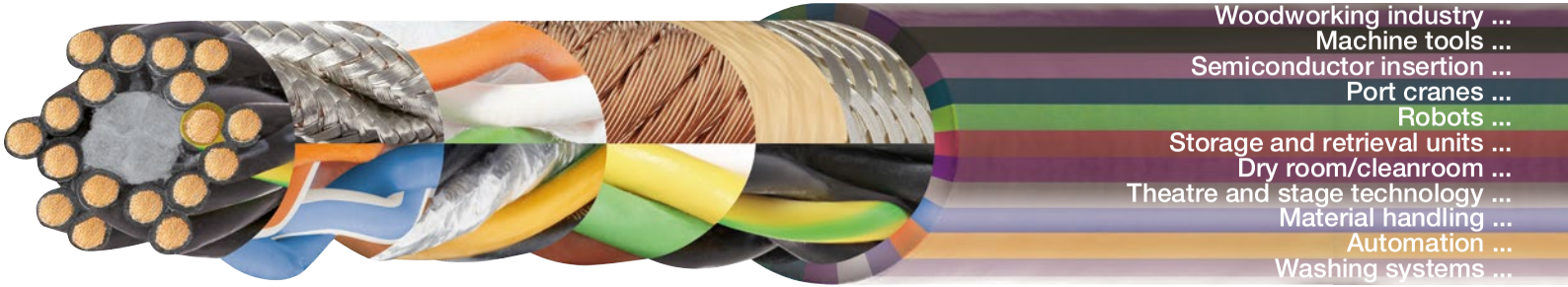
tested...

igus.eu ...cables for e-chains®...



...chainflex® cables ... motion plastics®...

chainflex®

chainflex® works: worldwide No. 1 in terms of testing.

... more than two billion test cycles, over 30 years of experience, a four-year guarantee, presence in over 80 countries and over 50 industries, and more than 1,350 types available from stock 24/7 ...

Available from stock.
Ready to ship from 24hrs, earlier upon request.
The delivery times indicated are the average time until the ordered goods are dispatched.

No minimum order value. No surcharges.
No minimum order value with igus®. Just order the amount you need - No cutting charges (up to 10 cuts of the same type).

From 1m
Since chainflex® are high quality cables, you should only order the length you need. We welcome orders from 1m. You can also order in 0.5m steps.

4-year guarantee
We provide a 4-year guarantee on every chainflex® cable. Up to 100 million double strokes guaranteed. Thanks to testing in the largest laboratory for moving cables, we are the only supplier that can offer a 4-year guarantee on our cables with complete reliability.

„7 to 8 plus Saturday“ service

Monday to Friday	7.00am to 8.00pm
Saturday from	8.00am to 12.00pm.

Order hotline

Phone	+49-2203 9649-800
Fax	+49-2203 9649-222

Onlineshop www.igus.eu/chainflex
Our entire product range, including product finder, service life calculator, live chat and much more. Order around-the-clock!

Service life calculator www.igus.eu/chainflexlife
With the chainflex® service life calculator, you can easily and quickly calculate the expected service life of chainflex® cables specifically for your application.

Do you have any questions?
If you have any questions, simply call us or use our online tools at www.igus.eu/chainflex

www.igus.eu/chainflex

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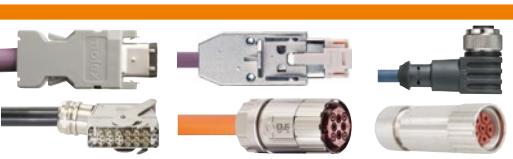

readycable® and readychain®
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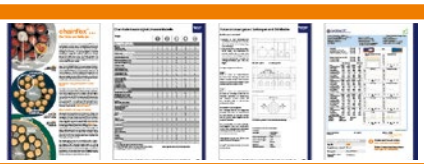

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Classification of chainflex® cables according to

basic requirements, travel distance, oil-resistance and torsion

The chainflex® class is composed of 4 parts:

Basic requirements 1 to 7	Travel distance 1 to 6	Oil resistance 1 to 4	Torsion 1 to 4

1 Basic requirements	low	1	2	3	4	5	6	7	highest
2 Travel distance	unsupported	1	2	3	4	5	6		≥ 400m
3 Oil-resistance	none	1	2	3	4				highest
4 Torsion	none	1	2	3	4				±360°

1 Basic requirements

1: Flexible cables
2: Highly flexible cables
3: Cables without special structure (e.g. winding in layers) for use in e-chains®.
4: Cables with special structure for continuous movement in e-chains® for medium duty applications and radii from 7.5 x d, speed up to 3 m/s.
5: Cables for continuous movement in e-chains® for heavy duty applications and radii from 6.8 x d, speed up to 10 m/s.
6: Cables for continuous movement in e-chains® for heaviest duty applications and radii from 5 x d, speed up to 10 m/s.
7: Cables for continuous movement in e-chains® for heaviest duty applications and smallest radii, indoor and outdoor, radii from 3 x d, speed up to 10 m/s and more.

2 Travel distance

1: Unsupported travel up to 10 m
2: Gliding travel up to 10 m
3: Gliding travel up to 20 m
4: Gliding travel up to 50 m
5: Gliding travel up to 100 m
6: Gliding travel up to 400 m and more

3 Oil resistance

1: No oil resistance
2: Oil-resistant (following DIN EN 50363-4-1)
3: Oil-resistant (following DIN EN 50363-10-2)
4: Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA)

4 Torsion

1: No torsion
2: ±90°, with 1 m cable length
3: ±180°, with 1 m cable length
4: ±360°, with 1 m cable length

In theory the following classes would be possible: Lowest "Class 1.1.1.1", highest "Class 7.6.4.4"

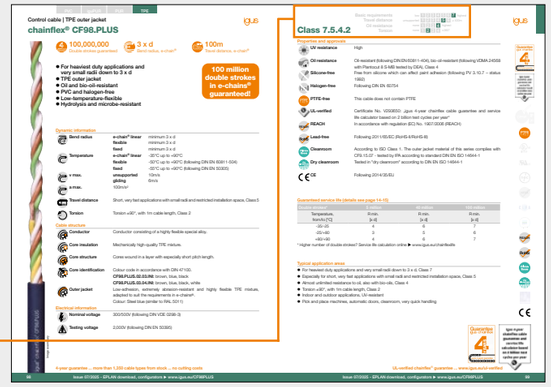
To make selection easier, we have classified all chainflex® cables according to 4 criteria: basic application requirements, travel distance, oil resistance and torsion. The higher the number the better the cable.

Example: If you are looking for a cable which is suitable for the highest mechanical load, travel distance up to 100 m for unsupported and gliding applications and oil-resistant following DIN EN 60811-404.

Choose from the classification overview:

Basic requirements: 7
Travel distance: 5
Oil resistance: 4
Torsion: 2

This results in the cable classification – here "Class 7.5.4.2". This can be found on every product page.

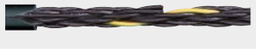
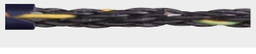
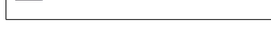


chainflex® selection according to "Class"

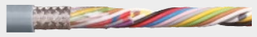
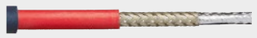
chainflex® series	Basic require-ments	Travel distance	Oil resistance	Torsion
CF880	3	1	1	1
CF881	3	1	1	1
CFLG88	3	1	1	1
CF884	3	1	1	1
CF885	3	1	1	1
CF885.PE	3	1	1	1
CF886	3	1	1	1
CF887	3	1	1	1
CF888	3	1	1	1
CF890	3	1	3	1
CF891	3	1	3	1
CF894	3	1	3	1
CF895	3	1	3	1
CF896	3	1	3	1
CF897	3	1	3	1
CF898	3	1	3	1
CF210.UL **New**	4	2	2	1
CF210.UL (motor) **New**	4	2	2	1
CF211 (measuring) **New**	4	2	2	1
CF220.UL.H **New**	4	2	2	1
CF111.D **New**	4	2	3	1
CF270.UL.D **New**	4	2	3	1
CF270.UL.D (motor) **New**	4	2	3	1
CF280.UL.H **New**	4	2	3	1
CFBUS.PVC	4	3	2	1
CFBUS.PUR	4	3	3	1
CF140.UL **New**	4	4	1	1
CF130.UL **New**	4	4	1	2
CF240	4	4	2	1
CF240.PUR	4	4	3	1
CF150.UL **New**	4	4	3	2
CF160.UL	4	4	3	1
CF77.UL.D (robot)	5	1	3	3
CFLK	5	3	3	1
CFTHERMO **New**	5	4	3	1
CF6	5	5	2	1
CF21.UL	5	5	2	1
CF211 (data)	5	5	2	1
CF31 **New**	5	5	2	1
CF5	5	5	2	2
CF30 **New**	5	5	2	2
CF78.UL	5	5	3	1
CF211.PUR (data) **New**	5	5	3	1
CF77.UL.D	5	5	3	3

chainflex® series	Basic require-ments	Travel distance	Oil resistance	Torsion
CFROBOT2	6	1	3	3
CFROBOT3	6	1	3	3
CFROBOT4	6	1	3	3
CFROBOT7	6	1	3	3
CFROBOT9	6	1	3	3
CFROBOT8.PLUS	6	1	3	4
CFROBOT	6	1	4	3
CFROBOT5	6	1	4	3
CFROBOT6	6	1	4	3
CF2	6	5	3	1
CF112	6	5	3	1
CFLG.LB.PUR	6	5	3	1
CF113.D	6	5	3	1
CF27.D	6	5	3	1
CF27.D (motor) **New**	6	5	3	1
CFCRANE **New**	6	6	3	1
CFCRANE.PUR	6	6	3	1
CF10.UL	6	6	4	1
CF11	6	6	4	1
CF12	6	6	4	1
CFKoax	6	6	4	1
CFBUS	6	6	4	1
CF11.D	6	6	4	1
CF35.UL **New**	6	6	4	1
CF310.UL	6	6	4	1
CF9.UL	6	6	4	2
CF34.UL.D **New**	6	6	4	2
CF300.UL.D	6	6	4	2
CFPE	6	6	4	2
CFSOFT1	7	1	2	2
CFSOFT2	7	1	2	2
CFLG.G	7	4	4	1
CFLG.LB **New**	7	5	4	1
CF99.PLUS	7	5	4	1
CFFLAT	7	5	4	1
CF98.PLUS	7	5	4	2
CFBUS.LB	7	6	4	1
CF10	7	6	4	1
CF29.D	7	6	4	1
CF38 **New**	7	6	4	1
CF340 **New**	7	6	4	1
CF9	7	6	4	2
CF37.D **New**	7	6	4	2
CF330.D **New**	7	6	4	2

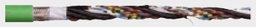
Control cables

	chainflex® cables	Jacket	Shield	Bend radius e-chain® min. [xd]	Temperature e-chain® from/to [°C]	Price index	Page
Control cables							
	CF880	PVC		12.5	+5/+70		26
	CF881	PVC	●	12.5	+5/+70		30
	CF130.UL New	PVC		7.5	+5/+70		34
	CF140.UL New	PVC	●	7.5	+5/+70		38
	CF150.UL New	PVC		7.5	+5/+70		42
	CF160.UL	PVC	●	7.5	+5/+70		46
	CF5	PVC		6.8	+5/+70		50
	CF6	PVC	●	6.8	+5/+70		54
	CFSOFT1	PVC		5	+5/+70		58
	CFSOFT2	PVC	●	5	+5/+70		60
	CF890	iguPUR		12.5	-20/+80		62
	CF891	iguPUR	●	12.5	-20/+80		66
	CF77.UL.D	PUR		6.8	-25/+80		70
	CF78.UL	PUR	●	6.8	-25/+80		74
	CF2	PUR	●	5	-20/+80		78
	**CF9.UL**	TPE		5	-35/+100		82
	CF10.UL	TPE	●	5	-35/+100		86
	**CF9**	TPE		5	-35/+100		90
	CF10	TPE	●	5	-35/+100		94
	CF98.PLUS	TPE		3	-35/+90		98
	**CF99.PLUS**	TPE	●	3	-35/+90		102

Data cables/bus cables/Fibre Optic Cables

	chainflex® cables	Jacket	Shield	Bend radius e-chain® min. [xd]	Temperature e-chain® from/to [°C]	Price index	Page
Data cables							
	CF240	PVC	●	10	+5/+70		110
	**CF240.PUR**	PUR	●	10	-25/+80		114
	CF211	PVC	●	7.5	+5/+70		118
	CF211.PUR New	PUR	●	7.5	-25/+80		122
	CF11	TPE	●	6.8	-35/+100		126
	CF112	PUR	●	10	-25/+80		130
	CF12	TPE	●	10	-35/+100		134
Coax cables							
	**CFKoax**	TPE	●	10	-35/+100		136
Bus cables							
	CF888	PVC	●	15	+5/+70		148
	CFBUS.PVC	PVC	●	12.5	+5/+70		152
	CF898	iguPUR	●	15	-20/+70		156
	CFBUS.PUR	PUR	●	12.5	-20/+70		160
	CFBUS	TPE	●	10	-35/+70		164
	CFBUS.LB	TPE	●	7.5	-35/+70		170
Fibre Optic Cables							
	CFLK	PUR		12.5	-20/+60		178
	CFLG88	PVC		7.5	+5/+70		180
	CFLG.LB.PUR	PUR		5	-25/+80		182
	CFLG.LB New	TPE		5	-35/+80		186
	CFLG.G	TPE		10	-40/+80		190

Measuring system cables/servo cables

	chainflex® cables	Jacket	Shield	Bend radius e-chain® min. [xd]	Temperature e-chain® from/to [°C]	Price index	Page
Measuring system cables							
	CF884	PVC	●	15	+5/+70	◐○○	200
	**CF211 New**	PVC	●	10	+5/+70	◐○○	204
	CF894	iguPUR	●	15	-20/+80	◐○○	210
	CF111.D New	PUR	●	10	-25/+80	◐○○	214
	CF113.D	PUR	●	7.5	-25/+80	●○○	220
	CF11.D	TPE	●	6.8	-35/+90	●○○	226
Servo cables							
	CF887	PVC	●	15	+5/+70	◐○○	240
	CF210.UL New	PVC	●	10	+5/+70	●○○	242
	CF21.UL	PVC	●	7.5	+5/+70	●○○	246
	CF897	iguPUR	●	15	-20/+80	◐○○	250
	CF270.UL.D New	PUR	●	10	-25/+80	◐○○	252
	CF27.D	PUR	●	7.5	-25/+80	●◐○	256
	CF29.D	TPE	●	6.8	-35/+100	●○○	260
Hybrid servo cables							
	CF220.UL.H New	PVC	●	10	+5/+70	◐○○	262
	CF280.UL.H New	PUR	●	10	-25/+80	◐○○	266

Motor cables

	chainflex® cables	Jacket	Shield	Bend radius e-chain® min. [xd]	Temperature e-chain® from/to [°C]	Price index	Page
Motor cables							
	CF885	PVC		15	+5/+70	◐○○	280
	CF886	PVC	●	15	+5/+70	◐○○	282
	CF210.UL New	PVC	●	10	+5/+70	●○○	284
	CF30 New	PVC		7.5	+5/+70	●○○	286
	CF31 New	PVC	●	7.5	+5/+70	●○○	290
	CF895	iguPUR		15	-20/+80	◐○○	294
	CF896	iguPUR	●	15	-20/+80	◐○○	296
	CF270.UL.D New	PUR	●	10	-25/+80	●○○	298
	CF27.D New	PUR	●	7.5	-25/+80	◐○○	302
	CF34.UL.D New	TPE		7.5	-35/+90	●●◐	306
	CF35.UL New	TPE	●	7.5	-35/+90	●●◐	310
	CF37.D New	TPE		7.5	-35/+90	●●◐	314
	CF38 New	TPE	●	7.5	-35/+90	●●◐	318
Spindle cables/Single cores							
	CF885	PVC		15	+5/+70	◐○○	322
	CF885.PE	PVC		15	+5/+70	◐○○	324
	CF886	PVC	●	15	+5/+70	◐○○	326
	CF270.UL.D	PUR	●	10	-25/+80	●○○	328
	CF300.UL.D	TPE		7.5	-35/+90	●●○	330
	CFPE	TPE		7.5	-35/+90	●●○	334
	CF310.UL	TPE	●	7.5	-35/+90	●●○	336
	CF330.D New	TPE		7.5	-35/+90	●●○	340
	CF340 New	TPE	●	7.5	-35/+90	●●○	342
Medium voltage cables							
	CFCRANE.PUR	PUR	●	10	-20/+80	●●○	344
	CFCRANE New	igupren	●	10	-20/+80	●●●	346

Twistable cables for robots

	chainflex® cables	Jacket	Shield	Bend radius e-chain® min. [xd]	Torsion angle [°/m]	Temperature e-chain® from/to [°C]	Price index	Page
Twistable cables								
	CF77.UL.D	PUR		6.8	±180	-25/+80	●○○	354
	CFROBOT2	PUR	●	10	±180	-25/+80	●●◐	358
	CFROBOT3	PUR	●	10	±180	-25/+80	●●◐	360
	CFROBOT4	PUR	●	10	±180	-25/+80	●●○	362
	CFROBOT5	TPE		10	±180	-35/+80	●●○	366
	CFROBOT6	PUR		10	±180	-25/+80	●●◐	368
	CFROBOT7	PUR	●	10	±180	-25/+80	●●◐	370
	CFROBOT	TPE	●	10	±180	-35/+90	●●◐	374
	CFROBOT8	PUR	●	10	±180	-25/+70	●○○	376
	CFROBOT8.PLUS	PUR	●	10	±360	-25/+70	●◐○	380
	CFROBOT9	PUR	●	10	±180	-25/+80	●●○	384

	chainflex® cables	Jacket	Shield	Bend radius e-chain® min. [xd]	Temperature e-chain® from/to [°C]	Price index	Page
Special cables							
	CFTHERMO New	PUR	●	12.5	-25/+80	●●○	392
	CFFLAT	TPE		5	-35/+90	●●○	394
	CFSPECIAL.182	PUR	●	10	-25/+80	●●○	396
	CFSPECIAL.192	PUR	●	10	-25/+80	●●○	398
	CFSPECIAL.532	PUR	●	10	-25/+80	●◐○	400
	CFSPECIAL.562.PE	PUR		10	-25/+80	●◐○	402
	CFSPECIAL.572	PUR	●	10	-25/+80	●◐○	404
	CFSPECIAL.592	PUR	●	10	-25/+80	●◐○	406
	CFSPECIAL.792	PUR	●	10	-25/+80	◐○○	408

Special cables/CFCLEAN elements

	chainflex® cables	Jacket	Shield	Bend radius e-chain® min. [xd]	Temperature e-chain® from/to [°C]	Price index	Page
CFCLEAN elements for cleanroom applications							
	CFCLEAN1		●	40	-10/+80	●●◐	416
	CFCLEAN2		●	40	-10/+80	●●◐	418
	CFCLEAN3		●	40	-10/+80	●●◐	420
	CFCLEAN4		●	40	-10/+80	●●◐	422
	CFCLEAN7		●	70	-10/+80	●●◐	424
	CFCLEAN8		●	40	-10/+80	●●◐	426

chainflex® CASE ship'n store by igus®

Tidy storage made easy

The chainflex® CASE is a cardboard box that allows the drum to be shipped without a pallet. This means that the goods can be dispatched using a parcel delivery service. The chainflex® CASE is not only used for transport, but is also a storage system for cable drums. The cable can be easily unreeled directly from the box. Thanks to the stacking capability, we offer the option of setting up flexible storage facilities. The QR code on the shipping carton makes it easy to reorder online. This not only saves you shipping costs, but also process and storage costs. The chainflex® CASE is available in sizes S and M as well as a refill option for your existing CASEs.

chainflex® CASE M

chainflex® CASE S

Easy delivery:

The chainflex CASE is dispatched without a pallet and is sent by parcel carrier. This eliminates the expensive costs of a haulage company. You can save up to 84% on shipping costs.

Easy storage:

The stacking capability of up to three CASES and the integrated carry handles mean that flexible and individual storage spaces can be created.

Easy unreeling:

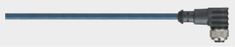
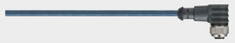
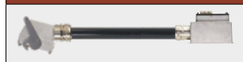
The portable storage can be set up at the place of use and enables precise unreeling directly from the CASE without wastage.

Simple reordering:

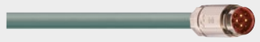
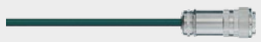
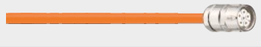
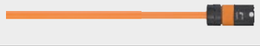
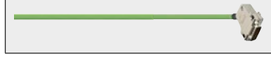
Using the QR code on each CASE, the cable can be reordered in the online shop in just a few seconds.

www.igus.eu/cf-case

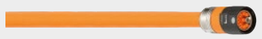
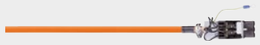
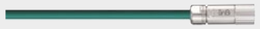
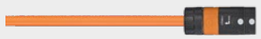
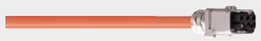
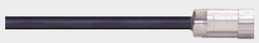
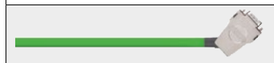
Video ... network ... sensor/actuator ... industry ... robotics

	Cable type		Jacket	Page
Camera/video/bus technology				
	Harnessed bus and coax cables		PVC/PUR/TPE	439
	Harnessed Fibre Optic Cables for video		TPE	439
Network				
	Harnessed Ethernet cables		PVC/PUR/TPE	442
	Harnessed Profibus cables		PVC/PUR/TPE	442
	Harnessed Profinet cables		PVC/PUR/TPE	442
	Harnessed DeviceNet cables		TPE	442
	Harnessed Fibre Optic Cables for network		TPE	443
Sensor/actuator				
		CF9 - CF.INI	TPE	446
		CF10 - CF.INI	TPE	447
		CF98 - CF.INI	TPE	447
		chainflex® cables for actuator/ sensor distribution box	TPE	448
chainflex® cables with industrial connectors				
	HARTING Han 6B		PVC/PUR/TPE	452
	HARTING Han 10B		PVC/PUR/TPE	452
	HARTING Han 16B		PVC/PUR/TPE	452
	HARTING Han 24B		PVC/PUR/TPE	453
Robot				
	Harnessed cables for robots			455
	Cables according to AIDA specifications			455

Drive technology

	Selection according to manufacturer		Jacket	Page
Harnessed cables for drive technology				
	Allen Bradley	Motor cables, servo cables, hybrid servo cables, brake cables, feedback cables, adapter cables (transition cable)	PVC/PUR/TPE	460
	B&R	Motor cables, servo cables, EnDat cables, encoder cables, resolver cables, bus cables	PVC/PUR/TPE	460
	Baumer Thalheim	Encoder cables	PVC/PUR/TPE	460
	Baumüller	Servo cables, resolver cables, pulse encoder cables SpeedTec: servo cables, resolver cables, pulse encoder cables	PVC/PUR/TPE	460
	Beckhoff	Motor cables, servo cables, hybrid servo cables, encoder cables, thermal protection cables, resolver cables, network cables, EtherCat	PVC/PUR/TPE	460
	Berger Lahr	Servo cables, resolver cables	PVC/PUR/TPE	460
	Bonfiglioli	Servo cables	PVC/PUR	460
	Bosch Rexroth	Motor cables, servo cables, hybrid servo cables, encoder cables	PVC/PUR/TPE	460
	Control Techniques/ Nidec Drives	Motor cables, servo cables, encoder cables	PVC/PUR/TPE	460
	Danfoss	Servo cables	PVC/PUR	460
	Delta	Measuring system cables, servo cables, motor cables	PVC/PUR/TPE	460
	ELAU/ Schneider Electric	Servo cables, hybrid servo cables, encoder cables	PVC/PUR/TPE	461
	FAGOR	Path measuring cables	PUR/TPE	461
	FANUC	Motor cables, servo cables, brake cables, signal cables	PVC/PUR/TPE	461
	Festo	Servo cables, control cables, encoder cables, data cables, bus cables	PVC/PUR/TPE	461
	Harmonic Drive	Measuring system cables, servo cable	PVC/PUR/TPE	461
	Heidenhain	Servo cables, adapter cables	PVC/PUR/TPE	461
	Heidrive	Data cables, servo cables	PVC/PUR	461
	Hengstler	Measuring system cables	PVC/PUR	461
	Jetter	Motor cables, servo cables, resolver cables	PVC/PUR/TPE	461

Drive technology

	Selection according to manufacturer		Jacket	Page
Harnessed cables for drive technology				
	KEB	Measuring system cables, servo cable	PVC/PUR	461
	**KEBA**	Data cables, servo cables	PVC/PUR/TPE	461
	Koco Motion	Data cables, servo cables	PVC/PUR	461
	Kollmorgen/ Danaher Motion	Motor cables, servo cables, signal cables	PVC/PUR/TPE	462
	Lenze	Servo cables, fan cables, decoder cables, encoder cables,feedback cables, resolver cables	PVC/PUR/TPE	462
	**LinMot**	Motor cables, servo cables	PVC/PUR	462
	LTiDRiVES	Servo cable, encoder cables	PVC/PUR/TPE	462
	Mitsubishi	Motor cables, control cables, encoder cables	PVC/PUR	462
	Moog	Data cables, servo cables	PVC/PUR/TPE	462
	**Motor Power Company**	Servo cables	PVC/PUR	462
	NUM	Power cables, servo cables, fan cables, encoder cables	PVC/PUR/TPE	462
	Omron	Motor cables, control cables, encoder cables	PVC/PUR/TPE	462
	Panasonic	Servo cables, motor cables, control cables, data cables	PVC/PUR/TPE	462
	**Parker**	Motor cables, resolver cables	PVC/PUR/TPE	462
	Schunk	Bus cables, data cables, control cables	PVC/PUR/TPE	462
	**SEW-EURODRIVE**	Motor cables, servo cables, hybrid servo cables, control cables, encoder cables	PVC/PUR/TPE	463
	Siemens	Power cables, servo cables, signal cables, signal cables DriveCliq; Speedtec: power cables, servo cables, signal cables	PVC/PUR/TPE	463
	**Sigmatek**	Servo cables, encoder cables	PVC/PUR/TPE	463
	Stöber	Servo cable, encoder cables	PVC/PUR/TPE	463
	**Wittenstein**	Servo cables, motor cables, measuring system cables, data cables	PVC/PUR/TPE	463

Connector ... technical appendix

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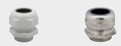	**Glands**	469
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Unique: 4 years guaranteed

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

The unique chainflex® guarantee is now being extended to a maximum of four years. With clear statements on the guaranteed service life, customers gain additional confidence. The reason is that functional reliability is essential, both from an operational-functional and legal-financial point of view. Plant and machine manufacturers must make binding statements on operational safety and reliability. However, a guarantee statement to the end customer always involves a considerable risk. The unique chainflex® guarantee on igus® cables in e-chains® not only makes this risk more calculable, but also reduces it considerably.

With the unique and now extended guarantee of up to four years on every chainflex® cable in our catalogue, we assume part of the responsibility and create valuable planning reliability for the manufacturer.

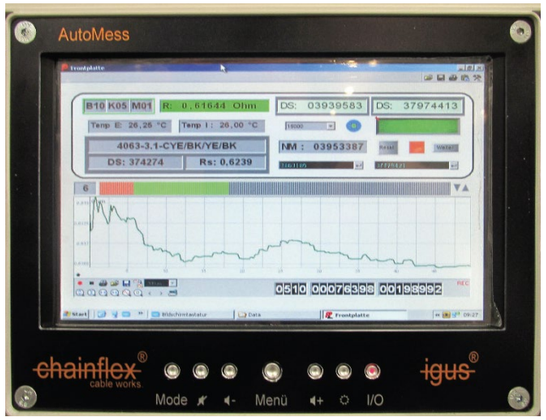
This is only possible because igus® has amassed more than 30 years of experience and an enormous amount of test data in the largest laboratory for cables and e-chains® with a 5,500m² floor area. This enables the generation of reliable statements about the durability and service life of chainflex® cables.

Guarantee instead of just warranty or defects liability expands the assurance in legal terms

The assurance of a guarantee is done voluntarily by the manufacturer, and goes beyond the mandatory assurance or warranty by the seller. For the customer not only receives the promise to obtain a defect-free product, but also the ability to function over a certain period.

"**In case of guarantee the buyer is entitled to the rights under the guarantee as per the terms set down in the guarantee statement vis-à-vis the person who has given the guarantee, regardless of the legal claims (§ 443 I BGB).**"

In Germany, quality and durability guarantees are used. The latter in particular is of great importance for many customers. A mere extension of the guarantee is not enough for them, they want binding statements on the durability. The chainflex® guarantee based on the reliable data from laboratory and field experience, was created precisely for this purpose.



Analysis of the measured data: igus® "AutΩMeS" system

Overview of the service life using the "double strokes" selection tables

For each chainflex® series you will find a selection table called "Double strokes - guaranteed service life" This gives the technical parameters for using the respective chainflex® cable. If the cable is operated in accordance with the operating conditions specified in the selection table, a guaranteed service life of 5, 7.5 or 10 million double strokes is applicable depending on the application. The service life itself, measured by the number of possible double strokes, can even be significantly higher.

1 Temperature, from/to [°C]

2 Double strokes guaranteed

3 Minimum bend radius [x d]

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	7.5 million	12.5 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
-35/-25	6.8	7.5	8.5
-25/+90	5	6	7
+90/+100	6.8	7.5	8.5

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Example: Selection table "Guaranteed service life" for CF9

Example:

A cable with a diameter of 12mm in an energy chain with a radius of 100mm results in a bending factor of 8.3 (100mm/12mm). In order to determine the guaranteed durability, you set the technical conditions from the data ranges 1 & 2. In data range 3, you can now see that (with an assumed temperature range of -25/+90°C) with 8.3 x d the effective bending factor is above the minimum limit of 7 and therefore for that cable you have a guaranteed operation of 10 million double strokes. Should the temperature become higher or lower, the necessary factor for this guarantee level would be 8.5, meaning that the number of guaranteed double strokes is reduced to 7.5 million. This very clear statement provides reliability and planning safety for your machine and can be further refined with the **online service life calculator**.

Calculate service life online:
www.igus.eu/chainflexlife

Specific tests for specific requirements

Over 30 years of testing experience in the chainflex® laboratory

In practice, chainflex® cables also prove themselves under extreme conditions

The chainflex® laboratory specialises in tests which, apart from just theoretical procedures, also investigate real applications as they would occur in the real world of mechanical and production engineering. For more than 30 years, specific data has been collected in the largest test laboratory for moving cables, which is indispensable for determining service life and function. On a laboratory floor area of 5,500 m², 800 tests are currently running in parallel, which help to constantly monitor and improve the interplay of e-chains® and cables in dynamic applications. The combination of e-chains® and chainflex® cables on the one hand, and of e-chains® and other cables that are sold as "chain-compatible" by a large number of cable providers on the market on the other. However, it is here that questions arise for the customer as to the extent to which these cables are actually suitable for use in energy chains and what is the expected service life. The conventional standard tests give generalised answers to generalised questions. The customer, however, wants a concrete answer and solution for their specific problem, which is often not, or only partially, addressed by the normal standards. It is precisely these individual customer requirements that the igus® laboratory devotes itself to. A further consequence of our intensive research and laboratory activities is the development of standard tests and production standards for chainflex® cables for long-term use in e-chains®.

In principle, there are five main focus areas:

1. Tests of materials
In line with customer requirements, new materials for the conductors, insulation and outer jackets are developed. Differences arise that are significant but not obvious, particularly in the case of conductor and jacket materials. To this end, up to eight different chainflex® standards are used in the tests.

2. Tests of the technical design
These tests systematically evaluate new designs, manufacturing methods and the associated influences on service life. As the studies have shown, tiny differences in manufacturing processes can lead to significantly different outcomes in moving applications.

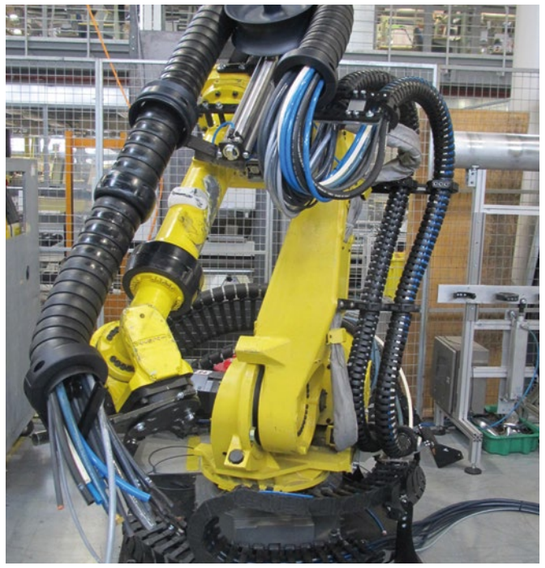
3. Quality tests during production
After production, a random number of cables are subjected to the VDE or UL standard tests, as well as other special igus® tests according to certain selection criteria. The laboratory batch tests up to 20% of all finished cables in a continuous bending test and then carries out the necessary structural examinations afterwards.

4. Long-time tests of service life
These tests have to be carried out over a period of up to 5 years and investigate the actual maximum service life of the selected cables. The focus here is on a continuous monitoring of the electrical and mechanical parameters in order to detect a failure.

5. Customer-specific applications
A special service is offered for customer-specific tests according to the igus® standard. This type of test is based on the customer-specific movement sequences and offers the significant advantage of test-defined limits and the potential for optimisation before the start of mass production.

Linear chain tests of all chainflex® cables with different radii and travels

Rotary movement tests in very demanding chain applications using igus® twisterchain®


Test for complex movements by simulating multi-axis applications on robots

The largest test lab for moving cables worldwide

... 5,500m² test laboratory with over 65 test stations, two climatic containers (40 feet each), and 200m of outdoor testing facilities ...

2 billion test strokes every year

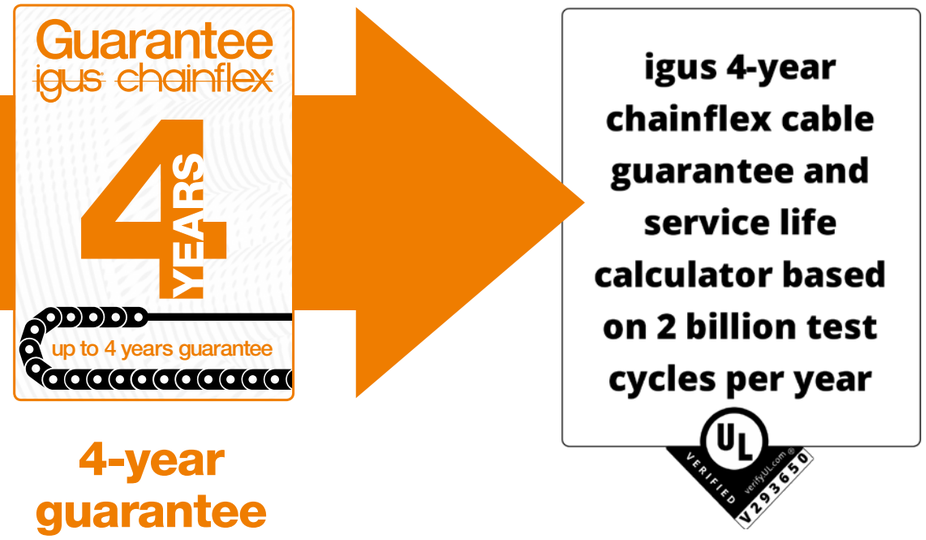
Anyone who wants to carry out systematic, comparative and reproducible tests for more than 2 billion double strokes and 1.4 million electrical measurements must invest in the necessary space and resources. On a total of 65 test stations, various test series are carried out according to the igus® test standards. The laboratory team is made up of technically qualified employees who test and monitor thousands of measuring points in e-chains® and cables over a wide range of travel lengths, in horizontal or vertical applications and always under the most real-life conditions possible. Multi-axis e-chains® such as the triflex® series from the robot range are also tested for torsional strength on special test rigs.

250 million cycles in batch testing per year

Special test equipment for special applications
In addition to the normal service life and quality tests, special test rigs are also available for custom tests. For example, abrasion and media tests for materials are carried out under more demanding experimental conditions than carried out according to UL or VDE standards for storage and aging. The optimum matching of igus® cable outer jacket materials to the energy supply system materials is vital. The influence of thermal factors on moving cables can be analysed in two special 40 foot climatic containers covering a temperature range of -40°C to +60°C. Both are equipped with a 6m long travel, which can be operated with different radii and e-chains®. In contrast to the standard VDE winding mandrel test, one can test the aging in very different temperature profiles during continuous motion in e-chains®.

... UL verified ...

... qualified monitoring of laboratory & manufacturing with UL ... certified chainflex® guarantee promise ...



4-year guarantee

Consistent monitoring and accurate test documentation
A necessary condition for successful and meaningful testing is the systematic monitoring and documentation of the results. Here, monitoring systems developed by igus® are used which, in addition to offering constant online monitoring, ensure documentation with a very high accuracy. In this way wear can also be detected before failure. This early detection - without a destructive test - allows design modifications to be made. After each test, all the cables are dissected into their elements, examined in detail and their properties documented.

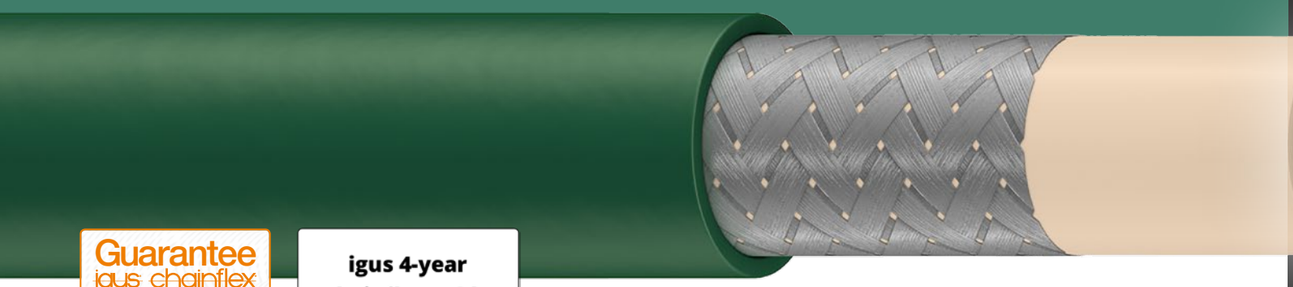
Because of these test programs, good quality data on all chainflex® cables are available and offer the user planning reliability for their cable selection.

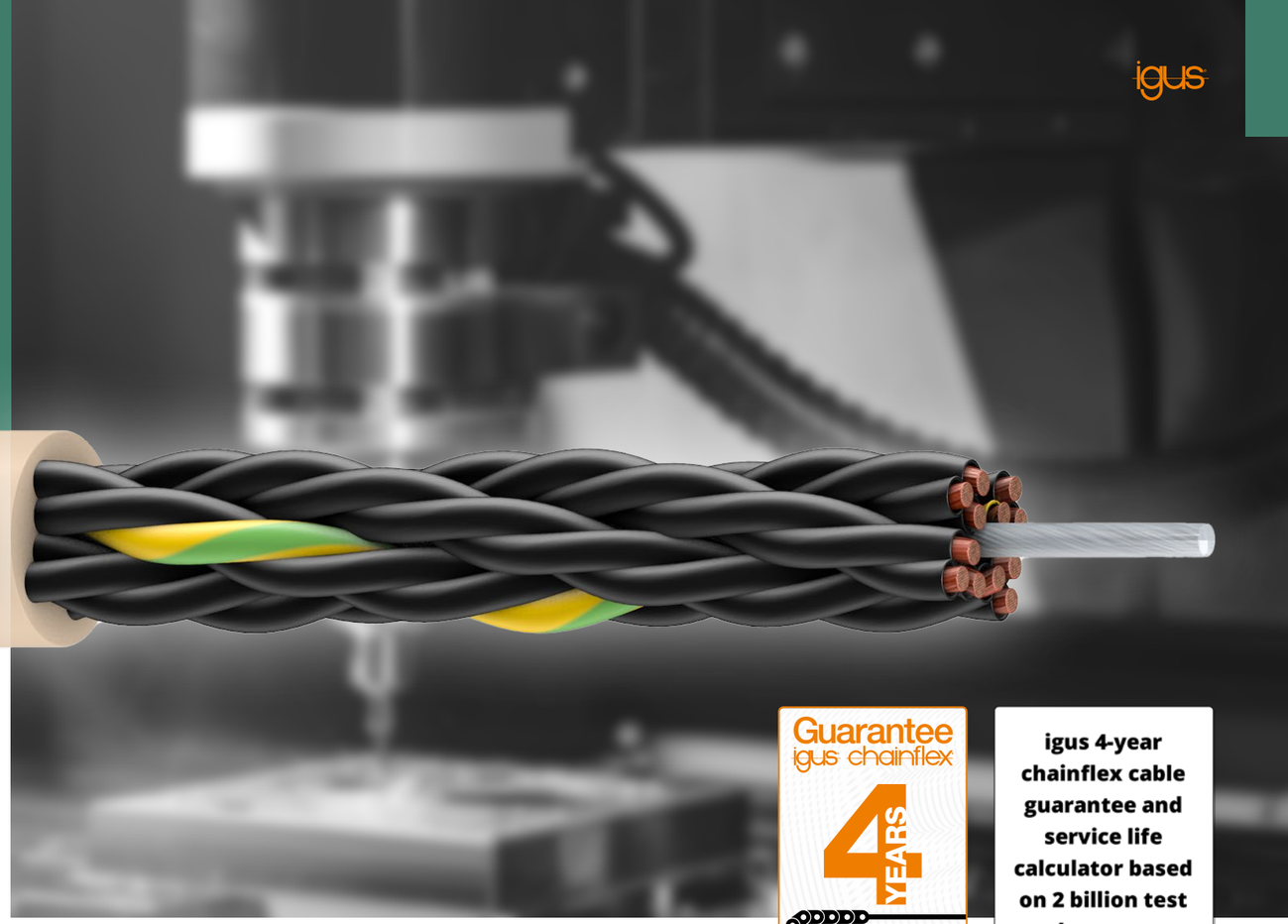
Facts and figures

- The industry‘s largest test lab for moving cables
- 30 years of experience
- 5,500m² test area
- 65 test stations
- 800 tests conducted in parallel
- 2 billion double strokes a year
- 1.4 million electric measurements per year
- Audited and certified by Underwriter Laboratories (UL)

chainflex®

Control cables





Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

Control cables for energy chains

Specially designed for use in e-chains®, for small bend radii (up to 3xd). Unshielded or shielded cables, each in different mechanical stress classes and with different outer sheath materials (PVC, PUR and TPE). Tested with a chainflex® guarantee of up to 4 years.

- Cores wound in bundles for long travel in moving applications in e-chains®
- With 6 different outer jacket materials, always find the most cost-effective control cable that is guaranteed to work in your application
- Tested in the industry's largest test laboratory (5,500m²)
- Sustainability thanks to a longer service life is practical resource protection, enhancing economic efficiency and protecting the environment
- Calculate the exact service life online: igus.eu/chainflexlife

The unique chainflex® guarantee.

Planning reliability when selecting cables

With a four-year guarantee on chainflex® cables, igus® is the only supplier that can offer genuine planning reliability when it comes to selecting cables.

This is only possible because igus® has amassed more than 30 years of experience and an enormous amount of test data in the largest test laboratory for cables and e-chains® with a 5,500m² floor area. It is at the heart of our quality and guarantee promise and ensures a comprehensive data base to provide our customers with such a unique guarantee promise.

The largest test laboratory in the industry carries out special tests under realistic conditions and collects data from over two billion test cycles with more than 1.4 million electrical measurements every year. Continuous monitoring and documentation are carried out on 65 test systems with professionally qualified personnel.

This basis of practical experience and test laboratory made the unique chainflex® guarantee possible.
In addition, the exact service life of the selected chainflex® cable in the individual application can be determined using the chainflex® service life calculator online. The test laboratory also provides the relevant database for this.

In a complex certification process, the chainflex® guarantee promise was certified together with the corresponding laboratory processes by the US institute "Underwriters Laboratories" (UL).
This makes igus® the first company to have the validity of its guarantee statement confirmed.

Seven reasons for our chainflex® cable

In the course of cable developments over the past few decades, seven principles have evolved that ensure a high-quality, long-lasting cable in an e-chain®. At igus®, we call these findings the "seven reasons".

We developed the flexible chainflex® cables in 1985 to last and not to fail after just a few strokes. In doing so, we recognized that cables used in motion have special mechanical design requirements. That is why we developed the chainflex® seven reasons, which we use in as many chainflex® cables as possible. Each of these seven reasons describes a mechanical feature that makes the cable durable in moving applications.

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

2. Movement-optimised stranded wires
Several test series have helped to determine which combination of wire diameter, pitch length and direction optimises bending resistance in cables optimised for movement. Although very flexible cables can be made using very thin individual wires, these tend towards extreme formation of kinks.

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 kilometres are then used in e-chains® applications.

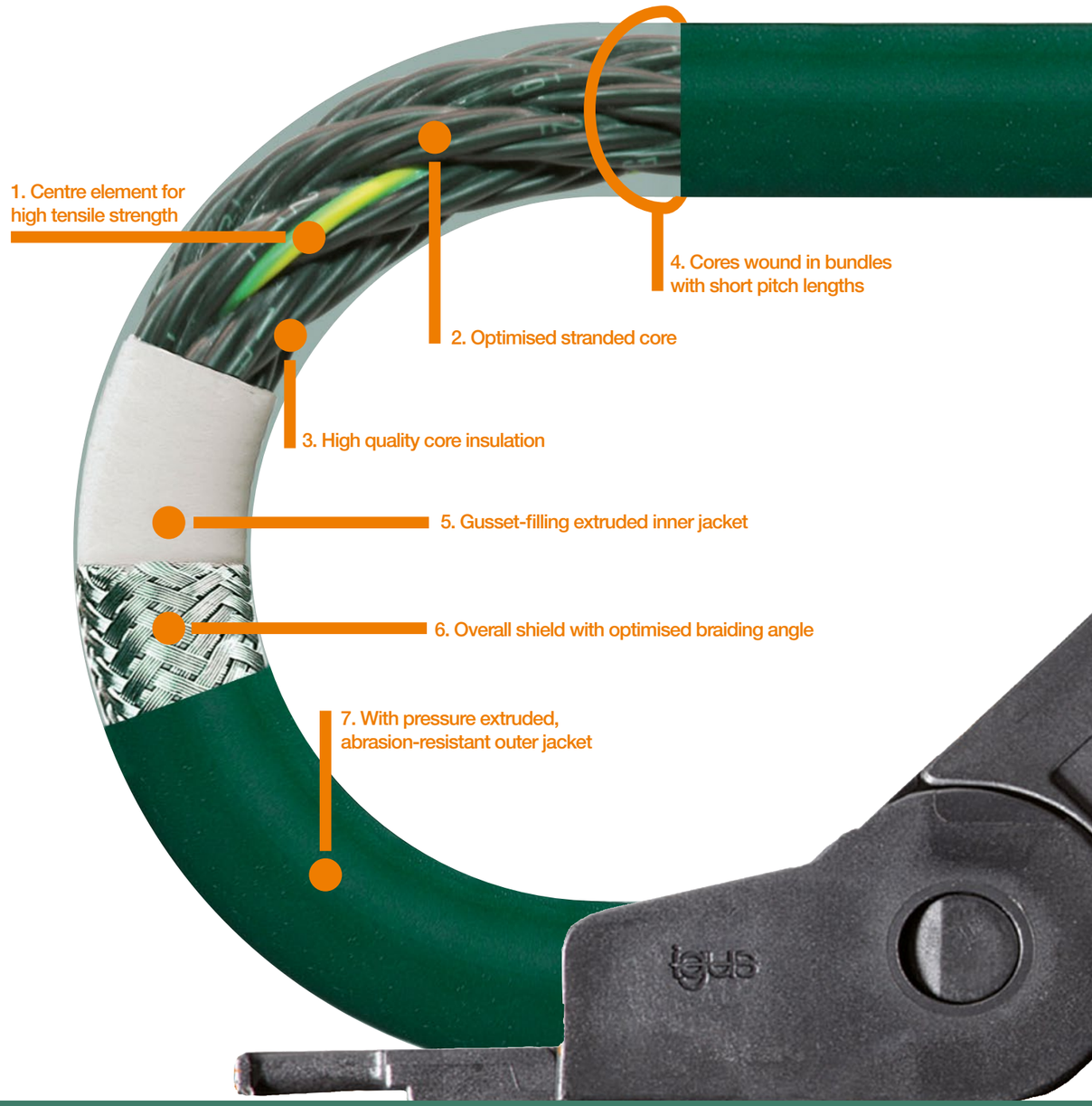
4. Structure
The structure must be wound around a stable, tension-proof centre with an optimised short pitch length. However, due to the insulating materials being used, this wound structure should still used. Starting from a quantity of 12 cores, a bundled design should be used.

5. Inner jacket
A gusset-filling extruded inner jacket must be used instead of inexpensive fleeces, fillers or accessory fillers. This measure ensures that the core structure is efficiently guided in longitudinal direction. Moreover, the wound structure cannot fall apart or wander off. Hence, the inner jacket serves as solid foundation for the shield.

6. Shielding
The overall shield should be made tight using an optimised 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 wound structure.

7. Outer jacket
An external jacket made of PVC, PUR or TPE can meet a wide range of specifications: from UV resistance through low-temperature flexibility and oil resistance to cost effectiveness. 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-filling).

