyChain<sup>®</sup> delivery times

## ReadyChain<sup>®</sup> Basic

Consists of igus<sup>®</sup> Energy Chains<sup>®</sup> with inserted igus<sup>®</sup> Chainflex<sup>®</sup> cables and all necessary components such as separators and connecting elements.

**Time of delivery:**  
1 – 3 days

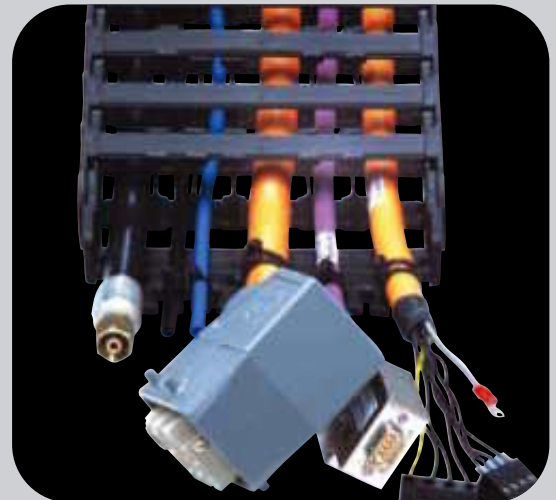
(after telephonic clarification)



## ReadyChain<sup>®</sup> Standard

Consists of "basic", additionally with all patch plugs and connecting elements for igus<sup>®</sup> Energy Chains<sup>®</sup> and igus<sup>®</sup> Chainflex<sup>®</sup> cables.

**Time of delivery:**  
3 - 5 days



## ReadyChain<sup>®</sup> Premium

Consists of "standard", additionally with all patch plugs and connecting elements for igus<sup>®</sup> cables, especially designed for the interface of the machine.

**Time of delivery:**  
3 - 10 days



# ReadyChain<sup>®</sup> Factory

Longstanding experience with harnessing of Energy Chains<sup>®</sup>



igus<sup>®</sup> Factory in Cologne:  
Harnessing of Energy Chains<sup>®</sup> since 1994



All-automatic crimp machines guarantee  
safe connections, rationally connected



Computer-aided high-voltage testing  
positions ensure tested quality



Non-spinning cable handling  
for more safety



The all-automatic break down facility  
allows cheap prices for highest quality

+++++ We are professionals for Energy Chain<sup>®</sup> harnessing +++++

# ReadyChain<sup>®</sup> Factory

For our customers: follow-up of order by web cam



More than 50 ReadyChain<sup>®</sup> specialists use up-to-date machines for quick planning, harnessing and final inspection of your ReadyChain<sup>®</sup> Energy Chain System<sup>®</sup>. Go and see for yourself: [www.readychain.eu](http://www.readychain.eu)



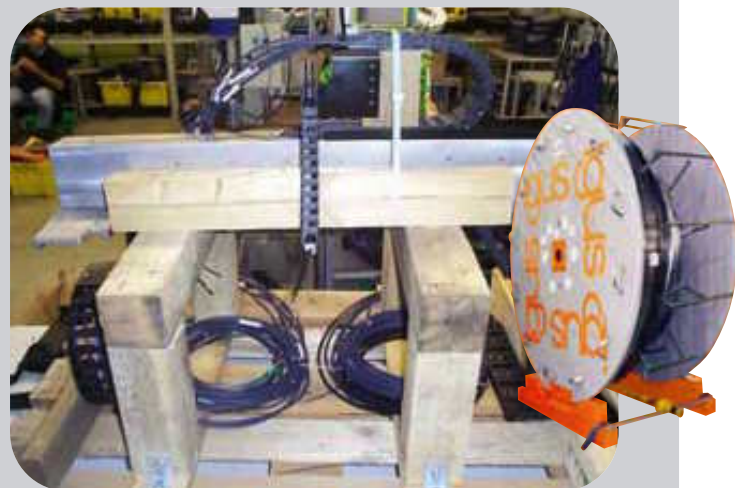
70.000 Energy Chain<sup>®</sup> components on stock



More than 850 Chainflex<sup>®</sup> Special cables for Energy Chains<sup>®</sup> are available for you ex stock: [www.chainflex.eu](http://www.chainflex.eu)



More than 2.500 electrical components for patch plugs – available right away from the all-automatic high-bay warehouse



Many thousand on time deliveries in customer specific transport facilities

+++++ We are professionals for Energy Chain<sup>®</sup> harnessing +++++

# Applications

Examples for successful applications with ReadyChain®



igus® ReadyChain® used for GEORG disposal vehicle - tested quality among hard conditions



igus® ReadyChain® used for travel axles for 6-axes robots - standard filling with additional options



igus® ReadyChain® for plastic processing machines - perfect filling for high service life



igus® ReadyChain® with industry patch plugs - faster starting-up, simple assembling



igus® ReadyChain® used for a zigzag application of an illumination cross arm, Royal Opera, London



igus® ReadyChain® used for terotechnology - serial applications with different travels

+++++ We are professionals for Energy Chain® harnessing +++++

# Assembly

At home or abroad – igus® assembles the ReadyChains® for you "ready for occupancy"

The larger the building site, the more inscrutable is the team play of general businessman, subcontractors, erectors of industrial plants and individual craftsman which are participating to provide the overall performance. Today the installation of an Energy Chain System® for the use of high-grade plants often need more than 100 m travel and/or masses of several tons.

The following factors rapidly increase costs of the plant to non-calculated amounts:

- Replacement of parts
- Additional costs for assembly
- Costly waiting period
- Deadline pressure for follow-up work
- Loss of production in case of exceeding deadlines

To contribute to the increasing complexity of the installation we lately offer assembly and pre-harnessing.

As a system supplier we can yield all necessary performances until starting up from the first to the last maneuverable point. Only the electrical connection and the involved entire starting up need to be done by a technical engineer.

Ask for "ready for occupancy" Energy Chain Systems® at igus®.



igus® ReadyChains® ready to assemble "from the roll"



Treasure Island Energy Chain Systems® under water with on-site assembly

+++++ We are professionals for Energy Chain® harnessing +++++

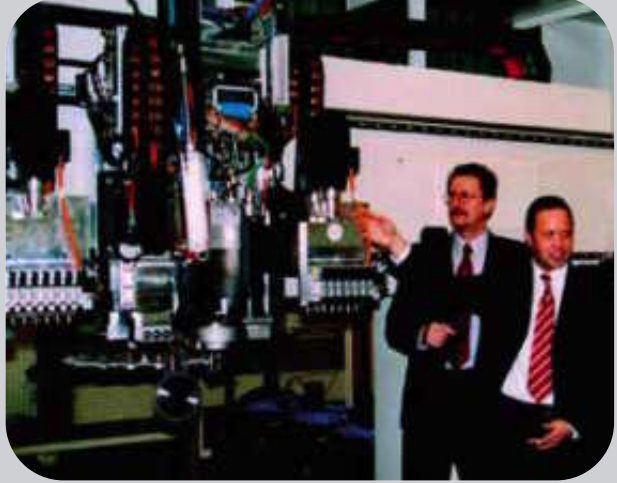
# Planning

Reduce your planning expenses

Reduce your planning expenses. We relieve you from as much work as possible. Our trained staff will step by step support a smooth realization of your ReadyChain® project.

We can answer many of your questions already on the Telephone and demonstrate all advantages of ReadyChain® for your business Tel. +49-2203-96 49-0

We collect on-site all necessary data for the purpose of precise planning expenses. At the same time we go into your specific application.



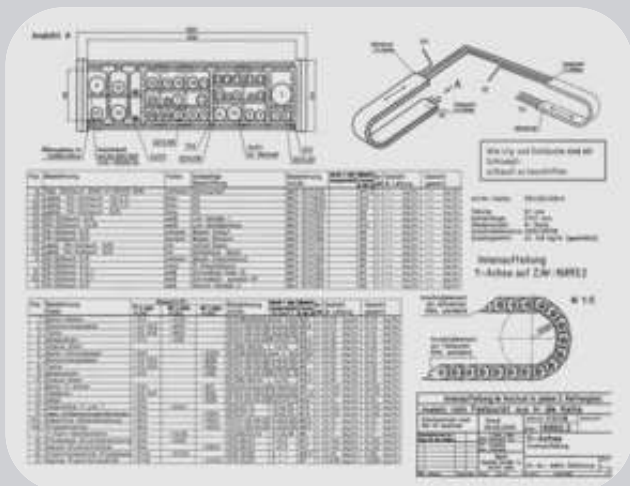
igus® staff at the "on-site inspection" of a plant



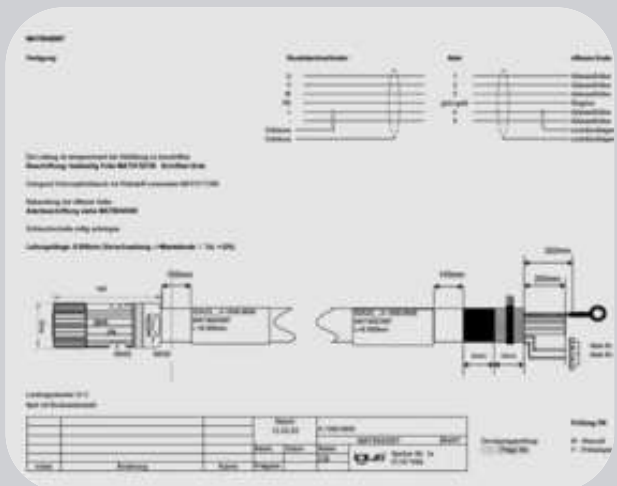
Planning with well thought-out forms and special software



We can submit a complex offer within a week



Drawing up detailed design worksheets



Precise job and grouping of cables planning for each cable

+++++ We are professionals for Energy Chain® harnessing +++++





# Designing





## Technical Data and Schedules/user information/contact

### Designing with igus®

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Give us your opinion – Catalogue improvement

Definition of the icons used in the catalogue Cover (back)

Chainflex® cables classification Cover (ahead)

## General rules for cables and hoses in Energy Chains®

### Data and energy supply in all forms – in an Energy Chain System®

That is the big advantage of an igus® Energy Chain System®: You can safely accommodate many different forms of data cables and energy carriers in a system. It remains up to you, however, to decide how strictly you want to apply your rules to separating and subdividing various media. You can, for example, comply with the minimum separating distances between bus cables and power cables and mix any pneumatic, electrical and hydraulic systems.

In addition to the quality of the cables being used, the arrangement of a cable within a chain as well as the space conditions. Many different separation variants make it possible to adapt the Energy Chains® to suit the specific requirements of each application. Generalized rules such as "No more than 80% of the clear space of Energy Chains® is allowed to be used" no longer make sense given the complexity of present-day applications. In this chapter, we will attempt to give you detailed recommendations. Due to the large number of application variants, we recommend that you use our free planning service in any case. Specify your requested cables – or also only the demanded electrical or other output data – and you will then receive the recommendation we have worked out for you.

**Fax form on page 486 + Internet questionnaire at [www.igus.eu](http://www.igus.eu) or simply give us a telephone call. Within a few hours, you will be holding a detailed system suggestion in your hands.**

### Maximum cable diameter

The maximum cable diameter corresponds to the clear height of the selected Energy Chains®/ energy tubes minus the reserve space. This minimum reserve space, for example, amounts to 10% for electrical round cables, and 20% for hydraulic hoses. Energy Chains® are ideally filled when a lateral minimum separating distance to the next cable or wall is provided. Depending on the structure of the cables and the dynamics and the service life, extra reserve space must be provided in addition. In cases of exception, the filling can also be designed to meet more confined space requirements.