In over 2 billion test cycles per year, we have acquired unique expertise in the field of e-chains® at the igus® chainflex® laboratory (5,500m²). This expertise forms the basis for the rules we have developed for extremely durable cables.



chainflex® control cables

Mechanical parameters

chainflex® cables	Jacket	Shield	Bend radius e-chain® min. [xd]	Temperature e-chain® from/to [°C]	v max. [m/s] unsupported	v max. [m/s] gliding	a max. [m/s²]	Travel distance [m]	Page
CF880	PVC		12.5	+5/+70	3	-	20	≤ 10	26
CF881	PVC	●	12.5	+5/+70	3	-	20	≤ 10	30
CF130.UL New	PVC		7.5	+5/+70	3	2	20	≤ 50	34
CF140.UL New	PVC	●	7.5	+5/+70	3	2	20	≤ 50	38
CF150.UL New	PVC		7.5	+5/+70	3	2	20	≤ 50	42
CF160.UL	PVC	●	7.5	+5/+70	3	2	20	≤ 50	46
CF5	PVC		6.8	+5/+70	10	5	80	≤ 100	50
CF6	PVC	●	6.8	+5/+70	10	5	80	≤ 100	54
CFSOFT1	PVC		5	+5/+70	10	5	80	≤ 5	58
CFSOFT2	PVC	●	5	+5/+70	10	5	80	≤ 5	60
CF890	iguPUR		12.5	-20/+80	3	-	20	≤ 10	62
CF891	iguPUR	●	12.5	-20/+80	3	-	20	≤ 10	66
CF77.UL.D	PUR		6.8	-25/+80	10	5	80	≤ 100	70
CF78.UL	PUR	●	6.8	-25/+80	10	5	80	≤ 100	74
CF2	PUR	●	5	-20/+80	10	5	80	≤ 100	78
CF9.UL	TPE		5	-35/+100	10	6	100	> 400	82
CF10.UL	TPE	●	5	-35/+100	10	6	100	> 400	86
CF9	TPE		5	-35/+100	10	6	100	> 400	90
CF10	TPE	●	5	-35/+100	10	6	100	> 400	94
CF98.PLUS	TPE		3	-35/+90	10	6	100	≤ 100	98
CF99.PLUS	TPE	●	3	-35/+90	10	6	100	≤ 100	102

Approvals/resistance

chainflex® cables	oil		PTFE free	Approvals and standards															Page
CF880			●				●			●			●	●				●	26
CF881			●				●			●			●	●				●	30
CF130.UL New		●	●				●			●			●	●	●			●	34
CF140.UL New			●				●			●			●	●	●			●	38
CF150.UL New	●	●	●		●	●	●		●	●			●	●				●	42
CF160.UL	●		●		●	●	●		●	●			●	●				●	46
CF5	●	●	●				●			●			●	●	●			●	50
CF6	●		●				●			●			●	●	●			●	54
CFSOFT1	●		●				●			●			●	●	●			●	58
CFSOFT2	●		●				●			●			●	●	●			●	60
CF890	●		●				●						●	●				●	62
CF891	●		●				●						●	●				●	66
CF77.UL.D	●	●	●				●			●		●	●	●	●		●	●	70
CF78.UL	●		●				●			●		●	●	●	●			●	74
CF2	●		●				●			●			●	●	●			●	78
CF9.UL	●	●	●				●			●		●	●	●	●			●	82
CF10.UL	●		●				●			●		●	●	●	●			●	86
CF9	●	●	●					●					●	●	●	●		●	90
CF10	●		●					●					●	●	●	●		●	94
CF98.PLUS	●	●	●										●	●	●	●		●	98
CF99.PLUS	●		●										●	●	●	●		●	102

Guaranteed service life

chainflex® cables	Temperature, from/to [°C]	Min. bend radius [xd] for travel distance < 10m	Min. bend radius [xd] for travel distance ≥ 10m	Min. bend radius [xd] for travel distance < 10m	Min. bend radius [xd] for travel distance ≥ 10m	Min. bend radius [xd] for travel distance < 10m	Min. bend radius [xd] for travel distance ≥ 10m	Page
		5 million (1 million) double strokes *		7.5 million (3 million) double strokes *		10 million (5 million) double strokes *		
CF880	+5 / +15	15	-	16	-	17	-	
	+15 / +60	12.5	-	13.5	-	14.5	-	26
	+60 / +70	15	-	16	-	17	-	
CF881	+5 / +15	15	-	16	-	17	-	
	+15 / +60	12.5	-	13.5	-	14.5	-	30
	+60 / +70	15	-	16	-	17	-	
CF130.UL New	+5 / +15	10	12.5	11	13.5	12	14.5	
	+15 / +60	7.5	10	8.5	11	9.5	12	34
	+60 / +70	10	12.5	11	13.5	12	14.5	
CF140.UL New	+5 / +15	10	12.5	11	13.5	12	14.5	
	+15 / +60	7.5	10	8.5	11	9.5	12	38
	+60 / +70	10	12.5	11	13.5	12	14.5	
CF150.UL New	+5 / +15	10	12.5	11	13.5	12	14.5	
	+15 / +60	7.5	10	8.5	11	9.5	12	42
	+60 / +70	10	12.5	11	13.5	12	14.5	
CF160.UL	+5 / +15	10	12.5	11	13.5	12	14.5	
	+15 / +60	7.5	10	8.5	11	9.5	12	46
	+60 / +70	10	12.5	11	13.5	12	14.5	
CF5	+5 / +15	7.5	10	8.5	11	9.5	12	
	+15 / +60	6.8	7.5	7.8	8.5	8.8	9.5	50
	+60 / +70	7.5	10	8.5	11	9.5	12	
CF6	+5 / +15	7.5	10	8.5	11	9.5	12	
	+15 / +60	6.8	7.5	7.8	8.5	8.8	9.5	54
	+60 / +70	7.5	10	8.5	11	9.5	12	
		10 million		15 million		20 million		
CFSOFT1	+5 / +15	6.8	-	7.5	-	8.5	-	
	+15 / +60	5	-	6	-	7	-	58
	+60 / +70	6.8	-	7.5	-	8.5	-	
CFSOFT2	+5 / +15	6.8	-	7.5	-	8.5	-	
	+15 / +60	5	-	6	-	7	-	60
	+60 / +70	6.8	-	7.5	-	8.5	-	
		5 million (1 million) double strokes *		7.5 million (3 million) double strokes *		10 million (5 million) double strokes *		
CF890	-20 / -10	15	-	16	-	17	-	
	-10 / +70	12.5	-	13.5	-	14.5	-	62
	+70 / +80	15	-	16	-	17	-	
CF891	-20 / -10	15	-	16	-	17	-	
	-10 / +70	12.5	-	13.5	-	14.5	-	66
	+70 / +80	15	-	16	-	17	-	
CF77.UL.D	-25 / -15	8.5	10	9.5	11	10.5	12	
	-15 / +70	6.8	7.5	7.5	8.5	8.5	9.5	70
	+70 / +80	7.5	10	9.5	11	10.5	12	
CF78.UL	-25 / -15	8.5	10	9.5	11	10.5	12	
	-15 / +70	6.8	7.5	7.5	8.5	8.5	9.5	74
	+70 / +80	7.5	10	9.5	11	10.5	12	
CF2	-20 / -10	6.8		7.5		8.5		
	-10 / +70	5		6.8		7.5		78
	+70 / +80	6.8		7.5		8.5		
CF9.UL	-35 / -25	6.8		7.5		10		
	-25 / +90	5		6		7		82
	+90 / +100	6.8		7.5		10		
CF10.UL	-35 / -25	6.8		7.5		8.5		
	-25 / +90	5		6		7		86
	+90 / +100	6.8		7.5		8.5		
		5 million		7.5 million		12.5 million		
CF9	-35 / -25	6.8		7.5		8.5		
	-25 / +90	5		6		7		90
	+90 / +100	6.8		7.5		8.5		
CF10	-35 / -25	6.8		7.5		8.5		
	-25 / +90	5		6		7		94
	+90 / +100	6.8		7.5		8.5		
		5 million		40 million		100 million		
CF98.PLUS	-35 / -25	4		6		7		
	-25 / +80	3		5		6		98
	+80 / +90	4		6		7		
CF99.PLUS	-35 / -25	4		6		7		
	-25 / +80	3		5		6		102
	+80 / +90	4		6		7		

* Higher number of double strokes? Calculate service life online: ▶ www.igus.eu/chainflexlife
Figures in brackets refer to series CF880, CF881, CF890 and CF891

Control cable | PVC outer jacket

chainflex® CF880

Image exemplary

5,000,000 Double strokes guaranteed

12.5 x d Bend radius, e-chain®

10m Travel distance, e-chain®

- For flexing applications
- PVC outer jacket
- Flame-retardant

Dynamic information

Bend radius	**e-chain® linear**	minimum 12.5 x d
	flexible	minimum 10 x d
	fixed	minimum 7 x d
Temperature	**e-chain® linear**	+5°C up to +70°C
	flexible	-5°C up to +70°C (following DIN EN 60811-504)
	fixed	-15°C up to +70°C (following DIN EN 50305)
v max.	**unsupported**	3m/s
a max.		20m/s²
Travel distance		Unsupported travels up to 10m, Class 1

Cable structure

Conductor	Conductor consisting of bare copper wires (according to DIN EN 60228).
Core insulation	Mechanically high-quality TPE mixture.
Core structure	Cores wound with an optimised pitch length.
Core identification	Black cores with white numbers, one green-yellow core.
Outer jacket	Low-adhesion PVC mixture, adapted to suit the requirements in e-chains®. Colour: jet black (similar to RAL 9005)

Electrical information

Nominal voltage	300/500V 300V (following UL)
Testing voltage	2,000V (following DIN EN 50395)

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 3.1.1.1

Basic requirements	low	1	2	**3**	4	5	6	7 highest
Travel distance	unsupported	**1**	2	3	4	5	6	≥ 400m
Oil resistance	none	**1**	2	3	4	highest		
Torsion	none	**1**	2	3	4	±360°		

Properties and approvals

Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF880
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	1 million	3 million	5 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
+5/+15	15	16	17
+15/+60	12.5	13.5	14.5
+60/+70	15	16	17

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For flexing applications, Class 3
- Especially for unsupported travels, Class 1
- Without influence of oil, Class 1
- No torsion, Class 1
- Preferably indoor applications
- Wood/stone processing, packaging industry, feeding, handling, adjusting devices

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Control cable | PVC outer jacket

chainflex® CF880

Class 3.1.1.1

Basic requirements	low	1	2	**3**	4	5	6	7	highest
Travel distance	unsupported	**1**	2	3	4	5	6		≥ 400m
Oil resistance	none	**1**	2	3	4				highest
Torsion	none	**1**	2	3	4				±360°

Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Shop and prices online
CF880.05.02	2x0.5	5.0	11	32	
CF880.05.03	3G0.5	5.5	16	37	
CF880.05.04	4G0.5	6.0	21	46	
CF880.05.05	5G0.5	6.5	26	55	
CF880.05.07	7G0.5	7.5	37	73	
CF880.05.12	12G0.5	8.5	63	108	
CF880.05.18	18G0.5	10.0	94	158	
CF880.05.25	25G0.5	12.0	128	227	
CF880.07.02	2x0.75	5.5	16	40	
CF880.07.03	3G0.75	6.0	24	49	
CF880.07.04	4G0.75	6.5	32	61	
CF880.07.05	5G0.75	7.0	40	73	
CF880.07.07	7G0.75	8.0	56	99	
CF880.07.12	12G0.75	10.0	94	152	
CF880.07.18	18G0.75	11.5	140	167	
CF880.07.25	25G0.75	13.5	194	284	
CF880.10.02	2x1.0	6.0	21	48	
CF880.10.03	3G1.0	6.5	32	58	
CF880.10.04	4G1.0	7.0	42	62	
CF880.10.05	5G1.0	7.5	52	86	
CF880.10.07	7G1.0	8.5	73	116	
CF880.10.12	12G1.0	10.5	124	182	
CF880.10.18	18G1.0	12.5	186	278	
CF880.10.25	25G1.0	15.0	258	393	
CF880.15.02	2x1.5	6.5	32	64	
CF880.15.03	3G1.5	7.0	47	82	
CF880.15.04	4G1.5	7.5	63	104	
CF880.15.05	5G1.5	8.5	78	120	
CF880.15.07	7G1.5	10.0	109	167	
CF880.15.12	12G1.5	12.0	186	260	
CF880.15.18	18G1.5	14.5	279	370	
CF880.15.25	25G1.5	17.5	387	514	

CF-A-0001

www.igus.eu/CF880

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Shop and prices online
CF880.25.03	3G2.5	8.5	78	120	
CF880.25.04	4G2.5	9.0	103	150	
CF880.25.05	5G2.5	10.0	129	184	
CF880.25.07	7G2.5	12.0	181	256	
CF880.25.12	12G2.5	15.0	327	414	

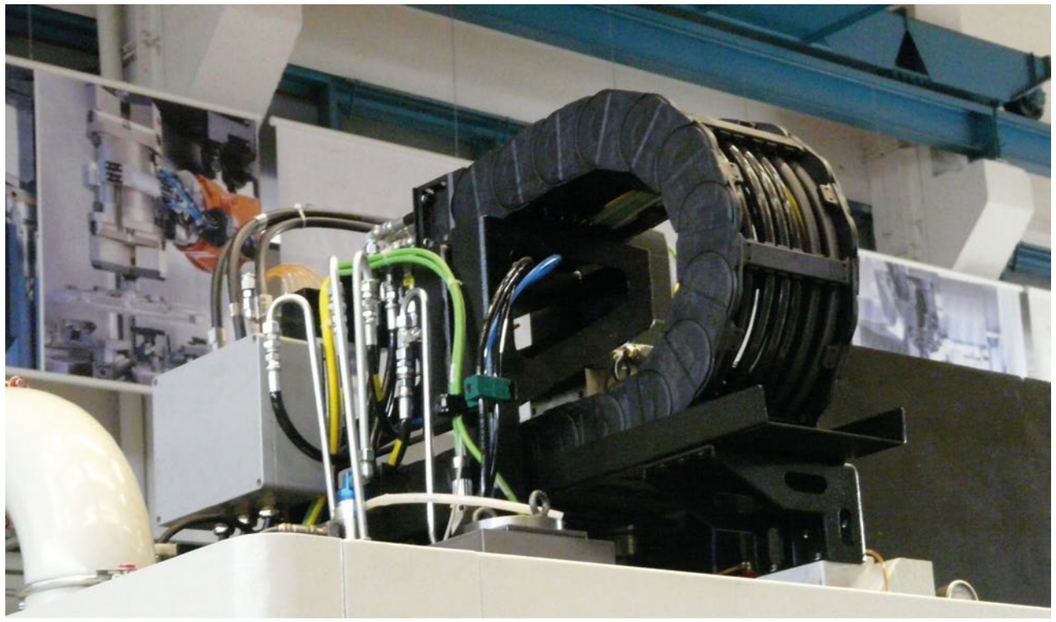
CF-A-0001

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case



chainflex® CF880 in a short travel application in woodworking

Control cable | PVC outer jacket

chainflex® CF881

Image exemplary

5,000,000 Double strokes guaranteed

12.5 x d Bend radius, e-chain®

10m Travel distance, e-chain®

- For flexing applications
- PVC outer jacket
- Shielded
- Flame-retardant

Dynamic information

Bend radius	**e-chain® linear**	minimum 12.5 x d
	flexible	minimum 10 x d
	fixed	minimum 7 x d
Temperature	**e-chain® linear**	+5°C up to +70°C
	flexible	-5°C up to +70°C (following DIN EN 60811-504)
	fixed	-15°C up to +70°C (following DIN EN 50305)
v max.	**unsupported**	3m/s
a max.		20m/s²
Travel distance		Unsupported travels up to 10m, Class 1

Cable structure

Conductor	Conductor consisting of bare copper wires (according to DIN EN 60228).
Core insulation	Mechanically high-quality TPE mixture.
Core structure	Cores wound with an optimised pitch length.
Core identification	Black cores with white numbers, one green-yellow core.
Overall shield	Braiding made of tinned copper wires. Coverage approx. 60% optical
Outer jacket	Low-adhesion PVC mixture, adapted to suit the requirements in e-chains®. Colour: jet black (similar to RAL 9005)

Electrical information

Nominal voltage	300/500V 300V (following UL)
Testing voltage	2,000V (following DIN EN 50395)

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 3.1.1.1

Basic requirements	low	1	2	**3**	4	5	6	7 highest
Travel distance	unsupported	**1**	2	3	4	5	6	≥ 400m
Oil resistance	none	**1**	2	3	4	highest		
Torsion	none	**1**	2	3	4	±360°		

Properties and approvals

Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF881
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	1 million	3 million	5 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
+5/+15	15	16	17
+15/+60	12.5	13.5	14.5
+60/+70	15	16	17

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For flexing applications, Class 3
- Especially for unsupported travels, Class 1
- Without influence of oil, Class 1
- No torsion, Class 1
- Preferably indoor applications
- Wood/stone processing, packaging industry, feeding, handling, adjusting devices

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Control cable | PVC outer jacket

chainflex® CF881

Class 3.1.1.1

Basic requirements	low	1	2	**3**	4	5	6	7	highest
Travel distance	unsupported	**1**	2	3	4	5	6		≥ 400m
Oil resistance	none	**1**	2	3	4				highest
Torsion	none	**1**	2	3	4				±360°

Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CF881.05.03	(3G0.5)C	6.0	28	47
CF881.05.04	(4G0.5)C	6.5	35	54
CF881.05.05	(5G0.5)C	7.0	41	65
CF881.05.07	(7G0.5)C	8.0	59	75
CF881.05.12	(12G0.5)C	9.0	91	125
CF881.05.18	(18G0.5)C	11.0	136	177
CF881.05.25	(25G0.5)C	13.0	210	243
CF881.07.02	(2x0.75)C	6.5	30	50
CF881.07.03	(3G0.75)C	7.0	37	66
CF881.07.04	(4G0.75)C	7.5	46	72
CF881.07.05	(5G0.75)C	8.0	61	87
CF881.07.07	(7G0.75)C	9.0	83	112
CF881.07.12	(12G0.75)C	10.5	124	170
CF881.07.18	(18G0.75)C	12.0	183	238
CF881.07.25 [11)]	(25G0.75)C	14.5	222	309
CF881.10.02	(2x1.0)C	6.5	30	52
CF881.10.03	(3G1.0)C	7.0	46	73
CF881.10.04	(4G1.0)C	7.5	63	102
CF881.10.05	(5G1.0)C	8.0	76	110
CF881.10.07	(7G1.0)C	9.5	100	130
CF881.10.12	(12G1.0)C	11.5	167	229
CF881.10.18	(18G1.0)C	13.0	213	281
CF881.10.25	(25G1.0)C	16.0	291	390
CF881.15.02	(2x1.5)C	7.5	60	71
CF881.15.03	(3G1.5)C	7.5	63	87
CF881.15.04	(4G1.5)C	8.5	90	111
CF881.15.05	(5G1.5)C	9.0	94	131
CF881.15.07	(7G1.5)C	11.0	153	183
CF881.15.12	(12G1.5)C	13.0	212	282
CF881.15.18	(18G1.5)C	15.0	399	458
CF881.15.25	(25G1.5)C	18.5	425	573
CF881.25.04	(4G2.5)C	10.0	141	163
CF881.25.05	(5G2.5)C	11.0	149	195
CF881.25.07	(7G2.5)C	13.0	204	262
CF881.25.12 [11)]	(12G2.5)C	16.0	342	428

Shop and prices online

CF-A-0002

www.igus.eu/CF881

[11)] Phase-out model

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Order example: CF881.25.25 - to your required length (0.5m steps)
CF881 chainflex® series .25 Code nominal cross section .25 Number of cores

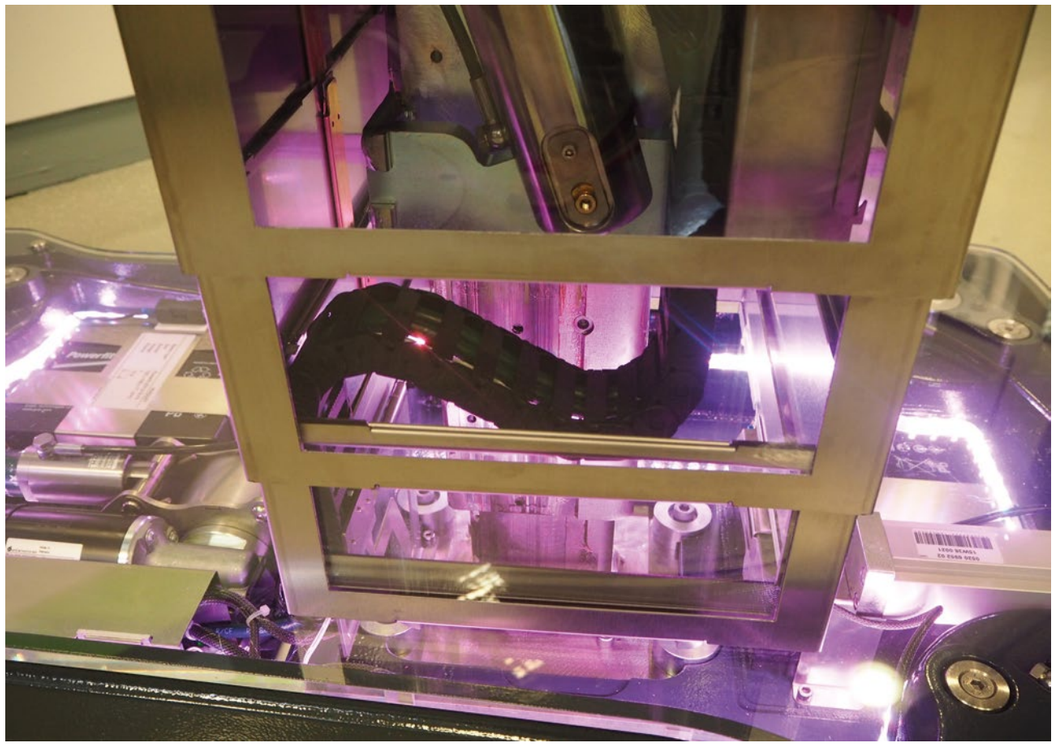
Order online ▶ www.igus.eu/CF881

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case



chainflex® CF881 in a mobile surgical table

Control cable | PVC outer jacket

chainflex® CF130.UL

Image exemplary

10 million Double strokes guaranteed

7.5 x d Bend radius, e-chain®

50m Travel distance, e-chain®

- For medium duty applications
- PVC outer jacket
- Flame-retardant

Dynamic information

Bend radius	**e-chain® linear**	minimum 7.5 x d
	flexible	minimum 6 x d
	fixed	minimum 4 x d
Temperature	**e-chain® linear**	+5°C up to +70°C
	flexible	-5°C up to +70°C (following DIN EN 60811-504)
	fixed	-15°C up to +70°C (following DIN EN 50305)
v max.	**unsupported**	3m/s
	gliding	2m/s
a max.		20m/s²
Travel distance		Unsupported travels and up to 50m for gliding applications, Class 4
Torsion		Torsion ±90°, with 1m cable length, Class 2

Cable structure

Conductor	Finely stranded conductor consisting of bare copper wires (following DIN EN 60228).
Core insulation	Mechanically high-quality TPE mixture.
Core structure	**Number of cores < 12:** Cores wound in a layer with short pitch length. **Number of cores ≥ 12:** Cores wound in bundles which are then wound around a high tensile strength centre element, all with optimised short pitch lengths and directions. Especially low-torsion structure.
Core identification	**Cores < 0.5mm²:** Colour code in accordance with DIN 47100. **Cores ≥ 0.5mm²:** Black cores with white numbers, one green-yellow core.
Outer jacket	Low-adhesion PVC mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-4-1). Colour: Silver-grey (similar to RAL 7001)
CFRIP®	Strip cables faster: a tear strip is moulded into the outer jacket Video ▶ www.igus.eu/CFRIP

Electrical information

Nominal voltage	300/500V (following DIN VDE 0298-3) 300V (following UL)
Testing voltage	2,000V (following DIN EN 50395)

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 4.4.1.2

Basic requirements	low	1	2	3	**4**	5	6	7 highest
Travel distance	unsupported	1	2	3	**4**	5	6	≥ 400m
Oil resistance	none	**1**	2	3	4	highest		
Torsion	none	1	**2**	3	4	±360°		

Properties and approvals

Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ See data sheet for details ▶ www.igus.eu/CF130UL
UL/CSA AWM	
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1, material/cable tested by IPA according to DIN EN ISO standard 14644-1
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million		7.5 million		10 million	
Temperature, from/to [°C]	< 10m	≥ 10m	< 10m	≥ 10m	< 10m	≥ 10m
	R min. [x d]	R min. [x d]	R min. [x d]	R min. [x d]	R min. [x d]	R min. [x d]
+5/+15	10	12.5	11	13.5	12	14.5
+15/+60	7.5	10	8.5	11	9.5	12
+60/+70	10	12.5	11	13.5	12	14.5

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For medium duty applications, Class 4
- Unsupported travels and up to 50m for gliding applications, Class 4
- Without influence of oil, Class 1
- Torsion ±90°, with 1m cable length, Class 2
- Preferably indoor applications
- Wood/stone processing, packaging industry, feeding, handling, adjusting devices

chainflex® CF130.UL for woodworking application. e-chain®: E4/light

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Control cable | PVC outer jacket

chainflex® CF130.UL

Strip cables 50% faster with CFRIP® tear strip

Image exemplary

Class 4.4.1.2

Basic requirements	low	1	2	3	**4**	5	6	7 highest
Travel distance	unsupported	1	2	3	**4**	5	6	≥ 400m
Oil resistance	none	**1**	2	3	4	highest		
Torsion	none	1	**2**	3	4	±360°		

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Shop and prices online
CF130.02.03.UL	3x0.25	5.0	9	26	
CF130.02.04.UL	4x0.25	5.5	11	35	
CF130.02.06.UL	6x0.25	6.0	16	48	
CF130.02.07.UL	7x0.25	6.5	19	56	
CF130.02.12.UL	12x0.25	8.5	33	96	
CF130.02.18.UL	18x0.25	10.0	46	123	
CF130.02.20.UL	20x0.25	10.5	51	145	
CF130.02.25.UL	25x0.25	11.5	66	164	
CF130.02.30.UL	30x0.25	12.5	75	188	
CF130.03.02.UL	2x0.34	5.0	8	27	
CF130.03.05.UL	5x0.34	6.0	18	42	
CF130.05.02.UL	2x0.5	5.5	11	38	
CF130.05.03.UL	3G0.5	5.5	16	40	
CF130.05.04.UL	4G0.5	6.0	21	47	
CF130.05.05.UL	5G0.5	6.5	26	56	
CF130.05.07.UL	7G0.5	7.5	37	76	
CF130.05.12.UL	12G0.5	10.0	63	140	
CF130.05.18.UL	18G0.5	12.0	94	192	
CF130.05.25.UL	25G0.5	13.5	129	259	
CF130.07.02.UL	2x0.75	6.0	16	48	
CF130.07.03.UL	3G0.75	6.0	23	50	
CF130.07.04.UL	4G0.75	6.5	31	60	
CF130.07.05.UL	5G0.75	7.0	38	70	
CF130.07.07.UL	7G0.75	8.0	54	96	
CF130.07.12.UL	12G0.75	11.0	91	175	
CF130.07.18.UL	18G0.75	13.5	134	248	
CF130.07.25.UL	25G0.75	16.0	186	346	
CF130.07.36.UL	36G0.75	19.0	293	531	
CF130.07.42.UL	42G0.75	21.0	341	608	
CF130.10.02.UL	2x1.0	6.0	21	55	
CF130.10.03.UL	3G1.0	6.5	31	61	
CF130.10.04.UL	4G1.0	7.0	41	74	
CF130.10.05.UL	5G1.0	7.5	50	87	
CF130.10.07.UL	7G1.0	9.0	71	118	
CF130.10.12.UL	12G1.0	12.5	120	228	
CF130.10.18.UL	18G1.0	15.0	179	308	
CF130.10.25.UL	25G1.0	17.5	248	410	

CF-A-0003

www.igus.eu/CF130UL

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Shop and prices online
CF130.15.02.UL	2x1.5	6.5	31	71	
CF130.15.03.UL	3G1.5	7.0	46	76	
CF130.15.04.UL	4G1.5	8.0	61	93	
CF130.15.05.UL	5G1.5	8.5	75	111	
CF130.15.07.UL [17]	7G1.5	10.5	105	166	
CF130.15.12.UL	12G1.5	13.0	179	288	
CF130.15.18.UL	18G1.5	17.0	268	438	
CF130.15.25.UL	25G1.5	19.5	371	563	
CF130.15.36.UL	36G1.5	23.0	579	887	
CF130.25.03.UL	3G2.5	8.5	75	118	
CF130.25.04.UL	4G2.5	9.5	100	149	
CF130.25.07.UL [17]	7G2.5	12.0	174	250	
CF130.25.12.UL	12G2.5	16.5	297	445	
CF130.40.03.UL	3G4.0	10.0	119	209	
New **CF130.40.04.UL**	4G4.0	11.0	159	245	
CF130.40.05.UL	5G4.0	12.0	198	294	
CF130.60.04.UL	4G6.0	13.0	237	392	
CF130.60.05.UL	5G6.0	14.0	299	471	

CF-A-0003

www.igus.eu/CF130UL

[17] When using the cables with "7G1.5mm²" and "7G2.5mm²" minimum bend radius must be 17.5xd with gliding travel distance ≥ 5m.

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

CFRIP

PTFE FREE

NFPA

REACH

RoHS

Clean-Room

CE

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Control cable | PVC outer jacket

chainflex® CF140.UL

Image exemplary

10 million Double strokes guaranteed

7.5 x d Bend radius, e-chain®

50m Travel distance, e-chain®

- For medium duty applications
- PVC outer jacket
- Shielded
- Flame-retardant

Dynamic information

Bend radius	**e-chain® linear**	minimum 7.5 x d
	flexible	minimum 6 x d
	fixed	minimum 4 x d
Temperature	**e-chain® linear**	+5°C up to +70°C
	flexible	-5°C up to +70°C (following DIN EN 60811-504)
	fixed	-15°C up to +70°C (following DIN EN 50305)
v max.	**unsupported**	3m/s
	gliding	2m/s
a max.		20m/s²
Travel distance		Unsupported travels and up to 50m for gliding applications, Class 4

Cable structure

Conductor	Finely stranded conductor consisting of bare copper wires (following DIN EN 60228).
Core insulation	Mechanically high-quality TPE mixture.
Core structure	**Number of cores < 12:** Cores wound in a layer with short pitch length. **Number of cores ≥ 12:** Cores wound in bundles which are then wound around a high tensile strength centre element, all with optimised short pitch lengths and directions. Especially low-torsion structure.
Core identification	**Cores < 0.5mm²:** Colour code in accordance with DIN 47100. **Cores ≥ 0.5mm²:** Black cores with white numbers, one green-yellow core.
Inner jacket	PVC mixture adapted to suit the requirements in e-chains®.
Overall shield	Bending-resistant braiding made of tinned copper wires. Coverage linear approx. 55%, optical approx. 80%
Outer jacket	Low-adhesion PVC mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-4-1). Colour: Silver-grey (similar to RAL 7001)
CFRIP®	Strip cables faster: a tear strip is moulded into the inner jacket Video ▶ www.igus.eu/CFRIP

Electrical information

Nominal voltage	300/500V (following DIN VDE 0298-3) 300V (following UL)
Testing voltage	2,000V (following DIN EN 50395)

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 4.4.1.1

Basic requirements	low	1	2	3	**4**	5	6	7 highest
Travel distance	unsupported	1	2	3	**4**	5	6	≥ 400m
Oil resistance	none	**1**	2	3	4	highest		
Torsion	none	**1**	2	3	4	±360°		

Properties and approvals

Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF140UL
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF130.15.07 - tested by IPA according to standard DIN EN ISO 14644-1
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million		7.5 million		10 million	
Temperature, from/to [°C]	< 10m	≥ 10m	< 10m	≥ 10m	< 10m	≥ 10m
	R min. [x d]	R min. [d]	R min. [x d]	R min. [x d]	R min. [x d]	R min. [x d]
+5/+15	10	12.5	11	13.5	12	14.5
+15/+60	7.5	10	8.5	11	9.5	12
+60/+70	10	12.5	11	13.5	12	14.5

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For medium duty applications, Class 4
- Unsupported travels and up to 50m for gliding applications, Class 4
- Without influence of oil, Class 1
- No torsion, Class 1
- Preferably indoor applications
- Wood/stone processing, packaging industry, feeding, handling, adjusting devices

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Control cable | PVC outer jacket

chainflex® CF140.UL

Strip cables 50% faster with CFRIP® tear strip

Image exemplary

Class 4.4.1.1

Basic requirements	low	1	2	3	**4**	5	6	7	highest
Travel distance	unsupported	1	2	3	**4**	5	6		≥ 400m
Oil resistance	none	**1**	2	3	4				highest
Torsion	none	**1**	2	3	4				±360°

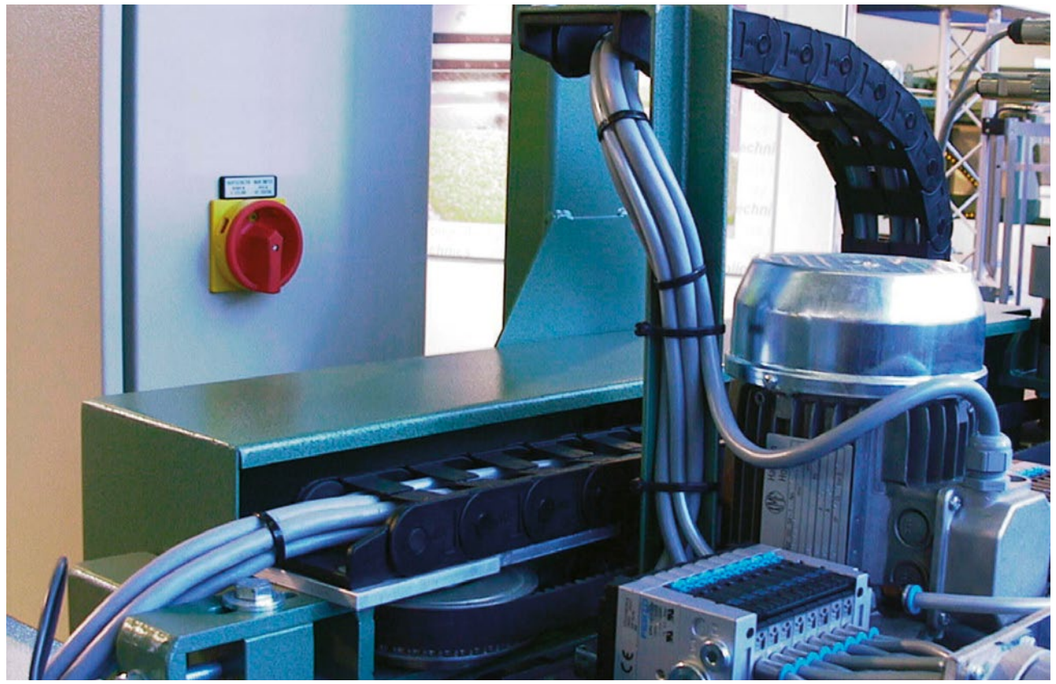
	Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Shop and prices online
	CF140.02.12.UL	(12x0.25)C	10.5	72	133	
	CF140.03.05.UL	(5x0.34)C	7.5	36	72	
	CF140.05.03.UL	(3G0.5)C	7.0	33	72	
New	CF140.05.04.UL	(4G0.5)C	7.5	38	81	
	CF140.05.05.UL	(5G0.5)C	8.0	45	91	
	CF140.05.18.UL	(18G0.5)C	14.5	147	258	
	CF140.05.36.UL	(36G0.5)C	18.5	258	468	
	CF140.07.03.UL	(3G0.75)C	8.0	42	85	
	CF140.07.04.UL	(4G0.75)C	8.5	51	102	
	CF140.07.05.UL	(5G0.75)C	9.0	61	115	
	CF140.07.07.UL	(7G0.75)C	10.0	83	152	
	CF140.07.12.UL	(12G0.75)C	13.0	136	263	
	CF140.07.18.UL	(18G0.75)C	15.5	194	359	
	CF140.07.25.UL	(25G0.75)C	18.0	261	479	
	CF140.10.02.UL	(2x1.0)C	8.0	35	86	
	CF140.10.03.UL	(3G1.0)C	8.5	51	105	
	CF140.10.04.UL	(4G1.0)C	9.0	62	118	
	CF140.10.05.UL	(5G1.0)C	9.5	74	136	
	CF140.10.07.UL	(7G1.0)C	10.5	104	176	
	CF140.10.12.UL	(12G1.0)C	14.0	166	300	
	CF140.10.18.UL	(18G1.0)C	16.5	240	413	
	CF140.10.25.UL	(25G1.0)C	19.5	325	562	
	CF140.15.03.UL	(3G1.5)C	9.0	68	126	
	CF140.15.04.UL	(4G1.5)C	9.5	86	146	
	CF140.15.05.UL	(5G1.5)C	9.5	108	168	
	CF140.15.07.UL [17)]	(7G1.5)C	11.5	144	226	
	CF140.15.12.UL	(12G1.5)C	16.0	233	387	
	CF140.15.18.UL	(18G1.5)C	19.0	346	463	
	CF140.15.25.UL	(25G1.5)C	22.5	464	737	
	CF140.15.36.UL	(36G1.5)C	26.5	663	1150	
	CF140.25.03.UL	(3G2.5)C	10.5	106	202	
	CF140.25.04.UL	(4G2.5)C	11.5	140	210	

CF-A-0004

www.igus.eu/CF140UL

[17)] When using the cables with "7G1.5mm²" and "7G2.5mm²" minimum bend radius must be 17.5xd with gliding travel distance ≥ 5m.

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core



chainflex® CF140.UL in a feeder application. e-chain®: easychain®

chainflex CASE

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

CFRIP

PTFE FREE

REACH

RoHS

Clean-Room

CE

Control cable | PVC outer jacket

chainflex® CF150.UL

Image exemplary

10 million Double strokes guaranteed

7.5 x d Bend radius, e-chain®

50m Travel distance

- For medium duty applications
- PVC outer jacket
- Oil-resistant
- Flame-retardant
- TC-ER (Power and Control Tray Cable)
- UL-listed

UL	CSA:
TC-ER UL 1277	C(UL) CIC/TC
MTW UL 1063	
WTTC UL 2277	**Specifications:**
DP-1 UL 1690	OIL RES I / SUN RES
AWM 2587	75°C wet ≥2.5mm²
	90°C dry
	DIR BUR ≥2.5mm²

Dynamic information

Bend radius	**e-chain® linear**	minimum 7.5 x d
	flexible	minimum 6 x d
	fixed	minimum 4 x d
Temperature	**e-chain® linear**	+5°C up to +70°C
	flexible	-5°C up to +70°C (following DIN EN 60811-504)
	fixed	-15°C up to +70°C (following DIN EN 50305)
v max.	**unsupported**	3m/s
	gliding	2m/s
a max.		20m/s²
Travel distance		Unsupported travels and up to 50m for gliding applications, Class 4
Torsion		Torsion ±90°, with 1m cable length, Class 2

Cable structure

Conductor	Finely stranded conductor consisting of bare copper wires (following DIN EN 60228).
Core insulation	Mechanically high-quality PVC/PA mixture.
Core structure	**Number of cores < 12:** Cores wound in a layer with short pitch length. **Number of cores ≥ 12:** Cores wound in bundles which are then wound around a high tensile strength centre element, all with optimised short pitch lengths and directions. Especially low-torsion structure.
Core identification	Black cores with white numbers, one green-yellow core.
Outer jacket	Low-adhesion, oil-resistant PVC mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-4-1) Colour: jet black (similar to RAL 9005)
CFRIP®	Strip cables faster: a tear strip is moulded into the outer jacket Video ▶ www.igus.eu/CFRIP

Electrical information

Nominal voltage	300/500V (following DIN VDE 0298-3) 600V TC-ER, 1000V WTTC, 600V MTW, 600V AWM
Testing voltage	2,000V (following DIN EN 50395)

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 4.4.2.2

Basic requirements	low	1	2	3	**4**	5	6	7	highest
Travel distance	unsupported	1	2	3	**4**	5	6		≥ 400m
Oil resistance	none	1	**2**	3	4				highest
Torsion	none	1	**2**	3	4				±360°

Properties and approvals

UV resistance	Medium
Oil resistance	Oil resistant (according to DIN EN 50363-4-1), UL Oil Res I, Class 2
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame, FT4
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL-listed	TC-ER UL 1277, WTTC UL 2277, MTW UL W63
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF150UL
NEC	In accordance with Article 501 Part II 501.10(B) Class I Division 2 and Article 502 Part II 502.10(B), TC-ER cables may be used in Class I and Class II, Division 2 hazardous areas.
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II)
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million		7.5 million		10 million	
Temperature, from/to [°C]	< 10m	≥ 10m	< 10m	≥ 10m	< 10m	≥ 10m
	R min. [x d]	R min. [x d]	R min. [x d]	R min. [x d]	R min. [x d]	R min. [x d]
+5/+15	10	12.5	11	13.5	12	14.5
+15/+60	7.5	10	8.5	11	9.5	12
+60/+70	10	12.5	11	13.5	12	14.5

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For medium duty applications, Class 4
- Unsupported travels and up to 50m for gliding applications, Class 4
- Light oil influence, Class 2
- Torsion ±90°, with 1m cable length, Class 2
- Preferably indoor applications, but also outdoor ones at temperatures > 5 °C
- Storage and retrieval units for high-bay warehouses, machining units/packaging machines, quick handling, indoor cranes, laying of cables on cable trays

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Control cable | PVC outer jacket

chainflex® CF150.UL

Strip cables 50% faster with CFRIP® tear strip

Class 4.4.2.2

Basic requirements	low	1	2	3	**4**	5	6	7	highest
Travel distance	unsupported	1	2	3	**4**	5	6		≥ 400m
Oil resistance	none	1	**2**	3	4				highest
Torsion	none	1	**2**	3	4				±360°

Image exemplary

	Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
	CF150.UL.10.03	3G1.0	8.0	30	78
	CF150.UL.10.04	4G1.0	8.5	40	94
	CF150.UL.10.05	5G1.0	9.0	50	112
	CF150.UL.10.07	7G1.0	10.5	70	155
	CF150.UL.10.12	12G1.0	15.0	119	281
	CF150.UL.10.18	18G1.0	19.0	178	425
	CF150.UL.15.03	3G1.5	8.5	45	98
	CF150.UL.15.04	4G1.5	9.0	60	122
	CF150.UL.15.05	5G1.5	10.0	75	148
	CF150.UL.15.07 [17]	7G1.5	12.0	104	205
	CF150.UL.15.12	12G1.5	16.5	178	365
	CF150.UL.15.18	18G1.5	21.0	267	529
New	**CF150.UL.15.25**	25G1.5	24.5	371	746
	CF150.UL.25.03	3G2.5	9.5	75	133
	CF150.UL.25.04	4G2.5	10.0	100	164
	CF150.UL.25.05	5G2.5	11.0	124	200
	CF150.UL.25.07 [17]	7G2.5	13.5	173	291
	CF150.UL.25.12	12G2.5	18.5	297	502
	CF150.UL.25.18	18G2.5	24.5	445	808

Shop and prices online

www.igus.eu/CF150UL

[17] When using the cables with "7G1.5mm²" and "7G2.5mm²" minimum bend radius must be 17.5xd with gliding travel distance ≥ 5m.

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Order example: CF150.UL.10.03 - to your required length (0.5m steps)
CF150.UL chainflex® series .10 Code nominal cross section .03 Number of cores

Order online ▶ www.igus.eu/CF150UL

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

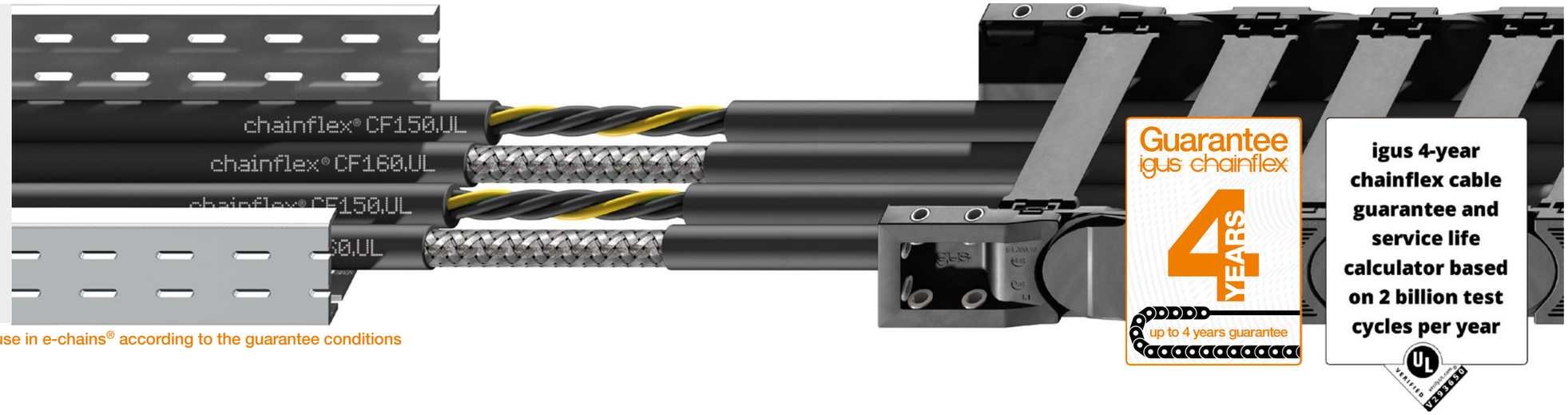
More on this online: www.igus.eu/cf-case

The only* UL-listed MTW/TC-ER cable for e-chain® AND cable tray

UL
TC-ER UL 1277
MTW UL 1063
WTTC UL 2277
DP-1 UL 1690
AWM 2587

CSA:
C(UL) CIC/TC

Specifications:
OIL RES I / SUN RES
75°C wet ≥2.5mm²
90°C dry
DIR BUR ≥2.5mm²



* with guaranteed service life for use in e-chains® according to the guarantee conditions

Control cable | PVC outer jacket

chainflex® CF160.UL

Image exemplary

10 million Double strokes guaranteed

7.5 x d Bend radius, e-chain®

50m Travel distance

- For medium duty applications
- PVC outer jacket
- Shielded
- Oil-resistant
- Flame-retardant
- TC-ER (Power and Control Tray Cable)
- UL-listed

UL	CSA:
TC-ER UL 1277	C(UL) CIC/TC
MTW UL 1063	
WTTC UL 2277	**Specifications:**
DP-1 UL 1690	OIL RES I / SUN RES
AWM 2587	75°C wet ≥ 2.5mm²
	90°C dry
	DIR BUR ≥ 2.5mm²

Dynamic information

Bend radius	**e-chain® linear**	minimum 7.5 x d
	flexible	minimum 6 x d
	fixed	minimum 4 x d
Temperature	**e-chain® linear**	+5°C up to +70°C
	flexible	-5°C up to +70°C (following DIN EN 60811-504)
	fixed	-15°C up to +70°C (following DIN EN 50305)
v max.	**unsupported**	3m/s
	gliding	2m/s
a max.		20m/s²
Travel distance		Unsupported travels and up to 50m for gliding applications, Class 4

Cable structure

Conductor	Finely stranded conductor consisting of bare copper wires (following DIN EN 60228).
Core insulation	Mechanically high-quality PVC/PA mixture.
Core structure	**Number of cores < 12:** Cores wound in a layer with short pitch length. **Number of cores ≥ 12:** Cores wound in bundles which are then wound around a high tensile strength centre element, all with optimised short pitch lengths and directions. Especially low-torsion structure.
Core identification	Black cores with white numbers, one green-yellow core.
Inner jacket	PVC mixture adapted to suit the requirements in e-chains®.
Overall shield	Bending-resistant braiding made of tinned copper wires. Coverage linear approx. 55%, optical approx. 80%
Outer jacket	Low-adhesion, oil-resistant PVC mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-4-1) Colour: jet black (similar to RAL 9005)
CFRIP®	Strip cables faster: a tear strip is moulded into the inner jacket Video ▶ www.igus.eu/CFRIP

Electrical information

Nominal voltage	300/500V (following DIN VDE 0298-3) 600V TC-ER, 1000V WTTC, 600V MTW, 600V AWM
Testing voltage	2,000V (following DIN EN 50395)

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 4.4.2.1

Basic requirements	low	1	2	3	**4**	5	6	7	highest
Travel distance	unsupported	1	2	3	**4**	5	6	≥ 400m	
Oil resistance	none	1	**2**	3	4	highest			
Torsion	none	**1**	2	3	4	±360°			

Properties and approvals

UV resistance	Medium
Oil resistance	Oil resistant (according to DIN EN 50363-4-1), UL Oil Res I, Class 2
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame, FT4
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL-listed	TC-ER UL 1277, WTTC UL 2277, MTW UL W63
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF160UL
NEC	In accordance with Article 501 Part II 501.10(B) Class I Division 2 and Article 502 Part II 502.10(B), TC-ER cables may be used in Class I and Class II, Division 2 hazardous areas.
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II)
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million		7.5 million		10 million	
Temperature, from/to [°C]	< 10m	≥ 10m	< 10m	≥ 10m	< 10m	≥ 10m
	R min. [x d]	R min. [x d]	R min. [x d]	R min. [x d]	R min. [x d]	R min. [x d]
+5/+15	10	12.5	11	13.5	12	14.5
+15/+60	7.5	10	8.5	11	9.5	12
+60/+70	10	12.5	11	13.5	12	14.5

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For medium duty applications, Class 4
- Unsupported travels and up to 50m for gliding applications, Class 4
- Light oil influence, Class 2
- Preferably indoor applications, but also outdoor ones at temperatures > 5 °C
- Storage and retrieval units for high-bay warehouses, machining units/packaging machines, quick handling, indoor cranes, laying of cables on cable trays

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Control cable | PVC outer jacket

chainflex® CF160.UL

Strip cables 50% faster with CFRIP® tear strip

Basic requirements: low 1 2 3 **4** 5 6 7 highest
Travel distance: unsupported 1 2 3 **4** 5 6 ≥ 400m
Oil resistance: none 1 **2** 3 4 highest
Torsion: none **1** 2 3 4 ±360°

Class 4.4.2.1

Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CF160.UL.10.03	(3G1.0)C	9.5	53	121
CF160.UL.10.04	(4G1.0)C	10.0	66	143
CF160.UL.10.05	(5G1.0)C	11.0	77	164
CF160.UL.10.07	(7G1.0)C	12.5	107	220
CF160.UL.10.12	(12G1.0)C	18.5	177	389
CF160.UL.10.18	(18G1.0)C	23.5	280	648
CF160.UL.15.03	(3G1.5)C	10.0	72	149
CF160.UL.15.04	(4G1.5)C	11.0	89	175
CF160.UL.15.05	(5G1.5)C	12.0	105	204
CF160.UL.15.07 [17)]	(7G1.5)C	13.5	140	271
CF160.UL.15.12	(12G1.5)C	20.0	243	478
CF160.UL.15.18	(18G1.5)C	25.5	373	762
CF160.UL.25.03	(3G2.5)C	11.0	103	185
CF160.UL.25.04	(4G2.5)C	12.0	129	219
CF160.UL.25.05	(5G2.5)C	13.0	159	264
CF160.UL.25.07 [17)]	(7G2.5)C	14.5	223	361
CF160.UL.25.12	(12G2.5)C	23.5	389	688
CF160.UL.25.18	(18G2.5)C	29.5	573	1092

Shop and prices online

CF-A-0006

www.igus.eu/CF160UL

[17)] When using the cables with "7G1.5mm²" and "7G2.5mm²" minimum bend radius must be 17.5xd with gliding travel distance ≥ 5m.

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Order example: CF160.UL.10.03 - to your required length (0.5m steps)
CF160.UL chainflex® series .10 Code nominal cross section .03 Number of cores

Order online ▶ www.igus.eu/CF160UL

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

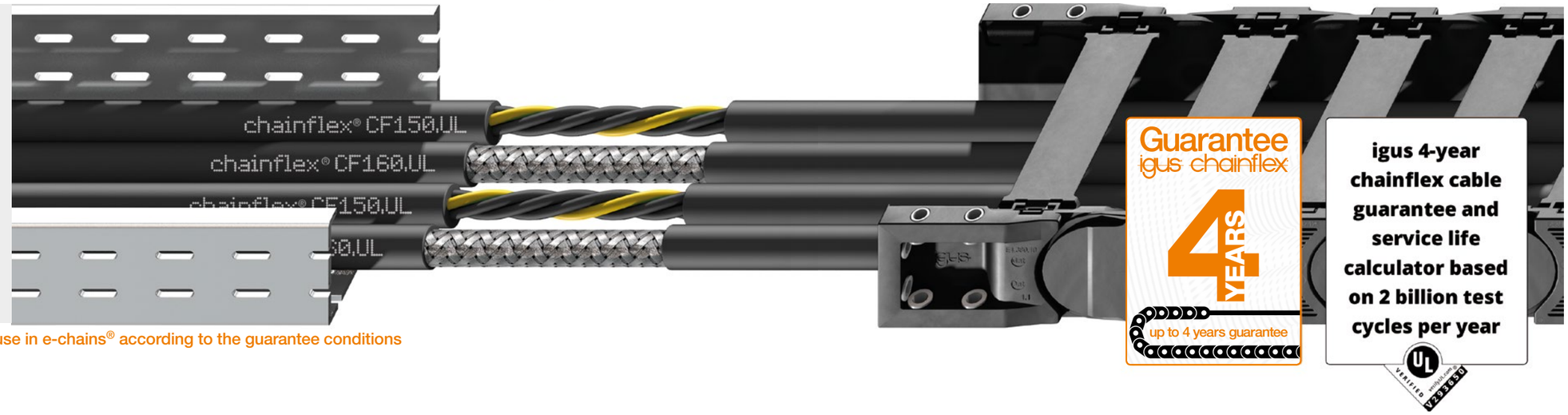
More on this online: www.igus.eu/cf-case

The only* UL-listed MTW/TC-ER cable for e-chain® AND cable tray

UL
TC-ER UL 1277
MTW UL 1063
WTTC UL 2277
DP-1 UL 1690
AWM 2587

CSA:
C(UL) CIC/TC

Specifications:
OIL RES I / SUN RES
75°C wet ≥2.5mm²
90°C dry
DIR BUR ≥2.5mm²



* with guaranteed service life for use in e-chains® according to the guarantee conditions

Control cable | PVC outer jacket

chainflex® CF5

Image exemplary

10 million Double strokes guaranteed

6.8 x d Bend radius, e-chain®

100m Travel distance, e-chain®

- For heavy duty applications
- PVC outer jacket
- Oil-resistant
- Flame-retardant

Dynamic information

Bend radius	**e-chain® linear**	minimum 6.8 x d
	flexible	minimum 5 x d
	fixed	minimum 4 x d
Temperature	**e-chain® linear**	+5°C up to +70°C
	flexible	-5°C up to +70°C (following DIN EN 60811-504)
	fixed	-15°C up to +70°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	5m/s
a max.		80m/s²
Travel distance		Unsupported travels and up to 100m for gliding applications, Class 5
Torsion		Torsion ±90°, with 1m cable length, Class 2

Cable structure

Conductor	Finely stranded conductor consisting of bare copper wires (following DIN EN 60228).
Core insulation	**Cores ≤ 0.5mm²:** mechanically high-quality TPE mixture. **Cores ≥ 0.75mm²:** mechanically high-quality PVC mixture.
Core structure	**Number of cores < 12:** Cores wound in a layer with short pitch length. **Number of cores ≥ 12:** Cores wound in bundles which are then wound around a high tensile strength centre element, all with optimised short pitch lengths and directions. Especially low-torsion structure.
Core identification	**Cores < 0.5mm²:** Colour code in accordance with DIN 47100. **Cores ≥ 0.5mm²:** Black cores with white numbers, one green-yellow core.
Outer jacket	Low-adhesion, oil-resistant PVC mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-4-1). Colour: Moss green (similar to RAL 6005)
CFRIP®	Strip cables faster: a tear strip is moulded into the outer jacket Video ▶ www.igus.eu/CFRIP

Electrical information

Nominal voltage	300/500V (following DIN VDE 0298-3) 600V (following UL)
Testing voltage	2,000V (following DIN EN 50395)

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 5.5.2.2

Basic requirements	low	1	2	3	4	**5**	6	7	highest
Travel distance	unsupported	1	2	3	4	**5**	6		≥ 400m
Oil resistance	none	1	**2**	3	4				highest
Torsion	none	1	**2**	3	4				±360°

Properties and approvals

UV resistance	Medium
Oil resistance	Oil-resistant (following DIN EN 50363-4-1), Class 2
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF5
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 2, material/cable tested by IPA according to ISO standard 14644-1
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million		7.5 million		10 million	
Temperature, from/to [°C]	< 10m	≥ 10m	< 10m	≥ 10m	< 10m	≥ 10m
	R min. [x d]	R min. [x d]	R min. [x d]	R min. [x d]	R min. [x d]	R min. [x d]
+5/+15	7.5	10	8.5	11	9.5	12
+15/+60	6.8	7.5	7.8	8.5	8.8	9.5
+60/+70	7.5	10	8.5	11	9.5	12

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For heavy-duty applications, Class 5
- Unsupported travels and up to 100m for gliding applications, Class 5
- Light oil influence, Class 2
- Torsion ±90°, with 1m cable length, Class 2
- Preferably indoor applications, but also outdoor ones at temperatures > 5 °C
- Storage and retrieval units, machining units/packaging machines, quick handling, indoor cranes

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Control cable | PVC outer jacket

chainflex® CF5

Strip cables 50% faster with CFRIP® tear strip

Image exemplary

Class 5.5.2.2

Basic requirements	low	1	2	3	4	**5**	6	7	highest
Travel distance	unsupported	1	2	3	4	**5**	6		≥ 400m
Oil resistance	none	1	**2**	3	4				highest
Torsion	none	1	**2**	3	4				±360°

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Shop and prices online
CF5.02.36	36x0.25	15.0	99	209	
CF5.03.15	15x0.34	11.0	55	113	
CF5.03.18	18x0.34	12.0	67	143	
CF5.03.25	25x0.34	14.0	92	194	
CF5.05.02	2x0.5	6.0	11	38	
CF5.05.03	3G0.5	6.0	16	41	
CF5.05.04	4G0.5	6.5	21	47	
CF5.05.05	5G0.5	7.0	25	59	
CF5.05.07	7G0.5	8.0	36	78	
CF5.05.12	12G0.5	11.0	61	131	
CF5.05.18	18G0.5	13.0	91	190	
CF5.05.25	25G0.5	16.0	124	281	
CF5.05.30	30G0.5	18.0	149	325	
CF5.07.03	3G0.75	6.5	23	54	
CF5.07.04	4G0.75	7.0	32	67	
CF5.07.05	5G0.75	7.5	39	82	
CF5.07.07	7G0.75	9.0	56	115	
CF5.07.12	12G0.75	12.5	91	189	
CF5.07.18	18G0.75	15.0	134	269	
CF5.07.25	25G0.75	17.5	190	384	
CF5.07.36	36G0.75	22.0	267	587	
CF5.07.42	42G0.75	23.5	313	745	
CF5.10.03	3G1.0	6.5	31	56	
CF5.10.04	4G1.0	7.0	41	78	
CF5.10.05	5G1.0	8.0	50	94	
CF5.10.07	7G1.0	9.5	74	130	
CF5.10.12	12G1.0	13.0	119	227	
CF5.10.18	18G1.0	16.5	179	306	
CF5.10.25	25G1.0	19.5	248	487	
CF5.15.03	3G1.5	7.5	46	74	
CF5.15.04	4G1.5	8.0	61	105	
CF5.15.05	5G1.5	9.0	75	127	
CF5.15.07 [17]	7G1.5	10.5	105	180	
CF5.15.12	12G1.5	15.0	179	264	
CF5.15.18	18G1.5	19.5	267	478	
CF5.15.25	25G1.5	21.5	371	645	
CF5.15.36	36G1.5	26.5	529	960	

CF-A-0007

www.igus.eu/CF5

[17] When using the cables with "7G1.5mm²" and "7G2.5mm²" minimum bend radius must be 17.5xd with gliding travel distance ≥ 5m.

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Shop and prices online
CF5.25.04	4G2.5	10.0	96	170	
CF5.25.05	5G2.5	11.0	120	200	
CF5.25.07 [17]	7G2.5	13.0	169	279	
CF5.25.12	12G2.5	18.5	284	480	
CF5.25.18	18G2.5	23.5	427	765	
CF5.25.25	25G2.5	27.5	591	1054	

CF-A-0007

[17] When using the cables with "7G1.5mm²" and "7G2.5mm²" minimum bend radius must be 17.5xd with gliding travel distance ≥ 5m.

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case

chainflex® CF5/CF6 for storage retrieval unit: Long travel in longitudinal axis.
e-chain®: Series E4/00 with igus® guide trough made of steel

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Control cable | PVC outer jacket

chainflex® CF6

Image exemplary

10 million Double strokes guaranteed

6.8 x d Bend radius, e-chain®

100m Travel distance, e-chain®

- For heavy duty applications
- PVC outer jacket
- Shielded
- Oil-resistant
- Flame-retardant

Dynamic information

Bend radius	**e-chain® linear**	minimum 6.8 x d
	flexible	minimum 5 x d
	fixed	minimum 4 x d
Temperature	**e-chain® linear**	+5°C up to +70°C
	flexible	-5°C up to +70°C (following DIN EN 60811-504)
	fixed	-15°C up to +70°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	5m/s
a max.		80m/s²
Travel distance		Unsupported travels and up to 100m for gliding applications, Class 5

Cable structure

Conductor	Finely stranded conductor consisting of bare copper wires (following DIN EN 60228).
Core insulation	**Cores ≤ 0.5mm²:** mechanically high-quality TPE mixture. **Cores ≥ 0.75mm²:** mechanically high-quality PVC mixture.
Core structure	**Number of cores < 12:** Cores wound in a layer with short pitch length. **Number of cores ≥ 12:** Cores wound in bundles which are then wound around a high tensile strength centre element, all with optimised short pitch lengths and directions. Especially low-torsion structure.
Core identification	**Cores < 0.5mm²:** Colour code in accordance with DIN 47100. **Cores ≥ 0.5mm²:** Black cores with white numbers, one green-yellow core.
Inner jacket	PVC mixture adapted to suit the requirements in e-chains®.
Overall shield	Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90%
Outer jacket	Low-adhesion, oil-resistant PVC mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-4-1). Colour: Moss green (similar to RAL 6005)
CFRIP®	Strip cables faster: a tear strip is moulded into the inner jacket Video ▶ www.igus.eu/CFRIP

Electrical information

Nominal voltage	300/500V (following DIN VDE 0298-3) 600V (following UL)
Testing voltage	2,000V (following DIN EN 50395)

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 5.5.2.1

Basic requirements	low	1	2	3	4	**5**	6	7	highest
Travel distance	unsupported	1	2	3	4	**5**	6		≥ 400m
Oil resistance	none	1	**2**	3	4	highest			
Torsion	none	**1**	2	3	4	±360°			

Properties and approvals

UV resistance	Medium
Oil resistance	Oil-resistant (following DIN EN 50363-4-1), Class 2
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 2. The outer jacket material of this series complies with CF5.10.07 - tested by IPA according to standard DIN EN ISO 14644-1
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million		7.5 million		10 million	
Temperature, from/to [°C]	< 10m	≥ 10m	< 10m	≥ 10m	< 10m	≥ 10m
	R min. [x d]	R min. [x d]	R min. [x d]	R min. [x d]	R min. [x d]	R min. [x d]
+5/+15	7.5	10	8.5	11	9.5	12
+15/+60	6.8	7.5	7.8	8.5	8.8	9.5
+60/+70	7.5	10	8.5	11	9.5	12

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For heavy-duty applications, Class 5
- Unsupported travels and up to 100m for gliding applications, Class 5
- Light oil influence, Class 2
- No torsion, Class 1
- Preferably indoor applications, but also outdoor ones at temperatures > 5 °C
- Storage and retrieval units, machining units/packaging machines, quick handling, indoor cranes

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Control cable | PVC outer jacket

chainflex® CF6

Class 5.5.2.1

Basic requirements	low	1	2	3	4	**5**	6	7	highest
Travel distance	unsupported	1	2	3	4	**5**	6		≥ 400m
Oil resistance	none	1	**2**	3	4	highest			
Torsion	none	**1**	2	3	4	±360°			

Strip cables 50% faster with CFRIP® tear strip

Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CF6.02.04	(4x0.25)C	7.0	29	61
CF6.02.25	(25x0.25)C	14.5	111	260
CF6.03.05	(5x0.34)C	7.5	37	90
CF6.05.02	(2x0.5)C	7.0	30	77
CF6.05.05	(5G0.5)C	8.5	49	106
CF6.05.07	(7G0.5)C	10.0	64	127
CF6.05.09	(9G0.5)C	12.0	80	154
CF6.05.12	(12G0.5)C	13.0	98	232
CF6.05.18	(18G0.5)C	15.0	145	286
CF6.05.25	(25G0.5)C	17.5	192	399
CF6.07.03	(3G0.75)C	8.0	46	98
CF6.07.04	(4G0.75)C	8.5	56	113
CF6.07.05	(5G0.75)C	9.0	67	128
CF6.07.07	(7G0.75)C	10.5	87	152
CF6.07.12	(12G0.75)C	14.0	128	266
CF6.07.18	(18G0.75)C	17.5	196	400
CF6.07.25	(25G0.75)C	19.5	265	536
CF6.10.03	(3G1.0)C	8.0	54	107
CF6.10.04	(4G1.0)C	9.0	65	116
CF6.10.05	(5G1.0)C	9.5	77	136
CF6.10.07	(7G1.0)C	12.0	103	205
CF6.10.12	(12G1.0)C	15.0	161	319
CF6.10.18	(18G1.0)C	19.0	245	482
CF6.10.25	(25G1.0)C	21.0	322	595
CF6.15.03	(3G1.5)C	9.0	72	122
CF6.15.04	(4G1.5)C	9.5	88	155
CF6.15.05	(5G1.5)C	10.5	105	177
CF6.15.07 [17)]	(7G1.5)C	12.5	146	258
CF6.15.12	(12G1.5)C	17.0	225	375
CF6.15.18	(18G1.5)C	21.0	345	581
CF6.15.25	(25G1.5)C	24.0	462	865
CF6.25.03	(3G2.5)C	10.5	107	180
CF6.25.04	(4G2.5)C	11.5	131	222

Shop and prices online

CF-A-0008

www.igus.eu/CF6

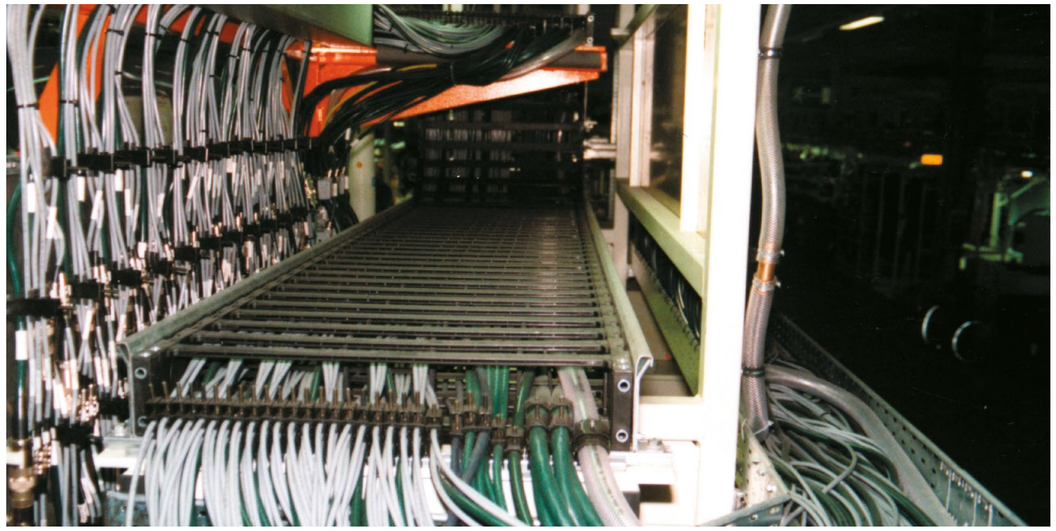
[17)] When using the cables with "7G1.5mm²" and "7G2.5mm²" minimum bend radius must be 17.5xd with gliding travel distance ≥ 5m.

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Order example: CF6.02.04 - to your required length (0.5m steps)
CF6 chainflex® series .02 Code nominal cross section .04 Number of cores

Order online ▶ www.igus.eu/CF6

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.



chainflex® CF5 and CF6 control cables (green) as well as CF211 measuring system cables (grey) in a screwing station of a car factory. e-chain®: E4/00 system with chainfix clip strain relief devices.

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Control cable | PVC outer jacket

chainflex® CFSOFT1

Image exemplary

20 million
Double strokes guaranteed

5 x d
Bend radius, e-chain®

5m
Travel distance, e-chain®

- For heaviest duty applications and especially small radii down to 5 x d
- Highly flexible, soft design
- PVC outer jacket
- Oil-resistant
- Flame-retardant

Dynamic information

Bend radius	**e-chain® linear**	minimum 5 x d
	flexible	minimum 4 x d
	fixed	minimum 3 x d
Temperature	**e-chain® linear**	+5°C up to +70°C
	flexible	-5°C up to +70°C (following DIN EN 60811-504)
	fixed	-15°C up to +70°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	5m/s
a max.		80m/s²
Travel distance		Short, very fast applications with small radii and restricted installation space, Class 1

Cable structure

Conductor	Very finely stranded special conductors with especially soft and bending resistant design, made of bare copper wires.
Core insulation	Mechanically high-quality TPE mixture.
Core structure	Cores wound in a layer with especially short pitch length.
Core identification	Colour code in accordance with DIN 47100.
Outer jacket	Low-adhesion, oil-resistant PVC mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-4-1). Colour: jet black (similar to RAL 9005)

Electrical information

Nominal voltage	300/500V (following DIN VDE 0298-3) 300V (following UL)
Testing voltage	2,000V (following DIN EN 50395)

Properties and approvals

UV resistance	Medium
Oil resistance	Oil-resistant (following DIN EN 50363-4-1), Class 2
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)

Class 7.1.2.1

Basic requirements	low 1 2 3 4 5 6 **7** highest
Travel distance	unsupported **1** 2 3 4 5 6 ≥ 400m
Oil resistance	none 1 **2** 3 4 highest
Torsion	none **1** 2 3 4 ±360°

PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ See data sheet for details ▶ www.igus.eu/CFSOFT1
UL/CSA AWM	
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 2. The outer jacket material of this series complies with CF5.10.07 - tested by IPA according to standard DIN EN ISO 14644-1
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	10 million	15 million	20 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
+5/+15	6.8	7.5	8.5
+15/+60	5	6	7
+60/+70	6.8	7.5	8.5

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For heaviest duty applications and especially small radii down to 5 x d, Class 7
- Especially for short, very fast applications with small radii and restricted installation space, Class 1
- Light oil influence, Class 2
- No torsion, Class 1
- Especially soft cable design, for reduced forces
- Pick and place machines, automatic doors, cleanroom, very quick handling

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CFSOFT1.02.03	3x0.25	5.5	9	28
CFSOFT1.02.08	8x0.25	7.0	21	62
CFSOFT1.03.04	4x0.34	6.0	15	39
CFSOFT1.05.04	4x0.5	7.0	21	52

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Shop and prices online
CF-A-0009
www.igus.eu/CFSOFT1

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case

Control cable | PVC outer jacket

chainflex® CFSOFT2

Image exemplary

20 million Double strokes guaranteed

5 x d Bend radius, e-chain®

5m Travel distance, e-chain®

- For heaviest duty applications and especially small radii down to 5 x d
- Highly flexible, soft design
- PVC outer jacket
- Shielded
- Oil-resistant
- Flame-retardant

Dynamic information

Bend radius	**e-chain® linear**	minimum 5 x d
	flexible	minimum 4 x d
	fixed	minimum 3 x d
Temperature	**e-chain® linear**	+5°C up to +70°C
	flexible	-5°C up to +70°C (following DIN EN 60811-504)
	fixed	-15°C up to +70°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	5m/s
a max.		80m/s²
Travel distance		Short, very fast applications with small radii and restricted installation space, Class 1

Cable structure

Conductor	Very finely stranded special conductors with especially soft and bending resistant design, made of bare copper wires.
Core insulation	Mechanically high-quality TPE mixture.
Core structure	Cores wound in a layer with especially short pitch length.
Core identification	**Cores < 0.75mm²:** Colour code in accordance with DIN 47100. **Cores ≥ 0.75mm²:** Black cores with white numbers, one green-yellow core.
Intermediate layer	Fleece banding over the outer layer.
Overall shield	Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90%
Outer jacket	Low-adhesion, oil-resistant PVC mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-4-1). Colour: jet black (similar to RAL 9005)

Electrical information

Nominal voltage	300/500V (following DIN VDE 0298-3) 300V (following UL)
Testing voltage	2,000V (following DIN EN 50395)

Class 7.1.2.1

Basic requirements	low	1	2	3	4	5	6	**7** highest
Travel distance	unsupported	**1**	2	3	4	5	6	≥ 400m
Oil resistance	none	1	**2**	3	4	highest		
Torsion	none	**1**	2	3	4	±360°		

Properties and approvals

UV resistance	Medium
Oil resistance	Oil-resistant (following DIN EN 50363-4-1), Class 2
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CFSOFT2
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 2. The outer jacket material of this series complies with CF5.10.07 - tested by IPA according to standard DIN EN ISO 14644-1
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	10 million	15 million	20 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
+5/+15	6.8	7.5	8.5
+15/+60	5	6	7
+60/+70	6.8	7.5	8.5

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For heaviest duty applications and especially small radii down to 5 x d, Class 7
- Especially for short, very fast applications with small radii and restricted installation space, Class 1
- Light oil influence, Class 2
- No torsion, Class 1
- Especially soft cable design, for reduced forces
- Pick and place machines, automatic doors, cleanroom, very quick handling

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CFSOFT2.02.03	(3x0.25)C	6.0	17	41
CFSOFT2.02.08	(8x0.25)C	7.5	38	86
CFSOFT2.03.04	(4x0.34)C	6.5	24	50
CFSOFT2.05.04	(4x0.5)C	7.5	36	80

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Shop and prices online

www.igus.eu/CFSOFT2

Control cable | iguPUR outer jacket

chainflex® CF890

Image exemplary

5,000,000 Double strokes guaranteed

12.5 x d Bend radius, e-chain®

10m Travel distance, e-chain®

- For flexing applications
- iguPUR outer jacket
- Oil-resistant
- Flame-retardant

Dynamic information

Bend radius	**e-chain® linear**	minimum 12.5 x d
	flexible	minimum 10 x d
	fixed	minimum 7 x d
Temperature	**e-chain® linear**	-20°C up to +80°C
	flexible	-40°C up to +80°C (following DIN EN 60811-504)
	fixed	-50°C up to +80°C (following DIN EN 50305)
v max.	**unsupported**	3m/s
a max.		20m/s²
Travel distance		Unsupported travels up to 10m, Class 1

Cable structure

Conductor	Conductor consisting of bare copper wires (according to DIN EN 60228).
Core insulation	Mechanically high-quality TPE mixture.
Core structure	Cores wound with an optimised pitch length.
Core identification	Black cores with white numbers, one green-yellow core.
Outer jacket	Low-adhesion iguPUR mixture, adapted to suit the requirements in e-chains®. Colour: jet black (similar to RAL 9005)

Electrical information

Nominal voltage	300/500V 600V (following UL)
Testing voltage	2,000V (following DIN EN 50395)

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 3.1.3.1

Basic requirements	low	1	2	**3**	4	5	6	7 highest
Travel distance	unsupported	**1**	2	3	4	5	6	≥ 400m
Oil resistance	none	1	2	**3**	4	highest		
Torsion	none	**1**	2	3	4	±360°		

Properties and approvals

UV resistance	Medium
Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF890
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	1 million	3 million	5 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
-20/-10	15	16	17
-10/+70	12.5	13.5	14.5
+70/+80	15	16	17

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For flexing applications, Class 3
- Especially for unsupported travels, Class 1
- With influence of oil, Class 3
- No torsion, Class 1
- Indoor and outdoor applications without direct sun radiation
- Machining units/machine tools, low temperature applications

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Control cable | iguPUR outer jacket

chainflex® CF890

Class 3.1.3.1

Basic requirements	low	1	2	**3**	4	5	6	7	highest
Travel distance	unsupported	**1**	2	3	4	5	6		≥ 400m
Oil resistance	none	1	2	**3**	4				highest
Torsion	none	**1**	2	3	4				±360°

Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CF890.05.02	2x0.5	5.0	11	30
CF890.05.03	3G0.5	5.5	16	34
CF890.05.04	4G0.5	6.0	21	44
CF890.05.05	5G0.5	6.5	26	53
CF890.05.07	7G0.5	7.5	37	70
CF890.05.12	12G0.5	8.5	63	105
CF890.05.18	18G0.5	10.0	94	155
CF890.05.25	25G0.5	12.0	128	222
CF890.07.02	2x0.75	5.5	16	38
CF890.07.03	3G0.75	6.0	24	46
CF890.07.04	4G0.75	6.5	32	58
CF890.07.05	5G0.75	7.0	40	71
CF890.07.07	7G0.75	8.0	56	96
CF890.07.12	12G0.75	10.0	94	146
CF890.07.18	18G0.75	11.5	140	162
CF890.07.25	25G0.75	13.5	194	278
CF890.10.02	2x1.0	6.0	21	46
CF890.10.03	3G1.0	6.5	32	56
CF890.10.04	4G1.0	7.0	42	58
CF890.10.05	5G1.0	7.5	52	89
CF890.10.07	7G1.0	8.5	73	117
CF890.10.12	12G1.0	10.5	124	178
CF890.10.18	18G1.0	12.5	186	273
CF890.10.25	25G1.0	15.0	258	375
CF890.15.02	2x1.5	6.5	32	62
CF890.15.03	3G1.5	7.0	47	76
CF890.15.04	4G1.5	7.5	63	97
CF890.15.05	5G1.5	8.5	78	117
CF890.15.07	7G1.5	10.0	109	163
CF890.15.12	12G1.5	12.0	186	256
CF890.15.18	18G1.5	14.5	279	362
CF890.15.25	25G1.5	17.5	387	502
CF890.25.03	3G2.5	8.5	78	136
CF890.25.04	4G2.5	9.0	103	145
CF890.25.05	5G2.5	10.0	129	175
CF890.25.07	7G2.5	12.0	181	246
CF890.25.12	12G2.5	15.0	327	408
CF890.25.25	25G2.5	21.5	638	786

Shop and prices online

CF-A-0011

www.igus.eu/CF890

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Order example: CF890.05.02 - to your required length (0.5m steps)
CF890 chainflex® series .05 Code nominal cross section .02 Number of cores

Order online ▶ www.igus.eu/CF890

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

Cables available in the chainflex® CASE

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More on this online: www.igus.eu/cf-case

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Control cable | iguPUR outer jacket

chainflex® CF891

Image exemplary

5,000,000 Double strokes guaranteed

12.5 x d Bend radius, e-chain®

10m Travel distance, e-chain®

- For flexing applications
- iguPUR outer jacket
- Oil-resistant
- Shielded
- Flame-retardant

Dynamic information

Bend radius	**e-chain® linear**	minimum 12.5 x d
	flexible	minimum 10 x d
	fixed	minimum 7 x d
Temperature	**e-chain® linear**	-20°C up to +80°C
	flexible	-40°C up to +80°C (following DIN EN 60811-504)
	fixed	-50°C up to +80°C (following DIN EN 50305)
v max.	**unsupported**	3m/s
a max.		20m/s²
Travel distance		Unsupported travels up to 10m, Class 1

Cable structure

Conductor	Conductor consisting of bare copper wires (according to DIN EN 60228).
Core insulation	Mechanically high-quality TPE mixture.
Core structure	Cores wound with an optimised pitch length.
Core identification	Black cores with white numbers, one green-yellow core.
Overall shield	Braiding made of tinned copper wires. Coverage approx. 60% optical
Outer jacket	Low-adhesion iguPUR mixture, adapted to suit the requirements in e-chains®. Colour: jet black (similar to RAL 9005)

Electrical information

Nominal voltage	300/500V 600V (following UL)
Testing voltage	2,000V (following DIN EN 50395)

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 3.1.3.1

Basic requirements	low	1	2	**3**	4	5	6	7 highest
Travel distance	unsupported	**1**	2	3	4	5	6	≥ 400m
Oil resistance	none	1	2	**3**	4	highest		
Torsion	none	**1**	2	3	4	±360°		

Properties and approvals

UV resistance	Medium
Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF891
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	1 million	3 million	5 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
-20/-10	15	16	17
-10/+70	12.5	13.5	14.5
+70/+80	15	16	17

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For flexing applications, Class 3
- Especially for unsupported travels, Class 1
- With influence of oil, Class 3
- No torsion, Class 1
- Indoor and outdoor applications without direct sun radiation
- Machining units/machine tools, low temperature applications

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Control cable | iguPUR outer jacket

chainflex® CF891

Class 3.1.3.1

Basic requirements	low	1	2	**3**	4	5	6	7	highest
Travel distance	unsupported	**1**	2	3	4	5	6		≥ 400m
Oil resistance	none	1	2	**3**	4				highest
Torsion	none	**1**	2	3	4				±360°

Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CF891.05.02	(2x0.5)C	6.0	18	37
CF891.05.03	(3G0.5)C	6.0	28	45
CF891.05.05	(5G0.5)C	7.0	41	62
CF891.05.12	(12G0.5)C	9.0	91	122
CF891.05.18	(18G0.5)C	11.0	136	174
CF891.05.25	(25G0.5)C	13.0	210	234
CF891.07.02	(2x0.75)C	6.5	30	48
CF891.07.03	(3G0.75)C	7.0	37	63
CF891.07.04	(4G0.75)C	7.5	46	68
CF891.07.05	(5G0.75)C	8.0	61	85
CF891.07.07	(7G0.75)C	9.0	83	109
CF891.07.12	(12G0.75)C	10.5	124	166
CF891.07.18	(18G0.75)C	12.0	183	232
CF891.07.25	(25G0.75)C	14.5	222	299
CF891.10.02	(2x1.0)C	6.5	30	50
CF891.10.03	(3G1.0)C	7.0	46	71
CF891.10.04	(4G1.0)C	7.5	63	98
CF891.10.05	(5G1.0)C	8.0	76	105
CF891.10.07	(7G1.0)C	9.5	100	126
CF891.10.12	(12G1.0)C	11.5	167	224
CF891.10.18 [11)]	(18G1.0)C	13.0	213	276
CF891.10.25	(25G1.0)C	16.0	291	382
CF891.15.02	(2x1.5)C	7.5	60	69
CF891.15.03	(3G1.5)C	7.5	63	85
CF891.15.04	(4G1.5)C	8.5	90	108
CF891.15.05	(5G1.5)C	9.0	94	129
CF891.15.07	(7G1.5)C	11.0	153	177
CF891.15.12	(12G1.5)C	13.0	212	276
CF891.15.25 [11)]	(25G1.5)C	18.5	425	560
CF891.25.04	(4G2.5)C	10.0	141	157
CF891.25.05	(5G2.5)C	11.0	149	192
CF891.25.07	(7G2.5)C	13.0	204	255

Shop and prices online

CF-A-0012

www.igus.eu/CF891

[11)] Phase-out model

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Order example: CF891.05.02 - to your required length (0.5m steps)
CF891 chainflex® series .05 Code nominal cross section .02 Number of cores

Order online ▶ www.igus.eu/CF891

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case

chainflex® CF891 in an adjustment device for a process crane

Control cable | PUR outer jacket

chainflex® CF77.UL.D

Image exemplary

10 million Double strokes guaranteed

6.8 x d Bend radius, e-chain®

100m Travel distance, e-chain®

- For heavy duty applications
- PUR outer jacket
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

Dynamic information

Bend radius	**e-chain® linear**	minimum 6.8 x d
	flexible	minimum 5 x d
	fixed	minimum 4 x d
Temperature	**e-chain® linear**	-25°C up to +80°C
	flexible	-40°C up to +80°C (following DIN EN 60811-504)
	fixed	-50°C up to +80°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	5m/s
a max.		80m/s²
Travel distance		Unsupported travels and up to 100m for gliding applications, Class 5
Torsion		Torsion ±180°, with 1m cable length, Class 3 (except for 5-core types ≥ 4.0mm² ▶ Product range table)

Cable structure

Conductor Finely stranded conductor consisting of bare copper wires (following DIN EN 60228).

Core insulation Mechanically high-quality TPE mixture.

Core structure **Number of cores < 12:** Cores wound in a layer with short pitch length. **Number of cores ≥ 12:** Cores wound in bundles which are then wound around a high tensile strength centre element, all with optimised short pitch lengths and directions. Especially low-torsion structure.

Core identification **Cores < 0.5mm²:** Colour code in accordance with DIN 47100. **Cores ≥ 0.5mm²:** Black cores with white numbers, one green-yellow core. **CF77.UL.02.03.INI:** brown, blue, black **CF77.UL.03.04.INI:** brown, blue, black, white **CF77.UL.03.05.INI:** brown, blue, black, white, green-yellow

Outer jacket Low-adhesion, halogen-free, highly abrasion resistant PUR mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2) Colour: Window-grey (similar to RAL 7040) Variants ▶ Product range table

Electrical information

Nominal voltage 300/500V (following DIN VDE 0298-3) **Number of cores < 12:** **Cores < 0.5mm²:** 300V (following UL) **Cores ≥ 0.5mm²:** 1000V (following UL) **Number of cores ≥ 12:** 1000V (following UL)

Testing voltage 2,000V (following DIN EN 50395)

Class 5.5.2.1

Basic requirements	low	1	2	3	4	**5**	6	7	highest
Travel distance	unsupported	1	2	3	4	**5**	6		≥ 400m
Oil resistance	none	1	2	**3**	4	highest			
Torsion	none	1	2	**3**	4	±360°			

Properties and approvals

UV resistance	Medium
Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3
Offshore	MUD-resistant following NEK 606 - status 2016
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF77ULD
NFPA	Following NFPA 79-2018, chapter 12.9
DNV	Type Approval Certificate TAE00003X1 (Issue 04/2025) Current information in the data sheet ▶ www.igus.eu/CF77ULD
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1, material/cable tested by IPA according to DIN EN ISO standard 14644-1
DESINA	According to VDW, DESINA standardisation
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million		7.5 million		10 million	
Temperature, from/to [°C]	< 10m	≥ 10m	< 10m	≥ 10m	< 10m	≥ 10m
	R min. [x d]	R min. [x d]	R min. [x d]	R min. [x d]	R min. [x d]	R min. [x d]
-25/-15	8.5	10	9.5	11	10.5	12
-15/+70	6.8	7.5	7.5	8.5	8.5	9.5
+70/+80	8.5	10	9.5	11	10.5	12

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For heavy-duty applications, Class 5
- Unsupported travels and up to 100m for gliding applications, Class 5
- Almost unlimited resistance to oil, Class 3
- Torsion ±180°, with 1m cable length, Class 3
- Indoor and outdoor applications with average sun radiation
- Machining units/machine tools, storage and retrieval units for high-bay warehouses, packaging industry, quick handling, refrigerating sector

Control cable | PUR outer jacket

chainflex® CF77.UL.D

Class 5.5.2.1

Basic requirements	low	1	2	3	4	**5**	6	7	highest
Travel distance	unsupported	1	2	3	4	**5**	6		≥ 400m
Oil resistance	none	1	2	**3**	4	highest			
Torsion	none	1	2	**3**	4	±360°			

Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Shop and prices online
CF77.UL.02.03.INI [12)]	3x0.25	5.0	9	29	
CF77.UL.02.04.D	4x0.25	5.5	11	35	
CF77.UL.02.05.D	5x0.25	6.0	13	39	
CF77.UL.02.07.D	7x0.25	6.5	18	51	
CF77.UL.02.12.D	12x0.25	9.0	32	78	
CF77.UL.02.18.D	18x0.25	10.5	47	127	
CF77.UL.02.25.D	25x0.25	11.5	63	155	
CF77.UL.03.04.INI [12)]	4x0.34	6.0	15	36	
CF77.UL.03.05.INI [12)]	5x0.34	6.0	19	44	
CF77.UL.03.05.INI.D	5x0.34	6.0	19	44	
CF77.UL.05.04.D	4G0.5	6.0	21	46	
CF77.UL.05.05.D	5G0.5	6.5	26	53	
CF77.UL.05.07.D	7G0.5	7.5	39	78	
CF77.UL.05.12.D	12G0.5	10.0	63	130	
CF77.UL.05.18.D	18G0.5	12.0	94	184	
CF77.UL.05.25.D	25G0.5	14.0	129	243	
CF77.UL.05.30.D	30G0.5	15.0	155	315	
CF77.UL.07.03.D	3G0.75	6.5	23	52	
CF77.UL.07.04.D	4G0.75	7.0	31	59	
CF77.UL.07.05.D	5G0.75	7.5	38	71	
CF77.UL.07.07.D	7G0.75	8.5	54	100	
CF77.UL.07.12.D	12G0.75	12.0	91	180	
CF77.UL.07.18.D	18G0.75	13.5	134	239	
CF77.UL.07.20.D	20G0.75	14.5	149	269	
CF77.UL.07.25.D	25G0.75	16.0	186	336	
CF77.UL.07.36.D	36G0.75	19.0	279	506	
CF77.UL.07.42.D	42G0.75	21.0	341	580	
CF77.UL.10.02.D	2x1.0	6.5	21	51	
CF77.UL.10.03.D	3G1.0	6.5	31	58	
CF77.UL.10.04.D	4G1.0	7.0	41	73	
CF77.UL.10.05.D	5G1.0	8.0	50	90	
CF77.UL.10.07.D	7G1.0	9.0	71	120	
CF77.UL.10.12.D	12G1.0	12.5	120	220	
CF77.UL.10.18.D	18G1.0	15.0	179	314	
CF77.UL.10.25.D	25G1.0	17.5	248	431	
CF77.UL.10.42.D	42G1.0	22.5	433	699	

CF-A-0013

www.igus.eu/CF77ULD

[12)] Colour outer jacket: Colza yellow (similar to RAL 1021)

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Shop and prices online
CF77.UL.15.03.D	3G1.5	7.0	46	71	
CF77.UL.15.04.D	4G1.5	7.5	61	88	
CF77.UL.15.05.D	5G1.5	8.0	75	105	
CF77.UL.15.07.D [17)]	7G1.5	9.5	105	152	
CF77.UL.15.12.D	12G1.5	13.0	179	297	
CF77.UL.15.18.D	18G1.5	17.0	268	405	
CF77.UL.15.25.D	25G1.5	19.5	297	564	
CF77.UL.15.36.D	36G1.5	23.5	551	848	
CF77.UL.25.03.D	3G2.5	8.5	75	132	
CF77.UL.25.04.D	4G2.5	9.5	95	167	
CF77.UL.25.05.D	5G2.5	10.0	124	196	
CF77.UL.25.07.D [17)]	7G2.5	12.0	174	270	
CF77.UL.25.12.D	12G2.5	17.0	297	479	
CF77.UL.40.04.D [90)]	4G4.0	11.5	165	245	
CF77.UL.40.05.D [90)]	5G4.0	12.0	198	284	
CF77.UL.60.05.D [90)]	5G6.0	13.5	297	412	

CF-A-0013

www.igus.eu/CF77ULD

[17)] When using the cables with "7G1.5mm²" and "7G2.5mm²" minimum bend radius must be 17.5xd with gliding travel distance ≥ 5m.
[90)] Torsion ± 90°

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Control cable | PUR outer jacket

chainflex® CF78.UL

Image exemplary

10 million
Double strokes guaranteed

6.8 x d
Bend radius, e-chain®

100m
Travel distance, e-chain®

- For heavy duty applications
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

Dynamic information

Bend radius	**e-chain® linear**	minimum 6.8 x d
	flexible	minimum 5 x d
	fixed	minimum 4 x d
Temperature	**e-chain® linear**	-25°C up to +80°C
	flexible	-40°C up to +80°C (following DIN EN 60811-504)
	fixed	-50°C up to +80°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	5m/s
a max.		80m/s²
Travel distance		Unsupported travels and up to 100m for gliding applications, Class 5

Cable structure

Conductor	Finely stranded conductor consisting of bare copper wires (following DIN EN 60228).
Core insulation	Mechanically high-quality TPE mixture.
Core structure	**Number of cores < 12:** Cores wound in a layer with short pitch length. **Number of cores ≥ 12:** Cores wound in bundles which are then wound around a high tensile strength centre element, all with optimised short pitch lengths and directions. Especially low-torsion structure.
Core identification	Black cores with white numbers, one green-yellow core.
Inner jacket	TPE mixture adapted to suit the requirements in e-chains®.
Overall shield	Bending-resistant braiding made of tinned copper wires. Coverage linear approx. 55%, optical approx. 80%
Outer jacket	Low-adhesion, halogen-free, highly abrasion resistant PUR mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2) Colour: Window-grey (similar to RAL 7040)
CFRIP®	Strip cables faster: a tear strip is moulded into the inner jacket Video ▶ www.igus.eu/CFRIP

Electrical information

Nominal voltage	300/500V (following DIN VDE 0298-3) **Number of cores < 12:** **Cores < 0.5mm²:** 300V (following UL) **Cores ≥ 0.5mm²:** 1000V (following UL) **Number of cores ≥ 12:** 1000V (following UL)
Testing voltage	2,000V (following DIN EN 50395)

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 5.5.3.1

Basic requirements	low	1	2	3	4	**5**	6	7	highest
Travel distance	unsupported	1	2	3	4	**5**	6		≥ 400m
Oil resistance	none	1	2	**3**	4	highest			
Torsion	none	**1**	2	3	4	±360°			

Properties and approvals

UV resistance	Medium
Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3
Offshore	MUD-resistant following NEK 606 - status 2016
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF78UL
NFPA	Following NFPA 79-2018, chapter 12.9
DNV	Type Approval Certificate TAE00003X1 (Issue 04/2025) Current information in the data sheet ▶ www.igus.eu/CF78UL
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million		7.5 million		10 million	
Temperature, from/to [°C]	< 10m	≥ 10m	< 10m	≥ 10m	< 10m	≥ 10m
	R min. [x d]	R min. [x d]	R min. [x d]	R min. [x d]	R min. [x d]	R min. [x d]
-25/-15	8.5	10	9.5	11	10.5	12
-15/+70	6.8	7.5	7.5	8.5	8.5	9.5
+70/+80	8.5	10	9.5	11	10.5	12

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For heavy-duty applications, Class 5
- Unsupported travels and up to 100m for gliding applications, Class 5
- Almost unlimited resistance to oil, Class 3
- No torsion, Class 1
- Indoor and outdoor applications with average sun radiation
- Machining units/machine tools, storage and retrieval units for high-bay warehouses, packaging industry, quick handling, refrigerating sector

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Control cable | PUR outer jacket

chainflex® CF78.UL

Strip cables 50% faster with CFRIP® tear strip

Class 5.5.3.1

Basic requirements	low	1	2	3	4	**5**	6	7	highest
Travel distance	unsupported	1	2	3	4	**5**	6		≥ 400m
Oil resistance	none	1	2	**3**	4	highest			
Torsion	none	**1**	2	3	4	±360°			

Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CF78.UL.05.04	(4G0.5)C	8.0	38	77
CF78.UL.05.05	(5G0.5)C	8.0	45	91
CF78.UL.05.07	(7G0.5)C	9.5	59	115
CF78.UL.05.09	(9G0.5)C	11.0	77	143
CF78.UL.05.12	(12G0.5)C	12.5	92	202
CF78.UL.05.18	(18G0.5)C	14.5	146	248
CF78.UL.05.25	(25G0.5)C	16.0	168	354
CF78.UL.07.03	(3G0.75)C	8.0	42	79
CF78.UL.07.04	(4G0.75)C	8.5	49	96
CF78.UL.07.05	(5G0.75)C	9.5	61	112
CF78.UL.07.07	(7G0.75)C	10.5	83	151
CF78.UL.07.12	(12G0.75)C	13.5	136	249
CF78.UL.07.18	(18G0.75)C	15.5	194	354
CF78.UL.07.36	(36G0.75)C	22.0	390	702
CF78.UL.10.03	(3G1.0)C	8.5	50	96
CF78.UL.10.04	(4G1.0)C	9.0	62	112
CF78.UL.10.05	(5G1.0)C	9.5	74	129
CF78.UL.10.07	(7G1.0)C	11.0	104	176
CF78.UL.10.12	(12G1.0)C	14.5	166	300
CF78.UL.10.18	(18G1.0)C	17.0	240	407
CF78.UL.10.25	(25G1.0)C	20.0	325	545
CF78.UL.15.03	(3G1.5)C	9.5	68	122
CF78.UL.15.04	(4G1.5)C	10.0	86	145
CF78.UL.15.05	(5G1.5)C	9.5	108	159
CF78.UL.15.07 [17]	(7G1.5)C	11.5	144	217
CF78.UL.15.12	(12G1.5)C	16.0	233	387
CF78.UL.15.18	(18G1.5)C	19.0	346	541
CF78.UL.15.25	(25G1.5)C	22.5	464	724
CF78.UL.15.36	(36G1.5)C	26.5	663	1095
CF78.UL.15.42	(42G1.5)C	29.5	820	1296
CF78.UL.25.03	(3G2.5)C	10.0	106	174
CF78.UL.25.04	(4G2.5)C	11.5	140	203
CF78.UL.25.05	(5G2.5)C	12.0	166	235
CF78.UL.25.07 [17]	(7G2.5)C	14.5	230	334
CF78.UL.25.12	(12G2.5)C	19.0	382	585
CF78.UL.40.04	(4G4.0)C	13.0	203	328

Shop and prices online

CF-A-0014

www.igus.eu/CF78UL

[17] When using the cables with "7G1.5mm²" and "7G2.5mm²" minimum bend radius must be 17.5xd with gliding travel distance ≥ 5m.

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x** = without earth core

Order example: CF78.UL.05.04 - to your required length (0.5m steps)
CF78.UL chainflex® series .05 Code nominal cross section .04 Number of cores

Order online ▶ www.igus.eu/CF78UL

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case

cost down... ...life up

Reduce cost, improve technology, now!
Do the chainflex® price check ...
www.igus.eu/cf-price-check

… for example: reduce cost with CF6 ...

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Control cable | PUR outer jacket

chainflex® CF2

Phase-out model

Image exemplary

10 million Double strokes guaranteed

5 x d Bend radius, e-chain®

100m Travel distance, e-chain®

- For extremely heavy duty applications
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- Notch-resistant
- Hydrolysis and microbe-resistant

Dynamic information

Bend radius	**e-chain® linear**	minimum 5 x d
	flexible	minimum 4 x d
	fixed	minimum 3 x d
Temperature	**e-chain® linear**	-20°C up to +80°C
	flexible	-40°C up to +80°C (following DIN EN 60811-504)
	fixed	-50°C up to +80°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	5m/s
a max.		80m/s²
Travel distance		Unsupported travels and up to 100m for gliding applications, Class 5

Cable structure

Conductor	Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228).
Core insulation	Mechanically high-quality TPE mixture.
Core structure	**Number of cores < 12:** Cores wound in a layer with short pitch length. **Number of cores ≥ 12:** Cores wound in bundles which are then wound around a high tensile strength centre element, all with optimised short pitch lengths and directions. Especially low-torsion structure.
Core identification	Colour code in accordance with DIN 47100.
Inner jacket	PVC mixture adapted to suit the requirements in e-chains®.
Overall shield	Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90%
Outer jacket	Low-adhesion, halogen-free, highly abrasion resistant PUR mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2) Colour: Anthracite grey (similar to RAL 7016)

Electrical information

Nominal voltage	300/500V (following DIN VDE 0298-3) 300V (following UL)
Testing voltage	2,000V (following DIN EN 50395)

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 6.5.3.1

Basic requirements	low	1	2	3	4	5	**6**	7 highest
Travel distance	unsupported	1	2	3	4	**5**	6	≥ 400m
Oil resistance	none	1	2	**3**	4			highest
Torsion	none	**1**	2	3	4			±360°

Properties and approvals

UV resistance	High
Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3
Offshore	MUD-resistant following NEK 606 - status 2016
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ **www.igus.eu/CF2**
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	7.5 million	10 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
-20/-10	6.8	7.5	8.5
-10/+70	5	6.8	7.5
+70/+80	6.8	7.5	8.5

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For heavy-duty applications, Class 6
- Unsupported travels and up to 100m for gliding applications, Class 5
- Almost unlimited resistance to oil, Class 3
- No torsion, Class 1
- Indoor and outdoor applications
- Storage and retrieval units, machining units/packaging machines, quick handling, indoor cranes, refrigeration sector

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Control cable | PUR outer jacket

chainflex® CF2

Phase-out model

Class 6.5.3.1

Basic requirements	low	1	2	3	4	5	**6**	7	highest
Travel distance	unsupported	1	2	3	4	**5**	6		≥ 400m
Oil resistance	none	1	2	**3**	4				highest
Torsion	none	**1**	2	3	4				±360°

Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CF2.01.04 11)	(4x0.14)C	6.5	18	49
CF2.01.08 11)	(8x0.14)C	7.5	31	66
CF2.01.12 11)	(12x0.14)C	9.5	51	102
CF2.01.18 11)	(18x0.14)C	10.5	56	135
CF2.01.24 3) 11)	(24x0.14)C	11.5	68	162
CF2.01.36 11)	(36x0.14)C	14.5	92	240
CF2.02.04 11)	(4x0.25)C	7.0	25	59
CF2.02.08 11)	(8x0.25)C	8.0	43	84
CF2.02.18 11)	(18x0.25)C	12.0	100	173
CF2.02.48 11)	(48x0.25)C	17.5	191	387

Shop and prices online

CF-A-0015

www.igus.eu/CF2

The chainflex® types marked with a 3) refer to cables that are based on a bundling of 4 cores each. Due to their excellent electrical properties (starquad with especially minimum crosstalk), these cables can virtually be used in all cases in which otherwise twisted-pair cables are required.
11) Phase-out model

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

chainflex® CF2 cables are resistant to oil and coolants. e-chain®: E4/00 system.

Order example: CF2.01.04 - to your required length (0.5m steps)
CF6 chainflex® series .01 Code nominal cross section .04 Number of cores

Order online ▶ www.igus.eu/CF2

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

cost down...

...life up

Reduce cost, improve technology, now!
Do the chainflex® price check ...
www.igus.eu/cf-price-check

… for example: reduce cost with CF240.PUR ...

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Control cable | TPE outer jacket

chainflex® CF9.UL

Image exemplary

10 million Double strokes guaranteed

5 x d Bend radius, e-chain®

400m Travel distance, e-chain®

- For extremely heavy duty applications
- TPE outer jacket
- Oil and bio-oil-resistant
- Flame-retardant
- PVC-free
- Low-temperature-flexible
- Hydrolysis and microbe-resistant

Dynamic information

Bend radius	**e-chain® linear**	minimum 5 x d
	flexible	minimum 4 x d
	fixed	minimum 3 x d
Temperature	**e-chain® linear**	-35°C up to +100°C
	flexible	-45°C up to +100°C (following DIN EN 60811-504)
	fixed	-50°C up to +100°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	6m/s
a max.		100m/s²
Travel distance		Unsupported travels and up to 400m for gliding applications, Class 6
Torsion		Torsion ±90°, with 1m cable length, Class 2

Cable structure

Conductor Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228).

Core insulation Mechanically high-quality TPE mixture.

Core structure **Number of cores < 12:** Cores wound in a layer with short pitch length.
Number of cores ≥ 12: Cores wound in bundles which are then wound around a high tensile strength centre element, all with optimised short pitch lengths and directions. Especially low-torsion structure.