Please discuss this subject with us.

#### Rules for:

- Maximum cable diameter
- Separation
- Bending radius



**Complete the fax form on page 486 of the catalog – and receive your finished project suggestion in a few hours!**



**Hydraulic and electrical systems (in closed section) are separated from one other in this example.**



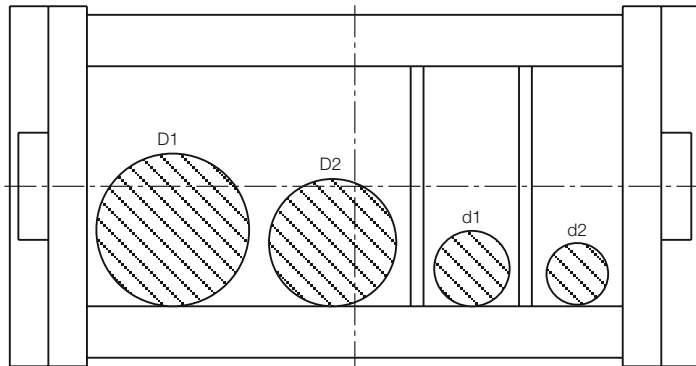
**Perfectly installed cables with igus® interior separation**

**Electrical cables require at least 10% of reserve space "all-round", hydraulic hoses 20%**

**The maximum cable diameter is specified for each series in the relevant chapter**

## Separation in Energy Chains®

- Cables with extremely varying diameters should be installed so that they are separated from one another. The separation is provided by means of separators.
- Cables must never have the possibility of being able to push themselves over one another. This is why the clear height of a compartment with several equally thick cables lying next to one another must **never amount to more than the cable diameter plus 50%**.



$$D1 + D2 > 1.2 \times hi$$

$$d1 + d2 \leq 1.2 \times hi$$

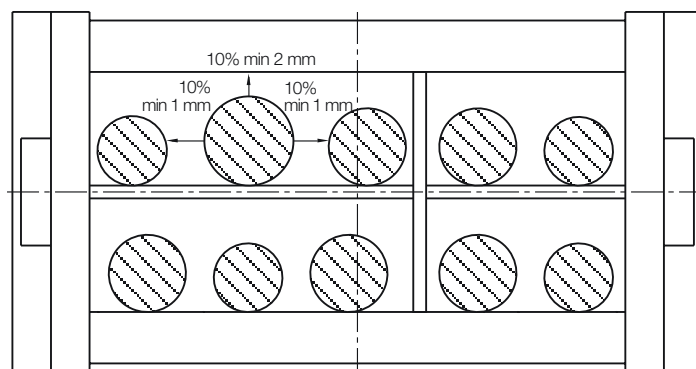
Expressed in rules, this means:

### Rule 1:

If  $D1 + D2 > 1.2 \times \text{chain inner height}$ , no separation must be made between the two cables. Two cables should never be allowed to lie on top of one another in unguided form or become tangled.

### Rule 2:

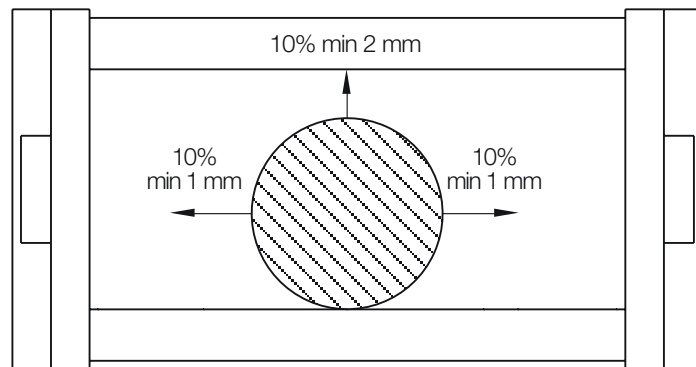
If  $d1 + d2 \leq 1.2 \times \text{chain inner height}$ , a separator or a modular compartment bottom must be installed in order to reduce the inner height. This is done in order to prevent d1 and d2 from becoming "mixed up".



$$d1 + d2 \leq 1.2 \times hi$$

The reason for these rules is:

The cables must be installed and fastened so that they can move freely in longitudinal direction at any time and do not exert any tensile force in the radius on the Energy Chains®.



### Reserve space "all-round" for electrical round cables

#### Reserve space capacities in % for various cables

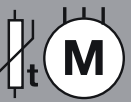
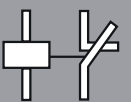
Cables	Reserve space "all-round"
Electrical round cables	10 %
Electrical flat cables	10 %
Pneumatics	5-10%
Hydraulics	20 %
Media hoses	15-20 %

In case of applications with high travel velocities and many load cycles, no cables are allowed to be placed on top of one another **without a horizontal separation**.

The guidance values for these applications are:

Travel velocity exceeding **0.5 m/s** and load cycles exceeding **10.000 p.a.**

The igus® interior separation offers a reliable solution for these applications.



## Further information on the separation of cables

- The cable weight should be distributed symmetrically across the width of the chain.
- In the case of cables with different external jackets, it is important to make sure that they do not become "stuck together". If appropriate, they may have to be installed separately. igus® Chainflex® cables of all the series can be combined with one another.
- The cables should always be fastened with a strain relief device at the fixed end and at the moving end. Exceptions are only to be found in the case of some hydraulic hoses with length compensation or in the case of other high-pressure hoses. (see "Hydraulic hoses")
- Generally speaking, the following applies: The faster and more frequently the Energy Chains® travel, the more important the precise assignment of the cables in the chain will be. Due to the large number of variants, we will gladly advise you with your specific application.



The igus® kit of Energy Chain Systems® solves all the requirements for interior separation known today



igus® Chainflex® cables also allow for minimum bending radii of 5 x d together with millions of strokes.

## Bending radius R

- The bending radius of your Energy Chains® is a factor of the "thickest" or "stiffest" cable or hose in your filling.
- The bending radius of the Energy Chains® should be adapted to suit the recommendations of the cable manufacturer. The selection of bending radius greater than the minimum bending radius has a positive effect on the service life to be expected.
- The specification of minimum bending radii in the case of cables applies to service use at normal temperatures. The use of other bending radii may therefore be advisable. Please ask your cable supplier.



The igus® product range offers up to 12 different bending radii for each chain series from stock. Here series 50 in the Storebaelt bridge project.

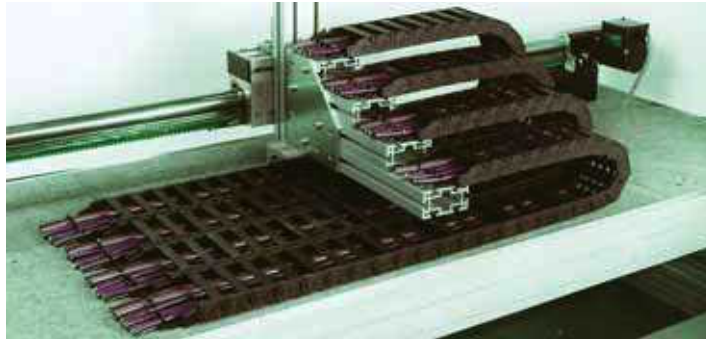
We will be glad to give you our recommendations for a complete Energy Chain System®. The bending radii of all cables and hoses, interior separation and service life are then perfectly adapted to suit one another in the best possible way. Also ask us about the igus® system guarantee. ► **Harnessing, from page 437 onwards**

## Electrical round cables

In the case of electrical cables, the round cable is a reliable, modular and low-cost solution for Energy Chain Systems®. For your purchase, we recommend that you consider the following criteria:

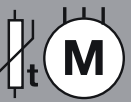
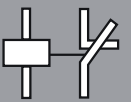
### Selection criteria:

- Small minimum bending radii and mounting heights
- Service life with minimum bending radius
- Service life for your application case, e.g. short or long distance of travel or suspended installation use
- Test values for the service life based on practice-oriented experiments
- Uncomplicated handling during assembly, e.g. no detaching, laying out, etc.
- Strain relief device on the connection element should be possible
- Bending-resistant shields in the case of shielded cables
- Abrasion-resistant, readily gliding external jackets
- Large selection in order to avoid expensive production of single products



Example igus® experimental laboratory: constant development and testing of Chainflex® electrical round cables

In the case of bus cables and fibre-optic cables, it is especially important to consider how well the transmission rates and the shielding effects are maintained after several million strokes in the minimum bending radius.



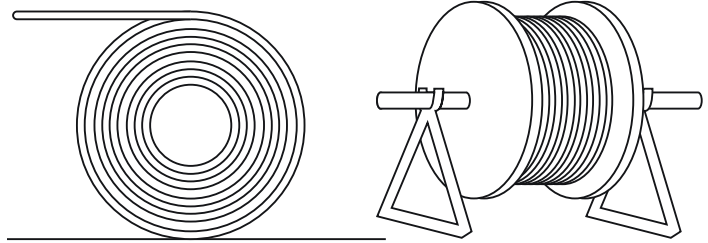
**Information on assembly and strain relief of electrical round cables**

1. The cables must be installed twist-free. Drums or rings are not allowed to be pulled off across the top. igus® Chainflex® cables are ready to be laid immediately. They do not need to be detached or laid out prior to the assembly procedure.
2. The cables must be laid so that each individual cable can move freely in longitudinal direction.
3. The cables must be able to move freely in the radius. This must be checked when the upper section reaches the biggest clear length.
4. The separation of the interior space by means of separators or by means of the igus® interior separation system is required whenever several or many cables with different diameters are being installed. It is important to make sure that the cables cannot wrap themselves around one another in spiral form.
5. In the case of cables with different external jackets, it is important to make sure that they do not become "stuck together". If appropriate, they may need to be separated. igus® Chainflex® cables of all the series can be combined with one another.
6. Electrical round cables must be fastened in strain-relieved form on both sides. In cases of exception, the cables must at least be fastened in strain-relieved form at the moving end of the Energy Chains®. A separating distance of 10-30 x cable diameter is recommended for most cables. Chainflex® cables, however, can be strain-relieved directly at the connection element, as confirmed by many series of tests.

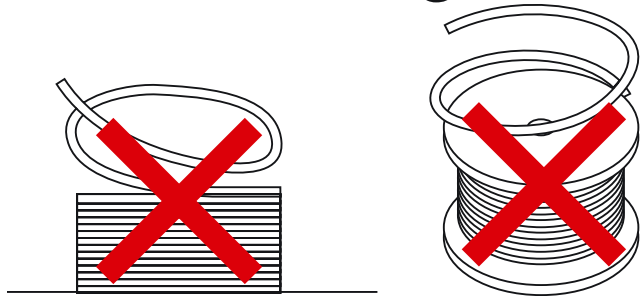
We will be glad to make you an offer on our ready-made Energy Chain Systems®: "igus® 3-K triple offer: chain, cable, harnessing".

► Harnessing, **from page 437 onwards**

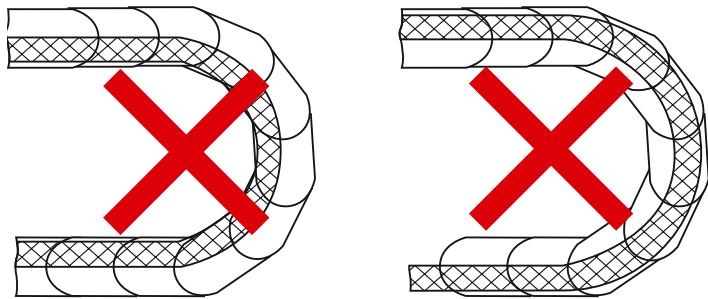
**Correct!**



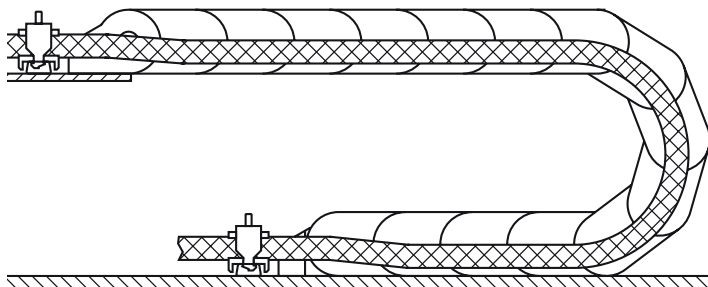
**Wrong!**



**Wrong!**



Cables must be able to move freely in the radius



Chainflex® cables can be strain-relieved directly at the connection element.



**Corkscrewing:** An imperfectly matched system can result in these failures.

igus® Energy  
Chain Systems®

Tel. +49-2203-96 49-0  
Fax +49-2203-96 49-222

igus® GmbH  
51147 Köln, Germany

www.igus.eu  
info@igus.de

### Pneumatic hoses

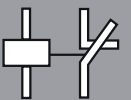
Basically, the same rules that apply to round cables also apply to pneumatic hoses. In practice, however, it can be seen that pneumatic hoses are less susceptible to malfunctions. Following proper consultation, they can also be laid to meet more confined space requirements than is provided for by the "10% reserve space all-round" rule. A strain relief device on both sides is usually the case here as well. In the case of pneumatic hoses made of rubber, we recommend strict compliance with the "10% reserve space" rule because these hoses tend to become "stuck together" among one another or with other cables.



**Completely ready-made Energy Chain System® with several pneumatic hoses next to and on top of one another.**

The igus® product range also offers thermoplastic pneumatic hoses "Chainflex® CFAIR".

► Page 206





**DIN 47100 colour code (however, deviating from DIN: without colour repetition after 44th core)\***

Chainflex®

1 white	17 white-gray	33 green-red	49 white-green-black
2 brown	18 gray-brown	34 yellow-red	50 brown-green-black
3 green	19 white-pink	35 green-black	51 white-yellow-black
4 yellow	20 pink-brown	36 yellow-black	52 yellow-brown-black
5 gray	21 white-blue	37 gray-blue	53 white-gray-black
6 pink	22 brown-blue	38 pink-blue	54 gray-brown-black
7 blue	23 white-red	39 gray-red	55 white-pink-black
8 red	24 brown-red	40 pink-red	56 pink-brown-black
9 black	25 white-black	41 gray-black	57 white-blue-black
10 violet	26 brown-black	42 pink-black	58 brown-blue-black
11 gray-pink	27 gray-green	43 blue-black	59 white-red-black
12 red-blue	28 yellow-gray	44 red-black	60 brown-red-black
13 white-green	29 pink-green	45 white-brown-black	61 black-white
14 brown-green	30 yellow-pink	46 yellow-green-black	
15 white-yellow	31 green-blue	47 gray-pink-black	
16 yellow-brown	32 yellow-blue	48 red-blue-black	

\* Exception: 4-core cables are braided in the colour sequence white, green, brown, yellow.

The first colour indicates the basic colour of the core insulation, and the second colour indicates the colour of the printed-on ring. In the case of three colours, the second and colours are printed on the basic colour.

**Calculation of the copper surcharge**

The copper surcharge is the calculation of the difference between the calculated price (copper basis) and the fluctuating, actual price of the copper share in a cable. In calculatory terms, the list price of each Chainflex® cable is based on a copper price to the amount of € 150,-/100 kg of copper. In the end, however, this copper share is calculated on the basis of the current daily price according to the DEL (German abbr. = German electrolyte copper for conducting purposes) quotation.

The copper index specifies the weight of the copper share in a cable in kg/km. The product from the copper index (kg/km) and the price difference per kg of copper according to the DEL quotation then provides the copper surcharge in € per km of cable.

**Here, the following example:**

Cable:	Chainflex® CF9.15.18
Copper index:	260 kg/km
DEL quotation:	€ 189,-/100 kg Cu
Copper basis:	€ 150,-/100 kg Cu

$$\text{Copper index [kg/km]} \times \frac{\text{DEL quotation [€/100 kg]} - \text{Copper basis [€/100 kg]}}{100} = \text{Copper surcharge [€/km]}$$

$$260 \times \frac{189 - 150}{100} = \text{Copper surcharge [€/km]}$$

Copper surcharge = 101.40 €/km

For this example, the copper surcharge amounts to € 101.40/km of cable. Any discounts that are granted only apply to the cable prices but not to the copper surcharge. The copper surcharge is shown separately on our invoices.

**New: You now have the possibility of calculating the individual extra charge for copper for your cable on-line**

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

**Copper wire dimensions according to Anglo-American AWG numbers**

AWG No.	Diameter mm	Cross section mm <sup>2</sup>	AWG No.	Diameter mm	Cross section mm <sup>2</sup>
500	17.96	253.00	18	1.024	0.823
350	15.03	177.00	20	0.813	0.519
250	12.70	127.00	22	0.643	0.324
4/0	11.88	107.20	24	0.511	0.205
3/0	10.40	85.00	26	0.405	0.128
2/0	9.27	67.50	28	0.320	0.0804
1/0	8.25	53.50	30	0.255	0.0507
1	7.35	42.40	32	0.203	0.0324
2	6.54	33.60	34	0.160	0.0200
4	5.19	21.20	36	0.127	0.0127
6	4.12	13.30	38	0.102	0.00811
8	3.26	8.37	40	0.079	0.00487
10	2.59	5.26	42	0.064	0.00317
12	2.05	3.31	44	0.051	0.00203
14	1.63	2.08			
16	1.29	1.31			

Tel. +49-2203-96 49-0  
Fax +49-2203-96 49-222

igus® GmbH  
51147 Köln, Germany

www.igus.eu  
info@igus.de

The values from the tables on the side of this page have been taken from the standard DIN VDE 0298, Part 4. These values have been simplified and only apply approximately. For each user, it is advisable to obtain and comply with the regulations that apply to each individual case of application (e.g. measures for protection in case of indirect contact in accordance with DIN VDE 0100 Part 410, overcurrent protective devices in accordance with DIN VDE 0100 Part 430 or voltage drop in accordance with DIN VDE 0100 Part 520). It is not possible to provide all the regulations or overviews in this catalog. Due to the harmonization that has been carried out, it is possible that different load-carrying values may be permissible for the same cable in some cases. For the selection of the relevant cross sections, the load capacity in undisturbed operation is the determining factor, i.e. the use with permissible operating temperature or permissible maximum temperature on the conductor.

The load-bearing capacity according to Table 1 on this page applies to operating-current-carrying conductors. Normally, these are 2 loaded conductors in the case of 2-core and 3-core cables, as well as 3 loaded conductors in the case of 4-core and 5-core cables. Please take this into account when planning for the use of multi-core cables in electrical installation conduits or Energy Chains®. This information is based on an ambient temperature of 30°C and a non-loaded cable. Please apply the conversion factors according to Table 2 in case the air temperature is increased due to the heat loss of the cables (please take thermal radiation into account as well, e.g. effects of exposure to the sun).

The possible cable installation types in Energy Chains® result in such a broad range of loading profiles that no generalized conversion factors can be mentioned for this large accumulation of cables. The installation type and the conversion factors must be looked up in Table 3 according to each individual application.

**Table 3:** Conversion factors for multi-core cables with cable cross sections up to 10 mm<sup>2</sup>

Loaded cores	Conversion factor
5	0.75
7	0.65
10	0.55
14	0.50
19	0.45
24	0.40
40	0.35
61	0.30

**Table 1:** Cables for fixed installation in energy-conducting chains and tubes

Insulation material	PVC	TPE
Chainflex® type	CF130.UL, CF5, CF140.UL, CF6, CF7, CF8, CF2, CF7.D, CF240, CF211 (Data)	CF130.UL, CF140.UL, CF170.D, CF180, CF9, CF10, CF9.UL, CF10.UL, CF98, CF99, CF11, CF12, CF21.UL, CF260, CF27.D, CF30, CF31, CF34, CF35, CF300, CF300, CFPE, CFPE, CF310, CF310, CF Braid, CF ROBOT, CF77.UL.D, CF78.UL
Number of cores	2 or 3	2 or 3
Installation		

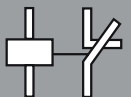
Nominal cross section Nominal cross of copper cable in mm <sup>2</sup>	Load-carrying capacity in amperes	
	PVC insulation	TPE insulation
0.14	2.5	2.5
0.25	4	5
0.34	5	7
0.50	8	10
0.75	12	14
1	15	17
1.50	18	21
2.50	26	30
4	34	41
6	44	53
10	61	74
16	82	99
25	108	131
35	135	162
50	168	202
70	207	250
95	250	301
120	292	352
150		404
185		461

**Table 2:** Conversion factors in case of varying ambient temperatures

Ambient temperature °C	Conversion factor	
	PVC insulation	TPE insulation
10	1.22	1.15
15	1.17	1.12
20	1.12	1.08
25	1.06	1.04
30	1.00	1.00
35	0.94	0.96
40	0.87	0.91
45	0.79	0.87
50	0.71	0.82
55	0.61	0.76
60	0.50	0.71
65	-	0.65
70	-	0.58
75	-	0.50
80	-	0.41
85	-	0.29
90	-	0.14

Chainflex®

Tel. +49-2203-96 49-0  
Fax +49-2203-96 49-222



The following tables provide measured values on the electrotechnical data of the cables available at the time of the survey. The values are understood as being approximate values. For precise information on the actually available cables, individual measurements are absolutely required.

The specification of the characteristic wave impedance at high frequencies in  $\Omega$  is an important quantity for a reflection-free matching of cables, e.g. in bus systems. With respect to the combination of various cables types and lengths, an adaptation must be provided via a matching resistor.