Core identification **Cores < 0.75mm²:** Colour code in accordance with DIN 47100.
Cores ≥ 0.75mm²: Black cores with white numbers, one green-yellow core.
CF9.UL.02.03.INI: brown, blue, black
CF9.UL.03.04.INI: brown, blue, black, white
CF9.UL.03.05.INI: braun, blau, schwarz, weiß, grüngelb

Outer jacket Low-adhesion, extremely abrasion-resistant and highly flexible TPE mixture, adapted to suit the requirements in e-chains®.
Colour: Slate grey (similar to RAL 7015)

CFRIP® Strip cables faster: a tear strip is moulded into the outer jacket
Video ▶ www.igus.eu/CFRIP

Electrical information

Nominal voltage 300/500V (following DIN VDE 0298-3)
Cores < 0.5mm²: 300V (following UL)
Cores ≥ 0.5mm²: 1000V (following UL)

Testing voltage 2,000V (following DIN EN 50395)

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 6.6.4.2

Basic requirements	low	1	2	3	4	5	**6**	7	highest
Travel distance	unsupported	1	2	3	4	5	**6**		≥ 400m
Oil resistance	none	1	2	3	**4**				highest
Torsion	none	1	**2**	3	4				±360°

Properties and approvals

UV resistance	High
Oil resistance	Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF9UL
NFPA	Following NFPA 79-2018, chapter 12.9
DNV	Type Approval Certificate TAE00003X2 (Issue 04/2025) Current information in the data sheet ▶ www.igus.eu/CF9UL
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF34.UL.25.04.D - tested by IPA according to standard DIN EN ISO 14644-1
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	7.5 million	10 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
-35/-25	6.8	7.5	8.5
-25/+90	5	6	7
+90/+100	6.8	7.5	8.5

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For heavy-duty applications, Class 6
- Unsupported travels and up to 400m and more for gliding applications, Class 6
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- Torsion ±90°, with 1m cable length, Class 2
- Indoor and outdoor applications, UV-resistant
- Storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, cleanroom, semiconductor insertion, ship to shore, outdoor cranes, low-temperature applications

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Control cable | TPE outer jacket

chainflex® CF9.UL

Strip cables 50% faster with CFRIP® tear strip

Image exemplary

Class 6.6.4.2

Basic requirements	low	1	2	3	4	5	**6**	7	highest
Travel distance	unsupported	1	2	3	4	5	**6**		≥ 400m
Oil resistance	none	1	2	3	**4**				highest
Torsion	none	1	**2**	3	4				±360°

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Shop and prices online
CF9.UL.02.02	2x0.25	5.0	5	24	
CF9.UL.02.03.INI	3x0.25	5.0	8	28	
CF9.UL.02.04	4x0.25	5.5	10	32	
CF9.UL.02.06	6x0.25	6.0	15	42	
CF9.UL.02.08	8x0.25	7.0	20	57	
CF9.UL.02.12	12x0.25	7.5	30	81	
CF9.UL.03.04.INI	4x0.34	5.5	14	38	
CF9.UL.03.05.INI	5x0.34	6.0	17	46	
CF9.UL.03.06	6x0.34	6.5	21	51	
CF9.UL.03.08	8x0.34	7.5	28	67	
CF9.UL.05.02	2x0.5	5.5	10	35	
CF9.UL.05.03	3x0.5	6.0	15	42	
CF9.UL.05.04	4x0.5	6.0	20	50	
CF9.UL.05.05	5x0.5	6.5	25	56	
CF9.UL.05.07	7x0.5	7.5	35	79	
CF9.UL.05.12	12x0.5	9.5	60	137	
CF9.UL.05.18	18x0.5	12.0	90	201	
CF9.UL.07.05	5G0.75	7.0	38	77	
CF9.UL.07.07	7G0.75	8.5	53	105	
CF9.UL.07.12	12G0.75	11.0	90	191	
CF9.UL.07.25	25G0.75	15.0	186	366	
CF9.UL.10.03	3G1.0	6.5	30	62	
CF9.UL.10.04	4G1.0	7.0	40	78	
CF9.UL.10.12	12G1.0	11.5	119	228	
CF9.UL.10.18	18G1.0	14.5	178	332	
CF9.UL.10.25	25G1.0	16.0	248	447	
CF9.UL.15.04	4G1.5	8.0	60	102	
CF9.UL.15.05	5G1.5	8.5	75	124	
CF9.UL.15.07 [17]	7G1.5	10.0	104	171	
CF9.UL.15.12	12G1.5	13.5	178	309	
CF9.UL.15.18	18G1.5	16.0	267	449	
CF9.UL.15.25	25G1.5	19.0	371	650	
CF9.UL.25.04	4G2.5	9.0	100	159	
CF9.UL.25.05	5G2.5	10.0	124	194	
CF9.UL.25.07 [17]	7G2.5	12.0	174	270	
CF9.UL.25.12	12G2.5	16.0	297	502	
CF9.UL.25.18	18G2.5	20.0	445	737	
CF9.UL.25.25	25G2.5	23.5	612	1,011	
CF9.UL.40.04	4G4.0	10.5	159	231	

CF-A-0016

www.igus.eu/CF9UL

[17] When using the cables with "7G1.5mm²" and "7G2.5mm²" minimum bend radius must be 17.5xd with gliding travel distance ≥ 5m.

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

CF-A-0016

www.igus.eu/CF9UL

[17] When using the cables with "7G1.5mm²" and "7G2.5mm²" minimum bend radius must be 17.5xd with gliding travel distance ≥ 5m.

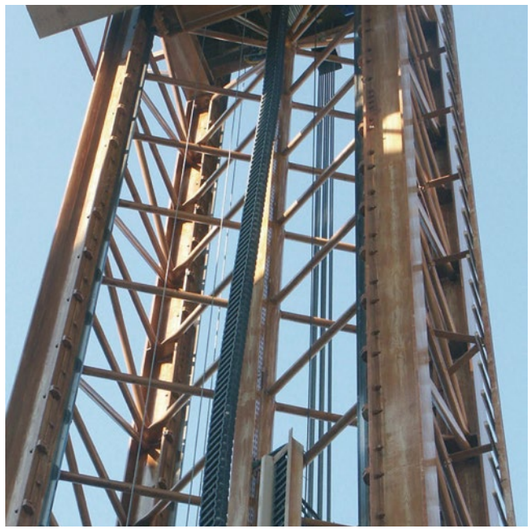
Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

chainflex CASE

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case



igus® chainflex® cables in a drilling application.

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Issue 07/2025 - EPLAN download, configurators ▶ www.igus.eu/CF9UL 85

Control cable | TPE outer jacket

chainflex® CF10.UL

Image exemplary

10 million Double strokes guaranteed

5 x d Bend radius, e-chain®

400m Travel distance, e-chain®

- For extremely heavy duty applications
- TPE outer jacket
- Shielded
- Oil and bio-oil-resistant
- Flame-retardant
- PVC-free
- Low-temperature-flexible
- Hydrolysis and microbe-resistant

Dynamic information

Bend radius	**e-chain® linear**	minimum 5 x d
	flexible	minimum 4 x d
	fixed	minimum 3 x d
Temperature	**e-chain® linear**	-35°C up to +100°C
	flexible	-45°C up to +100°C (following DIN EN 60811-504)
	fixed	-50°C up to +100°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	6m/s
a max.		100m/s²
Travel distance		Unsupported travels and up to 400m for gliding applications, Class 6

Cable structure

Conductor	Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228).
Core insulation	Mechanically high-quality TPE mixture.
Core structure	**Number of cores < 12:** Cores wound in a layer with short pitch length. **Number of cores ≥ 12:** Cores wound in bundles which are then wound around a high tensile strength centre element, all with optimised short pitch lengths and directions. Especially low-torsion structure.
Core identification	**Cores < 0.75mm²:** Colour code in accordance with DIN 47100. **Cores ≥ 0.75mm²:** Black cores with white numbers, one green-yellow core.
Inner jacket	TPE mixture adapted to suit the requirements in e-chains®.
Overall shield	Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90%
Outer jacket	Low-adhesion, extremely abrasion-resistant and highly flexible TPE mixture, adapted to suit the requirements in e-chains®. Colour: Slate grey (similar to RAL 7015)
CFRIP®	Strip cables faster: a tear strip is moulded into the inner jacket Video ▶ www.igus.eu/CFRIP

Electrical information

Nominal voltage	300/500V (following DIN VDE 0298-3) **Cores < 0.5mm²:** 300V (following UL) **Cores ≥ 0.5mm²:** 1000V (following UL)
Testing voltage	2,000V (following DIN EN 50395)

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Basic requirements	low	1	2	3	4	5	**6**	7 highest
Travel distance	unsupported	1	2	3	4	5	**6**	≥ 400m
Oil resistance	none	1	2	3	**4**	highest		
Torsion	none	**1**	2	3	4	±360°		

Class 6.6.4.1

Properties and approvals

UV resistance	High
Oil resistance	Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF10UL
NFPA	Following NFPA 79-2018, chapter 12.9
DNV	Type Approval Certificate TAE00003X2 (Issue 04/2025) Current information in the data sheet ▶ www.igus.eu/CF10UL
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF34.UL.25.04.D - tested by IPA according to standard DIN EN ISO 14644-1
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	7.5 million	10 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
-35/-25	6.8	7.5	8.5
-25/+90	5	6	7
+90/+100	6.8	7.5	8.5

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For heavy-duty applications, Class 6
- Unsupported travels and up to 400m and more for gliding applications, Class 6
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- No torsion, Class 1
- Indoor and outdoor applications, UV-resistant
- Storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, cleanroom, semiconductor insertion, ship to shore, outdoor cranes, low-temperature applications

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Control cable | TPE outer jacket

chainflex® CF10.UL

Strip cables 50% faster with CFRIP® tear strip

Image exemplary

Class 6.6.4.1

Basic requirements	low	1	2	3	4	5	**6**	7	highest
Travel distance	unsupported	1	2	3	4	5	**6**		≥ 400m
Oil resistance	none	1	2	3	**4**				highest
Torsion	none	**1**	2	3	4				±360°

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CF10.UL.02.04	(4x0.25)C	6.5	24	60
CF10.UL.02.08	(8x0.25)C	8.5	40	94
CF10.UL.02.12	(12x0.25)C	9.5	64	137
CF10.UL.02.25 [11]	(25x0.25)C	12.5	110	241
CF10.UL.05.04	(4x0.5)C	7.5	37	83
CF10.UL.05.05	(5x0.5)C	8.0	44	98
CF10.UL.05.12	(12x0.5)C	11.5	103	211
CF10.UL.05.25 [11]	(25x0.5)C	15.5	186	383
CF10.UL.07.04	(4G0.75)C	8.0	49	101
CF10.UL.07.05 [11]	(5G0.75)C	8.5	59	119
CF10.UL.07.07	(7G0.75)C	10.0	89	171
CF10.UL.07.12	(12G0.75)C	12.5	135	268
CF10.UL.10.02	(2x1.0)C	7.5	38	88
CF10.UL.10.03 [11]	(3G1.0)C	8.0	48	99
CF10.UL.10.04	(4G1.0)C	8.5	61	117
CF10.UL.10.05 [11]	(5G1.0)C	9.0	72	137
CF10.UL.10.07	(7G1.0)C	11.0	110	204
CF10.UL.15.04	(4G1.5)C	9.0	83	144
CF10.UL.15.05	(5G1.5)C	10.0	111	184
CF10.UL.15.07 [17]	(7G1.5)C	11.5	148	250
CF10.UL.15.12	(12G1.5)C	15.0	240	420
CF10.UL.15.18	(18G1.5)C	18.5	365	613
CF10.UL.25.04	(4G2.5)C	11.0	140	232
CF10.UL.25.07 [17]	(7G2.5)C	14.0	226	369
CF10.UL.25.12 [11]	(12G2.5)C	18.5	395	666
CF10.UL.40.04 [11]	(4G4.0)C	12.5	205	315

Shop and prices online

CF-A-0017

www.igus.eu/CF10UL

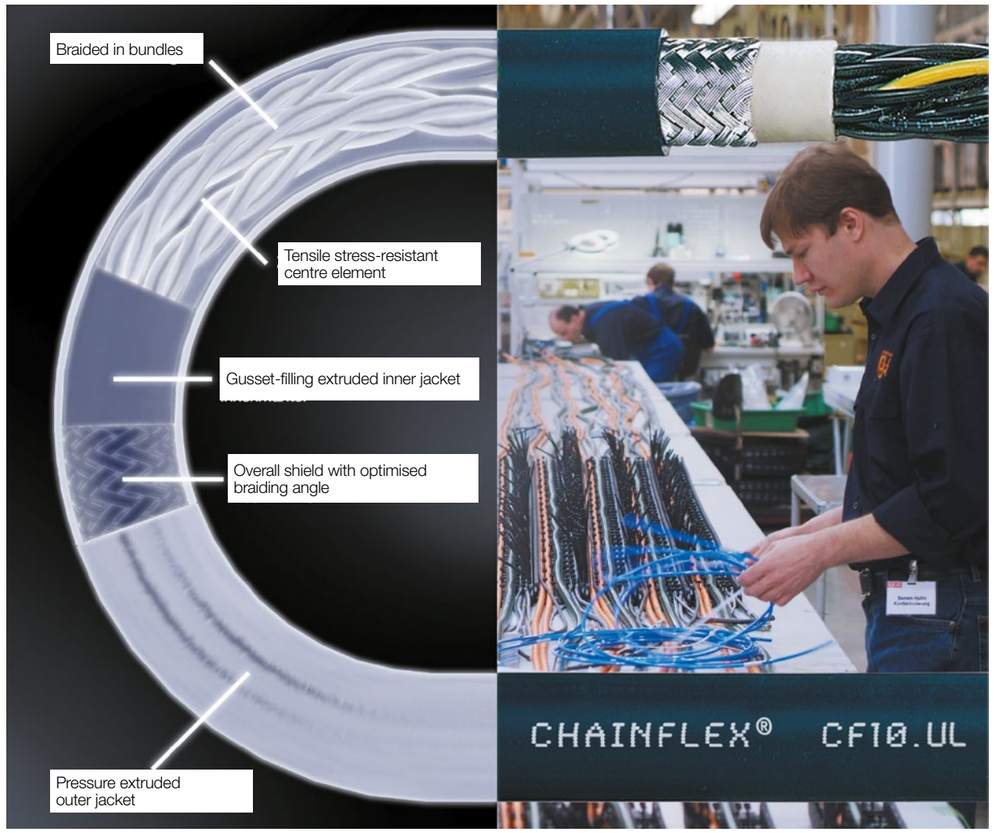
[11] Phase-out model
[17] When using the cables with "7G1.5mm²" and "7G2.5mm²" minimum bend radius must be 17.5xd with gliding travel distance ≥ 5m.

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case



The special cable structure of chainflex® CF10.UL guarantees quality – offered by igus® fully harnessed.

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Control cable | TPE outer jacket

chainflex® CF9

Image exemplary

12.5 million
Double strokes guaranteed

5 x d
Bend radius, e-chain®

400m
Travel distance, e-chain®

- For heaviest duty applications
- TPE outer jacket
- Oil and bio-oil-resistant
- PVC and halogen-free
- Low-temperature-flexible
- Hydrolysis and microbe-resistant

Now available with UL approval & 25% longer service life

Dynamic information

Bend radius	**e-chain® linear**	minimum 5 x d
	flexible	minimum 4 x d
	fixed	minimum 3 x d
Temperature	**e-chain® linear**	-35°C up to +100°C
	flexible	-50°C up to +100°C (following DIN EN 60811-504)
	fixed	-55°C up to +100°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	6m/s
a max.		100m/s²
Travel distance		Unsupported travels and up to 400m for gliding applications, Class 6
Torsion		Torsion ±90°, with 1m cable length, Class 2

Cable structure

Conductor
Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228).

Core insulation
Mechanically high-quality TPE mixture.

Core structure
Number of cores < 12: Cores wound in a layer with short pitch length.
Number of cores ≥ 12: Cores wound in bundles which are then wound around a high tensile strength centre element, all with optimised short pitch lengths and directions. Especially low-torsion structure.

Core identification
Cores < 0.75mm²: Colour code in accordance with DIN 47100.
Cores ≥ 0.75mm²: Black cores with white numbers, one green-yellow core.
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:
0.34mm²: violet/red/grey/red-blue, green/grey-pink/white-green/white-yellow, white-grey/black/yellow-brown/brown-green, white/yellow/pink/grey-brown
0.75mm²: blue/green-yellow/brown

Outer jacket
Low-adhesion, extremely abrasion-resistant and highly flexible TPE mixture, adapted to suit the requirements in e-chains®.
Colour: Steel blue (similar to RAL 5011)

CFRIP®
Strip cables faster: a tear strip is moulded into the outer jacket
Video ▶ www.igus.eu/CFRIP

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 7.6.4.2

Basic requirements	low	1	2	3	4	5	6	**7**	highest
Travel distance	unsupported	1	2	3	4	5	**6**		≥ 400m
Oil resistance	none	1	2	3	**4**				highest
Torsion	none	1	**2**	3	4				±360°

Electrical information

Nominal voltage
300/500V (following DIN VDE 0298-3)
Cores < 0.5mm²: 300V (following UL)
Cores ≥ 0.5mm²: 1000V (following UL)

Testing voltage
2000V (following DIN EN 50395)

Properties and approvals

UV resistance	High
Oil resistance	Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL AWM	See data sheet for details ▶ www.igus.eu/CF9 (from production date 01/2022)
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1, material/cable tested by IPA according to DIN EN ISO standard 14644-1
Dry cleanroom	Tested in "dry cleanroom" according to DIN EN ISO 14644-1
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	7.5 million	12.5 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
-35/-25	6.8	7.5	8.5
-25/+90	5	6	7
+90/+100	6.8	7.5	8.5

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For heavy-duty applications, Class 7
- Unsupported travels and up to 400m and more for gliding applications, Class 6
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- Torsion ±90°, with 1m cable length, Class 2
- Indoor and outdoor applications, UV-resistant
- Storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, cleanroom, semiconductor insertion, outdoor cranes, low-temperature applications

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Control cable | TPE outer jacket

chainflex® CF9

Strip cables 50% faster with CFRIP® tear strip

Image exemplary

Class 7.6.4.2

Basic requirements	low	1	2	3	4	5	6	**7**	highest
Travel distance	unsupported	1	2	3	4	5	**6**		≥ 400m
Oil resistance	none	1	2	3	**4**				highest
Torsion	none	1	**2**	3	4				±360°

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Shop and prices online
CF9.02.02	2x0.25	4.5	5	18	
CF9.02.03.INI	3x0.25	5.0	8	22	
CF9.02.06	6x0.25	5.5	15	36	
CF9.02.07	7x0.25	6.5	18	43	
CF9.02.08	8x0.25	6.5	20	49	
CF9.02.12	12x0.25	8.0	30	71	
CF9.02.18	18x0.25	9.0	45	100	
CF9.02.20	20x0.25	9.5	50	113	
CF9.02.25	25x0.25	10.5	63	138	
CF9.03.04.INI	4x0.34	5.0	14	31	
CF9.03.05.INI	5x0.34	5.5	17	36	
CF9.03.06	6x0.34	6.0	21	43	
CF9.03.08	8x0.34	7.0	28	57	
CF9.03.16.07.03.INI	16x0.34+3x0.75	11	77	152	
CF9.05.02	2x0.5	5.0	10	28	
CF9.05.03	3x0.5	5.5	15	34	
CF9.05.04	4x0.5	6.0	20	41	
CF9.05.05	5x0.5	6.5	25	50	
CF9.05.07	7x0.5	7.5	35	69	
CF9.05.12	12x0.5	10.0	60	123	
CF9.05.18	18x0.5	11.5	90	179	
CF9.05.25	25x0.5	13.5	124	240	
CF9.05.36	36x0.5	16.5	178	345	
CF9.07.04	4G0.75	6.5	30	56	
CF9.07.05	5G0.75	7.0	38	69	
CF9.07.07	7G0.75	8.0	53	94	
CF9.07.12	12G0.75	11.0	90	176	
CF9.07.20	20G0.75	13.5	149	270	
CF9.07.25	25G0.75	15	186	330	
CF9.10.03	3G1.0	6.0	30	54	
CF9.10.04	4G1.0	6.5	40	68	
CF9.10.05	5G1.0	7.5	50	84	
CF9.10.12	12G1.0	12.0	120	212	
CF9.10.18	18G1.0	14.0	179	303	
CF9.10.25	25G1.0	16.5	248	417	

CF-A-0018

www.igus.eu/CF9

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

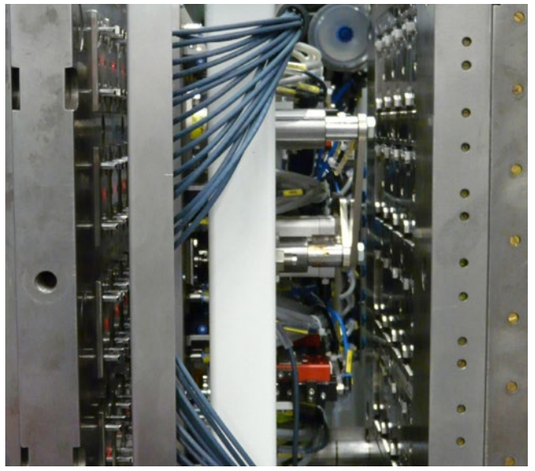
Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Shop and prices online
CF9.15.02	2x1.5	6.5	30	55	
CF9.15.04	4G1.5	7.5	60	90	
CF9.15.05	5G1.5	8.0	75	111	
CF9.15.07 [17]	7G1.5	9.5	104	159	
CF9.15.12	12G1.5	13.0	178	280	
CF9.15.18	18G1.5	16.0	267	412	
CF9.15.25	25G1.5	19.0	371	585	
CF9.15.36	36G1.5	22.5	534	816	
CF9.25.04	4G2.5	9.0	100	144	
CF9.25.05	5G2.5	9.5	124	176	
CF9.25.07 [17]	7G2.5	12.0	174	253	
CF9.25.12	12G2.5	17.0	297	465	
CF9.25.16	16G2.5	19.0	396	616	
CF9.25.18 [7]	18G2.5	22.5	445	795	
CF9.25.25	25G2.5	23.0	612	926	
CF9.40.04	4G4.0	10.5	159	212	
CF9.60.04	4G6.0	12.0	238	308	
CF9.60.05	5G6.0	13.0	297	378	
CF9.100.04	4G10	16.5	396	550	
CF9.160.04	4G16	20.5	633	843	

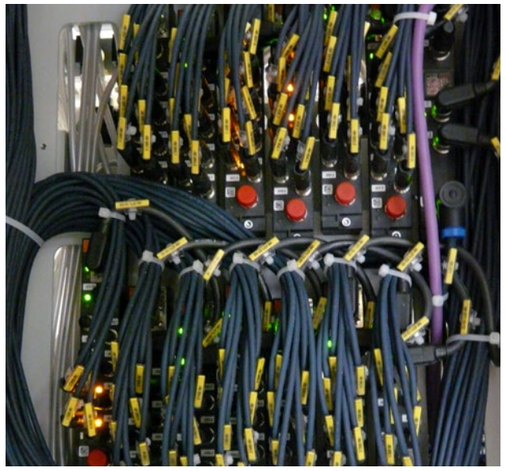
CF-A-0018

www.igus.eu/CF9

[7] Nominal voltage 600/1000V
[17] When using the cables with "7G1.5mm²" and "7G2.5mm²" minimum bend radius must be 17.5xd with gliding travel distance ≥ 5m.

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core





chainflex® CF9 INI cables in a high-performance system for plastics processing with cycle times in seconds. e-chain® E6 series. (Source: Hekuma)

Control cable | TPE outer jacket

chainflex® CF10

Image exemplary

12.5 million
Double strokes guaranteed

5 x d
Bend radius, e-chain®

400m
Travel distance, e-chain®

- For heaviest duty applications
- TPE outer jacket
- Shielded
- Oil and bio-oil-resistant
- PVC and halogen-free
- Low-temperature-flexible
- Hydrolysis and microbe-resistant

Now available with UL approval & 25% longer service life

Dynamic information

Bend radius	**e-chain® linear**	minimum 5 x d
	flexible	minimum 4 x d
	fixed	minimum 3 x d
Temperature	**e-chain® linear**	-35°C up to +100°C
	flexible	-50°C up to +100°C (following DIN EN 60811-504)
	fixed	-55°C up to +100°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	6m/s
a max.		100m/s²
Travel distance		Unsupported travels and up to 400m for gliding applications, Class 6

Cable structure

Conductor	Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228).
Core insulation	Mechanically high-quality TPE mixture.
Core structure	**Number of cores < 12:** Cores wound in a layer with short pitch length. **Number of cores ≥ 12:** Cores wound in bundles which are then wound around a high tensile strength centre element, all with optimised short pitch lengths and directions. Especially low-torsion structure.
Core identification	**Cores < 0.75mm²:** Colour code in accordance with DIN 47100. **Cores ≥ 0.75mm²:** Black cores with white numbers, one green-yellow core. **CF9.03.05.INI:** brown, blue, black, white, green-yellow
Inner jacket	TPE mixture adapted to suit the requirements in e-chains®.
Overall shield	Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90%
Outer jacket	Low-adhesion, extremely abrasion-resistant and highly flexible TPE mixture, adapted to suit the requirements in e-chains®. Colour: Steel blue (similar to RAL 5011)
CFRIP®	Strip cables faster: a tear strip is moulded into the inner jacket Video ▶ www.igus.eu/CFRIP

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 7.6.4.1

Basic requirements	low	1	2	3	4	5	6	**7**	highest
Travel distance	unsupported	1	2	3	4	5	**6**		≥ 400m
Oil resistance	none	1	2	3	**4**				highest
Torsion	none	**1**	2	3	4				±360°

Electrical information

Nominal voltage	300/500V (following DIN VDE 0298-3) **Cores < 0.5mm²:** 300V (following UL) **Cores ≥ 0.5mm²:** 1000V (following UL)
Testing voltage	2,000V (following DIN EN 50395)

Properties and approvals

UV resistance	High
Oil resistance	Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL AWM	See data sheet for details ▶ www.igus.eu/CF10 (from production date 01/2022)
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF9.15.07 - tested by IPA according to standard DIN EN ISO 14644-1
Dry cleanroom	Tested in "dry cleanroom" according to DIN EN ISO 14644-1
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	7.5 million	12.5 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
-35/-25	6.8	7.5	8.5
-25/+90	5	6	7
+90/+100	6.8	7.5	8.5

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For heavy-duty applications, Class 7
- Unsupported travels and up to 400m and more for gliding applications, Class 6
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- No torsion, Class 1
- Indoor and outdoor applications, UV-resistant
- Storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, cleanroom, semiconductor insertion, ship to shore, outdoor cranes, low-temperature applications

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Control cable | TPE outer jacket

chainflex® CF10

Strip cables 50% faster with CFRIP® tear strip

Image exemplary

Class 7.6.4.1

Basic requirements	low	1	2	3	4	5	6	**7**	highest
Travel distance	unsupported	1	2	3	4	5	**6**		≥ 400m
Oil resistance	none	1	2	3	**4**				highest
Torsion	none	**1**	2	3	4				±360°

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CF10.01.12	(12x0.14)C	7.5	37	78
CF10.01.18	(18x0.14)C	9.5	63	119
CF10.02.04	(4x0.25)C	6.5	24	49
CF10.02.08	(8x0.25)C	8.0	40	79
CF10.02.12	(12x0.25)C	9.5	65	122
CF10.02.25	(25x0.25)C	12.0	110	211
CF10.03.05.INI	(5x0.34)C	7.0	33	63
CF10.05.04	(4x0.5)C	7.0	37	70
CF10.05.05	(5x0.5)C	7.5	44	81
CF10.05.07	(7x0.5)C	8.5	58	104
CF10.05.12	(12x0.5)C	12.0	107	198
CF10.05.18	(18x0.5)C	13.5	144	261
CF10.05.25	(25x0.5)C	15.0	186	332
CF10.07.04	(4G0.75)C	7.5	49	86
CF10.07.05	(5G0.75)C	8.0	58	102
CF10.07.07	(7G0.75)C	9.5	90	147
CF10.07.12	(12G0.75)C	12.5	139	244
CF10.07.20	(20G0.75)C	15.5	210	350
CF10.07.25	(25G0.75)C	17.0	255	443
CF10.10.02	(2x1.0)C	7.5	38	72
CF10.10.03	(3G1.0)C	7.5	48	84
CF10.10.04	(4G1.0)C	8.0	60	100
CF10.10.05	(5G1.0)C	8.5	72	118
CF10.10.07	(7G1.0)C	10.0	110	172
CF10.10.12	(12G1.0)C	13.5	175	294
CF10.10.18	(18G1.0)C	16.0	244	404
CF10.10.25	(25G1.0)C	19.0	323	550
CF10.15.04	(4G1.5)C	9.0	94	141
CF10.15.05	(5G1.5)C	9.5	111	163
CF10.15.07 [17)]	(7G1.5)C	11.5	148	224
CF10.15.12	(12G1.5)C	15.0	240	373
CF10.15.18	(18G1.5)C	18.5	365	568
CF10.25.04	(4G2.5)C	11.0	140	209
CF10.25.07 [17)]	(7G2.5)C	13.5	227	335
CF10.25.12	(12G2.5)C	19.5	402	636
CF10.40.04	(4G4.0)C	12.5	205	287
CF10.40.05 [11)]	(5G4.0)C	13.5	254	351

Shop and prices online

CF-A-0019

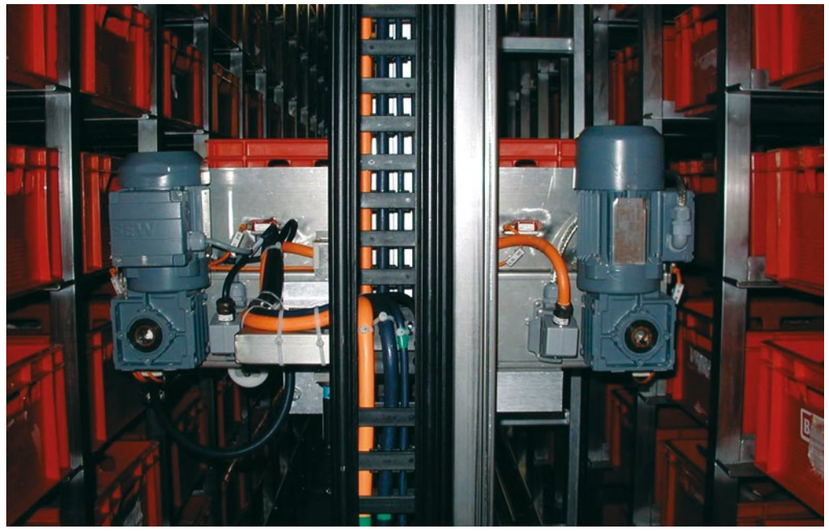
www.igus.eu/CF10

[11)] Phase-out model
[17)] When using the cables with "7G1.5mm²" and "7G2.5mm²" minimum bend radius must be 17.5xd with gliding travel distance ≥ 5m.
Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Order example: CF10.01.12 - to your required length (0.5m steps)
CF10 chainflex® series .01 Code nominal cross section .12 Number of cores

Order online ▶ www.igus.eu/CF10

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.



chainflex CF10 control cable in storage and retrieval units e-chain®: E2 system

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

Control cable | TPE outer jacket

chainflex® CF98.PLUS

Image exemplary

100,000,000 Double strokes guaranteed

3 x d Bend radius, e-chain®

100m Travel distance, e-chain®

- For heaviest duty applications and very small radii down to 3 x d
- TPE outer jacket
- Oil and bio-oil-resistant
- PVC and halogen-free
- Low-temperature-flexible
- Hydrolysis and microbe-resistant

100 million double strokes in e-chains® guaranteed!

Dynamic information

Bend radius	**e-chain® linear**	minimum 3 x d
	flexible	minimum 3 x d
	fixed	minimum 3 x d
Temperature	**e-chain® linear**	-35°C up to +90°C
	flexible	-50°C up to +90°C (following DIN EN 60811-504)
	fixed	-55°C up to +90°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	6m/s
a max.		100m/s²
Travel distance		Short, very fast applications with small radii and restricted installation space, Class 5
Torsion		Torsion ±90°, with 1m cable length, Class 2

Cable structure

Conductor	Conductor consisting of a highly flexible special alloy.
Core insulation	Mechanically high-quality TPE mixture.
Core structure	Cores wound in a layer with especially short pitch length.
Core identification	Colour code in accordance with DIN 47100. **CF98.PLUS.02.03.INI:** brown, blue, black **CF98.PLUS.03.04.INI:** brown, blue, black, white
Outer jacket	Low-adhesion, extremely abrasion-resistant and highly flexible TPE mixture, adapted to suit the requirements in e-chains®. Colour: Steel blue (similar to RAL 5011)

Electrical information

Nominal voltage	300/500V (following DIN VDE 0298-3)
Testing voltage	2,000V (following DIN EN 50395)

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 7.5.4.2

Basic requirements	low	1	2	3	4	5	6	**7** highest
Travel distance	unsupported	1	2	3	4	**5**	6	≥ 400m
Oil resistance	none	1	2	3	**4**	highest		
Torsion	none	1	**2**	3	4	±360°		

Properties and approvals

UV resistance	High
Oil resistance	Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF9.15.07 - tested by IPA according to standard DIN EN ISO 14644-1
Dry cleanroom	Tested in "dry cleanroom" according to DIN EN ISO 14644-1
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	40 million	100 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
-35/-25	4	6	7
-25/+80	3	5	6
+80/+90	4	6	7

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For heaviest duty applications and very small radii down to 3 x d, Class 7
- Especially for short, very fast applications with small radii and restricted installation space, Class 5
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- Torsion ±90°, with 1m cable length, Class 2
- Indoor and outdoor applications, UV-resistant
- Pick and place machines, automatic doors, cleanroom, very quick handling

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Control cable | TPE outer jacket

chainflex® CF98.PLUS

Basic requirements — low 1 2 3 4 5 6 **7** highest
Travel distance — unsupported 1 2 3 4 **5** 6 ≥ 400m
Oil resistance — none 1 2 3 **4** highest
Torsion — none 1 **2** 3 4 ±360°

Class 7.5.4.2

Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Shop and prices online
CF98.PLUS.01.02	2x0.14	4.5	4	18	
CF98.PLUS.01.03	3x0.14	4.5	6	20	
CF98.PLUS.01.04	4x0.14	5.0	7	25	
CF98.PLUS.01.08	8x0.14	6.5	15	45	
CF98.PLUS.02.03.INI	3x0.25	5.0	10	29	
CF98.PLUS.02.04	4x0.25	5.5	14	36	
CF98.PLUS.02.08	8x0.25	7.5	29	68	
CF98.PLUS.03.04.INI	4x0.34	6.0	15	38	
CF98.PLUS.05.04	4x0.5	6.0	32	53	

CF-A-0020

www.igus.eu/CF98PLUS

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case

Order example: CF98.PLUS.01.02 - to your required length (0.5m steps)
CF98.PLUS **chainflex® series** .01 **Code nominal cross section** .02 **Number of cores**

Order online ▶ www.igus.eu/CF98PLUS

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

Smaller and smaller installation spaces, shorter and shorter cycle times, 99% availability. These are the requirements that innovative automation specialists must meet.

To do this, igus® has been working on an unprecedented innovation for more than ten years.
The new generation of chainflex® **CF98.PLUS** (unshielded) and chainflex® **CF99.PLUS** (shielded) control cables are a consistent development of the well-known, highly successful CF98/CF99 and CF298 and CF299 control cable series.

Systematic research on process technology and insulation and conductor materials supported by a wide variety of test series in the igus® laboratory enabled igus® to develop this new generation of control cables.
The result is cable series that can be used reliably with a minimum **bend radius of just 3 x d** (3 x cable diameter).

The cross-sectional areas range from 0.14mm² to 0.5mm² in both the shielded and unshielded versions.
This makes igus® the first and only manufacturer to offer catalogue goods for use in an e-chain® with a **guaranteed service life of 100 million double strokes!**
This is with acceleration values of up to 100m/s².

Control cable | TPE outer jacket

chainflex® CF99.PLUS

Image exemplary

100,000,000 Double strokes guaranteed

3 x d Bend radius, e-chain®

100m Travel distance, e-chain®

- For heaviest duty applications and very small radii down to 3 x d
- TPE outer jacket
- Shielded
- Oil and bio-oil-resistant
- PVC and halogen-free
- Low-temperature-flexible
- Hydrolysis and microbe-resistant

100 million double strokes in e-chains® guaranteed!

Dynamic information

Bend radius	**e-chain® linear**	minimum 3 x d
	flexible	minimum 3 x d
	fixed	minimum 3 x d
Temperature	**e-chain® linear**	-35°C up to +90°C
	flexible	-50°C up to +90°C (following DIN EN 60811-504)
	fixed	-55°C up to +90°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	6m/s
a max.	100m/s²	
Travel distance	Short, very fast applications with small radii and restricted installation space, Class 5	

Cable structure

Conductor	Conductor consisting of a highly flexible special alloy.
Core insulation	Mechanically high-quality TPE mixture.
Core structure	Cores wound in a 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 e-chains®.
Overall shield	Extremely bending resistant braiding made of alloy wires. Coverage linear approx. 70%, optical approx. 90%
Outer jacket	Low-adhesion, extremely abrasion-resistant and highly flexible TPE mixture, adapted to suit the requirements in e-chains®. Colour: Steel blue (similar to RAL 5011)

Electrical information

Nominal voltage	300/500V (following DIN VDE 0298-3)
Testing voltage	2,000V (following DIN EN 50395)

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 7.5.4.1

Basic requirements	low	1	2	3	4	5	6	**7** highest
Travel distance	unsupported	1	2	3	4	**5**	6	≥ 400m
Oil resistance	none	1	2	3	**4**	highest		
Torsion	none	**1**	2	3	4	±360°		

Properties and approvals

UV resistance	High
Oil resistance	Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF9.15.07 - tested by IPA according to standard DIN EN ISO 14644-1
Dry cleanroom	Tested in "dry cleanroom" according to DIN EN ISO 14644-1
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	40 million	100 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
-35/-25	4	6	7
-25/+80	3	5	6
+80/+90	4	6	7

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For heaviest duty applications and very small radii down to 3 x d, Class 7
- Especially for short, very fast applications with small radii and restricted installation space, Class 5
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- No torsion, Class 1
- Indoor and outdoor applications, UV-resistant
- Pick and place machines, automatic doors, cleanroom, very quick handling

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Control cable | TPE outer jacket

chainflex® CF99.PLUS

Basic requirements
Travel distance
Oil resistance
Torsion

low 1 2 3 4 5 6 **7** highest
unsupported 1 2 3 4 **5** 6 ≥ 400m
none 1 2 3 **4** highest
none **1** 2 3 4 ±360°

Class 7.5.4.1

Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CF99.PLUS.01.02	(2x0.14)C	6.0	12	39
CF99.PLUS.01.04	(4x0.14)C	6.5	16	48
CF99.PLUS.01.08	(8x0.14)C	8.0	28	76
CF99.PLUS.02.04	(4x0.25)C	7.0	23	60
CF99.PLUS.03.08	(8x0.34)C	9.5	45	111

Shop and prices online
CF-A-0021
www.igus.eu/CF99PLUS

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case

Order example: CF99.PLUS.01.02 - to your required length (0.5m steps)
CF99.PLUS **chainflex® series** .01 **Code nominal cross section** .02 **Number of cores**

Order online ▶ www.igus.eu/CF99PLUS

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

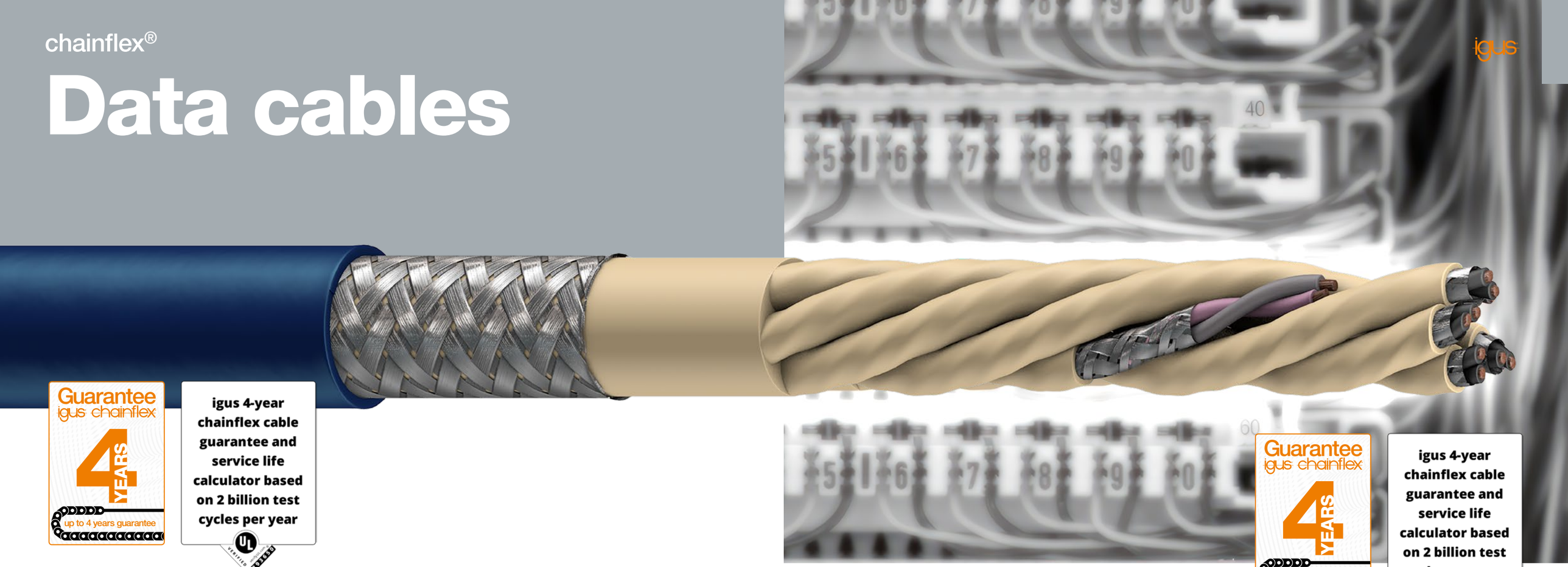
Smaller and smaller installation spaces, shorter and shorter cycle times, 99% availability. These are the requirements that innovative automation specialists must meet.

To do this, igus® has been working on an unprecedented innovation for more than ten years.
The new generation of chainflex® **CF98.PLUS** (unshielded) and chainflex® **CF99.PLUS** (shielded) control cables are a consistent development of the well-known, highly successful CF98/CF99 and CF298 and CF299 control cable series.

Systematic research on process technology and insulation and conductor materials supported by a wide variety of test series in the igus® laboratory enabled igus® to develop this new generation of control cables.
The result is cable series that can be used reliably with a minimum **bend radius of just 3 x d** (3 x cable diameter).

The cross-sectional areas range from 0.14mm² to 0.5mm² in both the shielded and unshielded versions.
This makes igus® the first and only manufacturer to offer catalogue goods for use in an e-chain® with a **guaranteed service life of 100 million double strokes!**
This is with acceleration values of up to 100m/s².

Data cables



Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

PTFE FREE · cULus · UL · NFPA · DNV · REACH · RoHS · Clean-Room · dry cleanroom testing · CE

Data cables for energy chains

Specially designed for use in e-chains®, for small bend radii (up to 6.8xd). Cores wound in layers, twisted pairs and twisted pairs with pair shields. In addition, various mechanical qualities are available. Tested with a chainflex® guarantee of up to 4 years.

- Three different structures: cores wound in layers, twisted pairs and pair shields
- With three different outer jacket materials, always find the most cost-effective data cable that is guaranteed to work in your application
- Best EMC properties thanks to high shield coverage, tested in the largest test laboratory for moving cables
- Sustainability thanks to a longer service life is practical resource protection, enhancing economic efficiency and protecting the environment
- Calculate the exact service life online: igus.eu/chainflexlife

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

Background

Flexible data cable as information carrier

Data cables are usually shielded and are used for signal transmission in automation technology e.g.

The electrical nominal cross-sections range from 0.14mm² to 0.5mm². Depending on requirements, there may also be exceptions with larger cross-sections.

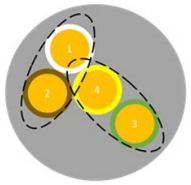
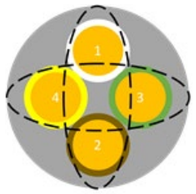
Due to their small cross-sections, data cables are usually colour-marked for better differentiation. Different colour markings are used, with the DIN 47100 system being the most common. This system defines the colour sequence of the wires (see the table on page 478).

Data cables have three different core structures, which are based on the electrical requirements of automation technology.

The difference between bus and data cables is that bus cables are assigned to a specific bus system in their electrical design. Certain electrical properties, such as characteristic wave impedance, are also defined here. Data cables, on the other hand, do not usually have specific data technology limits.

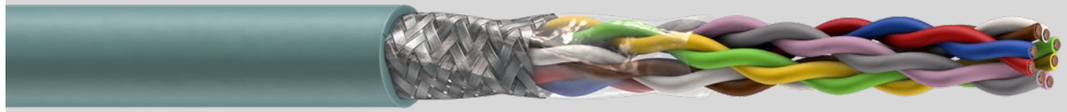
igus® offers nine electrically identical data cable series with different mechanical properties and jacket materials to provide the best solution for every e-chain® application.