Cable type CF130.UL, Nominal cross section *	0.14	0.25	0.34	0.5	0.75	1	1.5	2.5	4	6	10	16
Conductor loop consisting of two adjacent cores, aprox.												
Loop resistance in $\Omega$ /km approx.	276	158	114	78	52	39	26.6	16	9.9	6.6	3.8	
Loop capacitance up to 7 cores in nF/km approx.			120	105	110	125	125	140		140		
Loop capacitance from 12 cores in nF/km approx.				65	65	90						
Loop inductance in $\mu$ H/km approx.			635	650	640	620	610	610		565		
Characteristic wave impedance at 1 kHz in $\Omega$			80	90	90	80	80	70		65		
Capacitance: 2 cores versus all others up to 7 cores in nF/km approx.				150	190	190	205	210		230		
Capacitance: 2 cores versus all others up to 12 cores in nF/km approx.				150			205					
Cable type CF140.UL, Nominal cross section *	0.14	0.25	0.34	0.5	0.75	1	1.5	2.5	4	6	10	16
Conductor loop consisting of two adjacent cores, aprox.												
Loop resistance in $\Omega$ /km approx.	276	158	114	78	52	39	26.6	16	9.9	6.6	3.8	
Loop capacitance up to 7 cores in nF/km approx.			125	125	140	140	165	190				
Loop capacitance from 12 cores in nF/km approx.					75	90	90					
Loop inductance in $\mu$ H/km approx.			650	650	630	630	620	620				
Characteristic wave impedance at 1 kHz in $\Omega$			80	80	80	75	70	60				
Capacitance: 2 cores versus all others up to 7 cores in nF/km approx.			310	310	360	370	430	510				
Capacitance: 2 cores versus all others up to 12 cores in nF/km approx.												
Cable type CF5, Nominal cross section *	0.14	0.25	0.34	0.5	0.75	1	1.5	2.5	4	6	10	16
Conductor loop consisting of two adjacent cores, aprox.												
Loop resistance in $\Omega$ /km approx.	276	158	114	78	52	39	26.6	16	9.9	6.6	3.8	
Loop capacitance up to 7 cores in nF/km approx.				95	115	135	185	125				
Loop capacitance from 12 cores in nF/km approx.			120	90	105	105	135	670				
Loop inductance in $\mu$ H/km approx.			760	720	670	670	640	150				
Characteristic wave impedance at 1 kHz in $\Omega$			85	85	80	80	65					
Capacitance: 2 cores versus all others up to 7 cores in nF/km approx.				165	190	210	460					
Capacitance: 2 cores versus all others up to 12 cores in nF/km approx.			325	207	225	230	330					
Cable type CF6, Nominal cross section *	0.14	0.25	0.34	0.5	0.75	1	1.5	2.5	4	6	10	16
Conductor loop consisting of two adjacent cores, aprox.												
Loop resistance in $\Omega$ /km approx.	276	158	114	78	52	39	26.6	16	9.9	6.6	3.8	
Loop capacitance up to 7 cores in nF/km approx.		130	125	135	150	165	185					
Loop capacitance from 12 cores in nF/km approx.				110	120	120	135					
Loop inductance in $\mu$ H/km approx.		725	700	690	680	640	640					
Characteristic wave impedance at 1 kHz in $\Omega$		80	80	80	75	70	65					
Capacitance: 2 cores versus all others up to 7 cores in nF/km approx.		340	340	340	400	420	460					
Capacitance: 2 cores versus all others up to 12 cores in nF/km approx.				275	275	290	330					

\* The following values are approximate values, calculated from measurements of cables with different numbers of cores. The loop resistance can be maximally 5% over the specified value for cables that are very lavishly stranded in bundles (from 12 cores).

Cable type CF2, Nominal cross section *	0.14	0.25	0.34	0.5	0.75	1	1.5	2.5	4	6	10	16
Conductor loop consisting of two adjacent cores, aprox.												
Loop resistance in $\Omega$ /km approx.	276	158	114	78	52	39	26.6	16	9.9	6.6	3.8	
Loop capacitance up to 7 cores in nF/km approx.	110	130			110	110	135					
Loop capacitance from 12 cores in nF/km approx.	100	120			130	105	135					
Loop inductance in $\mu$ H/km approx.	690	630			740	730	670					
Characteristic wave impedance at 1 kHz in $\Omega$	90	80			85	85	75					
Capacitance: 2 cores versus all others up to 7 cores in nF/km approx.	280	305			320	320	370					
Capacitance: 2 cores versus all others up to 12 cores in nF/km approx.	230	270			300	260	330					
Cable type CF9, Nominal cross section *	0.14	0.25	0.34	0.5	0.75	1	1.5	2.5	4	6	10	16
Conductor loop consisting of two adjacent cores, aprox.												
Loop resistance in $\Omega$ /km approx.	276	158	114	78	52	39	26.6	16	9.9	6.6	3.8	2.6
Loop capacitance up to 7 cores in nF/km approx.		70	75	85	85	95	100	125	120	100		130
Loop capacitance from 12 cores in nF/km approx.		80		90	100	105	120	130				
Loop inductance in $\mu$ H/km approx.		670	650	650	620	590	560	560	600	520		530
Characteristic wave impedance at 1 kHz in $\Omega$		100	100	90	85	80	75	70	70	70		65
Capacitance: 2 cores versus all others up to 7 cores in nF/km approx.		115	135	135	145	145	170	190	150	185		200
Capacitance: 2 cores versus all others up to 12 cores in nF/km approx.		200		185	255	235	215	225				
Cable type CF10, Nominal cross section *	0.14	0.25	0.34	0.5	0.75	1	1.5	2.5	4	6	10	16
Conductor loop consisting of two adjacent cores, aprox.												
Loop resistance in $\Omega$ /km approx.	276	158	114	78	52	39	26.6	16	9.9	6.6	3.8	
Loop capacitance up to 7 cores in nF/km approx.		90		105	110	120	125	150				
Loop capacitance from 12 cores in nF/km approx.		80	95	95	105	115	120	130				
Loop inductance in $\mu$ H/km approx.		680	670	620	590	580	575	555				
Characteristic wave impedance at 1 kHz in $\Omega$		100	90	85	80	75	75	65				
Capacitance: 2 cores versus all others up to 7 cores in nF/km approx.		215		245	260	290	290	345				
Capacitance: 2 cores versus all others up to 12 cores in nF/km approx.	180	200		205	225	255	265	275				
Cable type CF9.UL, Nominal cross section *	0.14	0.25	0.34	0.5	0.75	1	1.5	2.5	4	6	10	16
Conductor loop consisting of two adjacent cores, aprox.												
Loop resistance in $\Omega$ /km approx.	276	158	114	78	52	39	26.6	16	9.9	6.6	3.8	2.6
Loop capacitance up to 7 cores in nF/km approx.		70	75	85	85	95	100	125	120	100		130
Loop capacitance from 12 cores in nF/km approx.		80		90	100	105	120	130				
Loop inductance in $\mu$ H/km approx.		670	650	650	620	590	560	560	600	520		530
Characteristic wave impedance at 1 kHz in $\Omega$		100	100	90	85	80	75	70	70	70		65
Capacitance: 2 cores versus all others up to 7 cores in nF/km approx.		115	135	135	145	145	170	190	150	185		200
Capacitance: 2 cores versus all others up to 12 cores in nF/km approx.		200		185	255	235	215	225				

\* The following values are approximate values, calculated from measurements of cables with different numbers of cores. The loop resistance can be maximally 5% over the specified value for cables that are very lavishly stranded in bundles (from 12 cores).

<b>Cable type CF10.UL, Nominal cross section *</b>	0.14	0.25	0.34	0.5	0.75	1	1.5	2.5	4	6	10	16
Conductor loop consisting of two adjacent cores, aprox.												
Loop resistance in $\Omega$ /km approx.	276	158	114	78	52	39	26.6	16	9.9	6.6	3.8	
Loop capacitance up to 7 cores in nF/km approx.		90		105	110	120	125	150				
Loop capacitance from 12 cores in nF/km approx.	80	95		95	105	115	120	130				
Loop inductance in $\mu$ H/km approx.	680	670		620	590	580	575	555				
Characteristic wave impedance at 1 kHz in $\Omega$	100	90		85	80	75	75	65				
Capacitance: 2 cores versus all others up to 7 cores in nF/km approx.		215		245	260	290	290	345				
Capacitance: 2 cores versus all others up to 12 cores in nF/km approx.	180	200		205	225	255	265	275				
<b>Cable type CF98, Nominal cross section</b>	0.14	0.25	0.34	0.5	0.75	1	1.5	2.5	4	6	10	16
Conductor loop consisting of two adjacent cores, aprox.												
Loop resistance in $\Omega$ /km approx.	276	158										
Loop capacitance in nF/km approx.	62	75										
Loop inductance in $\mu$ H/km approx.	600	565										
Characteristic wave impedance at 1 kHz in $\Omega$	115	115										
Capacitance of one core versus all other cores in nF/km approx.	100	120										
<b>Cable type CF240, Nominal cross section</b>	0.14	0.25	0.34	0.5	0.75	1	1.5	2.5	4	6	10	16
Conductor loop consisting of two adjacent cores, aprox.												
Loop resistance in $\Omega$ /km approx.	276	158	114									
Operating capacity at 1 kHz in nF/km approx.	100	110	120									
Characteristic wave impedance at 1 kHz in $\Omega$	95	85	80									
Capacitance: 2 cores versus all others cores and shield in nF/km approx.	240	300	305									
<b>Cable type CF211, Nominal cross section</b>	0.14	0.25	0.34	0.5	0.75	1	1.5	2.5	4	6	10	16
Conductor loop consisting of two adjacent cores, aprox.												
Loop resistance in $\Omega$ /km approx.		158	114	78								
Operating capacity at 10 MHz in nF/km approx.		157	145	125								
Characteristic wave impedance at 1 kHz in $\Omega$		75	70	80								
Characteristic wave impedance at 10 MHz in $\Omega$ approx.		60	50	60								
<b>Cable type CF111, Nominal cross section</b>	0.14	0.25	0.34	0.5	0.75	1	1.5	2.5	4	6	10	16
Conductor loop consisting of two adjacent cores, aprox.												
Loop resistance in $\Omega$ /km approx.		158	114	78								
Operating capacity at 10 MHz in nF/km approx.		157	145	125								
Characteristic wave impedance at 1 kHz in $\Omega$		75	70	80								
Characteristic wave impedance at 10 MHz in $\Omega$ approx.		60	50	60								
<b>Cable type CF11, Nominal cross section</b>	0.14	0.25	0.34	0.5	0.75	1	1.5	2.5	4	6	10	16
Conductor loop consisting of two adjacent cores, aprox.												
Loop resistance in $\Omega$ /km approx.	276	158	114	78	52	39	26.6	16	9.9	6.6	3.8	
Operating capacity at 10 MHz in nF/km approx.	100	110	115	140	145	150	150	180				
Characteristic wave impedance at 1 kHz in $\Omega$	100	85	85	75	70	65	60	60				
Characteristic wave impedance at 10 MHz in $\Omega$ approx.	70	65	60	50	50	45	45	40				

<b>Cable type CF12, Nominal cross section</b>	0.14	0.25	0.34	0.5	0.75	1	1.5	2.5	4	6	10	16
Conductor loop consisting of two adjacent cores, aprox.												
Loop resistance in $\Omega$ /km approx.	276	158	114	78	52	39	26.6	16	9.9	6.6	3.8	
Operating capacity at 10 MHz in nF/km approx.		150		165		200						
Characteristic wave impedance at 1 kHz in $\Omega$		70		70		50						
Characteristic wave impedance at 10 MHz in $\Omega$ approx.		45		45		35						
<b>Cable type CF113.D, Nominal cross section</b>	0.14	0.25	0.34	0.5	0.75	1	1.5	2.5	4	6	10	16
Conductor loop consisting of two adjacent cores, aprox.												
Loop resistance in $\Omega$ /km approx.	276	158	114	78	52	39	26.6	16	9.9	6.6	3.8	
Operating capacity at 1 kHz in nF/km approx.	55 - 80	65	55	50 - 110								
Characteristic wave impedance at 1 kHz in $\Omega$	110	105	125	75 - 155								
<b>Cable type CF111.D, Nominal cross section</b>	0.14	0.25	0.34	0.5	0.75	1	1.5	2.5	4	6	10	16
Conductor loop consisting of two adjacent cores, aprox.												
Loop resistance in $\Omega$ /km approx.	276		114	78	52	39	26.6	16	9.9	6.6	3.8	
Operating capacity at 1 kHz in nF/km approx. (pair shielded)	80			65								
Operating capacity at 1 kHz in nF/km approx. (pair unshielded)	55		55	80								
Characteristic wave impedance at 1 kHz in $\Omega$ (pair shielded)	105			130								
Characteristic wave impedance at 1 kHz in $\Omega$ (pair unshielded)	115		115	90								
<b>Cable type CF11.D, Nominal cross section</b>	0.14	0.25	0.34	0.5	0.75	1	1.5	2.5	4	6	10	16
Conductor loop consisting of two adjacent cores, aprox.												
Loop resistance in $\Omega$ /km approx.	276	158	114	78	52	39	26.6	16	9.9	6.6	3.8	
Operating capacity at 1 kHz in nF/km approx.	55 - 80	65	55	50 - 110								
Characteristic wave impedance at 1 kHz in $\Omega$	110	105	125	75 - 155								
<b>Cable type CF260, Energy conductor</b>	0.75	1	1.5	2.5	4	6	10	16	25	35	50	
Single impedance in $\Omega$ /km approx.			13.3	7.98	4.95	3.3	1.91	1.21	0.78	0.554	0.386	
Operating capacity in nF/km approx.			160	185		220		350				
Operating inductance in $\mu$ H/km approx.			345	330		320		300				
Characteristic wave impedance at 1 kHz in $\Omega$			90	90		85		55				
Capacitance of one core versus all other cores in nF/km approx.			150	150		175		325				
<b>Cable type CF260, Signal pair</b>	0.75	1	1.5	2.5	4	6	10	16	25	35	50	
Conductor loop consisting of two adjacent cores, aprox.												
Loop resistance in $\Omega$ /km approx.		39										
Loop capacitance in nF/km approx.		110										
Loop inductance in $\mu$ H/km approx.		600										
Characteristic wave impedance at 1 kHz in $\Omega$		80										
Capacitance of one core versus all other cores in nF/km approx.		200										