Core structures overview

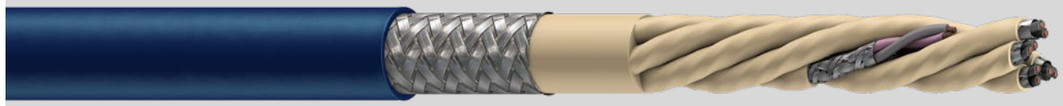
Core structures	Benefit	Disadvantage
Cores wound in layers	Low costs, diameter-optimised design	Low security during data transmission
Twisted pair 	High data transfer security	Higher costs
Star-quad stranding (typically used for 4-core cables) 	Cost-effective, small diameter, high data transmission security	Connection type must be observed

Cores wound in layers

Twisted pair



Twisted pairs with pair shields



chainflex® data cables

Mechanical parameters

chainflex® cables	Jacket	Shield	Bend radius e-chain® min. [xd]	Temperature e-chain® from/to [°C]	v max. [m/s] unsupported	v max. [m/s] gliding	a max. [m/s²]	Travel distance [m]	Page
CF240	PVC	●	10	+5/+70	3	2	20	≤ 50	110
CF240.PUR	PUR	●	10	-25/+80	3	2	20	≤ 50	114
CF211	PVC	●	7.5	+5/+70	5	3	50	≤ 100	118
CF211.PUR New	PUR	●	7.5	-25/+80	5	3	50	≤ 100	122
CF11	TPE	●	6.8	-35/+100	10	6	100	≤ 400	126
CF112	PUR	●	10	-25/+80	10	5	80	≤ 100	130
CF12	TPE	●	10	-35/+100	10	6	100	≤ 400	134
CFKoax1/3	TPE	●	10	-35/+100	10	5	100	≤ 400	136
CFKoax2	TPE	●	10	-35/+70	10	5	100	≤ 400	136

Approvals/resistance

chainflex® cables	Approvals and standards	Page
CF240	●	110
CF240.PUR	●	114
CF211	●	118
CF211.PUR New	●	122
CF11	●	126
CF112	●	130
CF12	●	134
CFKoax1/3	●	136
CFKoax2	●	136

Guaranteed service life

chainflex® cables	Temperature, from/to [°C]	Min. bend radius [xd] for travel distance < 10m	Min. bend radius [xd] for travel distance ≥ 10m	Min. bend radius [xd] for travel distance < 10m	Min. bend radius [xd] for travel distance ≥ 10m	Min. bend radius [xd] for travel distance < 10m	Min. bend radius [xd] for travel distance ≥ 10m	Page
		5 million double strokes *		7.5 million double strokes *		10 million double strokes *		
CF240	+5 / +15	12.5	15	13.5	16	14.5	17	
	+15 / +60	10	12.5	11	13.5	12	14.5	110
	+60 / +70	12.5	15	13.5	16	14.5	17	
CF240.PUR	-25 / -15	12.5	15	13.5	16	14.5	17	
	-15 / +70	10	12.5	11	13.5	12	14.5	114
	+70 / +80	12.5	15	13.5	16	14.5	17	
CF211	+5 / +15	10		11		12		
	+15 / +60	7.5		8.5		9.5		118
	+60 / +70	10		11		12		
CF211.PUR New	-25 / -15	10		11		12		
	-15 / +70	7.5		8.5		9.5		122
	+70 / +80	10		11		12		
		5 million		7.5 million		12.5 million		
CF11	-35 / -25	7.5		8.5		9.5		
	-25 / +90	6.8		7.5		8.5		126
	+90 / +100	7.5		8.5		9.5		
		5 million		7.5 million		10 million		
CF112	-20 / -15	12.5		13.5		14.5		
	-15 / +70	10		11		12		130
	+70 / +80	12.5		13.5		14.5		
		5 million		7.5 million		12.5 million		
CF12	-35 / -25	12.5		13.5		14.5		
	-25 / +90	10		11		12		134
	+90 / +100	12.5		13.5		14.5		
		5 million		7.5 million		10 million		
CFKoax1/3	-35 / -25	12.5		13.5		14.5		
	-25 / +90	10		11		12		136
	+90 / +100	12.5		13.5		14.5		
CFKoax2	-35 / -25	12.5		13.5		14.5		
	-25 / +60	10		11		12		136
	+60 / +70	12.5		13.5		14.5		

* Higher number of double strokes? Calculate service life online ▶ www.igus.eu/chainflexlife

Data cable | PVC outer jacket

chainflex® CF240

Image exemplary

10 million Double strokes guaranteed

10 x d Bend radius, e-chain®

50m Travel distance, e-chain®

- For medium duty applications
- PVC outer jacket
- Shielded
- Oil-resistant
- Flame-retardant

Dynamic information

Bend radius	**e-chain® linear**	minimum 10 x d
	flexible	minimum 8 x d
	fixed	minimum 5 x d
Temperature	**e-chain® linear**	+5°C up to +70°C
	flexible	-5°C up to +70°C (following DIN EN 60811-504)
	fixed	-15°C up to +70°C (following DIN EN 50305)
v max.	**unsupported**	3m/s
	gliding	2m/s
a max.		20m/s²
Travel distance		Unsupported travels and up to 50m for gliding applications, Class 4

Cable structure

Conductor	Very finely stranded special conductors of particularly bending resistant design made of bare copper wires.
Core insulation	Mechanically high-quality TPE mixture.
Core structure	The individual cores are wound in layers with a short pitch length.
Core identification	Colour code in accordance with DIN 47100.
Intermediate layer	Foil taping over the outer layer.
Overall shield	Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90%
Outer jacket	Low-adhesion, oil-resistant PVC mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-4-1). Colour: Silver-grey (similar to RAL 7001)

Electrical information

Nominal voltage	300/300V (following DIN VDE 0298-3) 300V (following UL)
Testing voltage	1,500V (following DIN EN 50395)

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 4.4.2.1

Basic requirements	low	1	2	3	**4**	5	6	7	highest
Travel distance	unsupported	1	2	3	**4**	5	6	≥ 400m	
Oil resistance	none	1	**2**	3	4	highest			
Torsion	none	**1**	2	3	4	±360°			

Properties and approvals

Oil resistance	Oil-resistant (following DIN EN 50363-4-1), Class 2
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF240
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1, material/cable tested by IPA according to DIN EN ISO standard 14644-1
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million		7.5 million		10 million	
Temperature, from/to [°C]	< 10m	≥ 10m	< 10m	≥ 10m	< 10m	≥ 10m
	R min. [x d]	R min. [x d]	R min. [x d]	R min. [x d]	R min. [x d]	R min. [x d]
+5/+15	12.5	15	13.5	16	14.5	17
+15/+60	10	12.5	11	13.5	12	14.5
+60/+70	12.5	15	13.5	16	14.5	17

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For medium duty applications, Class 4
- Unsupported travels and up to 50m for gliding applications, Class 4
- Light oil influence, Class 2
- No torsion, Class 1
- Preferably indoor applications, but also outdoor ones at temperatures > 5 °C
- Storage and retrieval units, machining units/packaging machines, handling, indoor cranes

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Data cable | PVC outer jacket

chainflex® CF240

Basic requirements
Travel distance
Oil resistance
Torsion

low 1 2 3 4 5 6 7 highest
unsupported 1 2 3 4 5 6 ≥ 400m
none 1 2 3 4 highest
none 1 2 3 4 ±360°

Class 4.4.2.1

Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CF240.01.03	(3x0.14)C	4.5	12	28
CF240.01.04	(4x0.14)C	5.0	17	32
CF240.01.05	(5x0.14)C	5.5	19	37
CF240.01.07	(7x0.14)C	6.0	25	47
CF240.01.14	(14x0.14)C	7.0	41	75
CF240.01.18	(18x0.14)C	7.5	51	90
CF240.01.24	(24x0.14)C	8.5	64	125
CF240.02.03	(3x0.25)C	5.0	19	35
CF240.02.04	(4x0.25)C	5.5	23	45
CF240.02.05	(5x0.25)C	6.0	28	49
CF240.02.07	(7x0.25)C	6.5	35	61
CF240.02.08	(8x0.25)C	7.0	39	68
CF240.02.14	(14x0.25)C	7.5	60	92
CF240.02.18	(18x0.25)C	8.5	71	122
CF240.02.24	(24x0.25)C	10.0	95	161
CF240.03.02	(2x0.34)C	5.5	21	37
CF240.03.03	(3x0.34)C	5.5	29	42
CF240.03.04	(4x0.34)C	6.0	33	51
CF240.03.05	(5x0.34)C	6.5	38	56
CF240.03.07	(7x0.34)C	7.5	50	77
CF240.03.10	(10x0.34)C	8.0	58	97
CF240.03.14	(14x0.34)C	8.0	74	112
CF240.03.18	(18x0.34)C	9.0	91	139
CF240.03.24	(24x0.34)C	10.0	119	177

Shop and prices online

CF-B-0001

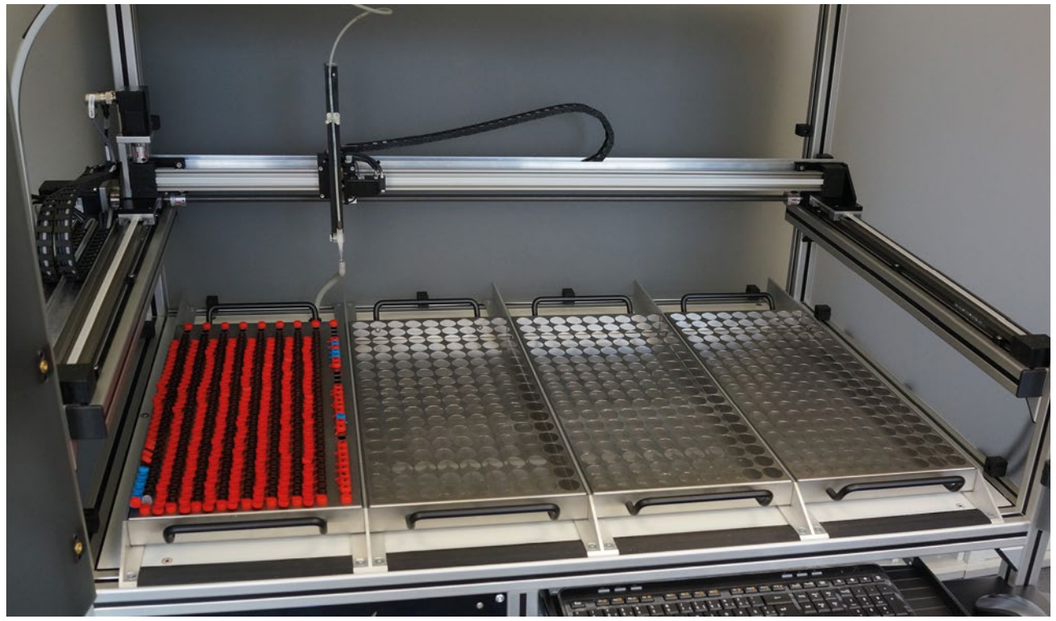
www.igus.eu/CF240

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Order example: CF240.01.03 - to your required length (0.5m steps)
CF240 **chainflex® series** .01 **Code nominal cross section** .03 **Number of cores**

Order online ▶ www.igus.eu/CF240

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.



chainflex® CF240 data cables in small handling machines

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

chainflex® CF240.PUR

Image exemplary

10 million
Double strokes guaranteed

10 x d
Bend radius, e-chain®

50m
Travel distance, e-chain®

- For medium duty applications
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

Dynamic information

Bend radius	**e-chain® linear**	minimum 10 x d
	flexible	minimum 8 x d
	fixed	minimum 5 x d
Temperature	**e-chain® linear**	-25°C up to +80°C
	flexible	-40°C up to +80°C (following DIN EN 60811-504)
	fixed	-50°C up to +80°C (following DIN EN 50305)
v max.	**unsupported**	3m/s
	gliding	2m/s
a max.		20m/s²
Travel distance		Unsupported travels and up to 50m for gliding applications, Class 4

Cable structure

Conductor	Very finely stranded special conductors of particularly bending resistant design made of bare copper wires.
Core insulation	Mechanically high-quality TPE mixture.
Core structure	The individual cores are wound in layers with a short pitch length.
Core identification	Colour code in accordance with DIN 47100.
Intermediate layer	Foil taping over the outer layer.
Overall shield	Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90%
Outer jacket	Low-adhesion, halogen-free, highly abrasion resistant PUR mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2) Colour: Window-grey (similar to RAL 7040)

Electrical information

Nominal voltage	300/300V (following DIN VDE 0298-3) 300V (following UL)
Testing voltage	1,500V (following DIN EN 50395)

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 4.4.3.1

Basic requirements	low	1	2	3	**4**	5	6	7 highest
Travel distance	unsupported	1	2	3	**4**	5	6	≥ 400m
Oil resistance	none	1	2	**3**	4	highest		
Torsion	none	**1**	2	3	4	±360°		

Properties and approvals

UV resistance	Medium
Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3
Offshore	MUD-resistant following NEK 606 - status 2016
Flame-retardant	According to IEC 60332-1-2, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF240PUR
NFPA	Following NFPA 79-2018, chapter 12.9
DNV	Type Approval Certificate TAE00003X3 (Issue 04/2025) Current information in the data sheet ▶ www.igus.eu/CF240PUR
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million		7.5 million		10 million	
Temperature, from/to [°C]	< 10m	≥ 10m	< 10m	≥ 10m	< 10m	≥ 10m
	R min. [x d]	R min. [x d]	R min. [x d]	R min. [x d]	R min. [x d]	R min. [x d]
-25/-15	12.5	15	13.5	16	14.5	17
-15/+70	10	12.5	11	13.5	12	14.5
+70/+80	12.5	15	13.5	16	14.5	17

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For medium duty applications, Class 4
- Unsupported travels and up to 50m for gliding applications, Class 4
- Almost unlimited resistance to oil, Class 3
- No torsion, Class 1
- Indoor and outdoor applications with average sun radiation
- Machining units/machine tools, storage and retrieval units for high-bay warehouses, packaging industry, quick handling, refrigerating sector

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

chainflex® CF240.PUR

Basic requirements — low 1 2 3 4 5 6 7 highest
Travel distance — unsupported 1 2 3 4 5 6 ≥ 400m
Oil resistance — none 1 2 3 4 highest
Torsion — none 1 2 3 4 ±360°

Class 4.4.3.1

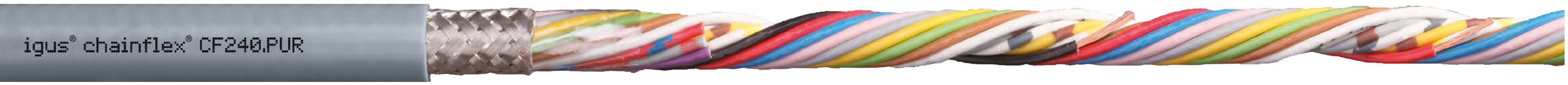


Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CF240.PUR.01.04	(4x0.14)C	5.5	15	39
CF240.PUR.01.07	(7x0.14)C	6.5	24	54
CF240.PUR.01.08 [11)]	(8x0.14)C	7.0	26	64
CF240.PUR.01.14	(14x0.14)C	7.5	41	79
CF240.PUR.01.18	(18x0.14)C	8.0	51	97
CF240.PUR.01.25	(25x0.14)C	8.5	66	101
CF240.PUR.02.03	(3x0.25)C	5.5	18	41
CF240.PUR.02.04	(4x0.25)C	6.0	22	45
CF240.PUR.02.05	(5x0.25)C	6.0	25	50
CF240.PUR.02.07	(7x0.25)C	7.0	33	65
CF240.PUR.02.08	(8x0.25)C	7.0	39	72
CF240.PUR.02.14	(14x0.25)C	8.0	60	103
CF240.PUR.02.18	(18x0.25)C	9.0	71	122
CF240.PUR.02.25	(25x0.25)C	10.5	97	152
CF240.PUR.03.03	(3x0.34)C	5.0	25	47
CF240.PUR.03.04	(4x0.34)C	5.5	30	54
CF240.PUR.03.05	(5x0.34)C	6.0	34	60
CF240.PUR.03.07	(7x0.34)C	6.5	45	84
CF240.PUR.03.14	(14x0.34)C	8.0	74	126
CF240.PUR.03.18	(18x0.34)C	8.5	91	156

Shop and prices online

CF-B-0002

www.igus.eu/CF240PUR

[11)] Phase-out model

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case

Order example: CF240.PUR.01.04 **- to your required length (0.5m steps)**
CF240.PUR **chainflex® series** .01 **Code nominal cross section** .04 **Number of cores**

Order online ▶ www.igus.eu/CF240PUR

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

cost down...

...life up

Reduce cost, improve technology, now!
Do the chainflex® price check ...
www.igus.eu/cf-price-check

… for example: reduce cost with CF240 ...

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

chainflex® CF211

Image exemplary

10 million
Double strokes guaranteed

7.5 x d
Bend radius, e-chain®

100m
Travel distance, e-chain®

- For heavy duty applications
- PVC outer jacket
- Shielded
- Twisted pair
- Oil-resistant
- Flame-retardant

Dynamic information

Bend radius	**e-chain® linear**	minimum 7.5 x d
	flexible	minimum 6 x d
	fixed	minimum 4 x d
Temperature	**e-chain® linear**	+5°C up to +70°C
	flexible	-5°C up to +70°C (following DIN EN 60811-504)
	fixed	-15°C up to +70°C (following DIN EN 50305)
v max.	**unsupported**	5m/s
	gliding	3m/s
a max.	50m/s²	
Travel distance	Unsupported travels and up to 100m for gliding applications, Class 5	

Cable structure

Conductor	Very finely stranded special conductors of particularly bending resistant design made of bare copper wires.
Core insulation	Mechanically high-quality TPE mixture.
Core structure	Cores twisted in pairs with a short pitch length, core pairs then wound with short pitch lengths.
Core identification	Colour code in accordance with DIN 47100.
Intermediate layer	Foil taping over the outer layer.
Overall shield	Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90%
Outer jacket	Low-adhesion, oil-resistant PVC mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-4-1). Colour: Silver-grey (similar to RAL 7001)

Electrical information

Nominal voltage	300/300V (following DIN VDE 0298-3) 300V (following UL)
Testing voltage	1,500V (following DIN EN 50395)

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 5.5.2.1

Basic requirements	low	1	2	3	4	**5**	6	7	highest
Travel distance	unsupported	1	2	3	4	**5**	6	≥ 400m	
Oil resistance	none	1	**2**	3	4	highest			
Torsion	none	**1**	2	3	4	±360°			

Properties and approvals

Oil resistance	Oil-resistant (following DIN EN 50363-4-1), Class 2
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF211DATA
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF240.02.24 - tested by IPA according to standard DIN EN ISO 14644-1
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	7.5 million	10 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
+5/+15	10	11	12
+15/+60	7.5	8.5	9.5
+60/+70	10	11	12

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For heavy-duty applications, Class 5
- Unsupported travels and up to 100m for gliding applications, Class 5
- Light oil influence, Class 2
- No torsion, Class 1
- Preferably indoor applications, but also outdoor ones at temperatures > 5 °C
- Storage and retrieval units, machining units/packaging machines, handling, indoor cranes

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Data cable | PVC outer jacket

chainflex® CF211

igus

Class 5.5.2.1

Basic requirements	low	1	2	3	4	**5**	6	7	highest
Travel distance	unsupported	1	2	3	4	**5**	6		≥ 400m
Oil resistance	none	1	**2**	3	4	highest			
Torsion	none	**1**	2	3	4	±360°			

igus

Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CF211.02.01.02	(2x0.25)C	5.0	18	33
CF211.02.02.02 [2)]	(2x(2x0.25))C	6.0	25	51
CF211.02.03.02	(3x(2x0.25))C	7.0	36	63
CF211.02.04.02	(4x(2x0.25))C	7.5	44	76
CF211.02.05.02	(5x(2x0.25))C	8.5	52	92
CF211.02.06.02	(6x(2x0.25))C	9.0	62	105
CF211.02.08.02	(8x(2x0.25))C	10.5	78	137
CF211.02.10.02	(10x(2x0.25))C	12.0	90	170
CF211.02.14.02	(14x(2x0.25))C	12.0	119	204
CF211.03.03.02	(3x(2x0.34))C	8.0	44	86
CF211.03.08.02	(8x(2x0.34))C	12.0	102	206
CF211.05.01.02	(2x0.5)C	6.0	26	51
CF211.05.02.02 [2)]	(2x(2x0.5))C	7.0	46	90
CF211.05.03.02	(3x(2x0.5))C	9.0	61	109
CF211.05.04.02	(4x(2x0.5))C	9.5	74	125
CF211.05.05.02	(5x(2x0.5))C	11.0	91	153
CF211.05.06.02	(6x(2x0.5))C	11.5	103	189
CF211.05.08.02	(8x(2x0.5))C	13.0	137	234
CF211.05.10.02	(10x(2x0.5))C	15.5	181	326
CF211.05.14.02	(14x(2x0.5))C	16.0	193	341

Shop and prices online

CF-B-0003

www.igus.eu/CF211DATA

The chainflex® types marked with [2)] are cables designed as a star-quad.

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Cables available in the chainflex® CASE

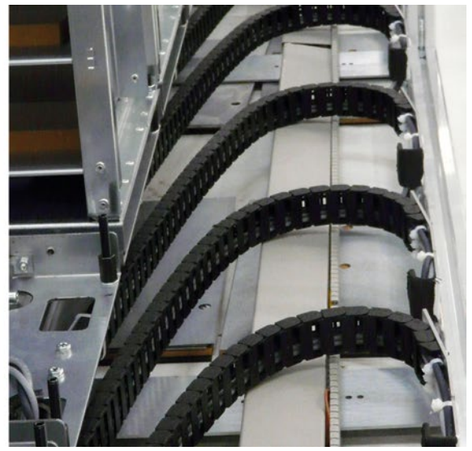
Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case

Order example: CF211.02.01.02 **- to your required length (0.5m steps)**
CF211 **chainflex® series** .02 **Code nominal cross section** .01 **Number of pairs** .02 **Identification pairs**

Order online ▶ www.igus.eu/CF211DATA

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.



chainflex® cables (e.g. CF211) and igus® e-chains® (E065 series) in a pharmacy picking systems

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

chainflex® CF211.PUR

Image exemplary

10 million
Double strokes guaranteed

7.5 x d
Bend radius, e-chain®

100m
Travel distance, e-chain®

- For heavy duty applications
- PUR outer jacket
- Shielded, twisted pair
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

Dynamic information

Bend radius	**e-chain® linear**	minimum 7.5 x d
	flexible	minimum 6 x d
	fixed	minimum 4 x d
Temperature	**e-chain® linear**	-25°C up to +80°C
	flexible	-40°C up to +80°C (following DIN EN 60811-504)
	fixed	-50°C up to +80°C (following DIN EN 50305)
v max.	**unsupported**	5m/s
	gliding	3m/s
a max.		50m/s²
Travel distance		Unsupported travels and up to 100m for gliding applications, Class 5

Cable structure

Conductor	Very finely stranded special conductors of particularly bending resistant design made of bare copper wires.
Core insulation	Mechanically high-quality TPE mixture.
Core structure	Cores twisted in pairs with a short pitch length, core pairs then wound with short pitch lengths.
Core identification	Colour code in accordance with DIN 47100.
Intermediate layer	Foil taping over the outer layer.
Overall shield	Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90%
Outer jacket	Low-adhesion, halogen-free, highly abrasion resistant PUR mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2) Colour: Window-grey (similar to RAL 7040)

Electrical information

Nominal voltage	300/300V (following DIN VDE 0298-3) 300V (following UL)
Testing voltage	1,500V (following DIN EN 50395)

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 5.5.3.1

Basic requirements	low	1	2	3	4	**5**	6	7 highest
Travel distance	unsupported	1	2	3	4	**5**	6	≥ 400m
Oil resistance	none	1	2	**3**	4	highest		
Torsion	none	**1**	2	3	4	±360°		

Properties and approvals

UV resistance	Medium
Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3
Offshore	MUD-resistant following NEK 606 - status 2016
Flame-retardant	According to IEC 60332-1-2, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF211PUR
NFPA	Following NFPA 79-2018, chapter 12.9
DNV	Type Approval Certificate TAE00003X3 (Issue 04/2025) Current information in the data sheet ▶ www.igus.eu/CF211PUR
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	7.5 million	10 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
-25/-15	10	11	12
-15/+70	7.5	8.5	9.5
+70/+80	10	11	12

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For heavy-duty applications, Class 5
- Unsupported travels and up to 100m for gliding applications, Class 5
- Almost unlimited resistance to oil, Class 3
- No torsion, Class 1
- Indoor and outdoor applications with average sun radiation
- Machining units/machine tools, storage and retrieval units for high-bay warehouses, packaging industry, quick handling, refrigerating sector

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Data cable | PUR outer jacket

chainflex® CF211.PUR

Basic requirements — low 1 2 3 4 **5** 6 7 highest
Travel distance — unsupported 1 2 3 4 **5** 6 ≥ 400m
Oil resistance — none 1 2 **3** 4 highest
Torsion — none **1** 2 3 4 ±360°

Class 5.5.3.1

Image exemplary

	Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
	CF211.PUR.02.01.02	(2x0.25)C	5.0	18	32
	CF211.PUR.02.02.02 2)	(2x(2x0.25))C	6.0	25	49
	CF211.PUR.02.03.02	(3x(2x0.25))C	7.0	36	65
	CF211.PUR.02.04.02	(4x(2x0.25))C	7.5	44	76
	CF211.PUR.02.05.02	(5x(2x0.25))C	8.5	52	89
	CF211.PUR.02.06.02	(6x(2x0.25))C	9.0	62	102
	CF211.PUR.02.08.02	(8x(2x0.25))C	10.5	78	130
	CF211.PUR.02.10.02	(10x(2x0.25))C	12.0	90	168
	CF211.PUR.02.14.02	(14x(2x0.25))C	12.0	119	204
	CF211.PUR.03.03.02	(3x(2x0.34))C	8.0	44	83
New	**CF211.PUR.03.06.02**	(6x(2x0.34))C	10	63	119
	CF211.PUR.03.08.02	(8x(2x0.34))C	12.0	95	163
	CF211.PUR.05.01.02	(2x0.5)C	6.0	26	51
	CF211.PUR.05.02.02 2)	(2x(2x0.5))C	7.0	41	86
	CF211.PUR.05.03.02	(3x(2x0.5))C	9.0	61	105
	CF211.PUR.05.04.02	(4x(2x0.5))C	9.5	74	123
	CF211.PUR.05.05.02	(5x(2x0.5))C	11.0	91	152
	CF211.PUR.05.06.02	(6x(2x0.5))C	11.5	103	189
	CF211.PUR.05.08.02	(8x(2x0.5))C	13.0	137	221
	CF211.PUR.05.10.02	(10x(2x0.5))C	15.5	170	297
	CF211.PUR.05.14.02	(14x(2x0.5))C	15.5	185	311

Shop and prices online

CF-B-0004

www.igus.eu/CF211PUR

The chainflex® types marked with 2) are cables designed as a star-quad.

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case

Order example: CF211.PUR.02.01.02 **- to your required length (0.5m steps)**
CF211-PUR **chainflex® series** .02 **Code nominal cross section** .01 **Number of pairs** .02 **Identification pairs**

Order online ▶ www.igus.eu/CF211PUR

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

cost down...

Reduce cost, improve technology, now!
Do the chainflex® price check ...
www.igus.eu/cf-price-check

… for example: reduce cost with CF211 ...

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

chainflex® CF11

Image exemplary

12.5 million
Double strokes guaranteed

6.8 x d
Bend radius, e-chain®

400m
Travel distance, e-chain®

- For extremely heavy duty applications
- TPE outer jacket
- Shielded
- Twisted pair
- Oil and bio-oil-resistant
- PVC and halogen-free
- Hydrolysis and microbe-resistant

Now available with UL approval & 25% longer service life

Dynamic information

Bend radius	**e-chain® linear**	minimum 6.8 x d
	flexible	minimum 5 x d
	fixed	minimum 4 x d
Temperature	**e-chain® linear**	-35°C up to +100°C
	flexible	-50°C up to +100°C (following DIN EN 60811-504)
	fixed	-55°C up to +100°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	6m/s
a max.		100m/s²
Travel distance		Unsupported travels and up to 400m and more for gliding applications, Class 6

Cable structure

Conductor	Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228).
Core insulation	Mechanically high-quality TPE mixture.
Core structure	Cores twisted in pairs with a short pitch length, core pairs then wound with short pitch lengths.
Core identification	**Cores < 1.0mm²:** Colour code in accordance with DIN 47100. **Cores ≥ 1.0mm²:** Black cores with white numbers.
Inner jacket	TPE mixture adapted to suit the requirements in e-chains®.
Overall shield	Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90%
Outer jacket	Low-adhesion, extremely abrasion-resistant and highly flexible TPE mixture, adapted to suit the requirements in e-chains®. Colour: Steel blue (similar to RAL 5011)

Electrical information

Nominal voltage	300/300V (following DIN VDE 0298-3) 300V (following UL)
Testing voltage	1,500V (following DIN EN 50395)

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 6.6.4.1

Basic requirements	low	1	2	3	4	5	6	7 highest
Travel distance	unsupported	1	2	3	4	5	6	≥ 400m
Oil resistance	none	1	2	3	4	highest		
Torsion	none	1	2	3	4	±360°		

Properties and approvals

UV resistance	High
Oil resistance	Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL AWM	See data sheet for details ▶ www.igus.eu/CF11 (from production date 01/2022)
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF9.15.07 - tested by IPA according to standard DIN EN ISO 14644-1
Dry cleanroom	Tested in "dry cleanroom" according to DIN EN ISO 14644-1
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	7.5 million	12.5 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
-35/-25	7.5	8.5	9.5
-25/+90	6.8	7.5	8.5
+90/+100	7.5	8.5	9.5

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For heavy-duty applications, Class 6
- Unsupported travels and up to 400m and more for gliding applications, Class 6
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- No torsion, Class 1
- Indoor and outdoor applications, UV-resistant
- Storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, cleanroom, semiconductor insertion, outdoor cranes, low-temperature applications

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Data cable | TPE outer jacket

chainflex® CF11

Class 6.6.4.1

Basic requirements	low	1	2	3	4	5	6	7	highest	
Travel distance	unsupported	1	2	3	4	5	6		≥ 400m	
Oil resistance	none	1	2	3	4				highest	
Torsion	none	1	2	3	4				±360°	

Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CF11.01.04.02	(4x(2x0.14))C	7.5	30	63
CF11.01.18.02	(18x(2x0.14))C	12.5	101	202
CF11.02.01.02	(2x0.25)C	6.0	17	39
CF11.02.02.02 [2)]	(2x(2x0.25))C	6.5	26	47
CF11.02.03.02	(3x(2x0.25))C	8.0	35	78
CF11.02.04.02	(4x(2x0.25))C	8.5	42	90
CF11.02.05.02	(5x(2x0.25))C	9.0	49	100
CF11.02.06.02	(6x(2x0.25))C	10.0	69	125
CF11.02.10.02	(10x(2x0.25))C	13.5	103	207
CF11.02.14.02	(14x(2x0.25))C	14.0	124	228
CF11.03.08.02	(8x(2x0.34))C	13.0	106	209
CF11.05.04.02	(4x(2x0.5))C	9.5	77	140
CF11.05.06.02	(6x(2x0.5))C	12.0	103	198
CF11.05.08.02	(8x(2x0.5))C	14.5	135	251
CF11.07.03.02	(3x(2x0.75))C	10.5	83	155
CF11.10.04.02	(4x(2x1.0))C	12.5	125	232
CF11.15.06.02	(6x(2x1.5))C	16.5	247	420

Shop and prices online

CF-B-0005

www.igus.eu/CF11

The chainflex® types marked with [2)] are cables designed as a star-quad.

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case

Order example: CF11.01.04.02 **- to your required length (0.5m steps)**
CF11 **chainflex® series** .01 **Code nominal cross section** .04 **Number of pairs** .02 **Identification pairs**

Order online ▶ www.igus.eu/CF11

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

cost down...

...life up

Reduce cost, improve technology, now!
Do the chainflex® price check ...
www.igus.eu/cf-price-check

… for example: reduce cost with CF211.PUR ...

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

chainflex® CF112

Image exemplary

10 million Double strokes guaranteed

10 x d Bend radius, e-chain®

100m Travel distance, e-chain®

- For extremely heavy duty applications
- PUR outer jacket
- Double shielded, twisted pair
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

Dynamic information

Bend radius	**e-chain® linear**	minimum 10 x d
	flexible	minimum 8 x d
	fixed	minimum 5 x d
Temperature	**e-chain® linear**	-25°C up to +80°C
	flexible	-40°C up to +80°C (following DIN EN 60811-504)
	fixed	-50°C up to +80°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	5m/s
a max.		80m/s²
Travel		Unsupported travels and up to 100m for gliding applications, Class 5

Cable structure

Conductor	Very finely stranded special conductors of particularly bending resistant design made of bare copper wires.
Core insulation	Mechanically high-quality TPE mixture.
Core structure	Cores twisted in pairs with a short pitch length, core pairs then wound with short pitch lengths.
Core identification	Colour code in accordance with DIN 47100.
Element shield	Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90%
Inner jacket	TPE mixture adapted to suit the requirements in e-chains®.
Overall shield	Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90%
Outer jacket	Low-adhesion, halogen-free, highly abrasion resistant PUR mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2) Colour: Anthracite grey (similar to RAL 7016)

Electrical information

Nominal voltage	300/300V (following DIN VDE 0298-3) 300V (following UL)
Testing voltage	1,500V (following DIN EN 50395)

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 6.5.3.1

Basic requirements	low	1	2	3	4	5	6	7	highest
Travel distance	unsupported	1	2	3	4	5	6		≥ 400m
Oil resistance	none	1	2	3	4				highest
Torsion	none	1	2	3	4				±360°

Properties and approvals

UV resistance	High
Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3
Offshore	MUD-resistant following NEK 606 - status 2016
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF112
NFPA	Following NFPA 79-2018, chapter 12.9
DNV	Type Approval Certificate TAE00003X3 (Issue 04/2025) Current information in the data sheet ▶ www.igus.eu/CF112
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	7.5 million	10 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
-25/-15	12.5	13.5	14.5
-15/+70	10	11	12
+70/+80	12.5	13.5	14.5

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For heavy-duty applications, Class 6
- Unsupported travels and up to 100m for gliding applications, Class 5
- Almost unlimited resistance to oil, Class 3
- No torsion, Class 1
- Indoor and outdoor applications with average sun radiation
- Machining units/machine tools, storage and retrieval units for high-bay warehouses, packaging industry, quick handling, refrigerating sector

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Data cable | PUR outer jacket

chainflex® CF112

Basic requirements
Travel distance
Oil resistance
Torsion

low 1 2 3 4 5 6 7 highest
unsupported 1 2 3 4 5 6 ≥ 400m
none 1 2 3 4 highest
none 1 2 3 4 ±360°

Class 6.5.3.1

Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Shop and prices online
CF112.02.02.02	(2x(2x0.25)C)C	9.5	57	118	CF-B-0006
CF112.02.03.02	(3x(2x0.25)C)C	10.0	71	133	
CF112.02.04.02	(4x(2x0.25)C)C	11.0	78	153	
CF112.02.05.02	(5x(2x0.25)C)C	11.5	99	178	
CF112.05.02.02	(2x(2x0.5)C)C	11.5	75	163	
CF112.05.04.02	(4x(2x0.5)C)C	13.0	117	217	www.igus.eu/CF112
CF112.05.06.02	(6x(2x0.5)C)C	14.5	160	285	

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Cables available in the chainflex® CASE

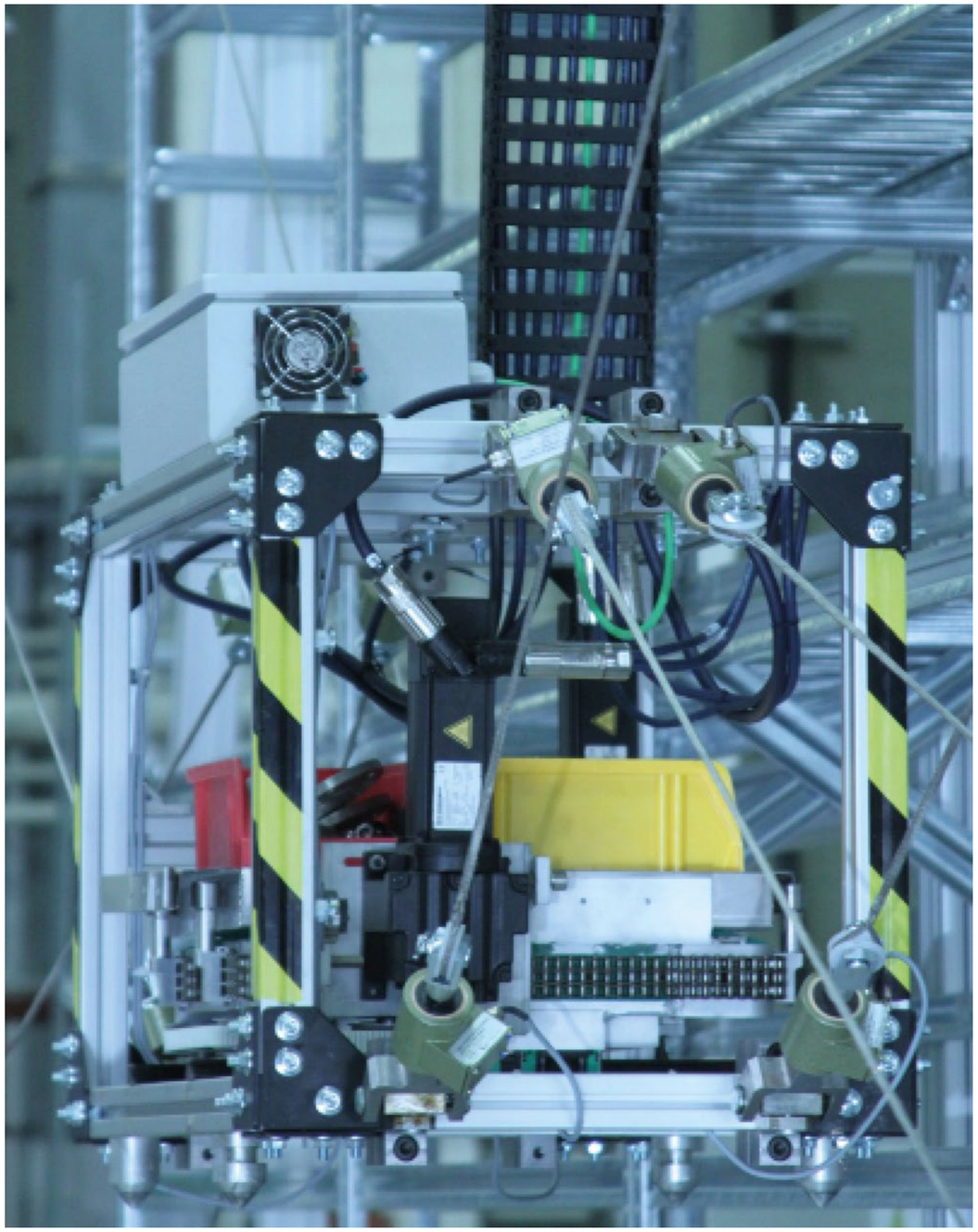
Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case

Order example: CF112.02.02.02 **- to your required length (0.5m steps)**
CF112 **chainflex® series** .02 **Code nominal cross section** .02 **Number of pairs** .02 **Identification pairs**

Order online ▶ www.igus.eu/CF112

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.



Hanging application with chainflex® CF112 data cables

Data cable | TPE outer jacket

chainflex® CF12

Image exemplary

12.5 million
Double strokes guaranteed

10 x d
Bend radius, e-chain®

400m
Travel distance, e-chain®

- For extremely heavy duty applications
- TPE outer jacket
- Double-shielded
- Oil and bio-oil-resistant
- PVC and halogen-free
- Hydrolysis and microbe-resistant

Now available with UL approval & 25% longer service life

Dynamic information

Bend radius	**e-chain® linear**	minimum 10 x d
	flexible	minimum 8 x d
	fixed	minimum 5 x d
Temperature	**e-chain® linear**	-35°C up to +100°C
	flexible	-50°C up to +100°C (following DIN EN 60811-504)
	fixed	-55°C up to +100°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	6m/s
a max.		100m/s²
Travel distance		Unsupported travels and up to 400m and more for gliding applications, Class 6

Cable structure

Conductor	Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228).
Core insulation	Mechanically high-quality TPE mixture.
Core structure	Cores twisted in pairs with a short pitch length, core pairs then wound with short pitch lengths.
Core identification	**Cores < 0.5mm²:** Colour code in accordance with DIN 47100. **Cores ≥ 0.5mm²:** Black cores with white numbers.
Element shield	Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90%
Element jacket	TPE mixture on pair shielding adapted to suit the requirements in e-chains®.
Inner jacket	TPE mixture adapted to suit the requirements in e-chains®.
Overall shield	Highly flexible shield consisting of galvanised steel wire braid. Coverage linear approx. 70%, optical approx. 90%
Outer jacket	Low-adhesion, extremely abrasion-resistant and highly flexible TPE mixture, adapted to suit the requirements in e-chains®. Colour: Steel blue (similar to RAL 5011)

Electrical information

Nominal voltage	300/300V (following DIN VDE 0298-3) 300V (following UL)
Testing voltage	1,500V (following DIN EN 50395)

Properties and approvals

UV resistance	High

Class 6.6.4.1

Basic requirements	low 1 2 3 4 5 6 7 highest
Travel distance	unsupported 1 2 3 4 5 6 ≥ 400m
Oil resistance	none 1 2 3 4 highest
Torsion	none 1 2 3 4 ±360°

Oil resistance	Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL AWM	See data sheet for details ▶ **www.igus.eu/CF12** (from production date 01/2022)
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF9.15.07 - tested by IPA according to standard DIN EN ISO 14644-1
Dry cleanroom	Tested in "dry cleanroom" according to DIN EN ISO 14644-1
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	7.5 million	12.5 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
-35/-25	12.5	13.5	14.5
-25/+90	10	11	12
+90/+100	12.5	13.5	14.5

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For heavy-duty applications, Class 6
- Unsupported travels and up to 400m and more for gliding applications, Class 6
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- No torsion, Class 1
- Indoor and outdoor applications, UV-resistant
- For maximum EMC protection
- Storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, cleanroom, semiconductor insertion, outdoor cranes, low-temperature applications

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CF12.02.04.02	(4x(2x0.25)C)C	11.5	52	172
CF12.05.03.02	(3x(2x0.5))C	13.5	65	224
CF12.05.04.02	(4x(2x0.5)C)C	14.5	83	267
CF12.05.06.02	(6x(2x0.5)C)C	17.0	128	376
CF12.05.08.02	(8x(2x0.5)C)C	20.5	163	503
CF12.05.10.02 [11)]	(10x(2x0.5)C)C	22.5	203	605
CF12.05.14.02	(14x(2x0.5)C)C	22.5	297	679
CF12.10.06.02	(6x(2x1.0)C)C	20.0	198	529

Shop and prices online

www.igus.eu/CF12

[11)] Phase-out model
Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Coax cable | TPE outer jacket

chainflex® CFKoax

Image exemplary

10 million
Double strokes guaranteed

10 x d
Bend radius, e-chain®

400m
Travel distance, e-chain®

- For extremely heavy duty applications
- TPE outer jacket
- Oil and bio-oil-resistant
- UV-resistant
- Hydrolysis and microbe-resistant

Dynamic information

Bend radius	**e-chain® linear**	minimum 10 x d
	flexible	minimum 8 x d
	fixed	minimum 5 x d
Temperature	**e-chain® linear**	-35°C up to +100°C (CFKoax1/3) -35°C up to +70°C (CFKoax2)
	flexible	-50°C up to+100°C (CFKoax1/3) -50°C up to +70°C (CFKoax2)
	fixed	-55°C up to +100°C (CFKoax1/3) -55°C up to +70°C (CFKoax2)
v max.	**unsupported**	10m/s
	gliding	5m/s
a max.		100m/s²
Travel distance		Unsupported travels and up to 400m and more for gliding applications, Class 6

Cable structure

Conductor	Multi-wire; adapted to single-wire diameter with pitch length to suit the requirements in e-chains®.
Core insulation	Special FEP mixture (CFKoax1/3) Special PE mixture (CFKoax2)
Core structure	Cores wound in a layer with especially short pitch length.
Core identification	Coaxial elements ▶ Product range table
Element shield	Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90%
Element jacket	TPE mixture adapted to suit the requirements in e-chains®.
Outer jacket	Low-adhesion, extremely abrasion-resistant and highly flexible TPE mixture, adapted to suit the requirements in e-chains®. Colour: ▶ Product range table

Electrical information

Nominal voltage	500/500V (following DIN VDE 0298-3)
Testing voltage	1,500V (following DIN EN 50395)

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 6.6.4.1

Basic requirements	low	1	2	3	4	5	6	7 highest
Travel distance	unsupported	1	2	3	4	5	6	≥ 400m
Oil resistance	none	1	2	3	4	highest		
Torsion	none	1	2	3	4	±360°		

Properties and approvals

UV resistance	Medium
Oil resistance	Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE(CFKoax2)
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF9.15.07 - tested by IPA according to standard DIN EN ISO 14644-1
CE	Following 2014/35/EU
Info	The coaxial elements used in cables of the CFKoax1 series are comparable with a HF75-0.3/1.6 according to MIL-C-17/94-RG179 and thus fit into an RG179 plug! The coaxial elements used in cables of the CFKoax2 series are comparable with a HF50-0.9/2.95 according to MIL-C-17/28-RG58 and thus fit into an RG58 plug! The coaxial elements used in cables of the CFKoax3 series are comparable with a HF50-0.3/0.85 according to MIL-C-17/93-RG178 and thus fit into an RG178 plug!

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	7.5 million	10 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
-35/-25	12.5	13.5	14.5
-25/+60 (CFKoax2)	10	11	12
-25/+90 (CFKoax1/CFKoax3)	10	11	12
+60/+70 (CFKoax2)	12.5	13.5	14.5
+90/+100 (CFKoax1/CFKoax3)	12.5	13.5	14.5

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For heavy-duty applications, Class 6
- Unsupported travels and up to 400m and more for gliding applications, Class 6
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- No torsion, Class 1
- Indoor and outdoor applications with average sun radiation
- Storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, cleanroom, semiconductor insertion, indoor cranes, low temperature applications

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Coax cable | TPE outer jacket

chainflex® CFKoax

Basic requirements
Travel distance
Oil resistance
Torsion

low 1 2 3 4 5 6 7 highest
unsupported 1 2 3 4 5 6 ≥ 400m
none 1 2 3 4 highest
none 1 2 3 4 ±360°

Class 6.6.4.1

Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CFKoax1.01 5)	1xHF75-0.3/1.6	4.5	8	23
CFKoax1.05 5)	5xHF75-0.3/1.6	10.0	34	110
CFKoax2.01	1xHF50-0.9/2.95	5.5	19	36
CFKoax3.01 5)	1xHF50-0.3/0.84	3.5	6	12

5) Not PTFE-free

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Shop and prices online

CF-C-0001

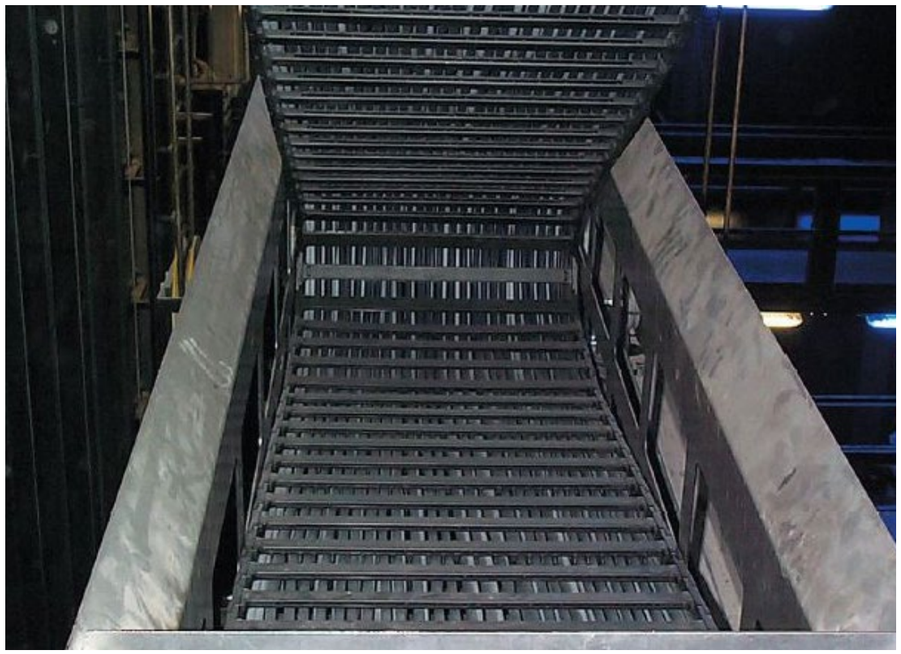
www.igus.eu/CFKOAX

Part No.	Characteristic wave impedance approx. [Ω]	Core identification	Colour outer jacket
CFKoax1.01	75	red	Steel-blue (similar to RAL 5011)
CFKoax1.05	75	red, green, blue, white, black	Steel-blue (similar to RAL 5011)
CFKoax2.01	50		Jet black (similar to RAL 9005)
CFKoax3.01	50		Window-grey (similar to RAL 7040)

Order example: CFKoax1.01 **- to your required length (0.5m steps)**
CFKoax **chainflex® series** .01 **Number of coaxial elements**

Order online ▶ www.igus.eu/CFKoax

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.



Coax cable and other chainflex® cables in a stage technology application. e-chain®: E4/4 system

chainflex CASE

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

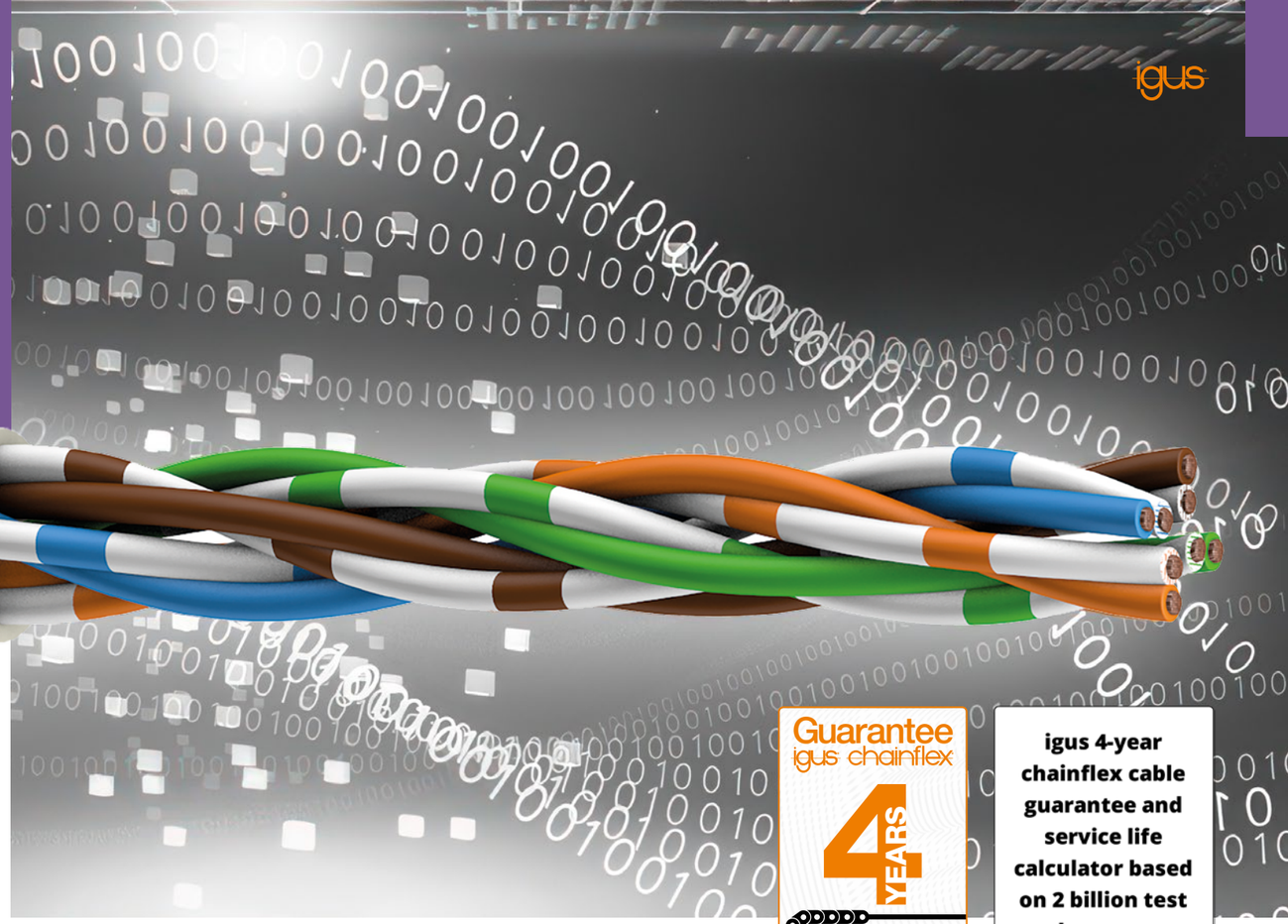
UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

chainflex®

Bus cables

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year



Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

Bus cables for energy chains

Specially designed for use in e-chains®. All common bus systems with mechanical features for reliable data transmission in moving applications. Six different outer jacket materials. Tested with a chainflex® guarantee of up to 4 years.

- All common bus systems for a wide range of (mechanical) application requirements
- With six different outer jacket materials, always find the most cost-effective bus cable that is guaranteed to work in your application
- Reliable data transmission tested in the igus® laboratory
- Sustainability thanks to a longer service life is practical resource protection, enhancing economic efficiency and protecting the environment
- Calculate the exact service life online: igus.eu/chainflexlife

Background

For the transfer of high data volumes

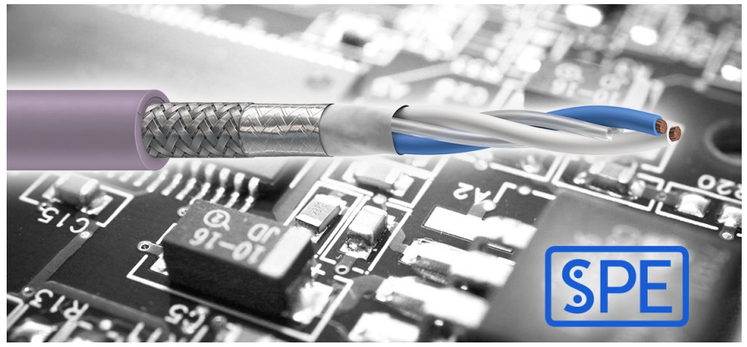
Today, these cables are the basis for familiar bus systems such as Profibus, Profinet and CAN bus, but also USB and CC-Link. We will show you the features that allow continuously functioning data transmission here.

Ethernet
Many bus systems are based on Ethernet. Well-known brands include Profinet, CC-Link IE, EtherCat and Sercos. They are all based on a structure that has been used for many years in mainframes and PCs. Ethernet is described as categories that cover frequencies and data volume capacities from 100MBit/s cover up to 10 GBit/s. The terms CAT5, CAT5e, CAT6A and CAT7 are frequently used. These cables contain two or four pairs in a shield pair or overall shield design, depending on requirements. We have prepared an overview matrix that considers the mechanical parameters in addition to the electrical parameters just mentioned.

Profinet
Profinet is one of the most popular bus cables for use in industry. The real-time capability option and modular concept makes it eminently well-suited to a large majority of applications. igus® has nine different mechanical qualities of Profinet cable, from PVC cables to PUR cables to cables for extraordinary applications such as those involving torsional movement or requiring great strength. Profinet fits into the Industrial Ethernet standard, alongside bus systems such as Sercos, EtherCat and CC-Link IE. igus® is a member of the Profinet user organisation and conforms to all required market standards.

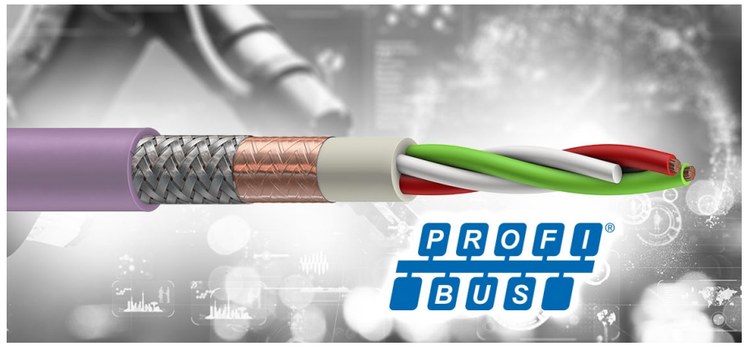
SPE

Single Pair Ethernet (SPE), the newest addition to the group of bus systems. The new bus technology was introduced in 2019 and has since progressively conquered the market. This innovation offers new capabilities for the fast-growing IIoT market. What is special here is the cable's new design: a single pair, but still with the capability of transmitting a CAT5e signal. We are working steadily with the SPE organisation on refining and standardising this technology. This technology has notable capabilities, particularly in applications involving tight installation space.