<b>Cable type CF21.UL, Energy conductor</b>	0.75	1	1.5	2.5	4	6	10	16	25	35	50
Single impedance in $\Omega$ /km approx.	26	19.5	13.3	7.98	4.95	3.3	1.91	1.21	0.78	0.554	0.386
Operating capacity in nF/km approx.	150	165	190	200	225	245	320				
Operating inductance in $\mu$ H/km approx.	365	365	350	340	340	340	330				
Characteristic wave impedance at 1 kHz in $\Omega$	95	95	80	80	70	70	60				
Capacitance of one core versus all other cores in nF/km approx.	130	140	170	170	200	210	270				
<b>Cable type CF21.UL, Signal pair</b>	0.34	0.75	1.5								
Conductor loop consisting of two adjacent cores, aprox.											
Loop resistance in $\Omega$ /km approx.	114	52	26.6								
Loop capacitance in nF/km approx.	80	100	130								
Loop inductance in $\mu$ H/km approx.	580	600	600								
Characteristic wave impedance at 1 kHz in $\Omega$	90	80	75								
Capacitance of one core versus all other cores in nF/km approx.	140	175	240								
<b>Cable type CF27, Energy conductor</b>	0.75	1	1.5	2.5	4	6	10	16	25	35	50
Single impedance in $\Omega$ /km approx.	26	19.5	13.3	7.98	4.95	3.3	1.91	1.21	0.78	0.554	0.386
Operating capacity in nF/km approx.	170	180	220	220	250	260	285		350	595	
Operating inductance in $\mu$ H/km approx.	360	380	355	355	325	310	310		310	310	
Characteristic wave impedance at 1 kHz in $\Omega$	95	90	80	80	70	70	65		65	45	
Capacitance of one core versus all other cores in nF/km approx.	145	150	185	185	205	215	240		295	495	
<b>Cable type CF27, Signal pair</b>	0.5	0.75	1.5								
Conductor loop consisting of two adjacent cores, aprox.											
Loop resistance in $\Omega$ /km approx.	78	52	26.6								
Loop capacitance in nF/km approx.	92	100	130								
Loop inductance in $\mu$ H/km approx.	650	600	600								
Characteristic wave impedance at 1 kHz in $\Omega$	90	80	75								
Capacitance of one core versus all other cores in nF/km approx.	170	175	240								
<b>Cable type CF30, Nominal cross section</b>		1.5	2.5	4	6	10	16	25	35	50	70
Single impedance in $\Omega$ /km approx.		13.3	7.98	4.95	3.3	1.91	1.21	0.78	0.554	0.386	0.272
Operating capacity in nF/km approx.		145	155	170	170	195	215	220	270		
Operating inductance in $\mu$ H/km approx.		330	330	320	320	310	300	295	290		
Characteristic wave impedance at 1 kHz in $\Omega$		95	95	90	90	80	70	70	65		
Capacitance of one core versus all other cores in nF/km approx.		110	115	130	130	150	160	170	200		
<b>Cable type CF31, Nominal cross section</b>		1.5	2.5	4	6	10	16	25	35	50	70
Single impedance in $\Omega$ /km approx.		13.3	7.98	4.95	3.3	1.91	1.21	0.78	0.554	0.386	0.272
Operating capacity in nF/km approx.		190	200	215	235	270	295	300	305	370	500
Operating inductance in $\mu$ H/km approx.		330	330	320	320	310	260	260	260	260	260
Characteristic wave impedance at 1 kHz in $\Omega$		85	80	75	70	70	60	60	60	55	50
Capacitance of one core versus all other cores in nF/km approx.		170	180	190	210	240	280	250	285	330	440

<b>Cable type CF34.UL.D, Nominal cross section</b>	1.5	2.5	4	6	10	16	25	35	50	70										
Single impedance in $\Omega$ /km approx.	13.3	7.98	4.95	3.3	1.91	1.21	0.78	0.554	0.386	0.272										
Operating capacity in nF/km approx.	120		145	150		200	175													
Operating inductance in $\mu$ H/km approx.	340		320	320		310	310													
Characteristic wave impedance at 1 kHz in $\Omega$	100		95	95		90	90													
Capacitance of one core versus all other cores in nF/km approx.	90		110	110		140	130													
<b>Cable type CF35.UL, Nominal cross section</b>	1.5	2.5	4	6	10	16	25	35	50	70										
Single impedance in $\Omega$ /km approx.	13.3	7.98	4.95	3.3	1.91	1.21	0.78	0.554	0.386	0.272										
Operating capacity in nF/km approx.		160	180	190	215	260														
Operating inductance in $\mu$ H/km approx.		330	320	320	310	290														
Characteristic wave impedance at 1 kHz in $\Omega$		100	85	85	75	70														
Capacitance of one core versus all other cores in nF/km approx.		140	155	170	190	220														
<b>Cable type CF37.D, Nominal cross section</b>	1.5	2.5	4	6	10	16	25	35	50	70										
Single impedance in $\Omega$ /km approx.	13.3	7.98	4.95	3.3	1.91	1.21	0.78	0.554	0.386	0.272										
Operating capacity in nF/km approx.	120		145	150		200	175													
Operating inductance in $\mu$ H/km approx.	340		320	320		310	310													
Characteristic wave impedance at 1 kHz in $\Omega$	100		95	95		90	90													
Capacitance of one core versus all other cores in nF/km approx.	90		110	110		140	130													
<b>Cable type CF38, Nominal cross section</b>	1.5	2.5	4	6	10	16	25	35	50	70										
Single impedance in $\Omega$ /km approx.	13.3	7.98	4.95	3.3	1.91	1.21	0.78	0.554	0.386	0.272										
Operating capacity in nF/km approx.		160	180	190	215	260														
Operating inductance in $\mu$ H/km approx.		330	320	320	310	290														
Characteristic wave impedance at 1 kHz in $\Omega$		100	85	85	75	70														
Capacitance of one core versus all other cores in nF/km approx.		140	155	170	190	220														
<b>Cable type CF300.UL.D, Nominal cross section</b>	1.5	2.5	4	6	10	16	25	35	50	70	95	120	150	185	240					
Resistance in $\Omega$ /km approx.	13.3	7.98	4.95	3.3	1.910	1.210	0.780	0.554	0.386	0.272	0.206	0.161	0.129	0.106	0.0801					
<b>Cable type CF310.UL, Nominal cross section</b>	1.5	2.5	4	6	10	16	25	35	50	70	95	120	150	185	240					
Resistance in $\Omega$ /km approx.	13.3	7.98	4.95	3.3	1.910	1.210	0.780	0.554	0.386	0.272	0.206	0.161	0.129	0.106	0.0801					
<b>Cable type CF330.D, Nominal cross section</b>	1.5	2.5	4	6	10	16	25	35	50	70	95	120	150	185	240					
Resistance in $\Omega$ /km approx.	13.3	7.98	4.95	3.3	1.910	1.210	0.780	0.554	0.386	0.272	0.206	0.161	0.129	0.106	0.0801					
<b>Cable type CF340, Nominal cross section</b>	1.5	2.5	4	6	10	16	25	35	50	70	95	120	150	185	240					
Resistance in $\Omega$ /km approx.	13.3	7.98	4.95	3.3	1.910	1.210	0.780	0.554	0.386	0.272	0.206	0.161	0.129	0.106	0.0801					



Group	Chainflex® cable	Jacket material	1	2	3	4	Page
<b>Control cable</b>							
Control cable	CF130.UL	PVC	1				54
Control cable	CF140.UL	PVC	1				58
Control cable	CF5	PVC		2			62
Control cable	CF6	PVC		2			66
Control cable	CF77.UL.D	PUR			3		70
Control cable	CF78.UL	PUR			3		72
Control cable	CF2	PUR			3		74
Control cable	CF9	TPE				4	78
Control cable	CF10	TPE				4	82
Control cable	CF9.UL	TPE				4	86
Control cable	CF10.UL	TPE				4	90
Control cable	CF98	TPE				4	94
Control cable	CF99	TPE				4	96
<b>Data cable</b>							
Data cable	CF240	PVC		2			100
Data cable	CF211	PVC		2			102
Data cable	CF112	PUR			3		104
Data cable	CF113	PUR			3		106
Data cable	CF111	TPE				4	108
Data cable	CF11	TPE				4	112
Data cable	CF12	TPE				4	114
<b>Bus cable</b>							
Bus cable	CFBUS	TPE				4	118
Bus cable	CF11.LC	TPE				4	122
Bus cable	CF11.LC.D	TPE				4	124
Bus cable	CF14	TPE				4	126
<b>Measuring system cable</b>							
Measuring system cable	CF211	PVC		2			128
Measuring system cable	CF113.D	PUR			3		132
Measuring system cable	CF111.D	TPE				4	136
Measuring system cable	CF11.D	TPE				4	140
<b>Koax cable</b>							
Koax cable	CFKoax1	TPE				4	144
<b>Fibre optic cable</b>							
Fibre optic cable	CFLG.2H	PUR			3		150
Fibre optic cable	CFLK	PUR			3		152
Fibre optic cable	CFLG.2LB	TPE				4	154
Fibre optic cable	CFLG.G	TPE				4	156
<b>Servo cable</b>							
Servo cable	CF210.UL	PVC		2			160
Servo cable	CF21.UL	PVC		2			162
Servo cable	CF260	PUR			3		166
Servo cable	CF27.D	PUR			3		170
Servo cable	CF270.UL.D	PUR			3		174
<b>Power cable</b>							
Power cable	CF30	PVC		2			180
Power cable	CF31	PVC		2			182
Power cable	CF34.UL.D	TPE				4	184
Power cable	CF35.UL	TPE				4	186
Power cable	CF37.D	TPE				4	188
Power cable	CF38	TPE				4	190
Power cable	CF300.UL.D	TPE				4	192
Power cable	CFPE	TPE				4	194
Power cable	CF310.UL	TPE				4	196
Power cable	CF330.D	TPE				4	198
Power cable	CF340	TPE				4	200
Power cable	CF BRAID	TPE				4	202

Cable type	1	2	3	4
<b>Inorganic chemicals</b>				
<b>Aqueous solutions, neutral</b>				
Water	+	+	+	+
Common salt (10%)	+	+	+	+
Glauber's salt (10%)	+	+	+	+
<b>Aqueous solutions, alkaline</b>				
Soda (10%)	0	+	0	+
<b>Aqueous solutions, acid</b>				
Sodium bisulfate (10%)	0	+	0	+
<b>Aqueous solutions, oxidizing</b>				
Hydrogen peroxide (10%)	+	+	+	+
Potassium permanganate (2%)	+	+	+	+
<b>Inorganic acids</b>				
Hydrochloric acid, concentrated	-	-	-	-
Hydrochloric acid (10%)	0	0	0	+
Sulfuric acid, concentrated	-	-	-	-
Sulfuric acid (10%)	0	0	0	+
Nitric acid, concentrated	-	-	-	-
Nitric acid (10%)	0	0	-	0
<b>Inorganic caustic solutions</b>				
Soda lye, concentrated	-	-	-	0
Soda lye (10%)	0	0	0	+
Potassium lye, concentrated	-	-	-	0
Potassium lye (10%)	0	0	0	+
Ammonia, concentrated	0	0	0	+
Ammonia (10%)	+	+	+	+
<b>Organic chemicals / organic acids</b>				
Acetic acid, concentrated (glacial acetic acid)	-	-	-	0
Acetic acid (10% in H <sub>2</sub> O)	0	+	0	+
Tartaric acid (10% in H <sub>2</sub> O)	0	+	+	+
Citric acid (10% in H <sub>2</sub> O)	0	+	+	+
<b>Ketones</b>				
Acetones	-	-	-	0
Methyl ethyl ketone (MEK)	-	-	-	0
<b>Alcohols</b>				
Ethyl alcohol (spirit)	-	0	0	+
Isopropyl alcohol	-	0	0	+
Diethylene glycol	0	0	+	+
<b>Aromatic compounds</b>				
Toluol	-	-	0	-
Xylol	-	-	0	-
<b>Fuels</b>				
Gasoline	-	0	+	+
Diesel fuel	-	0	+	+
<b>Synthetic oils / lubricating oil</b>				
ASTM oil #2	0	+	+	+
<b>Hydraulic oil</b>				
Mineral oil base	-	0	+	+
Glycol base	0	0	+	+
Synthetic ester base	-	0	+	+
<b>Vegetable oils</b>				
Rapeseed oil	0	+	+	+
Olive oil	0	+	+	+
Soya bean oil	0	+	+	+
<b>Cold cleaning agent</b>				
Cold cleaning agent	-	0	+	0

+ no or minimum negative influence  
 0 medium reciprocal effect, short-term exposure permissible  
 - unstable, material partly destroyed

All information applies to room temperature

## The General Conditions

The General Conditions of Sale of igus® shall apply. Excessive and short deliveries of  $\pm 10\%$  for cables conform with contractual agreements. Deliveries can be made in part-lengths. Statutory VAT must be added to the prices. The General Conditions of Sale and Delivery of igus® GmbH, Cologne, can be found online under [www.igus.de](http://www.igus.de). The prices quoted in the catalogue or other media are subject to alteration. igus® can modify the prices at any time at their own discretion.

## User information

Since our products are constantly being developed further in the interest of our customers, we reserve the right to make technical alterations at any time. With the issue of this catalog, all previous publications lose their validity. Subject to printing errors.

## Disclaimer

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If cable drums are to be used, please visit KTG directly online.

► [www.kabeltrommel.de](http://www.kabeltrommel.de)

## Product illustrations

The products illustrated are photos showing examples for whole series, i.e. the original cable can deviate from the cable shown.

## Technical notes

The USB, FireWire and GigE-cables shown on these pages were developed for the ambitious industrial usage in E-Chains®. High proofness to oil and lubricants is as secured as protection against electromagnetic interferences. This high mechanical service life was reached with the usage of high quality materials which even care for the electrical safeness. In single cases communication errors can occur, if very different hardware and software is combined. We recommend tests with all components and the cables before starting serial production, to get the prove for a perfect running system. Of course we support you with the details of these electrical tests. Just give us a call!

The specifications in the catalogue referring to temperature range, bending radius and travel must be seen as limiting value specifications. If two limiting value specifications are combined, this can lead to a reduction of the cable's service life. The term "oil-resistant" refers to a few selected oil types which have been tested accordingly. This does not mean, however, that the products are automatically resistant to all the oils on the market. Length printing: Respective printing of the metre length is already on many cables. These are not calibrated measurements, they are only intended as an orientation aid.

Just give us a call!



**igus® Chainflex® cables for DESINA**

DESINA: **DE**central and **St**andardised **INSt**allation technique is a recommendation of the Verein Deutscher Werkzeugmaschinenfabriken (VDW = Association of German machine tool industry) for the purpose of standardising components, interfaces and connecting systems.

DESINA describes an extensive whole concept for standardisation and decentralisation of the fluid technical and electrical installation of machines and plants.

For further information: [www.desina.de](http://www.desina.de)



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**Canadian Standards Association**

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**Commission Électrotechnique Internationale**



**Communauté Européenne**

# Configure and order cables online

## igus® provides electronic support

Rectangular connectors, Sub D connectors, round connectors – you can now select cables yourself from your workplace or home PC. Experienced users will only need about one and a half minutes to assemble the cable they need via the Internet. The components selected and all available ex-stock can then be placed in a virtual shopping basket and delivered by igus® without delay.

## Filter the optimum cable out and order online

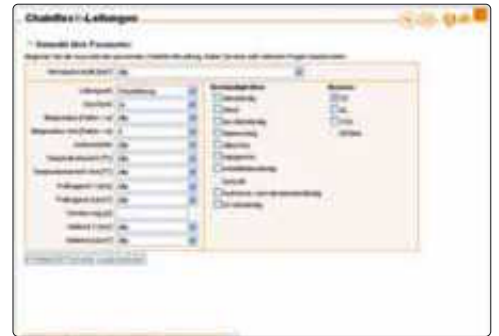
Using the QuickCable product finder, available online under [www.igus.eu/quickcable](http://www.igus.eu/quickcable), users can first search for the optimum technical solution and then make an online inquiry or place an order. Cable selection is via a choice of parameters: electrical, dynamic, mechanical and chemical parameters and environmental questions. Direct cable selection is also possible, of course.

## Individual pin assignment

Once the cable type has been found, the new QuickPin configurator is the next step. Under [www.igus.eu/quickpin](http://www.igus.eu/quickpin), igus® offers all its connector types in a convenient menu, including reason test. The pin or wire contact assignment is flexible, depending on the user's requirements. The contacts can be assigned logically per mouse click, the pole images are then represented by symbols. This means that instead of a list in a table, the pin assignment can be viewed as an image on one page.

## Calculate service life online

Calculate service life online – depending on the parameters **travel**, **bending radius** and **speed**. The program checks the logical plausibility of the parameters entered. The result is given in the number of double strokes to be expected. If other cable types could achieve better results on the basis of the parameters entered, this will be noted.



Livestream: Chainflex cable info

# igus® & ePLAN

## Chainflex® cable library for eplan

- The article data of all Chainflex® cables are now downloadable in **eplan** standard!
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- Completely created cable type file, including information on colour codes, cross-sections, shields, etc.
- Cable article file in **eplan** format for piece lists or order lists
- Fully compatible with **eplan 5/eplan 8**

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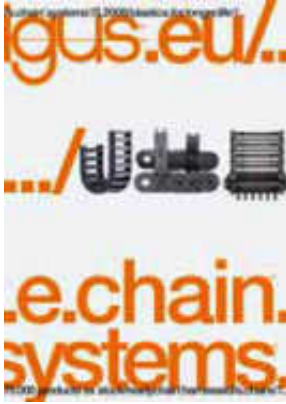
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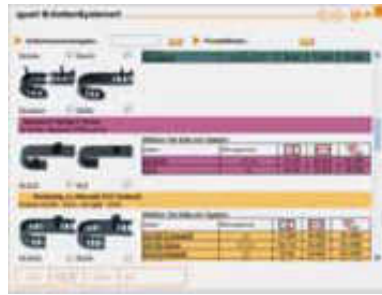
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[www.igus.eu](http://www.igus.eu)  
[info@igus.de](mailto:info@igus.de)



Chainflex®

Tel. +49-2203-96 49-0  
Fax +49-2203-96 49-222igus® GmbH  
51147 Köln, Germanywww.igus.eu  
info@igus.de

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Chainflex®

Tel. +49-2203-96 49-0  
Fax +49-2203-96 49-222

igus® GmbH  
51147 Köln, Germany

www.igus.eu  
info@igus.de

Chainflex®

Tel. +49-2203-96 49-0

Fax +49-2203-96 49-222

igus® GmbH

51147 Köln, Germany

www.igus.eu

info@igus.de

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Chainflex®

Tel. +49-2203-96 49-0  
Fax +49-2203-96 49-222

igus® GmbH  
51147 Köln, Germany

www.igus.eu  
info@igus.de

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Chainflex®

 Tel. +49-2203-96 49-0  
 Fax +49-2203-96 49-222

 igus® GmbH  
 51147 Köln, Germany

[www.igus.eu](http://www.igus.eu)  
[info@igus.de](mailto:info@igus.de)

# Control Cables

# Data Cables

## Chainflex® Quick Selection

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Machine Tools/ Processing Machines																				
Packaging Handling Automation																				
Cranes/Materials-Handling Technology Storage and Retrieval Units for High- Bay/Warehouses/ Indoor areas																				
Cranes/Harbor Equipment Systems/Materials- Handling Techno- logy/Outdoor																				
Low-Temperature Applications																				
Timber Processing Machines																				
Cutting and Wel- ding Systems																				
PVC-free/ halogen-free																				
UL and/or CSA approval																				
DESINA- conforming																				

# Chainflex® according to Industries

Bus Cables

Measuring system cables/Koax

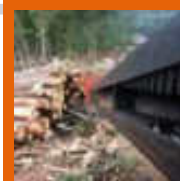
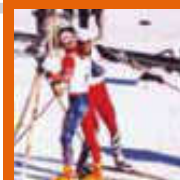
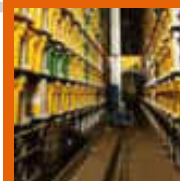
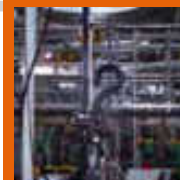
Fibre optic cables (FOC)

CFBUS	CF11.LC	CF11.LC.D	CF14CAT5	CF211	CF113.D	CF111.D	CF11.D	CFKoax1	CFLG.2LB	CFLG.2H	CFLK	CFLG.G
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Chainflex®  
Quick  
Selection

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Servo Cables

Power Cables

Hoses

Chainflex®  
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Selection






















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Machine Tools/ Processing Machines																				
Packaging Handling Automation																				
Cranes/Materials-Handling Technology Storage and Retrieval Units for High- Bay/Warehouses/ Indoor areas																				
Cranes/Harbor Equipment Systems/Materials- Handling Techno- logy/Outdoor																				
Low-Temperature Applications																				
Timber Processing Machines																				
Cutting and Wel- ding Systems																				
PVC-free/ halogen-free																				
UL and/or CSA approval																				
DESINA- conforming																				

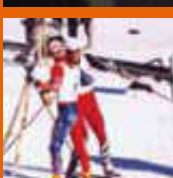
# Chainflex® according to Industries

## Twistable Cables

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Chainflex®  
Quick  
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Chainflex®