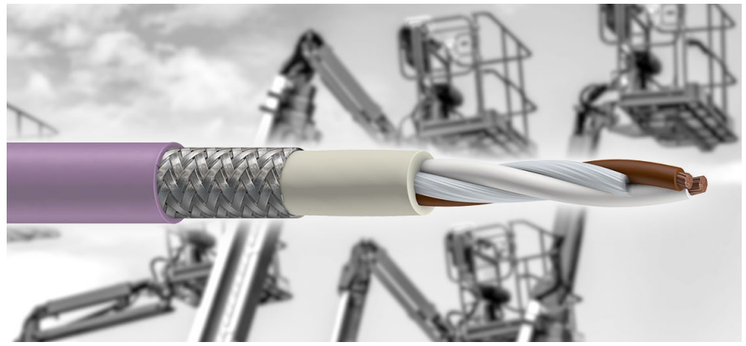
Profibus

Today, Profibus is one of the most important industrial bus cables. It was developed in the 1990s and quickly became the standard for reliability and high data quantities. The Profinet Nutzer Organisation (PNO), Germany's Regional PI Association, is concerned with technical refinement and coordination of various member companies such as igus®. The cable, with its red and green foam cores, is very distinctive. igus® provides chainflex® Profinet cables in PVC, PUR and TPE designs for any moving e-chain® application.



CAN-Bus

The CAN bus is extremely tough and remarkable for its robust network protocol. Its origins are in the automotive industry, and it is commonly found in industrial systems today. What is special about the CAN bus is that it is available in a variety of cross sections, which can be chosen according to requirement and can have one or two pairs, depending on application.
As with other bus systems, chainflex® offers cables for e-chains for linear multi-axis applications.



Other bus cables

Bus cables are used in a variety of applications, and bus systems for computers or consumer electronics are also commonly used in industrial applications. One example is USB 2.0 and USB 3.0, which have distinctive connectors and can often be found in industrial cameras. The same is true for DVI, a typical monitor interface. There are also chainflex® solutions for these bus cables. Some applications require prominent bus systems such as INTERBUS or DeviceNet, which are part of the CFBUS bus cable family. There is also the prominent ASi bus cable, which is easily identifiable in any system because of its yellow colour and square corners.

Selection table

chainflex® bus cables

Mechanical parameters

chainflex® cables	Jacket	Shield	Bend radius e-chain® min. [xd]	Temperature e-chain® from/to [°C]	v max. [m/s] unsupported	v max. [m/s] gliding	a max. [m/s²]	Travel distance [m]	Page
CF888	PVC	●	15	+5/+70	3	-	20	≤ 10	148
CFBUS.PVC	PVC	●	12.5	+5/+70	3	2	30	≤ 20	152
CF898	iguPUR	●	15	-20/+70	3	-	20	≤ 10	156
CFBUS.PUR	PUR	●	12.5	-20/+70	3	2	30	≤ 20	160
CFBUS	TPE	●	10	-35/+70	10	6	100	≤ 400	164
CFBUS.LB	TPE	●	7.5	-35/+70	10	6	100	≤ 400	170

Approvals/resistance

chainflex® cables	Approvals and standards																	Page
CF888			●				●			●			●	●				●	148
CFBUS.PVC	●		●	●			●			●	●		●	●	●			●	152
CF898	●		●				●			●			●	●				●	156
CFBUS.PUR	●		●	●			●			●	●	●	●	●	●		●	●	160
CFBUS	●		●				●			●	●	●	●	●	●		●	●	164
CFBUS.LB	●		●					●			●		●	●	●	●	●	●	170

Guaranteed service life

chainflex® cables	Temperature, from/to [°C]	Min. bend radius [xd] for travel distance < 10m	Min. bend radius [xd] for travel distance ≥ 10m	Page
		5 million (1 million) double strokes *	7.5 million (3 million) double strokes *	10 million (5 million) double strokes *	
CF888	+5 / +15	17.5	18.5	19.5	
	+15 / +60	15	16	17	148
	+60 / +70	17.5	18.5	19.5	
CFBUS.PVC	+5 / +15	15	16	17	
	+15 / +60	12.5	13.5	14.5	152
	+60 / +70	15	16	17	
CF898	-20 / -10	17.5	18.5	19.5	
	-10 / +60	15	16	17	156
	+60 / +70	17.5	18.5	19.5	
CFBUS.PUR	-20 / -10	15	16	17	
	-10 / +60	12.5	13.5	14.5	160
	+60 / +70	15	16	17	
CFBUS.001-.049	-35 / -25	12.5	13.5	14.5	
CFBUS.060	-25 / +60	10	11	12	164
	+60 / +70	12.5	13.5	14.5	
CFBUS.050-.055	-35 / -25	15	16	17	
CFBUS.065-.070	-25 / +60	12.5	13.5	14.5	164
	+60 / +70	15	16	17	
		5 million	7.5 million	12.5 million	
CFBUS.LB	-35 / -25	12.5	13.5	14.5	
.001-.022	-25 / +60	10	11	12	170
	+60 / +70	12.5	13.5	14.5	
CFBUS.LB	-35 / -25	10	11	12	
.040-.060	-25 / +60	7.5	8.5	9.5	170
	+60 / +70	10	11	12	

*** Higher number of double strokes? Calculate service life online ▶ www.igus.eu/chainflexlife**
Figures in brackets refer to series CF888 and CF898

The chainflex® bus cables product range at a glance

chainflex® cables	CF888	CFBUS.PVC	CF898	CFBUS.PUR	CFBUS	CFBUS.LB	CFROBOT8. PLUS	CFSPECIAL. 182	CFCLEAN8
Page	148	152	156	160	164	170	380	396	426
	Mechanical performance								
Bus types	PVC 15 x d	PVC oil-resistant 12.5 x d	iguPUR 15 x d	PUR 12.5 x d	TPE UL 10-12.5 x d	TPE 7.5 x d	Torsion 10 x d	Special applications*	Special applications
DVI					●				
CC-Link		●		●	●				
SPE				●					
Ethercat**	●	●	●	●	●	●			
Ethernet**	●	●	●	●	●	●	●	●	●
Profinet**	●	●	●	●	●	●	●	●	
USB		●		●	●				
FireWire		●		●	●				
CAN-Bus	●	●	●	●	●		●		
ASI			●						
Device Net					●				
Interbus					●				
Profibus	●	●	●	●	●		●		

* high tensile strain (.182)

** Details of the chainflex® Ethernet cables can be found on page 147!

Bus system/ chainflex® type	Jacket	Number of cores and conductor nominal cross section[mm²]	Page
Profibus (1x2x0.64mm) 150Ohm			
CF888.001	PVC	(2x0.25)C	150
CFBUS.PVC.001	PVC	(2x0.25)C	154
CF898.001	iguPUR	(2x0.25)C	158
CFBUS.PUR.001	PUR	(2x0.25)C	162
CFBUS.001	TPE	(2x0.25)C	166
CFBUS.002	TPE	(2x0.25)C+4x1.5	166
CFBUS.003	TPE	(2x0.25)C+3G0.75	166
CFBUS.LB.001	TPE	(2x0.25)C	172
CFROBOT8.PLUS.001	PUR	(2x0.25)C	382
Interbus 100Ohm			
CFBUS.010	TPE	(3x(2x0.25))C	166
CFBUS.011	TPE	(3x(2x0.25)+(3G1.0))C	166
CAN-Bus 120Ohm			
CF888.021	PVC	(2x0.5)C	150
CFBUS.PVC.020	PVC	(4x0.25)C	154
CFBUS.PVC.021	PVC	(2x0.5)C	154
CFBUS.PVC.022	PVC	(4x0.5)C	154
CF898.021	iguPUR	(2x0.5)C	158
CFBUS.PUR.020	PUR	(4x0.25)C	162
CFBUS.PUR.021	PUR	(2x0.5)C	162
CFBUS.PUR.022	PUR	(4x0.5)C	162
CFBUS.020	TPE	(4x0.25)C	166
CFBUS.021	TPE	(2x0.5)C	166
CFBUS.022	TPE	(4x0.5)C	166
CFBUS.LB.020	TPE	(4x0.25)C	172
CFBUS.LB.021	TPE	(2x0.5)C	172
CFBUS.LB.022	TPE	(4x0.5)C	172
CFROBOT8.PLUS.022	PUR	(4x0.5)C	382
Device Net 120Ohm			
CFBUS.030	TPE	((2xAWG24)C+2xAWG22)C	166
CFBUS.031	TPE	((2xAWG18)C+2xAWG15)C	166
CC-Link 110Ohm			
CFBUS.PVC.035	PVC	(3x0.5)C	154
CFBUS.PUR.035	PUR	(3x0.5)C	162
CFBUS.035	TPE	(3xAWG20)C	166
Ethernet/CAT5I 100Ohm			
CFBUS.PVC.040	PVC	(4x0.25)C	154
CFBUS.PUR.040	PUR	(4x0.25)C	162
CFBUS.040	TPE	(4x0.25)C	168
CFBUS.LB.040	TPE	(4x(0.25)C	172
Single Pair Ethernet 100Ohm			
CFBUS.PUR.042	PUR	(2x0.15)C	162
Ethernet/CAT5e 100Ohm			
CF888.045	PVC	(4x(2x0.14))C	150
CFBUS.PVC.045	PVC	(4x(2x0.15))C	154
CF898.045	iguPUR	(4x(2x0.14))C	158
CFBUS.PUR.045	PUR	(4x(2x0.15))C	162

Bus system/ chainflex® type	Jacket	Number of cores and conductor nominal cross section[mm²]	Page
Ethernet/CAT5e 100Ohm			
CFBUS.045	TPE	(4x(2x0.15))C	168
CFBUS.LB.045	TPE	(4x(2x0.15))C	172
CFROBOT8.PLUS.045	PUR	(4x(2x0.15))C	382
CFSPECIAL.182.045	PUR	(4x(2x0.15))C	396
Ethernet/CAT6 100Ohm			
CFBUS.PVC.049	PVC	(4x(2x0.15))C	154
CFBUS.PUR.049	PUR	(4x(2x0.15))C	162
CFBUS.PUR.H01.049	PUR	(4x(2x0.15))C+4x1.5	162
CFBUS.049	TPE	(4x(2x0.15))C	168
CFBUS.LB.049	TPE	(4x(2x0.15))C	172
CFROBOT8.PLUS.049	PUR	(4x(2x0.15))C	382
Ethernet/CAT6A 100Ohm			
CFBUS.PVC.050	PVC	4x(2x0.20)C	154
CFBUS.PUR.050	PUR	4x(2x0.20)C	162
CFBUS.050	TPE	(4x(2x0.15)C)C	168
CFROBOT8.PLUS.050	PUR	(4x(2x0.15)C)C	382
Ethernet/CAT7 100Ohm			
CFBUS.PVC.052	PVC	(4x(2x0.15)C)C	154
CFBUS.PUR.052	PUR	(4x(2x0.15)C)C	162
CFBUS.052	TPE	(4x(2x0.15)C)C	168
CFROBOT8.PLUS.052 New	PUR	(4x(2x0.15)C)C	382
FireWire IEEE 1394a/b 100Ohm			
CFBUS.PUR.056	PUR	(2x(2x0.15)C+2x0.38)C	162
CFBUS.055	TPE	2x(2x0.15)C+2x(0.34)C	168
Profinet 100Ohm			
CF888.060	PVC	(4x0.38)C	150
CFBUS.PVC.060	PVC	(4x0.38)C	154
CF898.060	iguPUR	(4x0.34)C	158
CF898.061.FC	iguPUR	(4x0.34)C	158
CFBUS.PUR.060	PUR	(4x0.38)C	162
CFBUS.PUR.H01.060	PUR	(4x0.38)C+4x1.5	162
CFBUS.060	TPE	(4x0.38)C	168
CFBUS.LB.060	TPE	(4x0.38)C	172
CFROBOT8.PLUS.060	PUR	(4x0.38)C	382
CFSPECIAL.182.060	PUR	(4x0.38)C	396
USB 90Ohm			
CFBUS.065	TPE	((2xAWG28)+2xAWG20)C	168
CFBUS.066	TPE	((2xAWG24)+2xAWG20)C	168
USB 3.0 90Ohm			
CFBUS.PVC.068	PVC	(2x(2xAWG28)+2x(2xAWG28)C)C	154
CFBUS.PUR.068	PUR	(2x(2xAWG28)+2x(2xAWG28)C)C	162
DVI 100Ohm			
CFBUS.070	TPE	(4x(2xAWG28)C +(2xAWG28)+3xAWG28)C	168
ASI BUS (flat cables)			
CF898.082 (yellow)	iguPUR	2x2.5	158
CF898.083 (black)	iguPUR	2x2.5	158

For all data volumes and types of movement ...

Networking your machine with chainflex® Ethernet cables

In our catalogue range you will find the right Ethernet solution for every type of motion. We have prepared a wide range of products both sold by the metre and also a wide variety of ready-to-connect cables with connectors. All chainflex® cables come with a **4-year guarantee** and up to 12.5 million double strokes as standard, giving you peace-of-mind and confidence.

We support you in three aspects of machine networking with Ethernet cables for moving applications that have been developed, manufactured and tested for high quality:

For your system, we offer Ethernet cables from **CAT5 to CAT7** so that you have the right solution for all data volumes. With that you can safely use Bus systems such as Ethernet/IP, Profinet, EtherCAT, Sercos and many other derivatives. The different quality levels of cable mean that there are opportunities for very large savings or future-proofing.

With the new **Single Pair Ethernet (SPE)** bus technology, it is now possible to create Ethernet connections all the way from the control cabinet to each machine element and thus connect the entire machine with one single bus system. Due to the construction using only one pair of wires, the cable can be manufactured with a considerable weight decrease and a 25% smaller outer diameter. For this pioneering development, we are a member in the Industrial Partner Network for SPE.

By taking into account the individual mechanical requirements in your application, we can offer more customised solutions. There are cables for large and small bend radii for linear movements in energy chains or torsional movements on robots. We can offer you a reasonably priced PVC solution, an oil-resistant PUR cable or a solution with highly abrasion-resistant TPE. Also, **special solutions** for long travels or high tensile strength versions for hanging applications or rolling solutions are standard products for us.

Our **online tools** also enable you to reduce process costs and help you to find the right cable with just a few clicks.

Also visit our Ethernet website:

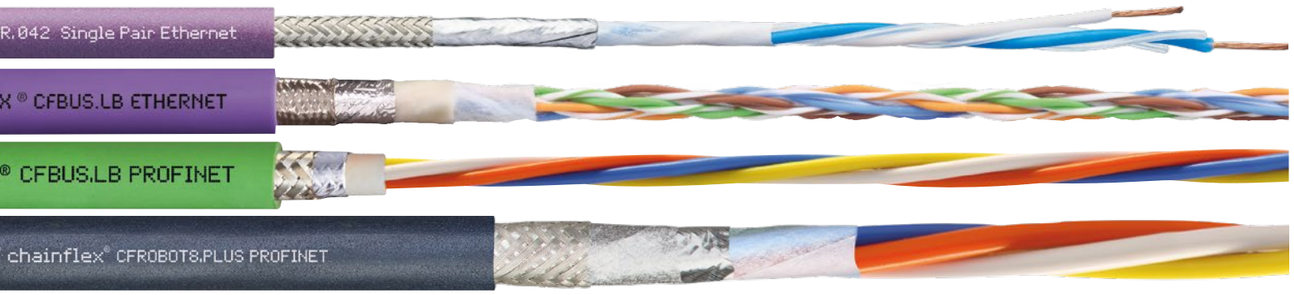
www.igus.eu/ethernet

All common bus types in different cable quality levels for your diverse applications. From stock. Tested. With a guarantee.

EtherCAT®

CC-Link IE Field

PROFINET®



Selection table for the largest range of flexible Ethernet cables

The most cost-effective Ethernet cable that is guaranteed to work

chainflex® cables	CF888	CFBUS.PVC	CF898	CFBUS.PUR	CFBUS	CFBUS.LB	CFROBOT8. PLUS	CFSPECIAL.182/ CFCLEAN8
Page	150	154	158	162	168	172	382	396/426
	Mechanical performance							
Electrical performance	PVC 15 x d	PVC oil-resistant12.5 x d	iguPUR 15 x d	PUR 12.5 x d	TPE UL 10-12.5 x d	TPE Hal 7.5 x d	PUR ± 360°/m	Special cables
CAT7 10GBit 600MHz		.052		.052	.052		.052 **New**	
CAT6A 10GBit 500MHz		.050		.050	.050		.050	
CAT6 1GBit 250MHz		.049		.049	.049	.049	.049	
CAT5e 1GBit 100MHz	.045	.045	.045	.045	.045	.045	.045	.045
SPE 1GBit 600MHz				.042				
Profinet 100MBit 100MHz	.060	.060	.060 / .061.FC	.060	.060	.060	.060	
CAT5 100MBit 100MHz		.040		.040	.040	.040		

The key to smart industrial automation

Single Pair Ethernet (SPE)

In the area of mechanical engineering, a strong trend in recent years has been a continuous increase in the need for more and faster data. Fieldbuses such as Profibus and CC-Link in Ethernet derivates such as Profinet and CC-Link IE have been developed further in order to enable improved performance in machines.

The situation is similar in the case of the Ethernet types. Whereas CAT5 used to be the standard and a quantum leap was achieved with CAT5e, everyone is now talking about CAT6A and CAT7 for the future. This is not only true with regard to building infrastructure but is also in the case of machine and robot cabling.

However, all products end at the last "intelligent" component of the machine. Due to the sheer size of the cable and the connector solutions, connections extending as far as the smallest sensor had not yet been possible. This is where we and our partners of the Industrial Partner Network e.V. are now breaking new ground with the Single Pair Ethernet (SPE). The idea is to reduce to one data pair in order to keep connector and cable small.

This is most evident in the case of the connector. It is now the size of an M8 round connector and is therefore considerably smaller than the normal RJ45. As regards the cable, we have reduced the diameter by 25% and have now also arrived in the range of a proximity switch cable. This allows smaller installation spaces and energy chains, which will be welcome in the field of machine design.

As a clear service life together with a guarantee is always given for all cables in the igus® catalogue; thorough testing is what allows us to do it. This also applies to the new member of the family, of course: CFBUS.PUR.042 is guaranteed to last for 10 million double strokes or 4 years.

Bus cable | PVC outer jacket

chainflex® CF888

Image exemplary

5,000,000 Double strokes guaranteed

15 x d Bend radius, e-chain®

10m Travel distance, e-chain®

- For flexing applications
- PVC outer jacket
- Shielded
- Flame-retardant

Dynamic information

Bend radius	**e-chain® linear**	minimum 15 x d
	flexible	minimum 12 x d
	fixed	minimum 8 x d
Temperature	**e-chain® linear**	+5°C up to +70°C
	flexible	-5°C up to +70°C (following DIN EN 60811-504)
	fixed	-15°C up to +70°C (following DIN EN 50305)
v max.	**unsupported**	3m/s
a max.		20m/s²
Travel distance		Unsupported travels up to 10m, Class 1

Cable structure

Conductor	Conductor consisting of bare copper wires (according to DIN EN 60228).
Core insulation	According to bus specification.
Core structure	According to bus specification.
Core identification	According to bus specification. ▶ Product range table
Overall shield	Braiding made of tinned copper wires. Coverage approx. 60% optical
Outer jacket	Low-adhesion PVC mixture, adapted to suit the requirements in e-chains®. Colour: Red lilac (similar to RAL 4001) Variants ▶ Product range table

Electrical information

Nominal voltage	50V 300V (following UL), except **CF888.001:** 30V (following UL)
Testing voltage	500V

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 3.1.1.1

Basic requirements	low	1	2	**3**	4	5	6	7 highest
Travel distance	unsupported	**1**	2	3	4	5	6	≥ 400m
Oil resistance	none	**1**	2	3	4	highest		
Torsion	none	**1**	2	3	4	±360°		

Properties and approvals

Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF888
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	1 million	3 million	5 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
+5/+15	17.5	18.5	19.5
+15/+60	15	16	17
+60/+70	17.5	18.5	19.5

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For flexing applications, Class 3
- Especially for unsupported travels, Class 1
- Without influence of oil, Class 1
- No torsion, Class 1
- Preferably indoor applications
- Wood/stone processing, packaging industry, feeding, handling, adjusting devices

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Bus cable | PVC outer jacket

chainflex® CF888

Basic requirements
Travel distance
Oil resistance
Torsion

low 1 2 **3** 4 5 6 7 highest
unsupported **1** 2 3 4 5 6 ≥ 400m
none **1** 2 3 4 highest
none **1** 2 3 4 ±360°

Class 3.1.1.1

Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Shop and prices online
Profibus (1x2x0.64mm)					
CF888.001	(2x0.25)C	8.0	18	59	CF-D-0001 www.igus.eu/CF888
CAN-Bus					
CF888.021	(2x0.5)C	8.5	24	73	
Ethernet/CAT5e					
CF888.045	(4x(2x0.14))C	7.0	25	62	
Profinet					
CF888.060 2) 13)	(4x0.34)C	7.0	25	59	

Part No.	Characteristic wave impedance approx. [Ω]	Core group	Colour code
Profibus (1x2x0.64mm)			
CF888.001	150	2x0.25	red, green
CAN-Bus			
CF888.021	120	2x0.5	white, brown
Ethernet/CAT5e			
CF888.045	100	4x(2x0.14)	white-blue/blue, white-orange/orange, white-green/green, white-brown/brown
Profinet			
CF888.060 2) 13)	100	4x0.34	white, orange, blue, yellow (star-quad)

The chainflex® types marked with 2) are cables designed as a star-quad.
13) Colour outer jacket: Yellow-green (RAL 6018)

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case

Technical note on bus cables
chainflex® bus cables have been specially developed and tested for continuously moving use in e-chains®. Depending on the material used for the outer jacket and on the underlying construction principle, the bus cables are designed for different mechanical requirements and resistance to diverse media.
The cables have been electrically designed in such a way that, on the one hand, the electrical requirements of the respective bus specification are reliably met and, on the other, that greater value is placed on a high degree of EMC reliability.
It is also ensured that the electrical values remain stable over the long term in spite of permanent movement.
The overall quality of transmission in a complete bus communication system, however, is not solely dependent on the cable used. What is also essential is that all components (electronic parts, connecting system and cable) are precisely matched to each other and that the maximum transmission lengths, which are dependent on the respective system, are adhered to with regard to the data transmission rates needed. A cable is thus not solely responsible for the reliable transmission of signals.
igus® advises you when you are designing your bus system to take all these factors into account and, with extensive tests, helps you to ensure the process reliability of your system from the very beginning.

chainflex® CF888 bus cables in a handling application

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Bus cable | PVC outer jacket

chainflex® CFBUS.PVC

Image exemplary

10 million Double strokes guaranteed

12.5 x d Bend radius, e-chain®

20m Travel distance, e-chain®

- For medium duty applications
- PVC outer jacket
- Shielded
- Oil-resistant
- Flame-retardant

Dynamic information

Bend radius	**e-chain® linear**	minimum 12.5 x d
	flexible	minimum 10 x d
	fixed	minimum 7 x d
Temperature	**e-chain® linear**	+5°C up to +70°C
	flexible	-5°C up to +70°C (following DIN EN 60811-504)
	fixed	-15°C up to +70°C (following DIN EN 50305)
v max.	**unsupported**	3m/s
	gliding	2m/s
a max.		30m/s²
Travel distance		Unsupported travels and up to 20m for gliding applications, Class 3

Cable structure

Conductor	Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228).
Core insulation	According to bus specification.
Core structure	According to bus specification.
Core identification	According to bus specification. ▶ Product range table
Overall shield	Bending-resistant braiding made of tinned copper wires. Coverage linear approx. 55%, optical approx. 80%
Outer jacket	Low-adhesion, oil-resistant PVC mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-4-1). Colour: Red lilac (similar to RAL 4001) Variants ▶ Product range table

Electrical information

Nominal voltage	50V 300V (following UL), except **CFBUS.PVC.020:** 30V (following UL)
Testing voltage	500V

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 4.3.2.1

Basic requirements	low	1	2	3	**4**	5	6	7 highest
Travel distance	unsupported	1	2	**3**	4	5	6	≥ 400m
Oil resistance	none	1	**2**	3	4			highest
Torsion	none	**1**	2	3	4			±360°

Properties and approvals

UV resistance	Medium
Oil resistance	Oil-resistant (following DIN EN 50363-4-1), Class 2
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL-listed	CMX, 75°C (except CFBUS.PVC.068)
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CFBUSPVC
NFPA	Following NFPA 79-2018, chapter 12.9
CLPA	**CFBUS.PVC.045:** CC-Link IE Field, Reference no. 153 **CFBUS.PVC.049:** CC-Link IE Field, Reference no. 154
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF240.02.24 - tested by IPA according to standard DIN EN ISO 14644-1
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	7.5 million	10 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
+5/+15	15	16	17
+15/+60	12.5	13.5	14.5
+60/+70	15	16	17

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For medium duty applications, Class 4
- Unsupported travels and up to 20m for gliding applications, Class 3
- Light oil influence, Class 2
- No torsion, Class 1
- Preferably indoor applications, but also outdoor ones at temperatures > 5 °C
- Machining units/packaging machines, handling, indoor cranes

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Bus cable | PVC outer jacket

chainflex® CFBUS.PVC

Basic requirements
Travel distance
Oil resistance
Torsion

low 1 2 3 **4** 5 6 7 highest
unsupported 1 2 **3** 4 5 6 ≥ 400m
none 1 **2** 3 4 highest
none **1** 2 3 4 ±360°

Class 4.3.2.1

Image exemplary

	Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Shop and prices online
	Profibus (1x2x0.64mm)					
PROFIBUS	**CFBUS.PVC.001**	(2x0.25)C	8.5	25	77	
	CAN-Bus					
	CFBUS.PVC.020 [2]	(4x0.25)C	7.0	23	57	
	CFBUS.PVC.021	(2x0.5)C	8.5	32	86	
	CFBUS.PVC.022 [2]	(4x0.5)C	8.5	43	94	
	CC-Link					
	CFBUS.PVC.035	(3x0.5)C	8.0	40	82	
	Ethernet/CAT5I					
EtherCAT	**CFBUS.PVC.040** [2]	(4x0.25)C	6.5	29	70	
	Ethernet/CAT5e					
CC-Link IE Field	**CFBUS.PVC.045**	(4x(2x0.15))C	7.5	33	67	CF-D-0002
	Ethernet/CAT6					
CC-Link IE Field	**CFBUS.PVC.049**	(4x(2x0.15))C	7.5	33	67	www.igus.eu/ CFBUSPVC
	Ethernet/CAT6A					
	CFBUS.PVC.050	4x(2x0.20)C	10.0	65	123	
	Ethernet/CAT7					
	CFBUS.PVC.052	(4x(2x0.15)C)C	9.5	89	136	
	Profinet					
PROFINET EtherCAT	**CFBUS.PVC.060** [2] [13]	(4x0.38)C	7.0	33	67	
	USB 3.0					
	CFBUS.PVC.068	(2x(2xAWG28) +2x(2xAWG28)C)C	7.0	39	68	

Part No.	Characteristic wave impedance approx. [Ω]	Core group	Colour code
Profibus (1x2x0.64mm)			
CFBUS.PVC.001	150	2x0.25	red, green
CAN-Bus			
CFBUS.PVC.020 [2]	120	4x0.25	white, green, brown, yellow (star-quad)
CFBUS.PVC.021	120	2x0.5	white, brown
CFBUS.PVC.022 [2]	120	4x0.5	white, green, brown, yellow (star-quad)
CC-Link			
CFBUS.PVC.035	110	3x0.5	white, blue, yellow
Ethernet/CAT5I			
CFBUS.PVC.040 [2]	100	4x0.25	white, green, brown, yellow (star-quad)
Ethernet/CAT5e			
CFBUS.PVC.045	100	4x(2x0.15)	white-blue/blue, white-orange/orange, white-green/green, white-brown/brown
Ethernet/CAT6			
CFBUS.PVC.049	100	4x(2x0.15)	white-blue/blue, white-orange/orange, white-green/green, white-brown/brown
Ethernet/CAT6A			
CFBUS.PVC.050	100	4x(2x0.20)C	white-blue/blue, white-orange/orange, white-green/green, white-brown/brown
Ethernet/CAT7			
CFBUS.PVC.052	100	4x(2x0.15)C	white-blue/blue, white-orange/orange, white-green/green, white-brown/brown
Profinet			
CFBUS.PVC.060 [2] [13]	100	4x0.38	white, orange, blue, yellow (star-quad)
USB 3.0			
CFBUS.PVC.068	90	2x(2xAWG28)	red/black, green/white-green
		2x(2xAWG28)C	blue/yellow, orange/violet

The chainflex® types marked with [2] are cables designed as a star-quad.
[13] Colour outer jacket: Yellow-green (RAL 6018)

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case

Technical note on bus cables
chainflex® bus cables have been specially developed and tested for continuously moving use in e-chains®. Depending on the material used for the outer jacket and on the underlying construction principle, the bus cables are designed for different mechanical requirements and resistance to diverse media.
The cables have been electrically designed in such a way that, on the one hand, the electrical requirements of the respective bus specification are reliably met and, on the other, that greater value is placed on a high degree of EMC reliability.
It is also ensured that the electrical values remain stable over the long term in spite of permanent movement.
The overall quality of transmission in a complete bus communication system, however, is not solely dependent on the cable used. What is also essential is that all components (electronic parts, connecting system and cable) are precisely matched to each other and that the maximum transmission lengths, which are dependent on the respective system, are adhered to with regard to the data transmission rates needed. A cable is thus not solely responsible for the reliable transmission of signals.
igus® advises you when you are designing your bus system to take all these factors into account and, with extensive tests, helps you to ensure the process reliability of your system from the very beginning.

Bus cable | iguPUR outer jacket

chainflex® CF898

Image exemplary

5,000,000 Double strokes guaranteed

15 x d Bend radius, e-chain®

10m Travel distance, e-chain®

- For flexing applications
- iguPUR outer jacket
- Oil-resistant
- Shielded
- Flame-retardant

Dynamic information

Bend radius	**e-chain® linear**	minimum 15 x d
	flexible	minimum 12 x d
	fixed	minimum 8 x d
Temperature	**e-chain® linear**	-20°C up to +70°C
	flexible	-40°C up to +70°C (following DIN EN 60811-504)
	fixed	-50°C up to +70°C (following DIN EN 50305)
v max.	**unsupported**	3m/s
a max.		20m/s²
Travel distance		Unsupported travels up to 10m, Class 1

Cable structure

Conductor	Conductor consisting of bare copper wires (according to DIN EN 60228).
Core insulation	According to bus specification.
Core structure	According to bus specification.
Core identification	According to bus specification. ▶ Product range table
Overall shield	Braiding made of tinned copper wires. Coverage approx. 60% optical
Outer jacket	Low-adhesion iguPUR mixture, adapted to suit the requirements in e-chains®. Colour: Red lilac (similar to RAL 4001) Variants ▶ Product range table

Electrical information

Nominal voltage	50V 300V (following UL), except **CF898.001:** 30V (following UL)
Testing voltage	500V

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 3.1.3.1

Basic requirements	low	1	2	**3**	4	5	6	7	highest
Travel distance	unsupported	**1**	2	3	4	5	6		≥ 400m
Oil resistance	none	1	2	**3**	4				highest
Torsion	none	**1**	2	3	4				±360°

Properties and approvals

UV resistance	Medium
Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame **CF898.082-CF898.083:** According to IEC 60332-1-2, FT2
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF898
NFPA	**CF898.001-CF898.060:** Following NFPA 79-2018, Kapitel 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	1 million	3 million	5 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
-20/-10	17.5	18.5	19.5
-10/+60	15	16	17
+60/+70	17.5	18.5	19.5

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For flexing applications, Class 3
- Especially for unsupported travels, Class 1
- With influence of oil, Class 3
- No torsion, Class 1
- Indoor and outdoor applications without direct sun radiation
- Machining units/machine tools, low temperature applications

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Bus cable | iguPUR outer jacket

chainflex® CF898

Basic requirements: low 1 2 **3** 4 5 6 7 highest
Travel: unsupported **1** 2 3 4 5 6 ≥ 400m
Oil resistance: none 1 2 **3** 4 highest
Torsion: none **1** 2 3 4 ±360°

Class 3.1.3.1

Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Shop and prices online
Profibus (1x2x0.64mm)					
CF898.001	(2x0.25)C	8.0	18	56	
CAN-Bus					
CF898.021	(2x0.5)C	8.5	24	80	
Ethernet/CAT5e					
CF898.045	(4x(2x0.14))C	7.0	25	54	
Profinet					
CF898.060 [13]	(4x0.34)C	7.0	25	58	www.igus.eu/CF898
CF898.061.FC	(4x0.34)C	7.0	25	72	
ASI BUS (flat cables)					
CF898.082 [14]	According to ASI	4.0	50	82	
CF898.083 [15]	According to ASI	4.0	50	79	

Part No.	Characteristic wave impedance approx. [Ω]	Core group	Colour code
Profibus (1x2x0.64mm)			
CF898.001	150	2x0.25	red, green
CAN-Bus			
CF898.021	120	2x0.5	white, brown
Ethernet/CAT5e			
CF898.045	100	4x(2x0.14)	white-blue/blue, white-orange/orange, white-green/green, white-brown/brown
Profinet			
CF898.060 [13]	100	4x0.34	white, orange, blue, yellow (star-quad)
CF898.061.FC	100	4x0.34	white, orange, blue, yellow (star-quad)
ASI BUS (flat cables)			
CF898.082 [14]	According to ASI	2x2.5	blue, brown
CF898.083 [15]	According to ASI	2x2.5	blue, brown

[13] Colour outer jacket: Yellow-green (RAL 6018)
[14] Colour outer jacket: Yellow (RAL 1021)
[15] Colour outer jacket: Jet black (RAL 9005)

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

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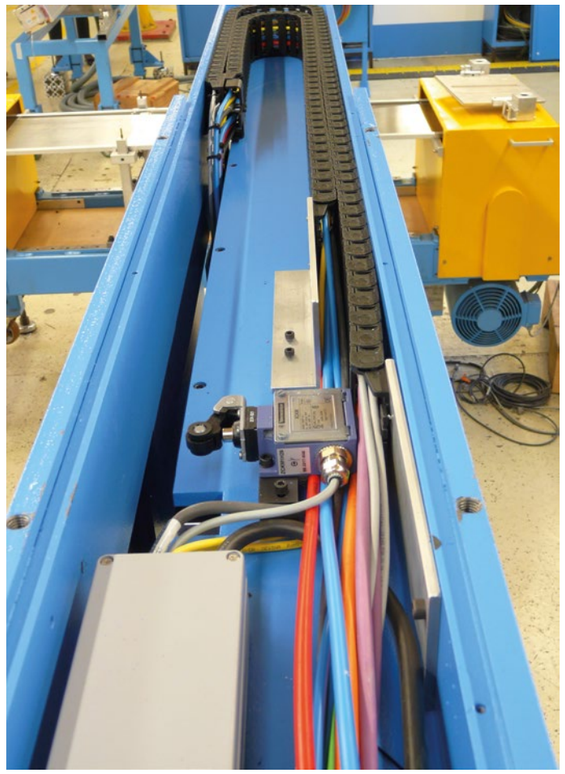
Technical note on bus cables
chainflex® bus cables have been specially developed and tested for continuously moving use in e-chains®. Depending on the material used for the outer jacket and on the underlying construction principle, the bus cables are designed for different mechanical requirements and resistance to diverse media.
The cables have been electrically designed in such a way that, on the one hand, the electrical requirements of the respective bus specification are reliably met and, on the other, that greater value is placed on a high degree of EMC reliability.
It is also ensured that the electrical values remain stable over the long term in spite of permanent movement.
The overall quality of transmission in a complete bus communication system, however, is not solely dependent on the cable used. What is also essential is that all components (electronic parts, connecting system and cable) are precisely matched to each other and that the maximum transmission lengths, which are dependent on the respective system, are adhered to with regard to the data transmission rates needed. A cable is thus not solely responsible for the reliable transmission of signals.
igus® advises you when you are designing your bus system to take all these factors into account and, with extensive tests, helps you to ensure the process reliability of your system from the very beginning.



Adjustment device with chainflex® CF898 bus cables

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Bus cable | PUR outer jacket

chainflex® CFBUS.PUR

Image exemplary

10 million Double strokes guaranteed

12.5 x d Bend radius, e-chain®

20m Travel distance, e-chain®

- For medium duty applications
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

Dynamic information

Bend radius	**e-chain® linear**	minimum 12.5 x d
	flexible	minimum 10 x d
	fixed	minimum 7 x d
Temperature	**e-chain® linear**	-20°C up to +70°C
	flexible	-40°C up to +70°C (following DIN EN 60811-504)
	fixed	-50°C up to +70°C (following DIN EN 50305)
v max.	**unsupported**	3m/s
	gliding	2m/s
a max.		30m/s²
Travel distance		Unsupported travels and up to 20m for gliding applications, Class 3

Cable structure

Conductor	Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228).
Core insulation	According to bus specification.
Core structure	According to bus specification.
Core identification	According to bus specification. ▶ Product range table
Overall shield	Bending-resistant braiding made of tinned copper wires. Coverage linear approx. 55%, optical approx. 80%
Outer jacket	Low-adhesion, halogen-free, highly abrasion resistant PUR mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2) Colour: Red lilac (similar to RAL 4001) Variants ▶ Product range table

Electrical information

Nominal voltage	50V 300V (following UL), except **CFBUS.PUR.020:** 30V (following UL)
Testing voltage	500V

Properties and approvals

UV resistance	Medium
Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3

Class 4.3.3.1

Basic requirements	low	1	2	3	**4**	5	6	7 highest
Travel distance	unsupported	1	2	**3**	4	5	6	≥ 400m
Oil resistance	none	1	2	**3**	4	highest		
Torsion	none	**1**	2	3	4	±360°		

Offshore	MUD-resistant following NEK 606 - status 2016
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL-listed	CMX, 75°C (except CFBUS.PUR.068)
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CFBUSPUR
NFPA	Following NFPA 79-2018, chapter 12.9
CLPA	**CFBUS.PUR.045:** CC-Link IE Field, Reference no. 151 **CFBUS.PUR.049:** CC-Link IE Field, Reference no. 152
DNV	Type Approval Certificate TAE00003X6 (Issue: 04/2025) **CFBUS.PUR.040-.052:** Type Approval Certificate TAE00003X8 (Issue: 04/2025) Current information in the data sheet ▶ www.igus.eu/CFBUSPUR
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1
DESINA	According to VDW, DESINA standardisation
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	7.5 million	10 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
-20/-10	15	16	17
-10/+60	12.5	13.5	14.5
+60/+70	15	16	17

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For medium duty applications, Class 4
- Unsupported travels and up to 20m for gliding applications, Class 3
- Almost unlimited resistance to oil, Class 3
- No torsion, Class 1
- Indoor and outdoor applications without direct sun radiation
- Machining units/machine tools, low temperature applications

Bus cable | PUR outer jacket

chainflex® CFBUS.PUR

Basic requirements
Travel distance
Oil resistance
Torsion

low 1 2 3 **4** 5 6 7 highest
unsupported 1 2 **3** 4 5 6 ≥ 400m
none 1 2 **3** 4 highest
none **1** 2 3 4 ±360°

Class 4.3.3.1

Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Shop and prices online
Profibus (1x2x0.64mm)					
CFBUS.PUR.001	(2x0.25)C	8.5	25	75	
CAN-Bus					
CFBUS.PUR.020 [2]	(4x0.25)C	7.5	23	64	
CFBUS.PUR.021	(2x0.5)C	8.5	32	82	
CFBUS.PUR.022 [2]	(4x0.5)C	8.5	43	91	
CC-Link					
CFBUS.PUR.035	(3x0.5)C	8.0	40	76	
Ethernet/CAT5I					
CFBUS.PUR.040 [2]	(4x0.25)C	6.5	29	69	
Single Pair Ethernet/CAT5e					
CFBUS.PUR.042	(2x0.15)C	5.5	12	33	
Ethernet/CAT5e					
CFBUS.PUR.045	(4x(2x0.15))C	7.5	33	66	
Ethernet/CAT6					
CFBUS.PUR.049	(4x(2x0.15))C	7.5	33	66	
CFBUS.PUR.H01.049	((4x(2x0.15))C+4x1.5)C	12.5	125	202	
Ethernet/CAT6A					
CFBUS.PUR.050	4x(2x0.20)C	10.0	65	120	
Ethernet/CAT7					
CFBUS.PUR.052	(4x(2x0.15)C)C	9.5	89	129	
FireWire IEEE 1394b					
CFBUS.PUR.056	(2x(2x0.15)C+2x0.38)C	9.0	59	91	
Profinet					
CFBUS.PUR.060 [2] [13]	(4x0.38)C	7.0	33	64	
CFBUS.PUR.H01.060	((4x0.38)C+4x1.5)C	11.5	120	196	
USB 3.0					
CFBUS.PUR.068	(2x(2xAWG28) +2x(2xAWG28)C)C	7.0	39	64	

CF-D-0004
www.igus.eu/CFBUSPUR

Part No.	Characteristic wave impedance approx. [Ω]	Core group	Colour code
Profibus (1x2x0.64mm)			
CFBUS.PUR.001	150	2x0.25	red, green
CAN-Bus			
CFBUS.PUR.020 [2]	120	4x0.25	white, green, brown, yellow (star-quad)
CFBUS.PUR.021	120	2x0.5	white, brown
CFBUS.PUR.022 [2]	120	4x0.5	white, green, brown, yellow (star-quad)
CC-Link			
CFBUS.PUR.035	110	3x0.5	white, blue, yellow
Ethernet/CAT5I			
CFBUS.PUR.040 [2]	100	4x0.25	white, green, brown, yellow (star-quad)
Single Pair Ethernet/CAT5e			
CFBUS.PUR.042		2x0.15	white/blue
Ethernet/CAT5e			
CFBUS.PUR.045	100	4x(2x0.15)	white-blue/blue, white-orange/orange, white-green/green, white-brown/brown
Ethernet/CAT6			
CFBUS.PUR.049	100	4x(2x0.15)	white-blue/blue, white-orange/orange, white-green/green, white-brown/brown
CFBUS.PUR.H01.049	100	(4x(2x0.15))C	white-blue/blue, white-orange/orange, white-green/green, white-brown/brown
		4x1.5	black, brown, grey, blue
Ethernet/CAT6A			
CFBUS.PUR.050	100	4x(2x0.20)C	white-blue/blue, white-orange/orange, white-green/green, white-brown/brown
Ethernet/CAT7			
CFBUS.PUR.052	110	(4x(2x0.15))C	white-blue/blue, white-orange/orange, white-green/green, white-brown/brown
FireWire IEEE 1394b			
CFBUS.PUR.056	110	2x(2x0.15)C 2x0.38	orange/blue, blue/red black, white
Profinet			
CFBUS.PUR.060 [2] [13]	100	4x0.38	white, orange, blue, yellow (star-quad)
CFBUS.PUR.H01.060	100	(4x0.38)C	white, orange, blue, yellow (star-quad)
		4x1.5	black, brown, grey, blue
USB 3.0			
CFBUS.PUR.068	90	2x(2xAWG28)	red/black, green/white-green
		2x(2xAWG28)C	blue/yellow, orange/violet

The chainflex® types marked with [2] are cables designed as a star-quad.
[13] Colour outer jacket: Yellow-green (RAL 6018)

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Bus cable | TPE outer jacket

chainflex® CFBUS

Image exemplary

10 million Double strokes guaranteed

10 x d Bend radius, e-chain®

400m Travel distance, e-chain®

- For extremely heavy duty applications
- TPE outer jacket
- Shielded
- Oil and bio-oil-resistant
- Flame-retardant
- Hydrolysis and microbe-resistant

Dynamic information

Bend radius	**e-chain® linear**	minimum 10 x d
	flexible	minimum 8 x d
	fixed	minimum 5 x d
Temperature	**e-chain® linear**	-35°C up to +70°C
	flexible	-45°C up to +70°C (following DIN EN 60811-504)
	fixed	-50°C up to +70°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	6m/s
a max.		100m/s²
Travel		Unsupported travels and up to 400m and more for gliding applications, Class 6

Cable structure

Conductor	Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228).
Core insulation	According to bus specification.
Core structure	According to bus specification.
Core identification	According to bus specification. ▶ Product range table
Inner jacket	TPE mixture adapted to suit the requirements in e-chains®.
Overall shield	Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90%
Outer jacket	Low-adhesion, extremely abrasion-resistant and highly flexible TPE mixture, adapted to suit the requirements in e-chains®. Colour: Red lilac (similar to RAL 4001) Variants ▶ Product range table

Electrical information

Nominal voltage	50V 600V (following UL), except **CFBUS.065/.066:** 30V (following UL)
Testing voltage	500V (following DIN EN 50289-1-3)

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 6.6.4.1

Basic requirements	low	1	2	3	4	5	**6**	7 highest
Travel distance	unsupported	1	2	3	4	5	**6**	≥ 400m
Oil resistance	none	1	2	3	**4**	highest		
Torsion	none	**1**	2	3	4	±360°		

Properties and approvals

UV resistance	Medium
Oil resistance	Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame **CFBUS.030/CFBUS.065/CFBUS.066:** According to IEC 60332-1-2, FT2
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶www.igus.eu/CFBUS
NFPA	Following NFPA 79-2018, chapter 12.9
CLPA	**CFBUS.045:** CC-Link IE Field, Reference no. 130 **CFBUS.049:** CC-Link IE Field, Reference no. 137
DNV	Type Approval Certificate TAE00003X5 (Issue: 04/2025) **CFBUS.040-.052:** Type Approval Certificate TAE00003X7 (Issue: 04/2025) Current information in the data sheet ▶ www.igus.eu/CFBUS
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF34.UL.25.04.D - tested by IPA according to standard DIN EN ISO 14644-1
DESINA	According to VDW, DESINA standardisation
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million		7.5 million		10 million	
Temperature, from/to [°C]	CFBUS .001-.049	CFBUS .050-.070	CFBUS .001-.049	CFBUS .050-.070	CFBUS .001-.049	CFBUS .050-.070
	R min. [x d]	R min. [x d]	R min. [x d]	R min. [x d]	R min. [x d]	R min. [x d]
-35/-25	12.5	15	13.5	16	14.5	17
-25/+60	10	12.5	11	13.5	12	14.5
+60/+70	12.5	15	13.5	16	14.5	17

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For heavy-duty applications, Class 6
- Unsupported travels and up to 400m and more for gliding applications, Class 6
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- No torsion, Class 1
- Indoor and outdoor applications without direct sun radiation
- Storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, cleanroom, semiconductor insertion, indoor cranes, low temperature applications

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Bus cable | TPE outer jacket

chainflex® CFBUS

Class 6.6.4.1

Basic requirements	low	1	2	3	4	5	**6**	7 highest
Travel distance	unsupported	1	2	3	4	5	**6**	≥ 400m
Oil resistance	none	1	2	3	**4**	highest		
Torsion	none	**1**	2	3	4	±360°		

Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
Profibus (1x2x0.64mm)				
CFBUS.001	(2x0.25)C	9.0	33	92
CFBUS.002	(2x0.25)C+4x1.5	12.5	94	191
CFBUS.003	(2x0.25)C+3G0.75	11.5	55	145
Interbus				
CFBUS.010	(3x(2x0.25))C	9.0	47	91
CFBUS.011	(3x(2x0.25)+(3G1.0))C	10.5	87	152
CAN-Bus				
CFBUS.020 [2]	(4x0.25)C	6.5	28	58
CFBUS.021	(2x0.5)C	8.0	39	81
CFBUS.022 [2]	(4x0.5)C	8.0	43	87
DeviceNet				
CFBUS.030 [4]	((2xAWG24)C +2xAWG22)C	7.0	36	57
CFBUS.031 [4]	((2xAWG18)C +2xAWG15)C	11.5	103	174
CC-Link				
CFBUS.035	(3xAWG20)C	8.5	43	96

Shop and prices online

CF-D-0005

www.igus.eu/CFBUS

Part No.	Characteristic wave impedance approx. [Ω]	Core group	Colour code
Profibus (1x2x0.64mm)			
CFBUS.001	150	2x0.25	red, green
CFBUS.002	150	(2x0.25)C	red/green
		4x1.5	black with white numbers 1-4
CFBUS.003	150	(2x0.25)C	red/green
		3G0.75	black, blue, green-yellow
Interbus			
CFBUS.010	100	3x(3x0.25)	white/brown, green/yellow, grey/pink
CFBUS.011	100	3x(2x0.25)	white/brown, green/yellow, grey/pink
		(3G1.0)	red, blue, green-yellow
CAN-Bus			
CFBUS.020 [2]	120	4x0.25	white, green, brown, yellow (star-quad)
CFBUS.021	120	2x0.5	white, brown
CFBUS.022 [2]	120	4x0.5	white, green, brown, yellow (star-quad)
DeviceNet			
CFBUS.030 [4]	120	(2xAWG24)C	white/blue
		2xAWG22	red, black
CFBUS.031 [4]	120	(2xAWG18)C	white/blue
		2xAWG15	red, black
CC-Link			
CFBUS.035	110	3xAWG20	white, blue, yellow

The chainflex® types marked with [2] are cables designed as a star-quad.
[4] Manufactured without inner jacket

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case

Technical note on bus cables
chainflex® bus cables have been specially developed and tested for continuously moving use in e-chains®. Depending on the material used for the outer jacket and on the underlying construction principle, the bus cables are designed for different mechanical requirements and resistance to diverse media.
The cables have been electrically designed in such a way that, on the one hand, the electrical requirements of the respective bus specification are reliably met and, on the other, that greater value is placed on a high degree of EMC reliability.
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igus® advises you when you are designing your bus system to take all these factors into account and, with extensive tests, helps you to ensure the process reliability of your system from the very beginning.

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

Bus cable | TPE outer jacket

chainflex® CFBUS

Class 6.6.4.1

Basic requirements	low	1	2	3	4	5	**6**	7	highest
Travel distance	unsupported	1	2	3	4	5	**6**		≥ 400m
Oil resistance	none	1	2	3	**4**				highest
Torsion	none	**1**	2	3	4				±360°

Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Shop and prices online
Ethernet/CAT5I					
CFBUS.040 [2]	(4x0.25)C	7.0	33	59	
Ethernet/CAT5e					
CFBUS.045	(4x(2x0.15))C	8.5	42	84	
Ethernet/CAT6					
CFBUS.049	(4x(2x0.15))C	8.5	42	84	
Ethernet/CAT6A					
CFBUS.050 [4] [5]	(4x(2x0.15)C)C	10.5	83	134	
Ethernet/CAT7					
CFBUS.052 [4]	(4x(2x0.15)C)C	10.5	89	133	
FireWire 1394a					
CFBUS.055 [5]	2x(2x0.15)C+2x(0.34)C	8.0	39	76	
Profinet					
CFBUS.060 [2] [13]	(4x0.38)C	7.5	39	74	
USB					
CFBUS.065 [5]	((2xAWG28)+2xAWG20)C	5.5	28	45	
CFBUS.066	((2xAWG24)+2xAWG20)C	6.5	32	51	
DVI					
CFBUS.070 [4] [5] [6]	(4x(2xAWG28)C +(2xAWG28)+3xAWG28)C	9.0	35	95	

CF-D-0005

www.igus.eu/CFBUS

Part No.	Characteristic wave impedance approx. [Ω]	Core group	Colour code
Ethernet/CAT5I			
CFBUS.040 [2]	100	4x0.25	white, green, brown, yellow (star-quad)
Ethernet/CAT5e			
CFBUS.045	100	4x(2x0.15)	white-blue/blue, white-orange/orange, white-green/green, white-brown/brown
Ethernet/CAT6			
CFBUS.049	100	4x(2x0.15)	white-blue/blue, white-orange/orange, white-green/green, white-brown/brown
Ethernet/CAT6A			
CFBUS.050 [4] [5]	100	4x(2x0.15)C	white-blue/blue, white-orange/orange, white-green/green, white-brown/brown
Ethernet/CAT7			
CFBUS.052 [4]	100	4x(2x0.15)C	white-blue/blue, white-orange/orange, white-green/green, white-brown/brown
FireWire 1394a			
CFBUS.055 [5]	100	2x(2x0.15)C	orange/blue, green/red
		2x(0.34)C	white, black
Profinet			
CFBUS.060 [2] [13]	100	4x0.38	white, orange, blue, yellow (star-quad)
USB			
CFBUS.065 [5]	90	(2xAWG28)	white/green
		2xAWG20	red, black
CFBUS.066	90	(2xAWG24)	white/green
		2xAWG20	red, black
DVI			
CFBUS.070 [4] [5] [6]	100	4x(2xAWG28)C	4 x white/yellow with element-shield in blue, black, red, white
		(2xAWG28)	white/brown
		3xAWG28)C	green, yellow, grey

The chainflex® types marked with [2] are cables designed as a star-quad.
[4] Manufactured without inner jacket
[5] Not PTFE-free
[6] without cULus
[13] Colour outer jacket: Yellow-green (RAL 6018)

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Technical note on bus cables
chainflex® bus cables have been specially developed and tested for continuously moving use in e-chains®. Depending on the material used for the outer jacket and on the underlying construction principle, the bus cables are designed for different mechanical requirements and resistance to diverse media.
The cables have been electrically designed in such a way that, on the one hand, the electrical requirements of the respective bus specification are reliably met and, on the other, that greater value is placed on a high degree of EMC reliability.
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Issue 07/2025 - EPLAN download, configurators ▶ www.igus.eu/CFBUS 169

Bus cable | TPE outer jacket

chainflex® CFBUS.LB

Image exemplary

12.5 million
Double strokes guaranteed

7.5 x d
Bend radius, e-chain®

400m
Travel distance, e-chain®

- For heaviest duty applications
- TPE outer jacket
- Shielded
- Oil and bio-oil-resistant
- Low-temperature-flexible
- PVC and halogen-free
- Hydrolysis and microbe-resistant

Now available with UL approval & 25% longer service life

Dynamic information

Bend radius	**e-chain® linear**	minimum 7.5 x d
	flexible	minimum 6 x d
	fixed	minimum 4 x d
Temperature	**e-chain® linear**	-35°C up to +70°C
	flexible	-50°C up to +70°C (following DIN EN 60811-504)
	fixed	-55°C up to +70°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	6m/s
a max.		100m/s²
Travel distance		Unsupported travels and up to 400m and more for gliding applications, Class 6

Cable structure

Conductor	Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228).
Core insulation	According to bus specification.
Core structure	According to bus specification.
Core identification	According to bus specification. ▶ Product range table
Inner jacket	TPE mixture adapted to suit the requirements in e-chains®.
Overall shield	Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90%
Outer jacket	Low-adhesion, extremely abrasion-resistant and highly flexible TPE mixture, adapted to suit the requirements in e-chains®. Colour: Red lilac (similar to RAL 4001) Variants ▶ Product range table

Electrical information

Nominal voltage	50V 600V (following UL)
Testing voltage	500V (following DIN EN 50289-1-3)

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 7.6.4.1

Basic requirements	low	1	2	3	4	5	6	**7** highest
Travel distance	unsupported	1	2	3	4	5	**6**	≥ 400m
Oil resistance	none	1	2	3	**4** highest			
Torsion	none	**1**	2	3	4	±360°		

Properties and approvals

UV resistance	Medium
Oil resistance	Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL AWM	See data sheet for details ▶ www.igus.eu/CFBUSLB (from production date 01/2022)
CLPA	**CFBUS.LB.045:** CC-Link IE Field, Reference no. 131 **CFBUS.LB.049:** CC-Link IE Field, Reference no. 138
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF9.15.07 - tested by IPA according to standard DIN EN ISO 14644-1
Dry cleanroom	Tested in "dry cleanroom" according to DIN EN ISO 14644-1
DESINA	According to VDW, DESINA standardisation
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million		7.5 million		12.5 million	
Temperature, from/to [°C]	CFBUS.LB .001-.022	CFBUS.LB .040-.060	CFBUS.LB .001-.022	CFBUS.LB .040-.060	CFBUS.LB .001-.022	CFBUS.LB .040-.060
	R min. [x d]	R min. [x d]	R min. [x d]	R min. [x d]	R min. [x d]	R min. [x d]
-35/-25	12.5	10	13.5	11	14.5	12
-25/+60	10	7.5	11	8.5	12	9.5
+60/+70	12.5	10	13.5	11	14.5	12

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For heavy-duty applications, Class 7
- Unsupported travels and up to 400m and more for gliding applications, Class 6
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- No torsion, Class 1
- Indoor and outdoor applications without direct sun radiation
- Storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, cleanroom, semiconductor insertion, indoor cranes, low temperature applications

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Bus cable | TPE outer jacket

chainflex® CFBUS.LB

Basic requirements low 1 2 3 4 5 6 **7** highest
Travel distance unsupported 1 2 3 4 5 **6** ≥ 400m
Oil resistance none 1 2 3 **4** highest
Torsion none **1** 2 3 4 ±360°

Class 7.6.4.1

Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Characteristic wave impedance approx. [Ω]	Core group	Colour code
Profibus (1x2x0.64mm)							
CFBUS.LB.001	(2x0.25)C	9.0	33	78	150	2x0.25	red, green
CAN-Bus/Feldbus							
CFBUS.LB.020 2)	(4x0.25)C	6.5	28	49	120	4x0.25	white, green, brown, yellow (star-quad)
CFBUS.LB.021	(2x0.5)C	8.0	39	67	120	2x0.5	white, brown
CFBUS.LB.022 2)	(4x0.5)C	8.0	43	78	120	4x0.5	white, green, brown, yellow (star-quad)
Ethernet/CAT5I							
CFBUS.LB.040 2)	(4x0.25)C	7.0	33	50	100	4x0.25	white, green, brown, yellow (star-quad)
Ethernet/CAT5e							
CFBUS.LB.045	(4x(2x0.15))C	8.5	42	71	100	4x(2x0.15)	white-blue/blue, white-orange/orange, white-green/green, white-brown/brown
Ethernet/CAT6							
CFBUS.LB.049	(4x(2x0.15))C	8.5	42	71	100	4x(2x0.15)	white-blue/blue, white-orange/orange, white-green/green, white-brown/brown
Profinet							
CFBUS.LB.060 2) 13)	(4x0.38)C	7.5	39	67	100	4x0.38	white, orange, blue, yellow (star-quad)

Shop and prices online

CF-D-0005

www.igus.eu/CFBUSLB

The chainflex® types marked with 2) are cables designed as a star-quad.
13) Colour outer jacket: Yellow-green (RAL 6018)

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case

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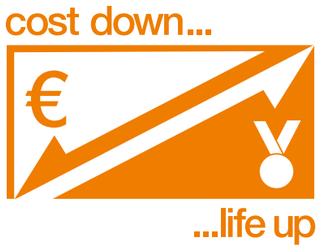


Reduce cost, improve technology, now!

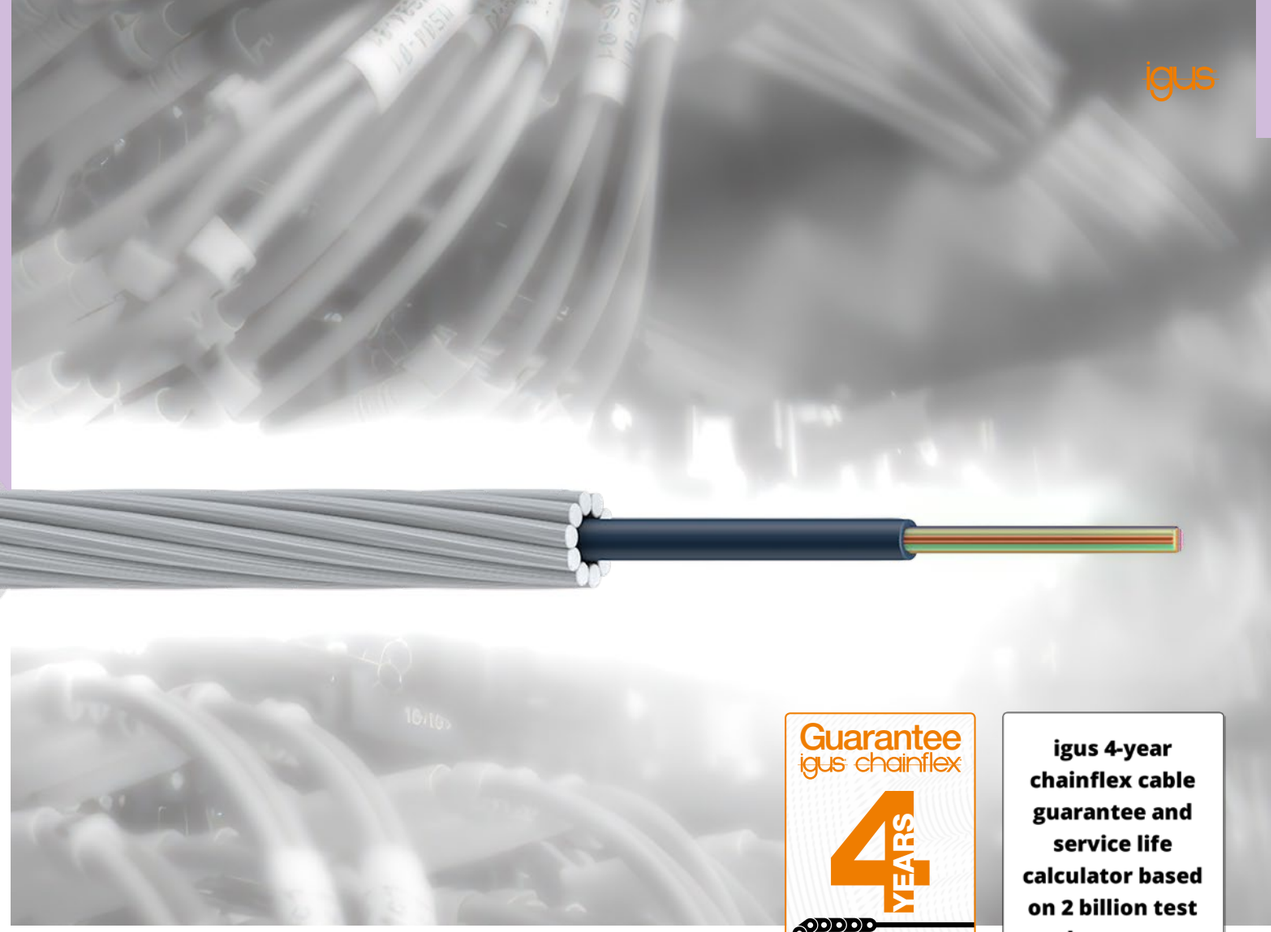
Do the chainflex® price check ...
www.igus.eu/cf-price-check

… for example: reduce cost with CFBUS.PUR ...

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Fibre Optic Cables



Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

Fibre Optic Cables for energy chains

Specially designed for use in e-chains®. Available with various fibre types and outer jacket materials.
For long distances and reliable transmission of large data volumes. Tested with a chainflex® guarantee of up to 4 years.

- For long distances, small radii and large data volumes
- With different fibre types and outer jacket materials, always find the most cost-effective Fibre Optic Cable that is guaranteed to work in your application
- Tested in the industry's largest test laboratory (5,500m²)
- Use without braided shielding that is susceptible to mechanical damage as EMC protection
- Calculate the exact service life online:
  igus.eu/chainflexlife

Background

Flexible and durable

Communication between systems in machines and plant is becoming more and more complex all the time, yet fault-free performance is becoming ever more important. However, many plant manufacturers or operators have major EMC problems that occur sporadically or even after years of operation.

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® 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 type, 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:

- **Multimode fibres**
  50/125µm
  62.5/125µm

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

- **POF (Plastic Optical Fibre)**
  980/1,000µm

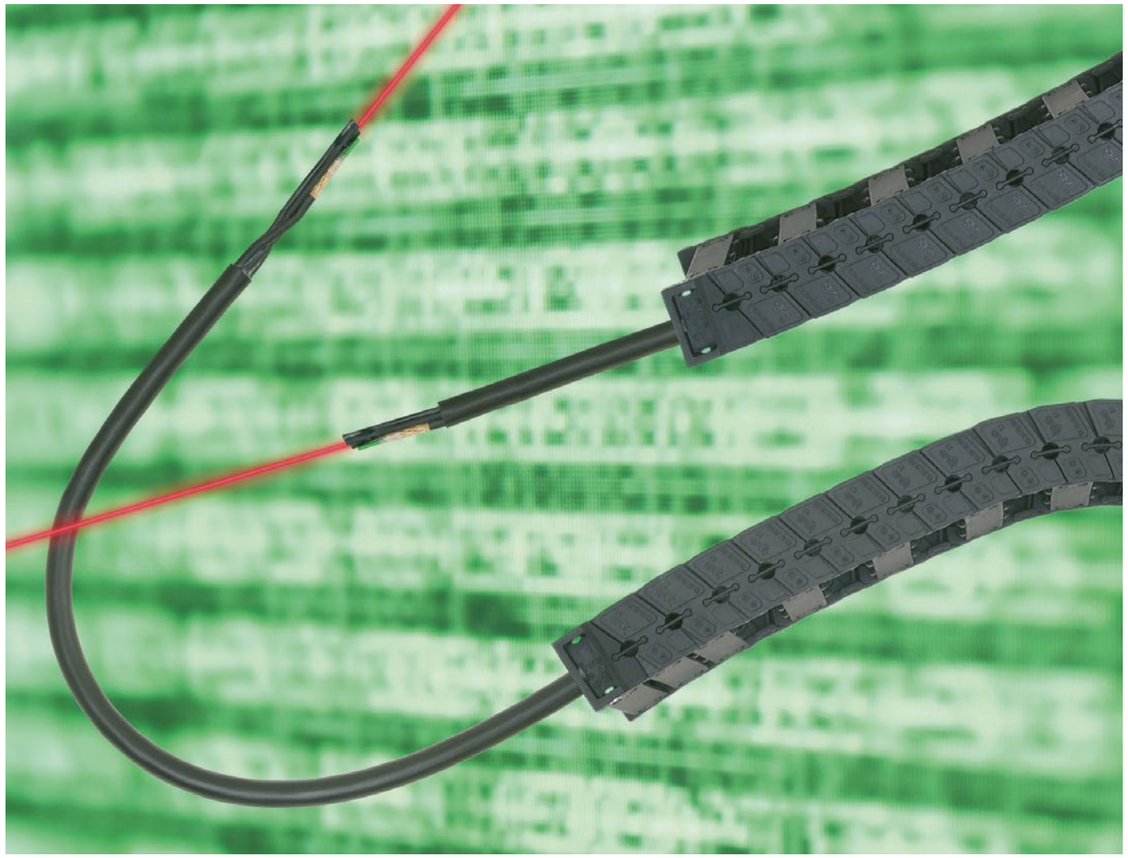
The ideal and low-cost fibre for short transmission paths. On account of the high output attenuation of the fibre type of 160-230dB/km, lengths over 15m must be avoided in constantly moving energy chains.

- **PCF (Polymer Cladded Fibre)**
  200/230µm

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 (100m and more) are possible without the original POF terminal devices having to be replaced.

- **Singlemode fibres**
  9/125µm

Singlemode fibre optics are also colloquially referred to as "Telecom cables", as this type of fibre is typically used for very long distances (several kilometres) and very high data rates in telecommunications networks. However, these fibres are increasingly being used in automation as the corresponding modules are becoming more cost-effective, while also enabling higher data rates.



Selection table

chainflex® fibre optic cables

Mechanical parameters

chainflex® cables	Jacket	Shield	Bend radius e-chain® min. [xd]	Temperature e-chain® from/to [°C]	v max. [m/s] unsupported	v max. [m/s] gliding	a max. [m/s²]	Travel distance [m]	Page
CFLK	PUR		12.5	-20/+60	10	5	20	≤ 20	178
CFLG88	PVC		7.5	+5/+70	3	-	20	≤ 10	180
CFLG.LB.PUR	PUR		5	-25/+80	10	6	20	≤ 100	182
CFLG.LB New	TPE		5	-35/+80	10	6	20	≤ 100	186
CFLG.G	TPE		10	-40/+80	10	6	20	≤ 50	190

Approvals/resistance

chainflex® cables	oil		PTFE free	Approvals and standards															Page
CFLK	●		●										●	●				●	178
CFLG88			●										●	●	●			●	180
CFLG.LB.PUR	●		●									●	●	●	●			●	182
CFLG.LB New	●		●										●	●	●	●		●	186
CFLG.G	●		●										●	●	●	●		●	190

Overview to find the right fibre optic cable

chainflex® cables	POF plastic FOC 980/1,000µm	GOF Multimode glass fibre FOC 50/125µm 62.5/125µm	GOF Singlemode glass fibre FOC 9/125µm	Page
CFLK	●			178
CFLG88		●		180
CFLG.LB.PUR		●	●	182
CFLG.LB New		●	●	186
CFLG.G		●	●	190

Guaranteed service life

chainflex® cables	Temperature, from/to [°C]	Min. bend radius [xd] for travel distance < 10m	Min. bend radius [xd] for travel distance ≥ 10m	Page
		5 million (1 million) double strokes *	7.5 million (3 million) double strokes *	10 million (5 million) double strokes *	
CFLK	-20 / -10	15	16	17	
	-10 / +50	12.5	13.5	14.5	178
	+50 / +60	15	16	17	
CFLG88	+5 / +15	10	11	12	
	+15 / +60	7.5	8.5	9.5	180
	+60 / +70	10	11	12	
CFLG.LB.PUR	-25 / -15	7.5	8.5	9.5	
	-15 / +70	5	6	7	182
	+70 / +80	7.5	8.5	9.5	
CFLG.LB New	-35 / -25	7.5	8.5	9.5	
	-25 / +70	5	6	7	186
	+70 / +80	7.5	8.5	9.5	
CFLG.G	-40 / -30	12.5	13.5	14.5	
	-30 / +70	10	11	12	190
	+70 / +80	12.5	13.5	14.5	

* Higher number of double strokes? Calculate service life online ▶ www.igus.eu/chainflexlife
Figures in brackets refer to series CFLG88

Fibre Optic Cable, POF | PUR outer jacket

chainflex® CFLK

Image exemplary

10 million
Double strokes guaranteed

12.5 x d
Bend radius, e-chain®

20m
Travel distance, e-chain®

- POF fibre for heavy duty applications and interference-free transmission
- PUR outer jacket
- Oil-resistant and coolant-resistant

Dynamic information

Bend radius	**e-chain® linear**	minimum 12.5 x d
	flexible	minimum 10 x d
	fixed	minimum 7 x d
Temperature	**e-chain® linear**	-20°C up to +60°C
	flexible	-40°C up to +60°C (following DIN EN 60811-504)
	fixed	-50°C up to +60°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	5m/s
a max.		20m/s²
Travel distance		Unsupported travels and up to 20m for gliding applications, Class 3

Cable structure

Fibre Optic Cable	980/1000 µm fibre with PE isolation.
Core structure	POF fibre with stranded high-tensile plastic reinforcement.
Core identification	▶ Product range table
Outer jacket	Low-adhesion, halogen-free PUR mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2). Colour: Red lilac (similar to RAL 4001)

Properties and approvals

UV resistance	Medium
Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
CE	Following 2014/35/EU

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Basic requirements: low 1 2 3 4 5 6 7 highest
Travel distance: unsupported 1 2 3 4 5 6 ≥ 400m
Oil resistance: none 1 2 3 4 highest
Torsion: none 1 2 3 4 ±360°

Class 5.3.3.1

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	7.5 million	10 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
-20/-10	15	16	17
-10/+50	12.5	13.5	14.5
+50/+60	15	16	17

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For heavy-duty applications, Class 5
- Unsupported travels and up to 20m for gliding applications, Class 3
- Almost unlimited resistance to oil, Class 3
- No torsion, Class 1
- Highest EMC safety
- Preferably indoor applications
- Wood/stone processing, packaging industry, feeding, handling, adjusting devices

Part No.	Number of fibres/ fibre diameter/conductor nominal cross section	Outer diameter (d) max. [mm]	Weight [kg/km]	Shop and prices online
CFLK.L1.01	1x980/1,000	6.0	27	CF-E-0001
CFLK.L1.02	2x980/1,000	7.0	31	

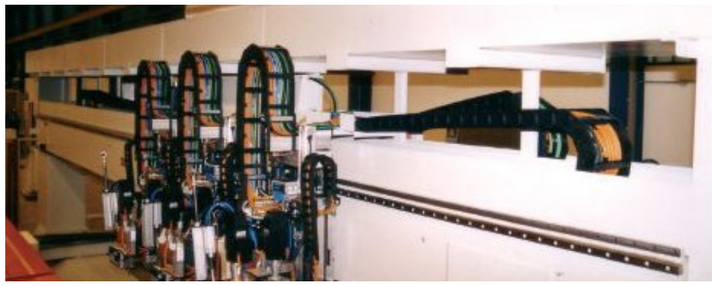
Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.

Part No.	Bandwidth [MHz x km] @ 650nm	Attenuation [dB/km] @ 650nm	Fibre identification
CFLK.L1.01	2	200	black
CFLK.L1.02	2	200	black, blue

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case


Woodworking machines with e-chains® and chainflex® cables

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Fibre Optic Cable, glass | PVC outer jacket

chainflex® CFLG88

Image exemplary

5,000,000 Double strokes guaranteed

7.5 x d Bend radius, e-chain®

10m Travel distance, e-chain®

- Graded index glass-fibre cable for flexing applications
- PVC outer jacket
- Flame-retardant

Dynamic information

Bend radius	**e-chain® linear**	minimum 7.5 x d
	flexible	minimum 6 x d
	fixed	minimum 4 x d
Temperature	**e-chain® linear**	+5°C up to +70°C
	flexible	-5°C up to +70°C (following DIN EN 60811-504)
	fixed	-15°C up to +70°C (following DIN EN 50305)
v max.	**unsupported**	3m/s
a max.		20m/s²
Travel distance		Unsupported travels up to 10m, Class 1

Cable structure

Fibre Optic Cable	50/125µm, 62.5/125µm bending-resistant solid glass fibre optic cores, with aramid strain relief elements.
Core structure	FOC cores wound with a short pitch length with high-tensile aramid dampers.
Core identification	FOC cores: Orange or blue with black numbers.
Outer jacket	Low-adhesion PVC mixture, adapted to suit the requirements in e-chains®. Colour: jet black (similar to RAL 9005)

Properties and approvals

Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF240.02.24 - tested by IPA according to standard DIN EN ISO 14644-1
CE	Following 2014/35/EU

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Basic requirements: low 1 2 **3** 4 5 6 7 highest
Travel distance: unsupported 1 2 3 4 5 6 ≥ 400m
Oil resistance: none 1 2 3 4 highest
Torsion: none 1 2 3 4 ±360°

Class 3.1.1.1

Guaranteed service life (details see page 14-15)

Double strokes*	1 million	3 million	5 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
+5/+15	10	11	12
+15/+60	7.5	8.5	9.5
+60/+70	10	11	12

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For flexing applications, Class 3
- Especially for unsupported travels, Class 1
- Without influence of oil, Class 1
- No torsion, Class 1
- Highest EMC safety
- Preferably indoor applications
- Wood/stone processing, packaging industry, feeding, handling, adjusting devices

Part No.	Number of fibres/ fibre diameter/conductor nominal cross section	Outer diameter (d) max. [mm]	Weight [kg/km]
CFLG88.2.62.5/125	2x62.5/125	7.0	44
CFLG88.2.50/125	2x50/125	7.0	44

Shop and prices online
CF-E-0002
www.igus.eu/CFLG88

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.

Part No.	Bandwidth [MHz x km] @ 850nm	Attenuation [dB/km] @ 850nm	Bandwidth [MHz x km] @ 1,300nm	Attenuation [dB/km] @ 1,300nm	Fibre identification
CFLG88.2.62.5/125	≥ 200	≤ 3.5	≥ 500	≤ 1.5	orange with black numbers
CFLG88.2.50/125	≥ 200	≤ 3.0	≥ 500	≤ 1.0	blue with black numbers

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

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igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Fibre Optic Cable, glass | PUR outer jacket

chainflex® CFLG.LB.PUR

Image exemplary

10 million Double strokes guaranteed

5 x d Bend radius, e-chain®

100m Travel distance, e-chain®

- Glass-fibre cable for heaviest duty applications
- PUR outer jacket
- Metal-free
- Oil-resistant
- Low-temperature-flexible
- PVC and halogen-free
- UV-resistant

Dynamic information

Bend radius	**e-chain® linear**	minimum 5 x d
	flexible	minimum 4 x d
	fixed	minimum 3 x d
Temperature	**e-chain® linear**	-25°C up to +80°C
	flexible	-40°C up to +80°C (following DIN EN 60811-504)
	fixed	-50°C up to +80°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	6m/s
a max.		20m/s²
Travel distance		Unsupported travels and up to 100m for gliding applications, Class 5

Cable structure

Fibre Optic Cable	50/125µm, 62.5/125µm, 9/125µm especially bending-resistant solid glass fibre optic cores, with aramid strain relief elements.
Core structure	FOC cores wound with a short pitch length with high-tensile aramid dampers.
Core identification	Orange, blue or yellow with black numbers.
Overall shield	Extremely bending-resistant aramid braid for torsion protection.
Outer jacket	Low-adhesion, halogen-free, highly abrasion resistant PUR mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2) Colour: jet black (similar to RAL 9005)

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 6.5.3.1

Load	low	1	2	3	4	5	6	7	highest
Travel distance	unsupported	1	2	3	4	5	6		≥ 400m
Oil resistance	none	1	2	3	4				highest
Torsion	none	1	2	3	4				±360°

Properties and approvals

UV resistance	High
Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3
Offshore	MUD-resistant following NEK 606 - status 2016
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
DNV	Type Approval Certificate TAE000048J
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	7.5 million	10 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
-25/-15	7.5	8.5	9.5
-15/+70	5	6	7
+70/+80	7.5	8.5	9.5

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For heaviest duty applications with 5-7.5 x d, Class 6
- Unsupported travels and up to 100 m for gliding applications (horizontal + vertical), Class 5
- Almost unlimited resistance to oil, Class 3
- No torsion, Class 1
- Maximum EMC protection, with high transmission qualities
- Indoor and outdoor applications
- Offshore, ships, storage and retrieval units, processing/packaging machines, fast handling, semiconductor assembly, refrigeration area

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Fibre Optic Cable, glass | PUR outer jacket

chainflex® CFLG.LB.PUR

Class 6.5.3.1

Basic requirements	low	1	2	3	4	5	6	7	highest
Travel distance	unsupported	1	2	3	4	5	6		≥ 400m
Oil resistance	none	1	2	3	4				highest
Torsion	none	1	2	3	4				±360°

Image exemplary

Part No.	Number of fibres/ fibre diameter/conductor nominal cross section	Outer diameter (d) max. [mm]	Weight [kg/km]	Shop and prices online
CFLG.2LB.PUR.62.5/125	2x62.5/125	8.5	62	CF-E-0003
CFLG.4LB.PUR.62.5/125	4x62.5/125	9.0	68	
CFLG.6LB.PUR.62.5/125	6x62.5/125	11.0	96	
CFLG.12LB.PUR.62.5/125	12x62.5/125	14.0	150	
CFLG.6LB.PUR.50/125	6x50/125	11.0	95	
CFLG.12LB.PUR.50/125	12x50/125	14.0	160	
CFLG.6LB.PUR.9/125	6x9/125	11.0	95	

www.igus.eu/CFLGLBPUR

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.

Part No.	Bandwidth [MHz x km] @ 850nm	Attenuation [dB/km] @ 850nm	Bandwidth [MHz x km] @ 1,300nm	Attenuation [dB/km] @ 1,300nm	Fibre identification
CFLG.2LB.PUR.62.5/125	≥ 200	≤ 3.5	≥ 500	≤ 1.5	orange with black numbers
CFLG.4LB.PUR.62.5/125	≥ 200	≤ 3.5	≥ 500	≤ 1.5	orange with black numbers
CFLG.6LB.PUR.62.5/125	≥ 200	≤ 3.5	≥ 500	≤ 1.5	orange with black numbers
CFLG.12LB.PUR.62.5/125	≥ 200	≤ 3.5	≥ 500	≤ 1.5	orange with black numbers
CFLG.6LB.PUR.50/125	≥ 1,500	≤ 3.5	≥ 500	≤ 1.5	blue with black numbers
CFLG.12LB.PUR.50/125	≥ 1,500	≤ 3.5	≥ 500	≤ 1.5	blue with black numbers

Part No.	Attenuation [dB/km] @ 1,310nm	Chromatic dispersion [ps/nm/km] @ 1,310nm	Attenuation [dB/km] @ 1,550nm	Chromatic dispersion [ps/nm/km] @ 1,550nm	Fibre identification
CFLG.6LB.PUR.9/125	≤ 0.5	≤ 3.5	≤ 0.5	≤ 18	yellow with black numbers

Order example: CFLG.4LB.PUR.62.5/125 **- to your required length (0.5m steps)**
CFLG.LB.PUR **chainflex® series** .4 **Number of fibres** .62.5/125 **Fibre diameter**

Order online ▶ www.igus.eu/CFLGLBPUR

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

chainflex CASE

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4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Fibre Optic Cable, glass | TPE outer jacket

chainflex® CFLG.LB

New

Image exemplary

10 million Double strokes guaranteed

5 x d Bend radius, e-chain®

100m Travel distance, e-chain®

- Glass-fibre cable for heaviest duty applications
- TPE outer jacket
- Metal-free
- Oil and bio-oil-resistant
- Low-temperature-flexible
- PVC and halogen-free
- UV-resistant

Dynamic information

Bend radius	**e-chain® linear**	minimum 5 x d
	flexible	minimum 4 x d
	fixed	minimum 3 x d
Temperature	**e-chain® linear**	-35°C up to +80°C
	flexible	-50°C up to +80°C (following DIN EN 60811-504)
	fixed	-55°C up to +80°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	6m/s
a max.		20m/s²
Travel distance		Unsupported travels and up to 100m for gliding applications, Class 5 **CFLG.12.LB:** Unsupported travels and up to 400m for gliding applications, Class 6

Cable structure

Fibre Optic Cable	50/125µm, 62.5/125µm, 9/125µm especially bending-resistant solid glass fibre optic cores, with aramid strain relief elements.
Core structure	FOC cores wound with a short pitch length with high-tensile aramid dampers.
Core identification	Orange or blue with black numbers.
Overall shield	Extremely bending-resistant aramid braid for torsion protection.
Outer jacket	Low-adhesion, extremely abrasion-resistant and highly flexible TPE mixture, adapted to suit the requirements in e-chains®. Colour: jet black (similar to RAL 9005)

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 7.5.4.1

Load	low	1	2	3	4	5	6	7 highest
Travel distance	unsupported	1	2	3	4	5	6	≥ 400m
Oil resistance	none	1	2	3	4	highest		
Torsion	none	1	2	3	4	±360°		

Properties and approvals

UV resistance	High
Oil resistance	Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF9.15.07 - tested by IPA according to standard DIN EN ISO 14644-1
Dry cleanroom	Tested in "dry cleanroom" according to DIN EN ISO 14644-1
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	7.5 million	10 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
-35/-25	7.5	8.5	9.5
-25/+70	5	6	7
+70/+80	7.5	8.5	9.5

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For heaviest duty applications with 5-7.5 x d, Class 7
- Unsupported travels and up to 100m for gliding applications (horizontal + vertical), Class 5, **CFLG.12LB:** Unsupported travels and up to 400m in gliding applications (horizontal + vertical), Class 6
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- No torsion, Class 1
- Maximum EMC protection, with high transmission qualities
- Indoor and outdoor applications
- Crane applications, conveyor technology, storage and retrieval units, processing/ packaging machines, fast handling, semiconductor assembly, refrigeration area

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

New

Fibre Optic Cable, glass | TPE outer jacket

chainflex® CFLG.LB

Basic requirements
Travel distance
Oil resistance
Torsion

low 1 2 3 4 5 6 7 highest
unsupported 1 2 3 4 5 6 ≥ 400m
none 1 2 3 4 highest
none 1 2 3 4 ±360°

Class 7.5.4.1

Image exemplary

	Part No.	Number of fibres/ fibre diameter/conductor nominal cross section	Outer diameter (d) max. [mm]	Weight [kg/km]	Shop and prices online
	CFLG.2LB.62.5/125	2x62.5/125	8.5	57	
	CFLG.4LB.62.5/125	4x62.5/125	9.0	68	
	CFLG.6LB.62.5/125	6x62.5/125	11.0	91	
	CFLG.12LB.62.5/125	12x62.5/125	14.0	150	
	CFLG.2LB.50/125	2x50/125	8.5	54	
	CFLG.4LB.50/125	4x50/125	9.0	64	
	CFLG.6LB.50/125	6x50/125	11.0	86	
	CFLG.12LB.50/125	12x50/125	14.0	150	
New	CFLG.2LB.9/125	2x9/125	8.5	57	
New	CFLG.4LB.9/125	4x9/125	9.0	68	
New	CFLG.12LB.9/125	12x9/125	15	125	

CF-E.0004

www.igus.eu/CFLGLB

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.

Part No.	Bandwidth [MHz x km] @ 850nm	Attenuation [dB/km] @ 850nm	Bandwidth [MHz x km] @ 1,300nm	Attenuation [dB/km] @ 1,300nm	Fibre identification
CFLG.2LB.62.5/125	≥ 200	≤ 3.5	≥ 500	≤ 1.5	orange with black numbers
CFLG.4LB.62.5/125	≥ 200	≤ 3.5	≥ 500	≤ 1.5	orange with black numbers
CFLG.6LB.62.5/125	≥ 200	≤ 3.5	≥ 500	≤ 1.5	orange with black numbers
CFLG.12LB.62.5/125	≥ 200	≤ 3.5	≥ 500	≤ 1.5	orange with black numbers
CFLG.2LB.50/125	≥ 1,500	≤ 3.5	≥ 500	≤ 1.5	blue with black numbers
CFLG.4LB.50/125	≥ 1,500	≤ 3.5	≥ 500	≤ 1.5	blue with black numbers
CFLG.6LB.50/125	≥ 1,500	≤ 3.5	≥ 500	≤ 1.5	blue with black numbers
CFLG.12LB.50/125	≥ 1,500	≤ 3.5	≥ 500	≤ 1.5	blue with black numbers

	Part No.	Attenuation [dB/km] @ 1,310nm	Chromatic dispersion [ps/nm/km] @ 1,310nm	Attenuation [dB/km] @ 1,550nm	Chromatic dispersion [ps/nm/km] @ 1,550nm	Fibre identification
New	CFLG.2LB.9/125	≤ 0.5	3.5	≤ 0.5	18	yellow with black numbers
New	CFLG.4LB.9/125	≤ 0.5	3.5	≤ 0.5	18	yellow with black numbers
New	CFLG.12LB.9/125	≤ 0.5	3.5	≤ 0.5	18	yellow with black numbers

Cables available in the chainflex® CASE

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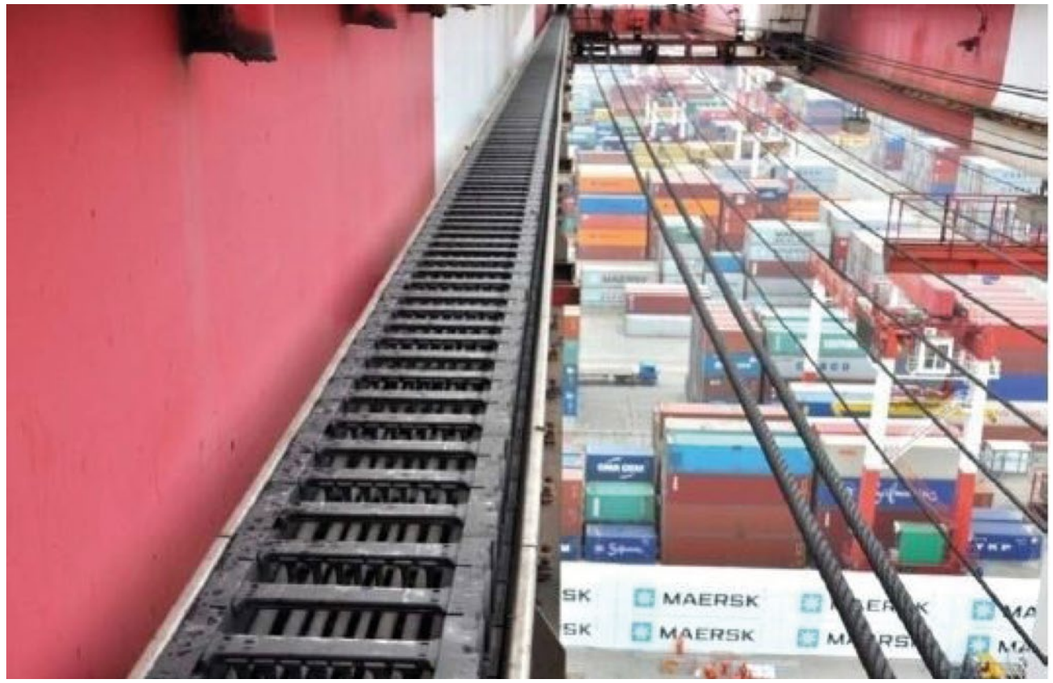
More on this online: www.igus.eu/cf-case

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Order example: CFLG.4LB.62.5/125 - to your required length (0.5m steps)
CFLG.LB chainflex® series .4 Number of fibres .62.5/125 Fibre diameter

Order online ▶ www.igus.eu/CFLGLB

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.



chainflex® fibre optic cable on an STS crane

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Fibre Optic Cable, glass | TPE outer jacket

chainflex® CFLG.G

Image exemplary

10 million Double strokes guaranteed

10 x d Bend radius, e-chain®

50m Travel distance, e-chain®

- Glass-fibre cable for heaviest duty applications
- TPE outer jacket
- Oil and bio-oil-resistant
- PVC and halogen-free
- Low-temperature-flexible
- Hydrolysis and microbe-resistant

Dynamic information

Bend radius	**e-chain® linear**	minimum 10 x d
	flexible	minimum 8 x d
	fixed	minimum 5 x d
Temperature	**e-chain® linear**	-40°C up to +80°C
	flexible	-50°C up to +80°C (following DIN EN 60811-504)
	fixed	-55°C up to +80°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	6m/s
a max.		20m/s²
Travel distance		Unsupported travels and up to 50m for gliding applications, Class 4

Cable structure

Fibre Optic Cable 9/125 µm, 50/125 µm, 62.5/125 µm fibres in gel-filled tubes.

Core structure Gel-filled fibre sheath surrounded by GRP rods and torsion protection braid in the outer jacket.

Core identification Fibres

▶ Product range table

Outer jacket Low-adhesion, extremely abrasion-resistant and highly flexible TPE mixture, adapted to suit the requirements in e-chains®.
Colour: jet black (similar to RAL 9005)

Class 7.4.4.1

Basic requirements	low	1	2	3	4	5	6	7 highest
Travel distance	unsupported	1	2	3	4	5	6	≥ 400m
Oil resistance	none	1	2	3	4	highest		
Torsion	none	1	2	3	4	±360°		

Properties and approvals

UV resistance	High
Oil resistance	Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF9.15.07 - tested by IPA according to standard DIN EN ISO 14644-1
Dry cleanroom	Tested in "dry cleanroom" according to DIN EN ISO 14644-1
CE	Following 2014/35/EU
Info	For hanging applications, please use cables of the series CFLG.LB - see page 186!

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	7.5 million	10 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
-40/-30	12.5	13.5	14.5
-30/+70	10	11	12
+70/+80	12.5	13.5	14.5

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For heavy-duty applications, Class 7
- Unsupported travels and up to 50m for gliding applications (horizontal), Class 4
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- No torsion, Class 1
- Maximum EMC protection, with high transmission qualities
- Indoor and outdoor applications
- Crane applications, conveyor technology, low temperature applications

Fibre Optic Cable, glass | TPE outer jacket

chainflex® CFLG.G

Basic requirements	low	1	2	3	4	5	6	7 highest
Travel distance	unsupported	1	2	3	4	5	6	≥ 400m
Oil resistance	none	1	2	3	4	highest		
Torsion	none	1	2	3	4	±360°		

Class 7.4.4.1

Image exemplary

Part No.	Number of fibres/ fibre diameter/conductor nominal cross section	Outer diameter (d) max. [mm]	Weight [kg/km]	Shop and prices online
CFLG.6G.62.5/125.TC	6x62.5/125	10.0	80	CF-E-0005 www.igus.eu/CFLGG
CFLG.12G.62.5/125.TC	12x62.5/125	10.0	80	
CFLG.6G.50/125.TC	6x50/125	10.0	60	
CFLG.12G.50/125.TC	12x50/125	10.0	75	
CFLG.12E.9/125.TC	12x9/125	10.0	75	

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.

Part No.	Bandwidth [MHz x km] @ 850nm	Attenuation [dB/km] @ 850nm	Bandwidth [MHz x km] @ 1,300nm	Attenuation [dB/km] @ 1,300nm
CFLG.6G.62.5/125.TC	≥ 200	≤ 3.5	≥ 500	≤ 1.0
CFLG.12G.62.5/125.TC	≥ 200	≤ 3.5	≥ 500	≤ 1.0
CFLG.6G.50/125.TC	≥ 1,500	≤ 3.5	≥ 500	≤ 1.0
CFLG.12G.50/125.TC	≥ 1,500	≤ 3.5	≥ 500	≤ 1.0

Part No.	Attenuation [dB/km] @ 1,310nm	Chromatic dispersion [ps/nm/km] @ 1,310nm	Attenuation [dB/km] @ 1,550nm	Chromatic dispersion [ps/nm/km] @ 1,550nm
CFLG.12E.9/125.TC	≤ 0.5	≤ 3.5	≤ 0.5	≤ 18

Part No.	Fibre identification	Hollow core identification
CFLG.6G.62.5/125.TC	ecru, yellow, green, red, violet, blue	orange
CFLG.12G.62.5/125.TC	ecru, yellow, green, red, violet, blue, turquoise, grey, brown, black, orange, pink	orange
CFLG.6G.50/125.TC	ecru, yellow, green, red, violet, blue	blue
CFLG.12G.50/125.TC	ecru, yellow, green, red, violet, blue, turquoise, grey, brown, black, orange, pink	blue
CFLG.12E.9/125.TC	ecru, yellow, green, red, violet, blue, turquoise, grey, brown, black, orange, pink	yellow

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case

Order example: CFLG.6G.62.5/125.TC **- to your required length (0.5m steps)**
CFLG.G **chainflex® series** .6G **Number of fibres** .62.5/125 **Fibre diameter** .TC **Special marking**

Order online ▶ www.igus.eu/CFLGG

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

cost down...

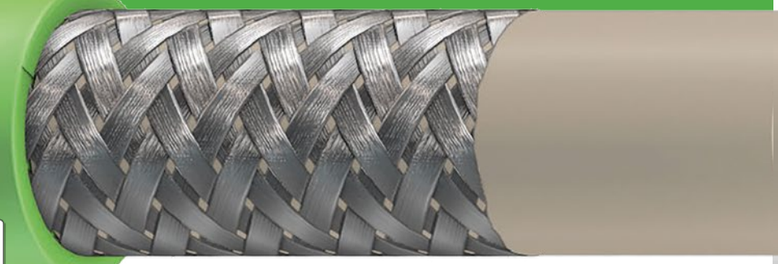
...life up

Reduce cost, improve technology, now!
Do the chainflex® price check ...
www.igus.eu/cf-price-check

... for example: Reduce bend radius with CFLG.LB ...

chainflex® fibre optic cable in a sea lock

Measuring system cables



Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

Measuring system cables for energy chains

Specially designed for use in e-chains®. Electrical design suitable for 24 manufacturer standards. Bend radii up to 6.8 x d, available in four jacket materials. Tested with a chainflex® guarantee of up to 4 years.

- Electrical design according to manufacturer standards for bend radius up to 6.8xd
- Always find the most cost-effective measuring system cable made from various jacket materials that is guaranteed to work.
- Developed, tested and optimised for longest life in e-chains®
- Sustainability thanks to a longer service life is practical resource protection, enhancing economic efficiency and protecting the environment.
- Calculate the exact service life online: igus.eu/chainflexlife

Background

Suitable for drive systems from numerous manufacturers

Structural differences by manufacturer
There are various measuring system manufacturers on the market. The electrically identical design elements also highlight the differences among the manufacturers. Core cross-section combinations, conductor identifications and element shields vary widely from manufacturer to manufacturer. At igus®, we match the important elements such as the outer jacket, shield, inner jacket and much more to the movement in the energy chain. This allows us to optimise durability.

DriveCliq - the Siemens standard
DriveCliq is a digital encoder interface from Siemens. The standard has become publicly available and can be used by other manufacturers. Unlike rotary encoders commonly used in earlier generations, this encoder system is equipped with a CAT5 Ethernet element and two thick supply cores. Connection is usually with a connector solution by Yamaichi that, much like an RJ 45 connector, carries data, but has power contacts to the right and left of the notch. This pin arrangement is also in an IP20 housing for the control cabinet or an IP65 housing for the field. An M12 solution has established itself among the connectors because it is more robust and compact and eliminates the need for an expensive connection coupling.

Benefits
- For high dynamics
- Suitable for 24 drive manufacturers
- Jacket materials: PVC, PUR, TPE
- Tested with a 4-year guarantee

Typical application areas
- Storage and retrieval units, machining units/packaging machines
- Handling, indoor cranes, wood/stone processing
- Machine tools

Design

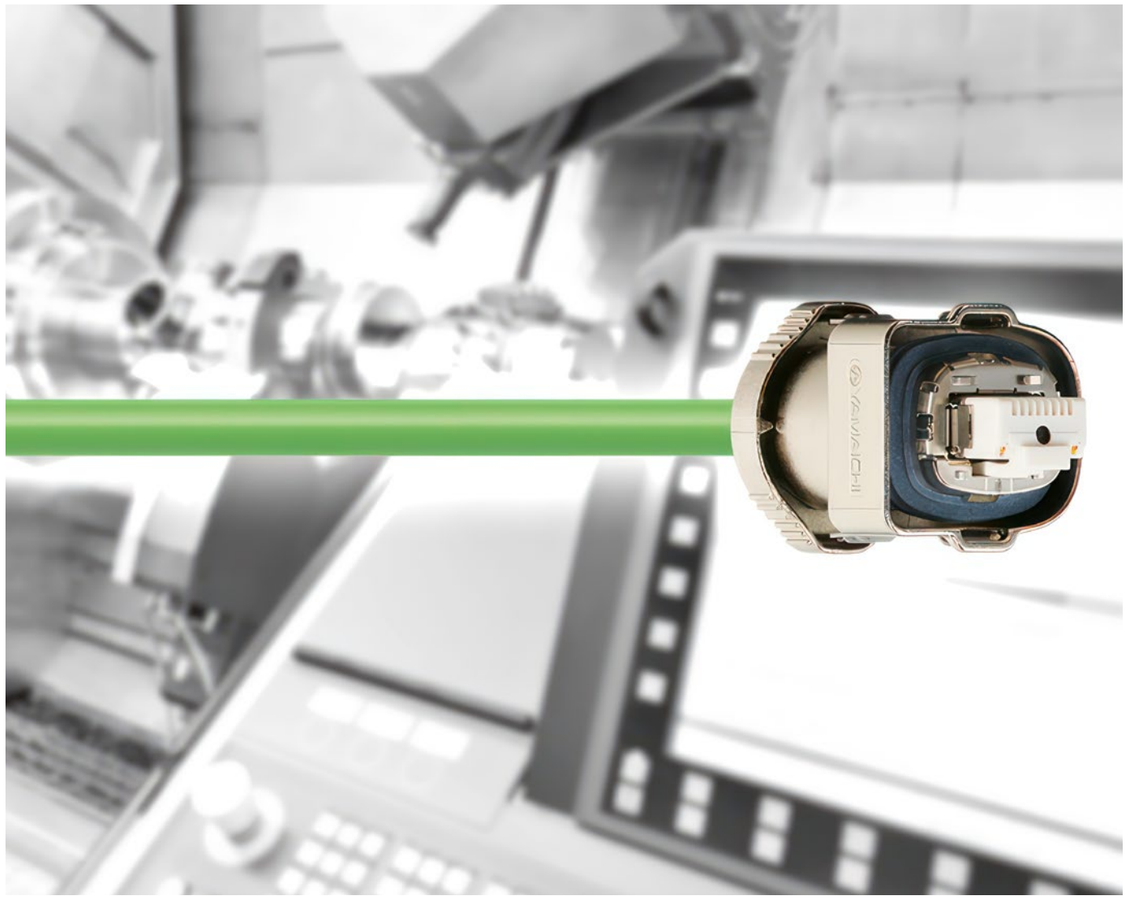
1. Stranded elements with optimised pitch length and pitch direction
2. Gusset-filling extruded inner jacket supports bundles
3. Tensile stress-resistant centre element
4. Pair braided shield
5. Overall shield with optimised braiding angle
6. Pressure extruded outer jacket

DriveCliq - the machine tool standard
Several years ago, there was a widespread move away from conventional analogue encoder systems to DriveCliq technology, which was new at the time. We were able to support major customers such as WALDRICH (based in Coburg) in this move.

Challenges arose for the new connector technology in conjunction with long cable lengths. We developed an extremely robust M23 circular signal connector together, which significantly improved processability and data transmission compared to the original solution.

So if you are also looking for a solution that is not available in the catalogue today, come to us and we promise to take a close look at your application.

Inner jacket - why it is important for long travels and small radii
Our inner jacket, located between the core structure and the shielding, gives us a unique design detail for our high-end cables. It protects and guides sensitive cores and supports the shield. Both of these functions are extremely important both in long travels and small bend radii, which is just where the cable is subjected to the most extreme forces.