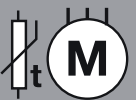
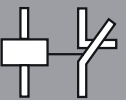
New Part No.	Old Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	Core group	Colour code
CF211.001	CF211.01.03.02.04.05.02	(3x(2x0.14)C+ (4x0.14)+(2x0.5))C	3x(2x0.14)C 4x0.14 2x0.5	yellow/green, black/brown, red/orange gray, blue, white-yellow, white-black brown-red, brown-blue
CF211.002	CF211.01.03.02.05.02	(3x(2x0.14)C+ (2x0.5C))C	3x(2x0.14)C 2x0.5C	green/yellow, black/brown, red/orange black, red
CF211.006	CF211.01.10.02.04.05.02	(3x(2x0.14)C+ (2x0.5+2x0.14)+ (4x0.23+2x0.14))C	3x(2x0.14)C 4x0.14 4x0.23 2x0.5	green/yellow, black/brown, red/orange gray, blue, white-yellow, white-black brown-yellow, brown-gray, green-black, green-red brown-red, brown-blue
CF211.009	–	(4x(2x0.25)+2x1.0)C	4x(2x0.25) 2x0.5	brown/green, blue/violet, gray/pink, red/black white, brown
CF211.010	CF211.02.04.02.10.02	(4x(2x0.25)+2x1.0)C	4x(2x0.25) 2x1.0	brown/green, blue/violet, gray/pink, red/black white, brown
CF211.011	CF211.03.04.02.05.04	(4x(2x0.34)+4x0.5)C	4x(2x0.34) 4x0.5	black/brown, red/orange, yellow/green, blue/violet blue-white, black-white, red-white, yellow-white
CF211.014	CF211.02.04.02.C.05.02	(4x(2x0.25)C+ 1x2x0.5)C	4x(2x0.25)C 2x0.5	white/brown, green/yellow, gray/pink, blue/red black (numeral printing 1-2)
CF211.016	CF211.02.C.03.02	(3x(2x0.25)C)C	3x(2x0.25)C	white/brown, green/yellow, gray/pink
CF211.017	CF211.01.04.02.10.04.01.04	(4x(2x0.14)+ 4x1.0+(4x0.14)C)C	(4x0.14)C 4x(2x0.14) 4x1.0	blue-black, red-black, yellow-black, green-black red/black, green/brown, yellow/violet, pink/gray white-green, brown-green, blue, white
CF211.018	CF211.02.02.02.05.02.	(2x(2x0.25)+2x0.5)C	2x(2x0.25) 2x0.5	red/black, gray/pink white, brown
CF211.019	CF211.02.02.03.02.03.10.02.D	(3x0.25+ 3x(2x0.25)C+2x1.0)C	3x(2x0.25)C 3x0.25 2x1.0	brown/green, pink/gray, red/black blue, yellow, violet white, brown
CF211.027	–	(5x(2x0.14) +2x0.5)C	5x(2x0.14) 2x0.5	green/brown, gray/yellow, white/violet, black/red, blue/pink white-green, white-red

Tel. +49-2203-96 49-0  
Fax +49-2203-96 49-222igus® GmbH  
51147 Köln, Germanywww.igus.eu  
info@igus.de

New Part No.	Old Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	Core group	Colour code
CF11.001.D	CF11.01.03.02.02.04.05.02.D	(3x(2x0.14)C+ (4x0.14)+(2x0.5)C	3x(2x0.14)C	yellow/green, black/brown, red/orange
			4x0.14	gray, blue, white-yellow, white-black
			2x0.5	brown-red, brown-blue
CF11.002.D	CF11.01.03.02.05.02.D	(3x(2x0.14)C+ (2x0.5C)C	3x(2x0.14)C	green/yellow, black/brown, red/orange
			2x0.5C	black, red
CF11.003.D	CF11.01.03.02.10.02.D	(3x(2x0.14)+2x1.0)C	3x(2x0.14)	white/brown, green/yellow, gray/pink
			2x1.0	blue, red
CF11.004.D	CF11.01.04.02.01.04.05.04.D	(4x(2x0.14)+ (4x0.14)C+4x0.5)C	4x(2x0.14)	brown/green, violet/yellow, gray/pink, red/black
			(4x0.14)C	yellow-black, red-black, green-black, blue-black
			4x0.5	brown-green, white-green, blue, white
CF11.005.D	CF11.01.04.02.05.04.D	(4x(2x0.14)+4x0.5)C	4x(2x0.14)	white/brown, green/yellow, gray/pink, blue/red
			4x0.5	black, violet, gray-pink, red-blue
CF11.006.D	CF11.01.10.02.04.05.02.D	(3x(2x0.14)C+ (2x0.5+2x0.14)+ (4x0.23+2x0.14)C	3x(2x0.14)C	green/yellow, black/brown, red/orange
			4x0.14	gray, blue, white-yellow, white-black
			4x0.23	brown-yellow, brown-gray, green-black, green-red
			2x0.5	brown-red, brown-blue
CF11.007.D	CF11.03.02.02.D	(2x(2x0.34)C	4x0.34	white, brown, green, yellow
CF11.008.D	CF11.02.03.02.D	(3x(2x0.25)C	3x(2x0.25)	white/brown, green/yellow, gray/pink
CF11.009.D	CF11.02.04.02.05.02.D	(4x(2x0.25)+2x0.5)C	4x(2x0.25)	brown/green, blue/violet, gray/pink, red/black
			2x0.5	white, brown
CF11.010.D	CF11.02.04.02.10.02.D	(4x(2x0.25)+2x1.0)C	4x(2x0.25)	brown/green, blue/violet, gray/pink, red/black
			2x1.0	white, brown
CF11.011.D	CF11.03.04.02.05.04.D	(4x(2x0.34)+4x0.5)C	4x(2x0.34)	black/brown, red/orange, yellow/green, blue/violet
			4x0.5	blue-white, black-white, red-white, yellow-white
CF11.012.D	CF11.01.06.03.04.02.05.02.D	(3x(2x0.14)C+ (2x0.5+6x0.14)+ (1x(3x0.14)C)C	3x(2x0.14)C	green/yellow, white/gray, blue/red
			(3x0.14)C	red, green, brown
			6x0.14	blue, gray, gray, yellow, pink, violet
			2x0.5	brown-red, brown-blue
CF11.013.D	CF11.01.03.02.C.05.02.D	(3x(2x0.14)C+2x0.5)C	3x(2x0.14)C	white/brown, green/yellow, gray/pink
			2x0.5	red, blue
CF11.015.D		(4x(2x0.14)+4x0.5)C	4x(2x0.14)	brown/green, violet/yellow, gray/pink, red/black
			4x0.5	blue, white, brown-green, white-green
CF11.017.D	CF11.01.002.10.04.01.04.D	(4x(2x0.14)+ 4x1.0+(4x0.14)C)C	(4x0.14)C	blue-black, red-black, yellow-black, green-black
			4x(2x0.14)	red/black, green/brown, yellow/violet, pink/gray
			4x1.0	white-green, brown-green, blue, white
CF11.018.D	CF11.02.02.02.05.02.D	(2x(2x0.25)+2x0.5)C	2x(2x0.25)	red/black, gray/pink
			2x0.5	white, brown
CF11.019.D	CF11.02.02.03.02.03.10.02.D	(3x0.25+ 3x(2x0.25)C+2x1.0)C	3x(2x0.25)C	brown/green, pink/gray, red/black
			3x0.25	blue, yellow, violet
			2x1.0	white, brown
CF11.021.D	-	(6x0.5+5x2x0.25)C	(3x0.5)	black with numerals 1-3
			(3x0.5)	red with numerals 1-3
			(5x2x0.25)	yellow/white, gray/white, black/orange, white/brown, black/gray
CF11.022.D	-	(5x0.5+1x2x0.25)C	(5x0.5)	blue, green, yellow, gray, pink
			(2x0.25)	white, brown
CF11.025.D	-	(3x(2x0.14)C +(2x0.5)C)C	3x(2x0.14)	green/yellow, blue/red, gray/pink
			(2x0.5)	white, brown
CF11.027.D	-	(5x(2x0.14) +2x0.5)C	5x(2x0.14)	green/brown, gray/yellow, white/violet, black/red, blue/pink
			2x0.5	white-green, white-red

Chainflex®

Tel. +49-2203-96 49-0  
Fax +49-2203-96 49-222



Date:	Phone: +49-2203-96 49-0 Fax: +49-2203-96 49-222
Sender:	Recipient: <b>igus® GmbH</b> Technical Marketing Spicher Str. 1a 51147 Köln Germany
Phone:	
Fax:	

Special applications in the sector of flexible energy supply systems depend on special cables that function for a long time. As a manufacturer of Energy Chains® and the corresponding cables, we will plan your specific requirement case on a customized basis – already starting from a cable length of 500 meters. Planning and calculation security will save you time and money.

This is why our offers get to the point quickly. Please help us by filling out this questionnaire as completely as possible.

With several brief items of information from the selection list, we will be glad to make you an offer. But we will also be pleased to help in person or by telephone with the clarification of technical details.

## Technical information

### Mechanical properties of the requested cable

Application case (short description):

---



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---



---

Energy Chain® series \_\_\_\_\_

Bending radius **R** \_\_\_\_\_

Velocity **V** \_\_\_\_\_

Acceleration **a** \_\_\_\_\_

Travel distance **S** \_\_\_\_\_

### Travel frequency

Number of double strokes/day to be expected \_\_\_\_\_

Number of manufacturing days to be expected \_\_\_\_\_

or \_\_\_\_\_

### Environment

Temperature (highest/lowest) \_\_\_\_\_

Chemical influences (oils, etc.) \_\_\_\_\_

Outdoor/Indoor use **O**  **I**

or \_\_\_\_\_

### Electrical properties of the requested cable

#### Voltage class

- ≤ 30 V  
 300/300 V  
 300/500 V  
 450/750 V  
 600/1000 V  
 or operating voltage \_\_\_\_\_

#### Cable type

- Data cable  
 Twisted-pair  
 Fibre-optic  
 Bus specification  
 Control cable  
 Power cable  
 Servo cable  
 or other \_\_\_\_\_

#### Cores

Quantity / Cross section  \_\_\_\_\_

#### Shielding

- Total shield  
 Pair shielding

#### Sheath material

- PVC  
 PVC oil-resistant  
 PUR  
 TPE  
 Pair shielding  
 Hybrid cable  
 or other \_\_\_\_\_

#### Additional options

- Flame-retardant  
 Halogen-free  
 or other \_\_\_\_\_

#### Approbation

- CE  
 CSA  
 DESINA  
 UL  
 or other \_\_\_\_\_

#### Other items

Max. Ø external \_\_\_\_\_

Numeral printing/colour code **N**  **C**

Estimated requirement/year \_\_\_\_\_

Date:	Phone: +49-2203-96 49-0 Fax: +49-2203-96 49-222
Sender:	Recipient: <b>igus® GmbH</b> Technical Marketing Spicher Str. 1a 51147 Köln Germany
Phone:	
Fax:	

Please send us information on your application data to the extent possible. Within 24 hours, you will then receive a complete analysis together with a filling proposal and offer. Please call us if you have any questions.

**Installation space**

Travel s: \_\_\_\_\_ mm      Fixed point:  
Travel centre point  yes  
or \_\_\_\_\_ mm from centre point

Overall width:  
Max. overall width allowed? \_\_\_\_\_ mm

Guide exists?  
 no  
 yes. If yes, which guide:  
Dimensions: B<sub>Ri</sub> \_\_\_\_\_ mm  
Dimensions: H<sub>Ri</sub> \_\_\_\_\_ mm

Installation location/floor, wall, console: \_\_\_\_\_ mm      Supporting width (standard = 2 m) \_\_\_\_\_ mm

**Dynamics**

Velocity: \_\_\_\_\_ (m/s)      Acceleration: \_\_\_\_\_ (m/s<sup>2</sup>)

Distances/day: \_\_\_\_\_      Days/year: \_\_\_\_\_      Ø Distance: \_\_\_\_\_

**Environment**

Temperature (°C): \_\_\_\_\_      Moisture (%): \_\_\_\_\_      Dust-dirt-chips: \_\_\_\_\_

Special details?: \_\_\_\_\_

**Filling of the Energy Chains®**

Quantity	Manufacturer/Art. no.	Cross sections	Ø	Weight kg/m	Permissible bending radius

**Additional individual components requested:**

Energy Chains® / Energy tube	<input type="checkbox"/>	Energy Chains®	<input type="checkbox"/>
Chainflex® special cables	<input type="checkbox"/>	Energy tube	<input type="checkbox"/>
Guiding troughs	<input type="checkbox"/>	To be opened on both sides	<input type="checkbox"/>
Strain relief	<input type="checkbox"/>	To be opened in outer radius	<input type="checkbox"/>
Harnessing	<input type="checkbox"/>	To be opened in inner radius	<input type="checkbox"/>
Assembly	<input type="checkbox"/>		
Other _____		Special requests: _____	
igus® system guarantee requested?	<input type="checkbox"/>		

**Installation type**

(Please check off)

	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>

Harnessing

Date:	Phone: +49-2203-96 49-0 Fax: +49-2203-96 49-222
Sender:	Recipient: <b>igus® GmbH</b> Technical Marketing Spicher Str. 1a 51147 Köln Germany
Phone:	
Fax:	

**Planning of ready-made Energy Chain Systems®**

Chain type: \_\_\_\_\_ Length: \_\_\_\_\_

Filling:


**Interior separation/separators**

Sketch of the arrangement of the cables

Excess length 1	Plug end 1	Screw connection 1	Excess length 2	Screw connection 2	Plug end 2

Tel. +49-2203-96 49-0  
Fax +49-2203-96 49-222

igus® GmbH  
51147 Köln, Germany

www.igus.eu  
info@igus.de

Fax order

Fax inquiry

Chainflex®



Fax

Date:	Phone: +49-2203-96 49-0 Fax +49-2203-96 49-222
Sender:	Recipient: <b>igus® GmbH</b> Technical Marketing Spicher Str. 1a 51147 Köln Germany
Phone:	
Fax:	

Order No. \_\_\_\_\_

Page \_\_\_\_\_ of \_\_\_\_\_ pages

We are placing our order based on the general terms and conditions of igus® GmbH. Excessive and short deliveries of ± 10 % for cables conform with contractual agreements. Deliveries can be made in part-lengths. Some Chainflex® cables have length information printed on them in metres. igus® expressly points out that these specifications are not calibrated. Statutory VAT must be added to the prices.

Item number	igus® order numbers	Quantity	Price per unit

Delivery deadline: \_\_\_\_\_

Signature/stamp \_\_\_\_\_

Harnessing

Tel. +49-2203-96 49-0  
Fax +49-2203-96 49-222

igus® GmbH  
51147 Köln, Germany

www.igus.eu  
info@igus.de





Chainflex®

Tel. +49-2203-96 49-0  
Fax +49-2203-96 49-222

igus® GmbH  
51147 Köln, Germany

[www.igus.eu](http://www.igus.eu)  
[info@igus.de](mailto:info@igus.de)

Chainflex®

Tel. +49-2203-96 49-0  
Fax +49-2203-96 49-222

igus® GmbH  
51147 Köln, Germany

[www.igus.eu](http://www.igus.eu)  
[info@igus.de](mailto:info@igus.de)



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Fax +49-2203-96 49-222

igus® GmbH  
51147 Köln, Germany

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[info@igus.de](mailto:info@igus.de)

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Tel. +49-2203-96 49-0  
Fax +49-2203-96 49-222

igus® GmbH  
51147 Köln, Germany

[www.igus.eu](http://www.igus.eu)  
[info@igus.de](mailto:info@igus.de)





**33 Netherlands**  
**igus® Nederland**  
 Sterrenbergweg 9  
 3769 BS Soesterberg  
 Phone +31-346-35 39 32  
 Fax +31-346-35 38 49  
 igus.nl@igus.de

**33 Netherlands – Bearings**  
**Elcee Holland BV**  
 Kamerlingh Onnesweg 28  
 NL-3316 GL Dordrecht  
 Phone +31-78-6544777  
 Fax +31-78-6544733  
 info@elcee.nl

**34 New Zealand**  
**Automation Equipment Ltd.**  
 P.O. Box 5656 Frankton  
 45 Colombo Street  
 Frankton, Hamilton  
 Phone +64-7-847 2082  
 Fax +64-7-847 71 60  
 sales@autoequip.co.nz

**35 Norway / Iceland**  
**ASI Automattikk AS**  
 Ingv. Ludvigsgate 23  
 3007 Drammen  
 Phone +47-32-82 92 90  
 Fax +47-32-82 92 98  
 info@asiautomattikk.no

**36 Peru**  
**Profaco**  
 Av. República de Panamá N°  
 4130 - Surquillo  
 Lima - Perú  
 Phone +51-1-241 43 70  
 +51-1-242 52 95  
 Fax +51-1-242 86 08  
 ventas@profaco.com

**37 Poland**  
**igus® Sp zo.o**  
 ul. Parowcowa 10 b  
 02-445 Warszawa  
 Phone +48-22-863 57 70  
 Fax +48-22-863 61 69  
 igus.pl@igus.com.pl

**38 Portugal**  
**igus® Lda.**  
 R. Eng. Ezequiel Campos, 239  
 4100-231 Porto  
 Phone +351-22-610 90 00  
 Fax +351-22-832 83 21  
 info@igus.pt

**39 Romania**  
**TechCon Industry SRL**  
 Calea Crangasi nr. 60  
 060346 Bucuresti  
 Phone +40-21-2219-640  
 Fax +40-21-2219-766  
 automatizari@meteor.ro

**39 Romania**  
**Hennlich SRL**  
 Str. Patria, Nr17  
 310106 Arad  
 Phone +40-257-21 11 19  
 Fax +40-257-21 10 21  
 igus@hennlich.ro

**40 Russia**  
**Eka-Service Kompani**  
 1-aja Dubrowskaja, 2A, k. 35  
 109044 Moskau  
 Phone +7-495-632 66 23  
 Fax +7-495-677 17 78  
 info@ekaservice.ru

**40 Russia**  
**Barti OOO**  
 p/b 333  
 194358 St. Petersburg  
 Phone +7-812-972 49 14  
 Fax +7-812-448 38 28  
 barti@barti.ru

**41 Serbia**  
**Hennlich doo Beograd**  
 Ul. S. Markovica 3/4  
 11400 Mladenovac  
 Phone +381-11 39 43 414  
 Fax +381-11 39 43 412  
 office@hennlich.rs

**42 Singapore – HQ ASEAN**  
**igus® Singapore Pte Ltd.**  
 15 Shaw Road, #03-02  
 Singapore 367953  
 Phone +65-64 87 14 11  
 Fax +65-64 87 15 11  
 Malaysia-Hotline +60-12-7093041  
 Thailand-Hotline +66-9-160 73 69  
 asia-sales@igus.de

**43 Slovakia**  
**Hennlich Industrietechnik s.r.o.**  
 Košická 52  
 821 08 Bratislava  
 Phone +421-2-50 20 43 08  
 Fax +421-2-50 20 43 11  
 technik@hennlich.sk

**44 Slovenia**  
**Hennlich, d.o.o.**  
 Industrijska tehnika  
 Podnart 33  
 SI-4244 Podnart  
 Phone +386-4-532 06 10  
 Fax +386-4-532 06 20  
 info@hennlich.si

**45 South Africa**  
**igus® Pty. Ltd.**  
 Unit 14, Heron Park  
 80 Corobrik Road  
 PO Box 4214  
 4017 Riverhorse Valley  
 Phone +27-31-569 6633  
 Fax +27-31-569 6636  
 admin@igus.co.za

**46 South Korea**  
**igus® Korea Co. Ltd.**  
 25BL 13LT Namdong Ind. Complex  
 446-11 Nonhyundong, Namdonggu  
 Incheon City, 405-300  
 Phone +82-32-821 29 11  
 Fax +82-32-821 29 13  
 sales-korea@igus.de

**47 Spain**  
**igus® S.L.**  
 C/ Llobatona, 6  
 Poligono Noi del Sucre  
 08840 Viladecans - Barcelona  
 Phone +34-93-647 39 50  
 Fax +34-93-647 39 51  
 igus.es@igus.es

**48 Sweden**  
**igus® ab**  
 Knut Påls väg 8  
 256 69 Helsingborg  
 Phone +46-42-32 92 70  
 Fax +46-42-21 15 85  
 info@igusab.se

**48 Sweden – E-Chains®**  
**OEM Automatic AB**  
 Box 1011 Dalagatan 4  
 573 28 Tranås  
 Phone +46-75-242 41 00  
 Fax +46-75-242 41 59  
 info@aut.oem.se

**48 Sweden – Bearings**  
 incl. DryLin®:  
**Colly Components AB**  
 P.O. Box 76  
 164 94 Kista  
 Phone +46-8-70 30 100  
 Fax +46-8-70 39 841  
 info@me.colly.se

**49 Switzerland**  
**igus® Schweiz GmbH**  
 Industriest. 11  
 4623 Neuendorf  
 Phone +41-62-38 89 797  
 Fax +41-62-38 89 799  
 info.ch@igus.ch

**50 Taiwan**  
**igus® Taiwan Company Limited**  
 2F, No 82, 32nd Road  
 Taichung Industrial Park  
 40768 Taichung  
 Phone +886-4-23 58-1000  
 Fax +886-4-23 58-1100  
 igus-taiwan@igus.com.tw

**51 Thailand**  
**Autoflexible Engineering Co., Ltd.**  
 111 Soi. Sukhumvit, 62/1  
 Bangjak, Phakanong  
 Bangkok 10260  
 Phone +66-2-311 21 11  
 Fax +66-2-332 79 00  
 kwanchai@autoflexible.com

**52 Turkey**  
**HIDREL Hidrolik Elemanlar**  
 Sanayi ve Ticaret A.S.  
 Percemlı Sk. No. 7  
 Tünel Mevkii  
 80000 Karaköy / Istanbul  
 Phone +90-212-249 48 81  
 Fax +90-212-292 08 50  
 info@hidrel.com.tr

**53 United Kingdom**  
**igus® UK Ltd.**  
 51A Caswell Road  
 Brackmills  
 Northampton NN4 7PW  
 Phone +44-1604-67 72 40  
 Fax Chain +44-01604 67 72 42  
 Fax Bearing +44-01604 67 72 45  
 sales\_uk@igus.co.uk

**54 Ukraine**  
**Cominpro Ltd.**  
 Romena Rollana 12, Office 220  
 61058 Kharkov  
 Phone +38-057 717 49 14  
 Fax +38-057 717 49 14  
 cominpro@gmail.com

**55 USA**  
**igus® inc.**  
 50 N. Broadway  
 P.O. Box 14349  
 East Providence, RI 02914  
 Phone +1-401-438 22 00  
 Fax +1-401-438 72 70  
 webmaster@igus.com



Chainflex®

Tel. +49-2203-96 49-0  
Fax +49-2203-96 49-222

igus® GmbH  
51147 Köln, Germany

[www.igus.eu](http://www.igus.eu)  
[info@igus.de](mailto:info@igus.de)

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Tel. +49-2203-96 49-0  
Fax +49-2203-96 49-222

igus® GmbH  
51147 Köln, Germany

[www.igus.eu](http://www.igus.eu)  
[info@igus.de](mailto:info@igus.de)





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Tel. +49-2203-96 49-0  
Fax +49-2203-96 49-222

igus® GmbH  
51147 Köln, Germany

[www.igus.eu](http://www.igus.eu)  
[info@igus.de](mailto:info@igus.de)