Selection table

chainflex® measuring system cables

Mechanical parameters

chainflex® cables	Jacket	Shield	Bend radius e-chain® min. [xd]	Temperature e-chain® from/to [°C]	v max. [m/s] unsupported	v max. [m/s] gliding	a max. [m/s²]	Travel distance [m]	Page
CF884	PVC	●	15	+5/+70	3	-	20	≤ 10	200
CF211 New	PVC	●	10	+5/+70	5	3	30	≤ 10	204
CF894	iguPUR	●	15	-20/+80	3	-	20	≤ 10	210
CF111.D New	PUR	●	10	-25/+80	5	3	30	≤ 10	214
CF113.D	PUR	●	7.5	-25/+80	10	5	50	≤ 100	220
CF11.D	TPE	●	6.8	-35/+90	10	6	100	≤ 400	226

Approvals/resistance

chainflex® cables	Approvals and standards																	Page
CF884			●				●			●			●	●				●	200
CF211 New	●		●				●			●			●	●	●			●	204
CF894	●		●				●			●			●	●				●	210
CF111.D New	●		●				●			●		●	●	●	●		●	●	214
CF113.D	●		●				●			●		●	●	●	●		●	●	220
CF11.D	●		●					●					●	●	●	●	●	●	226

Guaranteed service life

chainflex® cables	Temperature, from/to [°C]	Min. bend radius [xd] for travel distance < 10m	Min. bend radius [xd] for travel distance ≥ 10m	Min. bend radius [xd] for travel distance < 10m	Min. bend radius [xd] for travel distance ≥ 10m	Min. bend radius [xd] for travel distance < 10m	Min. bend radius [xd] for travel distance ≥ 10m	Page
		5 million (1 million) double strokes *		7.5 million (3 million) double strokes *		10 million (5 million) double strokes *		
CF884	+5 / +15	17.5		18.5		19.5		
	+15 / +60	15		16		17		200
	+60 / +70	17.5		18.5		19.5		
CF211 New	+5 / +15	12.5		13.5		14.5		
	+15 / +60	10		11		12		204
	+60 / +70	12.5		13.5		14.5		
CF894	-20 / -10	17.5		18.5		19.5		
	-10 / +70	15		16		17		210
	+70 / +80	17.5		18.5		19.5		
CF111.D New	-25 / -15	12.5		13.5		14.5		
	-15 / +70	10		11		12		214
	+70 / +80	12.5		13.5		14.5		
CF113.D	-25 / -15	10		11		12		
	-15 / +70	7.5		8.5		9.5		220
	+70 / +80	10		11		12		
		5 million		7.5 million		12.5 million		
CF11.D	-35 / -25	8.5	10	9.5	11	10.5	12	
	-25 / +80	6.8	7.5	7.5	8.5	8.5	9.5	226
	+80 / +90	7.5	10	9.5	11	10.5	12	

* Higher number of double strokes? Calculate service life online ▶ www.igus.eu/chainflexlife
Figures in brackets refer to series CF884 and CF894

chainflex® measuring system cables

Drive technology system		chainflex® series Class Jacket Page Number of cores and conductor nominal cross section [mm²]	CF884.yyy 3.1.1.1 PVC 200	CF211.yyy 4.2.2.1 PVC 204	CF894.yyy 3.1.3.1 PUR 210	CF111.yyy.D 4.2.3.1 PUR 214	CF113.yyy.D 6.5.3.1 PUR 220	CF11.yyy.D 6.6.4.1 TPE 226
Allen Bradley	CFxxx.040.D	(3x(4x0.14)+(2x0.14+2x0.34)+2x1.5)C				●	●	
B&R	CFxxx.024.D	((4x0.14)+2x(2x0.34))C		●		●		
	CFxxx.027.D	(5x(2x0.14)+2x0.5)C		●		●	●	●
Baumüller	CFxxx.027.D	(5x(2x0.14)+2x0.5)C		●		●	●	●
Beckhoff	CFxxx.007.D	(4x0.34)C		●			●	●
Berger Lahr	CFxxx.011.D	(4x(2x0.34)+4x0.5)C	●	●	●	●	●	●
Control	CFxxx.001.D	(3x(2x0.14)C+(4x0.14)+(2x0.5))C	●	●	●	●	●	●
Techniques	CFxxx.011.D	(4x(2x0.34)+4x0.5)C	●	●	●	●	●	●
	CFxxx.026.D	(6x(2x0.25)+(2x0.34)C+2x0.5)C				●		
ELAU	CFxxx.009.D	(4x(2x0.25)+2x0.5)C	●	●	●	●	●	●
Fagor	CFxxx.002.D	(3x(2x0.14)C+2x(0.5)C)C		●		●	●	●
	CFxxx.004.D	(2x(2x2x0.14)+(4x0.14)C+(4x0.5))C		●		●	●	●
	CFxxx.015.D	(4x(2x0.14)+4x0.5)C	●	●	●	●	●	●
FANUC	CFxxx.021.D	((4x0.25)+3x(2x0.25+2x0.5))C				●		●
	CFxxx.022.D	((2x0.25)+5x0.5)C	●	●	●	●	●	●
	CFxxx.041.D	(2x(2x0.18)+5x0.5)C		●		●		
	CFxxx.042.D	(3x(2x0.18)+6x0.5)C		●		●		
Festo	CFxxx.002.D	(3x(2x0.14)C+2x(0.5)C)C		●		●	●	●
Harmonic Drive	CFxxx.014.D	(4x(2x0.25)C+(2x0.5))C		●		●	●	●
Heidenhain	CFxxx.002.D	(3x(2x0.14)C+2x(0.5)C)C		●		●	●	●
	CFxxx.004.D	(2x(2x2x0.14)+(4x0.14)C+(4x0.5))C		●		●	●	●
	CFxxx.005.D	(4x(2x0.14)+4x0.5)C					●	●
	CFxxx.015.D	(4x(2x0.14)+4x0.5)C	●	●	●	●	●	●
	CFxxx.017.D	(4x(2x0.14)+(4x0.14)C+4x1.0)C		●			●	●
	CFxxx.025.D	(3x(2x0.14)C+(2x0.5)C)C					●	●
Hengstler	CFxxx.009.D	(4x(2x0.25)+2x0.5)C	●	●	●	●	●	●
Jetter	CFxxx.025.D	(3x(2x0.14)C+(2x0.5)C)C					●	●
Lenze	CFxxx.002.D	(3x(2x0.14)C+2x(0.5)C)C		●		●	●	●
	CFxxx.010.D	(4x(2x0.25)+2x1.0)C		●		●	●	●
	CFxxx.025.D	(3x(2x0.14)C+(2x0.5)C)C					●	●
	CFxxx.032.D	3x(2x0.14)C+(3x0.14)C		●		●	●	●
	CFxxx.033.D	4x(2x0.14)C+2x(1.0)C		●			●	●
LTi DRiVES	CFxxx.004.D	(2x(2x2x0.14)+(4x0.14)C+(4x0.5))C		●		●	●	●
	CFxxx.009.D	(4x(2x0.25)+2x0.5)C	●	●	●	●	●	●
	CFxxx.010.D	(4x(2x0.25)+2x1.0)C		●	●		●	●
NUM	CFxxx.001.D	(3x(2x0.14)C+(4x0.14)+(2x0.5))C	●	●	●	●	●	●
Omron	CFxxx.008.D	(3x(2x0.25))C					●	●
	CFxxx.009.D	(4x(2x0.25)+2x0.5)C	●	●	●	●	●	●
	CFxxx.010.D	(4x(2x0.25)+2x1.0)C		●		●	●	●
	CFxxx.018.D	(2x(2x0.25)+2x0.5)C		●			●	●

Drive technology system		chainflex® series Class Jacket Page Number of cores and conductor nominal cross section [mm²]	CF884.yyy 3.1.1.1 PVC 200	CF211.yyy 4.2.2.1 PVC 204	CF894.yyy 3.1.3.1 PUR 210	CF111.yyy.D 4.2.3.1 PUR 214	CF113.yyy.D 6.5.3.1 PUR 220	CF11.yyy.D 6.6.4.1 TPE 226
Rexroth	CFxxx.009.D	(4x(2x0.25)+2x0.5)C	●	●	●	●	●	●
	CFxxx.010.D	(4x(2x0.25)+2x1.0)C		●		●	●	●
	CFxxx.017.D	(4x(2x0.14)+(4x0.14)C+4x1.0)C		●			●	●
	CFxxx.018.D	(2x(2x0.25)+2x0.5)C		●			●	●
	CFxxx.019.D	(3x(2x0.25)C+(3x0.25)+2x1.0)C		●			●	●
Schneider Electric	CFxxx.009.D	(4x(2x0.25)+2x0.5)C	●	●	●	●	●	●
	CFxxx.038.D	(3x(2x0.14)+(2x0.34))C		●			●	●
SEW	CFxxx.008.D	(3x(2x0.25))C					●	●
	CFxxx.036.D	(5x(2x0.25))C		●			●	
	CFxxx.037.D	(6x(2x0.25))C		●			●	
Siemens	CFxxx.001.D	(3x(2x0.14)C+(4x0.14)+(2x0.5))C	●	●	●	●	●	●
	CFxxx.002.D	(3x(2x0.14)C+2x(0.5)C)C		●		●	●	●
	CFxxx.006.D	(3x(2x0.14)C+2x0.5+4x0.14+4x0.23)C	●	●	●	●	●	●
	CFxxx.011.D	(4x(2x0.34)+4x0.5)C	●	●	●	●	●	●
	CFxxx.023.D	(2x(2x0.25)+(2x0.34))C		●		●		
	CFxxx.028.D	(2x(2x0.15)+(2x0.38))C	●	●	●	●	●	●
	CFxxx.030.D	(3x(2x0.25)C+2x(2x0.25))C		●				
Stöber	CFxxx.008.D	(3x(2x0.25))C					●	●
	CFxxx.009.D	(4x(2x0.25)+2x0.5)C	●	●	●	●	●	●
	CFxxx.011.D	(4x(2x0.34)+4x0.5)C	●	●	●	●	●	●
	CFxxx.016.D	(3x(2x0.25)C)C		●			●	
	CFxxx.021.D	(3x(2x0.5+2x0.25)+(4x0.25))C				●		●
further chainflex® cables	CFxxx.003.D	(3x(2x0.14)+2x1.0)C					●	●
	CFxxx.012.D	(3x(2x0.14)C+(3x0.14)C+(4x0.14)+(2x0.14+2x0.5))C						●
	CFxxx.013.D	(3x(2x0.14)C+2x0.5)C					●	●
	CFxxx.020.D	(3x(2x0.14)+2x(4x0.14)+(2x0.5))C				●		
	CFxxx.029.D	(5x(2x0.25)C+(2x0.25+2x0.5))C					●	
	CFxxx.031.D	(2x(2x0.25)C+2x1.0)C					●	●
	CFxxx.039.D	(4x(2x0.14)C+2x(0.5)C)C		●				

Measuring system cable | PVC outer jacket

chainflex® CF884

Image exemplary

5,000,000 Double strokes guaranteed

15 x d Bend radius, e-chain®

10m Travel distance, e-chain®

- For flexing applications
- PVC outer jacket
- Shielded
- Flame-retardant

Dynamic information

Bend radius	**e-chain® linear**	minimum 15 x d
	flexible	minimum 12 x d
	fixed	minimum 8 x d
Temperature	**e-chain® linear**	+5°C up to +70°C
	flexible	-5°C up to +70°C (following DIN EN 60811-504)
	fixed	-15°C up to +70°C (following DIN EN 50305)
v max.	**unsupported**	3m/s
a max.		20m/s²
Travel distance		Unsupported travels up to 10m, Class 1

Cable structure

Conductor	Conductor consisting of bare copper wires (according to DIN EN 60228).
Core insulation	Mechanically high-quality TPE mixture.
Core structure	According to measuring system specification.
Core identification	According to measuring system specification. ▶ Product range table
Element shield	Foil taping of optimised, bending-resistant foil shield. Coverage approx. 100% optical
Overall shield	Braiding made of tinned copper wires. Coverage approx. 60% optical
Outer jacket	Low-adhesion PVC mixture, adapted to suit the requirements in e-chains®. Colour: Yellow-green (similar to RAL 6018)

Electrical information

Nominal voltage	50V 30V (following UL)
Testing voltage	500V

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 3.1.1.1

Basic requirements	low	1	2	**3**	4	5	6	7	highest
Travel distance	unsupported	**1**	2	3	4	5	6		≥ 400m
Oil resistance	none	**1**	2	3	4				highest
Torsion	none	**1**	2	3	4				±360°

Properties and approvals

Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶www.igus.eu/CF884
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	1 million	3 million	5 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
+5/+15	17.5	18.5	19.5
+15/+60	15	16	17
+60/+70	17.5	18.5	19.5

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For flexing applications, Class 3
- Especially for unsupported travels, Class 1
- Without influence of oil, Class 1
- No torsion, Class 1
- Preferably indoor applications
- Wood/stone processing, packaging industry, feeding, handling, adjusting devices

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Measuring system cable | PVC outer jacket

chainflex® CF884

Basic requirements
Travel distance
Oil resistance
Torsion

low 1 2 **3** 4 5 6 7 highest
unsupported **1** 2 3 4 5 6 ≥ 400m
none **1** 2 3 4 highest
none **1** 2 3 4 ±360°

Class 3.1.1.1

Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CF884.001	(3x(2x0.14)C+(4x0.14)+(2x0.5))C	8.5	41	91
CF884.006	(3x(2x0.14)C+(4x0.14)+(4x0.22)+(2x0.5))C	9.0	50	101
CF884.009	(4x(2x0.25)+2x0.5)C	8.0	44	91
CF884.011	(4x(2x0.34)+4x0.5)C	9.5	64	117
CF884.015	(4x(2x0.14)+4x0.5)C	8.5	44	92
CF884.022	((2x0.25)+5x0.5)C	8.0	44	79
CF884.028	(2x(2x0.15)+(2x0.38))C	7.5	41	58

Shop and prices online

CF-F-0001

www.igus.eu/CF884

Part No.	Core group	Colour code
CF884.001	3x(2x0.14)C	green/yellow, black/brown, red/orange
	(4x0.14)	grey, blue, white-yellow, white-black
	(2x0.5)	brown-red, brown-blue
CF884.006	3x(2x0.14)C	green/yellow, black/brown, red/orange
	(4x0.14)	grey, blue, white-yellow, white-black
	(4x0.22)	brown-yellow/brown-grey/green-black/green-red
	(2x0.5)	brown-red, brown-blue
CF884.009	4x(2x0.25)	brown/green, blue/violet, grey/pink, red/black
	2x0.5	white, brown
CF884.011	4x(2x0.34)	black/brown, red/orange, yellow/green, blue/violet
	4x0.5	blue-white, black-white, red-white, yellow-white
CF884.015	4x(2x0.14)	brown/green, yellow/violet, grey/pink, red/black
	4x0.5	blue, white, brown-green, white-green
CF884.022	(2x0.25)	white, brown
	5x0.5	green, yellow, grey, pink, blue
CF884.028	2x(2x0.15)	green/yellow, pink/blue
	(2x0.38)	red/black

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

chainflex CASE

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case

cost down...
...life up

Reduce cost, improve technology, now!

Do the chainflex® price check ...
www.igus.eu/cf-price-check

... for example: Reduce bend radius with CF113.D ...

Order example: CF884.015 - to your required length (0.5m steps)
CF884 **chainflex® series** .015 **Code measuring system type**

Order online ▶ www.igus.eu/CF884

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

Measuring system cable | PVC outer jacket

chainflex® CF211

New

Image exemplary

10 million Double strokes guaranteed

10 x d Bend radius, e-chain®

10m Travel distance, e-chain®

- For medium duty applications
- PVC outer jacket
- Shielded
- Oil-resistant
- Flame-retardant

Dynamic information

Bend radius	**e-chain® linear**	minimum 10 x d
	flexible	minimum 8 x d
	fixed	minimum 5 x d
Temperature	**e-chain® linear**	+5°C up to +70°C
	flexible	-5°C up to +70°C (following DIN EN 60811-504)
	fixed	-15°C up to +70°C (following DIN EN 50305)
v max.	**unsupported**	5m/s
	gliding	3m/s
a max.		30m/s²
Travel distance		Unsupported travels and up to 10m for gliding applications, Class 2

Cable structure

Conductor	Very finely stranded special conductors of particularly bending resistant design made of tinned copper wires.
Core insulation	Mechanically high-quality TPE mixture.
Core structure	According to measuring system specification.
Core identification	According to measuring system specification. ▶ Product range table
Element shield	Extremely bending-resistant, tinned copper cover. Coverage approx. 90% optical
Element jacket	TPE mixture on pair shielding adapted to suit the requirements in e-chains®.
Intermediate layer	Foil taping over the outer layer.
Overall shield	Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 55%, optical approx. 80%
Outer jacket	Low-adhesion, oil-resistant PVC mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-4-1). Colour: Yellow-green (similar to RAL 6018)

Electrical information

Nominal voltage	50V 300V (following UL)
Testing voltage	500V

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 4.2.2.1

Basic requirements	low	1	2	3	**4**	5	6	7	highest
Travel distance	unsupported	1	**2**	3	4	5	6	≥ 400m
Oil resistance	none	1	**2**	3	4	highest		
Torsion	none	**1**	2	3	4	±360°		

Properties and approvals

Oil resistance	Oil-resistant (following DIN EN 50363-4-1), Class 2
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF211
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 2. The outer jacket material of this series complies with CF5.10.07 - tested by IPA according to standard DIN EN ISO 14644-1
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	7.5 million	10 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
+5/+15	12.5	13.5	14.5
+15/+60	10	11	12
+60/+70	12.5	13.5	14.5

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For medium duty applications, Class 4
- Unsupported travels and up to 10m for gliding applications, Class 2
- Light oil influence, Class 2
- No torsion, Class 1
- Preferably indoor applications, but also outdoor ones at temperatures > 5 °C
- Storage and retrieval units, machining units/packaging machines, handling, indoor cranes, wood/stone processing

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Measuring system cable | PVC outer jacket

chainflex® CF211

New

Class 4.2.2.1

Basic requirements	low	1	2	3	**4**	5	6	7 highest
Travel distance	unsupported	1	**2**	3	4	5	6	≥ 400m
Oil resistance	none	1	**2**	3	4	highest		
Torsion	none	**1**	2	3	4	±360°		

Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CF211.001	(3x(2x0.14)C+(4x0.14)+(2x0.5))C	9.0	64	100
CF211.002	(3x(2x0.14)C+2x(0.5)C)C	9.5	66	106
CF211.004	(2x(2x(2x0.14))+(4x0.14)C +(4x0.5))C	10.0	70	115
CF211.006	(3x(2x0.14)C+(4x0.14)+(4x0.25) +(2x0.5))C	10.0	76	122
New **CF211.007**	(4x0.34)C	5.5	25	45
CF211.009	(4x(2x0.25)+2x0.5)C	8.0	49	79
CF211.010	(4x(2x0.25)+2x1.0)C	8.5	61	92
CF211.011	(4x(2x0.34)+4x0.5)C	9.5	72	109
CF211.014	(4x(2x0.25)C+(2x0.5))C	10.5	77	124
CF211.015	(4x(2x0.14)+4x0.5)C	8.5	54	86
CF211.016	(3x(2x0.25)C)C	9.0	51	89
CF211.017	(4x(2x0.14)+(4x0.14)C+4x1.0)C	10.0	92	134
CF211.018	(2x(2x0.25)+2x0.5)C	6.5	34	54
CF211.019	(3x(2x0.25)C+(3x0.25)+2x1.0)C	10.0	86	125
CF211.022	((2x0.25)+5x0.5)C	7.0	46	71
New **CF211.023**	(2x(2x0.25)+(2x0.34))C	7.0	39	60
CF211.024	((4x0.14)+2x(2x0.34))C	7.0	36	61
CF211.027	(5x(2x0.14)+2x0.5)C	8.0	45	75

Shop and prices online

CF-F-0002

www.igus.eu/CF211

Part No.	Core group	Colour code
CF211.001	3x(2x0.14)C	green/yellow, black/brown, red/orange
	(4x0.14)	grey/blue/white-yellow/white-black
	(2x0.5)	brown-red, brown-blue
CF211.002	3x(2x0.14)C	green/yellow, black/brown, red/orange
	2x(0.5)C	black, red
CF211.004	2x(2x(2x0.14))	(brown/green)/(yellow/violet), (grey/pink)/(red/black)
	(4x0.14)C	yellow-black/red-black/green-black/blue-black
	(4x0.5)	brown-green/white-green/blue/white
CF211.006	3x(2x0.14)C	green/yellow, black/brown, red/orange
	(4x0.14)	grey/blue/white-yellow/white-black
	(4x0.25)	brown-yellow/brown-grey/green-black/green-red
	(2x0.5)	brown-red, brown-blue
CF211.007	4x(0.34)C	white, green, brown, yellow (star-quad)
CF211.009	4x(2x0.25)	brown/green, blue/violet, grey/pink, red/black
	2x0.5	white, brown
CF211.010	4x(2x0.25)	brown/green, blue/violet, grey/pink, red/black
	2x1.0	white, brown
CF211.011	4x(2x0.34)	black/brown, red/orange, green/yellow, blue/violet
	4x0.5	black-white, red-white, yellow-white, blue-white
CF211.014	4x(2x0.25)C	white/brown, green/yellow, grey/pink, blue/red
	(2x0.5)	black no. 1/black no. 2
CF211.015	4x(2x0.14)	brown/green, yellow/violet, grey/pink, red/black
	4x0.5	blue, white, brown-green, white-green
CF211.016	3x(2x0.25)C	white/brown, green/yellow, grey/pink
CF211.017	4x(2x0.14)	red/black, brown/green, yellow/violet, grey/pink
	(4x0.14)C	blue-black/yellow-black/red-black/green-black
	4x1.0	white-green, brown-green, blue, white
CF211.018	2x(2x0.25)	red/black, grey/pink
	2x0.5	white, brown
CF211.019	3x(2x0.25)C	brown/green, grey/pink, red/black
	(3x0.25)	blue/violet/yellow
	2x1.0	white, brown
CF211.022	(2x0.25)	white/brown
	5x0.5	green, yellow, grey, pink, blue
CF211.023	2x(2x0.25)	white/brown, green/yellow
	(2x0.34)	blue/red
CF211.024	(4x0.14)	yellow/grey/violet/pink
	2x(2x0.34)	white-green/white, brown-green/blue
CF211.027	5x(2x0.14)	brown/green, yellow/grey, white/violet, red/black, pink/blue
	2x0.5	white-green, white-red

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Further cable types ▶ Page 208

Measuring system cable | PVC outer jacket

chainflex® CF211

New

Class 4.2.2.1

Basic requirements	low	1	2	3	**4**	5	6	7	highest
Travel distance	unsupported	1	**2**	3	4	5	6		≥ 400m
Oil resistance	none	1	**2**	3	4				highest
Torsion	none	**1**	2	3	4				±360°

Image exemplary

	Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
	CF211.028	(2x(2x0.15)+(2x0.38))C	7.5	40	77
New	**CF211.030**	(3x(2x0.25)C+2x(2x0.25))C	8.5	60	87
	CF211.032 [5]	3x(2x0.14)C+(3x0.14)C	8.0	35	79
	CF211.033 [5]	4x(2x0.14)C+2x(1.0)C	9.5	64	112
	CF211.036	(5x(2x0.25))C	8.0	42	69
	CF211.037	(6x(2x0.25))C	8.5	51	83
	CF211.038	(3x(2x0.14)+(2x0.34))C	7.5	33	62
	CF211.039	(4x(2x0.14)C+2x(0.5)C)C	10.0	77	125
	CF211.041	(2x(2x0.18)+5x0.5)C	7.5	49	79
	CF211.042	(3x(2x0.18)+6x0.5)C	8.5	62	98

Shop and prices online

CF-F-0002

www.igus.eu/CF211

Part No.	Core group	Colour code
CF211.028	2x(2x0.15)	green/yellow, pink/blue
	(2x0.38)	red/black
CF211.030	3x(2x0.25)C	white/brown, green/yellow, grey/pink
	2x(2x0.25)	blue/red, black/violet
CF211.032 [5]	3x(2x0.14)C	green/black, yellow/black, red/black
	(3x0.14)C	grey/pink/black
CF211.033 [5]	4x(2x0.14)C	yellow/black, red/black, blue/black, green/black
	2x(1.0)C	white, brown
CF211.036	5x(2x0.25)	white/brown green/yellow, grey/pink, blue/red, black/violet
CF211.037	6x(2x0.25)	white/brown, green/yellow, grey/pink, blue/red, black/violet, grey-pink/red-blue
CF211.038	3x(2x0.14)	white/brown, green/yellow, grey/pink
	(2x0.34)	blue/red
CF211.039	(4x(2x0.14)C	green/yellow, grey/pink, blue/red, black/violet
	2x(0.5)C	white, brown
CF211.041	2x(2x0.18)	white/brown, black/violet
	5x0.5	blue, violet, green, yellow, grey
CF211.042	3x(2x0.18)	white/black, red/white, black/red
	6x0.5	black no. 1, black no. 2, black no. 3, red no. 4, red no. 5, red no. 6

[5] Manufactured without overall shield

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Further cable types ▶ Page 206

chainflex CASE

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

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Do the chainflex® price check ...
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… for example: reduce cost with CF884 ...

Order example: CF211.038 - to your required length (0.5m steps)
CF211 **chainflex® series** .038 **Code measuring system type**

Order online ▶ www.igus.eu/CF211

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

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igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Measuring system cable | iguPUR outer jacket

chainflex® CF894

Image exemplary

5,000,000 Double strokes guaranteed

15 x d Bend radius, e-chain®

10m Travel distance, e-chain®

- For flexing applications
- iguPUR outer jacket
- Oil-resistant
- Shielded
- Flame-retardant

Dynamic information

Bend radius	e-chain® linear	minimum 15 x d
	flexible	minimum 12 x d
	fixed	minimum 8 x d
Temperature	e-chain® linear	-20°C up to +80°C
	flexible	-40°C up to +80°C (following DIN EN 60811-504)
	fixed	-50°C up to +80°C (following DIN EN 50305)
v max.	unsupported	3m/s
a max.		20m/s²
Travel distance		Unsupported travels up to 10m, Class 1

Cable structure

Conductor	Conductor consisting of bare copper wires (according to DIN EN 60228).
Core insulation	Mechanically high-quality TPE mixture.
Core structure	According to measuring system specification.
Core identification	According to measuring system specification. ▶ Product range table
Element shield	Foil taping of optimised, bending-resistant foil shield. Coverage approx. 100% optical
Overall shield	Braiding made of tinned copper wires. Coverage approx. 60% optical
Outer jacket	Low-adhesion iguPUR mixture, adapted to suit the requirements in e-chains®. Colour: Yellow-green (similar to RAL 6018)

Electrical information

Nominal voltage	50V 30V (following UL)
Testing voltage	500V

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 3.1.3.1

Basic requirements	low	1	2	3	4	5	6	7 highest
Travel distance	unsupported	1	2	3	4	5	6	≥ 400m
Oil resistance	none	1	2	3	4	highest		
Torsion	none	1	2	3	4	±360°		

Properties and approvals

UV resistance	Medium
Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF894
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	1 million	3 million	5 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
-20/-10	17.5	18.5	19.5
-10/+70	15	16	17
+70/+80	17.5	18.5	19.5

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For flexing applications, Class 3
- Especially for unsupported travels, Class 1
- With influence of oil, Class 3
- No torsion, Class 1
- Indoor and outdoor applications without direct sun radiation
- Machining units/machine tools, low temperature applications

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Measuring system cable | iguPUR outer jacket

chainflex® CF894

Class 3.1.3.1

Basic requirements	low	1	2	**3**	4	5	6	7	highest
Travel distance	unsupported	**1**	2	3	4	5	6		≥ 400m
Oil resistance	none	1	2	**3**	4				highest
Torsion	none	**1**	2	3	4				±360°

Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Shop and prices online
CF894.001	(3x(2x0.14)C+(4x0.14)+(2x0.5))C	8.5	41	80	
CF894.006	(3x(2x0.14)C+(4x0.14)+(4x0.22)+(2x0.5))C	9.0	50	105	
CF894.009	(4x(2x0.25)+2x0.5)C	8.0	44	80	
CF894.011	(4x(2x0.34)+4x0.5)C	9.5	64	126	CF-F-0003 www.igus.eu/CF894
CF894.015	(4x(2x0.14)+4x0.5)C	8.5	44	84	
CF894.022	((2x0.25)+5x0.5)C	8.0	44	78	
CF894.028	(2x(2x0.15)+(2x0.38))C	7.5	41	57	

Part No.	Core group	Colour code
CF894.001	3x(2x0.14)C	green/yellow, black/brown, red/orange
	(4x0.14)	grey, blue, white-yellow, white-black
	(2x0.5)	brown-red, brown-blue
CF894.006	3x(2x0.14)C	green/yellow, black/brown, red/orange
	(4x0.14)	grey, blue, white-yellow, white-black
	(4x0.22)	brown-yellow/brown-grey/green-black/green-red
	(2x0.5)	brown-red, brown-blue
CF894.009	4x(2x0.25)	brown/green, blue/violet, grey/pink, red/black
	2x0.5	white/brown
CF894.011	4x(2x0.34)	black/brown, red/orange, yellow/green, blue/violet
	4x0.5	blue-white, black-white, red-white, yellow-white
CF894.015	4x(2x0.14)	brown/green, yellow/violet, grey/pink, red/black
	4x0.5	blue, white, brown-green, white-green
CF894.022	(2x0.25)	white, brown
	5x0.5	green, yellow, grey, pink, blue
CF894.028	2x(2x0.15)	green/yellow, pink/blue
	(2x0.38)	red/black

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

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cost down... ...life up

Reduce cost, improve technology, now!

Do the chainflex® price check ...
www.igus.eu/cf-price-check

... for example: Reduce bend radius with CF113.D ...

Order example: CF894.011 - to your required length (0.5m steps)
CF894 chainflex® series .011 Code measuring system type

Order online ▶ www.igus.eu/CF894

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Measuring system cable | PUR outer jacket

chainflex® CF111.D

Image exemplary

10 million
Double strokes guaranteed

10 x d
Bend radius, e-chain®

10m
Travel distance, e-chain®

- For medium duty applications
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

Dynamic information

Bend radius	**e-chain® linear**	minimum 10 x d
	flexible	minimum 8 x d
	fixed	minimum 5 x d
Temperature	**e-chain® linear**	-25°C up to +80°C
	flexible	-40°C up to +80°C (following DIN EN 60811-504)
	fixed	-50°C up to +80°C (following DIN EN 50305)
v max.	**unsupported**	5m/s
	gliding	3m/s
a max.		30m/s²
Travel distance		Unsupported travels and up to 10m for gliding applications, Class 2

Cable structure

Conductor	Very finely stranded special conductors of particularly bending resistant design made of tinned copper wires.
Core insulation	Mechanically high-quality TPE mixture.
Core structure	According to measuring system specification.
Core identification	According to measuring system specification. ▶ Product range table
Element shield	Extremely bending-resistant, tinned copper cover. Coverage approx. 90% optical
Element jacket	TPE mixture on pair shielding adapted to suit the requirements in e-chains®.
Intermediate layer	Foil taping over the outer layer.
Overall shield	Bending-resistant braiding made of tinned copper wires. Coverage linear approx. 55%, optical approx. 80%
Outer jacket	Low-adhesion, halogen-free, highly abrasion resistant PUR mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2) Colour: Yellow-green (similar to RAL 6018)

Electrical information

Nominal voltage	50V 300V (following UL)
Testing voltage	500V

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 4.2.3.1

Basic requirements	low	1	2	3	**4**	5	6	7 highest
Travel distance	unsupported	1	**2**	3	4	5	6	≥ 400m
Oil resistance	none	1	2	**3**	4	highest		
Torsion	none	**1**	2	3	4	±360°		

Properties and approvals

UV resistance	Medium
Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3
Offshore	MUD-resistant following NEK 606 - status 2016
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ See data sheet for details ▶ www.igus.eu/CF111D
UL/CSA AWM	
NFPA	Following NFPA 79-2018, chapter 12.9
DNV	Type Approval Certificate TAE00003X4 (Issue 04/2025) Current information in the data sheet ▶ www.igus.eu/CF111D
REACH	In accordance with Regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1
DESINA	According to VDW, DESINA standardisation
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	7.5 million	10 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
-25/-15	12.5	13.5	14.5
-15/+70	10	11	12
+70/+80	12.5	13.5	14.5

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For medium duty applications, Class 4
- Unsupported travels and up to 10m for gliding applications, Class 2
- Almost unlimited resistance to oil, Class 3
- No torsion, Class 1
- Indoor and outdoor applications without direct sun radiation
- Machining units/machine tools, low temperature applications

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Measuring system cable | PUR outer jacket

chainflex® CF111.D

Basic requirements low 1 2 3 4 5 6 7 highest
Travel distance unsupported 1 2 3 4 5 6 ≥ 400m
Oil resistance none 1 2 3 4 highest
Torsion none 1 2 3 4 ±360°

Class 4.2.3.1

Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Shop and prices online
CF111.001.D	(3x(2x0.14)C+(4x0.14)+(2x0.5))C	9.5	64	104	
CF111.002.D	(3x(2x0.14)C+2x(0.5)C)C	9.5	66	109	
CF111.004.D	(2x(2x(2x0.14))+(4x0.14)C +(4x0.5))C	10.5	70	116	
CF111.006.D	(3x(2x0.14)C+(4x0.14)+(4x0.25) +(2x0.5))C	10.0	76	122	
CF111.009.D	(4x(2x0.25)+2x0.5)C	8.0	49	79	
CF111.010.D	(4x(2x0.25)+2x1.0)C	8.5	61	94	
CF111.011.D	(4x(2x0.34)+4x0.5)C	9.5	72	115	
CF111.014.D	(4x(2x0.25)C+(2x0.5))C	10.5	77	124	
CF111.015.D	(4x(2x0.14)+4x0.5)C	8.5	54	87	
CF111.020.D	(3x(2x0.14)+2x(4x0.14)+(2x0.5))C	8.5	52	87	
CF111.021.D	((4x0.25)+3x(2x0.25+2x0.5))C	9.5	80	117	
CF111.022.D	((2x0.25)+5x0.5)C	7.0	46	75	
New **CF111.023.D**	(2x(2x0.25)+(2x0.34))C	7.0	39	60	
CF111.024.D	((4x0.14)+2x(2x0.34))C	7.0	36	61	
CF111.026.D	(6x(2x0.25)+(2x0.34)C+(2x0.5))C	10.5	74	119	

CF-F-0004

www.igus.eu/CF111D

Part No.	Core group	Colour code
CF111.001.D	3x(2x0.14)C	green/yellow, black/brown, red/orange
	(4x0.14)	grey/blue/white-yellow/white-black
	(2x0.5)	brown-red/brown-blue
CF111.002.D	3x(2x0.14)C	green/yellow, black/brown, red/orange
	2x(0.5)C	black, red
CF111.004.D	2x(2x(2x0.14))	(brown/green)/(yellow/violet), (grey/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	green/yellow, black/brown, red/orange
	(4x0.14)	grey/blue/white-yellow/white-black
	(4x0.25)	brown-yellow/brown-grey/green-black/green-red
	(2x0.5)	brown-red/brown-blue
CF111.009.D	4x(2x0.25)	brown/green, blue/violet, grey/pink, red/black
	2x0.5	white, brown
CF111.010.D	4x(2x0.25)	brown/green, blue/violet, grey/pink, red/black
	2x1.0	white, brown
CF111.011.D	4x(2x0.34)	black/brown, red/orange, green/yellow, blue/violet
	4x0.5	black-white, red-white, yellow-white, blue-white
CF111.014.D	4x(2x0.25)C	white/brown, green/yellow, grey/pink, blue/red
	(2x0.5)	black no. 1/black no. 2
CF111.015.D	4x(2x0.14)	brown/green, yellow/violet, grey/pink, red/black
	4x0.5	blue, white, brown-green, white-green
CF111.020.D	3x(2x0.14)	blue/red, black/violet, grey-pink/red-blue
	2x(4x0.14)	green/grey/yellow/pink, white-green/white-yellow/brown-green/yellow-brown
	(2x0.5)	white/brown
CF111.021.D	(4x0.25)	white/brown/grey/black
	3x2x0.25	white/yellow, white/grey, black/orange
	3x2x0.5	black no. 1/black no. 2, black no. 3/black no. 4, black no. 5/black no. 6
CF111.022.D	(2x0.25)	white/brown
	5x0.5	green, yellow, grey, pink, blue
CF111.023.D	2x(2x0.25)	white/brown, green/yellow
	(2x0.34)	blue/red
CF111.024.D	(4x0.14)	yellow/grey/violet/pink
	2x(2x0.34)	white-green/white, brown-green/blue
CF111.026.D	6x(2x0.25)	green/yellow, grey/pink, blue/red, black/violet, grey-pink/red-blue, white-green/brown-green
	(2x0.34)C	white/brown
	(2x0.5)	blue/red

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Further cable types ▶ Page 218

Measuring system cable | PUR outer jacket

chainflex® CF111.D

Basic requirements
Travel distance
Oil resistance
Torsion

low 1 2 3 **4** 5 6 7 highest
unsupported 1 **2** 3 4 5 6 ≥ 400m
none 1 2 **3** 4 highest
none **1** 2 3 4 ±360°

Class 4.2.3.1

Image exemplary

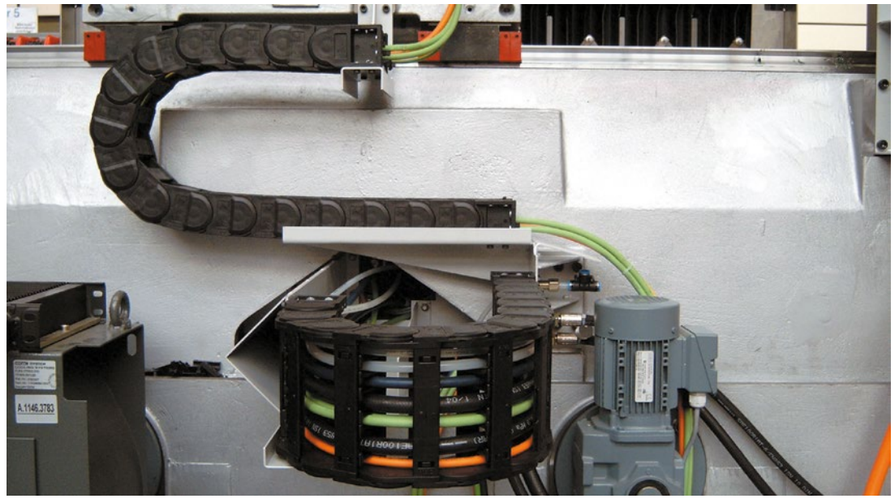
Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Shop and prices online
CF111.027.D	(5x(2x0.14)+2x0.5)C	8.0	45	76	
CF111.028.D	(2x(2x0.15)+(2x0.38))C	7.5	40	73	
CF111.032.D [5]	3x(2x0.14)C+(3x0.14)C	8.5	35	82	CF-F-0004
CF111.040.D	(3x(4x0.14)+(2x0.14+2x0.34)+2x1.5)C	9.0	81	118	www.igus.eu/CF111D
CF111.041.D	(2x(2x0.18)+5x0.5)C	7.5	49	80	
CF111.042.D	(3x(2x0.18)+6x0.5)C	8.5	62	99	

[5] Manufactured without overall shield

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Part No.	Core group	Colour code
CF111.027.D	5x(2x0.14)	brown/green, yellow/grey, white/violet, red/black, pink/blue
	2x0.5	white-green, white-red
CF111.028.D	2x(2x0.15)	green/yellow, pink/blue
	(2x0.38)	red/black
CF111.032.D [5]	3x(2x0.14)C	green/black, yellow/black, red/black
	(3x0.14)C	grey/pink/black
CF111.040.D	3x(4x0.14)	black/red/white-black/white-red, green/blue/white-green/white-blue, yellow/brown/white-yellow/white-brown
	(2x0.14+2x0.34)	violett/orange/weißviolett/weißorange
	2x1.5	white-grey, grey
CF111.041.D	2x(2x0.18)	white/brown, black/violet
	5x0.5	blue, violet, green, yellow, grey
CF111.042.D	3x(2x0.18)	white/black, red/white, black/red
	6x0.5	black no. 1, black no. 2, black no. 3, red no. 4, red no. 5, red no. 6

Further cable types ▶ Page 216



readychain® systems from igus® are completely pre-harnessed with chainflex® cables, hoses, metal parts etc.

Cables available in the chainflex® CASE
Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.
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4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs
UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Measuring system cable | PUR outer jacket

chainflex® CF113.D

Image exemplary

10 million
Double strokes guaranteed

7.5 x d
Bend radius, e-chain®

100m
Travel distance, e-chain®

- For extremely heavy duty applications
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

DriveCliq with 300V UL approval

Dynamic information

Bend radius	**e-chain® linear**	minimum 7.5 x d
	flexible	minimum 6 x d
	fixed	minimum 4 x d
Temperature	**e-chain® linear**	-25°C up to +80°C
	flexible	-40°C up to +80°C (following DIN EN 60811-504)
	fixed	-50°C up to +80°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	5m/s
a max.		50m/s²
Travel distance		Unsupported travels and up to 100m for gliding applications, Class 5

Cable structure

Conductor	Stranded conductor in especially bending-resistant version consisting of tinned copper wires (following DIN EN 60228).
Core insulation	Mechanically high-quality TPE mixture.
Core structure	According to measuring system specification.
Core identification	According to measuring system specification. ▶ Product range table
Element shield	Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90%
Element jacket	TPE mixture on pair shielding adapted to suit the requirements in e-chains®.
Inner jacket	TPE mixture adapted to suit the requirements in e-chains®.
Overall shield	Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90%
Outer jacket	Low-adhesion, halogen-free, highly abrasion resistant PUR mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2) Colour: Yellow-green (similar to RAL 6018)
CFRIP®	Strip cables faster: a tear strip is moulded into the inner jacket Video ▶ www.igus.eu/CFRIP

Electrical information

Nominal voltage	50V 300V (following UL)
Testing voltage	500V

Class 6.5.3.1

Basic requirements	low	1	2	3	4	5	**6**	7 highest
Travel distance	unsupported	1	2	3	4	**5**	6	≥ 400m
Oil resistance	none	1	2	**3**	4	highest		
Torsion	none	**1**	2	3	4	±360°		

Properties and approvals

UV resistance	Medium
Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3
Offshore	MUD-resistant following NEK 606 - status 2016
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF113D
NFPA	Following NFPA 79-2018, chapter 12.9
DNV	Type Approval Certificate TAE00003X4 (Issue 04/2025) Current information in the data sheet ▶ www.igus.eu/CF113D
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1
DESINA	According to VDW, DESINA standardisation
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	7.5 million	10 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
-25/-15	10	11	12
-15/+70	7.5	8.5	9.5
+70/+80	10	11	12

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For heavy-duty applications, Class 6
- Unsupported travels and up to 100m for gliding applications, Class 5
- Almost unlimited resistance to oil, Class 3
- No torsion, Class 1
- Indoor and outdoor applications without direct sun radiation
- Storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, cleanroom, semiconductor insertion, indoor cranes, low temperature applications

Measuring system cable | PUR outer jacket

chainflex® CF113.D

Strip cables 50% faster with CFRIP® tear strip

Image exemplary

Class 6.5.3.1

Basic requirements	low	1	2	3	4	5	**6**	7 highest
Travel distance	unsupported	1	2	3	4	**5**	6	≥ 400m
Oil resistance	none	1	2	**3**	4	highest		
Torsion	none	**1**	2	3	4	±360°		

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Shop and prices online
CF113.001.D	(3x(2x0.14)C+(4x0.14)+(2x0.5))C	10.0	71	137	
CF113.002.D	(3x(2x0.14)C+2x(0.5)C)C	10.0	74	144	
CF113.003.D	(3x(2x0.14)+2x1.0)C	8.0	56	103	
CF113.004.D	(2x(2x(2x0.14))+(4x0.14)C+(4x0.5))C	11.0	78	152	
CF113.005.D	(4x(2x0.14)+4x0.5)C	9.0	60	115	
CF113.006.D	(3x(2x0.14)C+(4x0.14)+(4x0.25)+(2x0.5))C	11.0	85	158	
CF113.007.D [2]	(4x0.34)C	6.5	31	54	
CF113.008.D	(3x(2x0.25))C	7.5	36	76	
CF113.009.D	(4x(2x0.25)+2x0.5)C	8.5	57	99	
CF113.010.D	(4x(2x0.25)+2x1.0)C	9.0	68	122	
CF113.011.D	(4x(2x0.34)+4x0.5)C	10.0	81	142	
CF113.013.D	(3x(2x0.14)C+2x0.5)C	9.0	62	121	
CF113.014.D	(4x(2x0.25)C+(2x0.5))C	11.0	86	163	
CF113.015.D	(4x(2x0.14)+4x0.5)C	9.0	60	114	
CF113.016.D	(3x(2x0.25)C)C	10.0	60	126	
CF113.017.D [4]	(4x(2x0.14)+(4x0.14)C+4x1.0)C	10.0	100	150	
CF113.018.D [4]	(2x(2x0.25)+2x0.5)C	6.5	41	65	

CF-F-0005

www.igus.eu/CF113D

Part No.	Core group	Colour code
CF113.001.D	3x(2x0.14)C	green/yellow, black/brown, red/orange
	(4x0.14)	grey/blue/white-yellow/white-black
	(2x0.5)	brown-red/brown-blue
CF113.002.D	3x(2x0.14)C	green/yellow, black/brown, red/orange
	2x(0.5)C	black, red
CF113.003.D	3x(2x0.14)	white/brown, green/yellow, grey/pink
	2x1.0	blue, red
CF113.004.D	2x(2x(2x0.14))	(brown/green)/(yellow/violet), (grey/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)	white/brown, green/yellow, grey/pink, blue/red
	4x0.5	black, violet, grey-pink, red-blue
CF113.006.D	3x(2x0.14)C	green/yellow, black/brown, red/orange
	(4x0.14)	grey/blue/white-yellow/white-black
	(4x0.25)	brown-yellow/brown-grey/green-black/green-red
	(2x0.5)	brown-red/brown-blue
CF113.007.D [2]	4x0.34	white, green, brown, yellow (star-quad)
CF113.008.D	3x(2x0.25)	white/brown, green/yellow, grey/pink
CF113.009.D	4x(2x0.25)	brown/green, blue/violet, grey/pink, red/black
	2x0.5	white, brown
CF113.010.D	4x(2x0.25)	brown/green, blue/violet, grey/pink, red/black
	2x1.0	white, brown
CF113.011.D	4x(2x0.34)	black/brown, red/orange, green/yellow, blue/violet
	4x0.5	black-white, red-white, yellow-white, blue-white
CF113.013.D	3x(2x0.14)C	white/brown, green/yellow, grey/pink
	2x0.5	blue, red
CF113.014.D	4x(2x0.25)C	white/brown, green/yellow, grey/pink, blue/red
	(2x0.5)	black no. 1/black no. 2
CF113.015.D	(4x(2x0.15))C	brown/green, yellow/violet, grey/pink, red/black
	4x0.5	blue, white, brown-green, white-green
CF113.016.D	3x(2x0.25)C	white/brown, green/yellow, grey/pink
CF113.017.D [4]	4x(2x0.14)	red/black, brown/green, yellow/violet, grey/pink
	(4x0.14)C	blue-black/yellow-black/red-black/green-black
	4x1.0	white-green, brown-green, blue, white
CF113.018.D [4]	2x(2x0.25)	red/black, grey/pink
	2x0.5	white, brown

The chainflex® types marked with [2] are cables designed as a star-quad.
[4] Manufactured without inner jacket

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Further cable types ▶ Page 224

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Measuring system cable | PUR outer jacket

chainflex® CF113.D

Strip cables 50% faster with CFRIP® tear strip

Image exemplary

Class 6.5.3.1

Basic requirements	low	1	2	3	4	5	**6**	7 highest
Travel distance	unsupported	1	2	3	4	**5**	6	≥ 400m
Oil resistance	none	1	2	**3**	4	highest		
Torsion	none	**1**	2	3	4	±360°		

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Shop and prices online
CF113.019.D [4]	(3x(2x0.25)C+(3x0.25)+2x1.0)C	10.0	93	143	
CF113.022.D	((2x0.25)+5x0.5)C	8.0	54	94	
CF113.025.D	(3x(2x0.14)C+(2x0.5)C)C	10.0	72	141	
CF113.027.D	(5x(2x0.14)+2x0.5)C	9.0	52	105	
CF113.028.D [4]	(2x(2x0.20)+(2x0.38))C	7.5	44	69	
CF113.029.D	(5x(2x0.25)C+(2x0.25+2x0.5))C	12.0	105	192	CF-F-0005
CF113.031.D	(2x(2x0.25)C+2x1.0)C	9.5	69	133	
CF113.032.D [5]	3x(2x0.14)C+(3x0.14)C	8.5	35	82	www.igus.eu/CF113D
CF113.033.D [5]	4x(2x0.14)C+2x(1.0)C	9.5	64	111	
CF113.036.D	(5x(2x0.25))C	8.5	51	103	
CF113.037.D	(6x(2x0.25))C	9.0	58	114	
CF113.038.D	(3x(2x0.14)+(2x0.34))C	8.5	36	87	
CF113.040.D	(3x(4x0.14)+(2x0.14+2x0.34) +2x1.5)C	10.0	88	155	

Part No.	Core group	Colour code
CF113.019.D [4]	3x(2x0.25)C	brown/green, grey/pink, red/black
	(3x0.25)	blue/violet/yellow
	2x1.0	white, brown
CF113.022.D	(2x0.25)	white/brown
	5x0.5	green, yellow, grey, pink, blue
CF113.025.D	3x(2x0.14)C	green/yellow, blue/red, grey/pink
	(2x0.5)C	white/brown
CF113.027.D	5x(2x0.14)	brown/green, yellow/grey, white/violet, red/black, pink/blue
	2x0.5	white-green, white-red
CF113.028.D [4]	2x(2x0.20)	green/yellow, pink/blue
	(2x0.38)	red/black
CF113.029.D	5x(2x0.25)C	white/brown green/yellow, grey/pink, blue/red, black/violet
	(2x0,25+2x0.5)	grey-pink/brown-green/white-green/red-blue
CF113.031.D	2x(2x0.25)C	white/brown, green/yellow
	2x1.0	black no. 1, black no. 2
CF113.032.D [5]	3x(2x0.14)C	green/black, yellow/black, red/black
	(3x0.14)C	grey/pink/black
CF113.033.D [5]	4x(2x0.14)C	yellow/black, red/black, blue/black, green/black
	2x(1.0)C	white, brown
CF113.036.D	5x(2x0.25)	white/brown green/yellow, grey/pink, blue/red, black/violet
CF113.037.D	6x(2x0.25)	white/brown, green/yellow, grey/pink, blue/red, black/violet, grey-pink/red-blue
CF113.038.D	3x(2x0.14)	white/brown, green/yellow, grey/pink
	(2x0.34)	blue/red
CF113.040.D	3x(4x0.14)	black/red/white-black/white-red, green/blue/white-green/white-blue, yellow/brown/white-yellow/white-brown
	(2x0.14+2x0.34)	violett/orange/weißviolett/weißorange
	2x1.5	white-grey, grey

[4] Manufactured without inner jacket
[5] Manufactured without overall shield

Further cable types ▶ Page 222

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case

chainflex® measuring system cables in a double-spindle machining centre.

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Measuring system cable | TPE outer jacket

chainflex® CF11.D

Image exemplary

12.5 million
Double strokes guaranteed

6.8 x d
Bend radius, e-chain®

400m
Travel distance, e-chain®

- For extremely heavy duty applications
- TPE outer jacket
- Shielded
- Oil and bio-oil-resistant
- PVC and halogen-free
- Hydrolysis and microbe-resistant

Now available with UL approval & 25% longer service life

Dynamic information

Bend radius	**e-chain® linear**	minimum 6.8 x d
	flexible	minimum 5 x d
	fixed	minimum 4 x d
Temperature	**e-chain® linear**	-35°C up to +90°C
	flexible	-50°C up to +90°C (following DIN EN 60811-504)
	fixed	-55°C up to +90°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	6m/s
a max.		100m/s²
Travel distance		Unsupported travels and up to 400m and more for gliding applications, Class 6

Cable structure

Conductor	Stranded conductor in especially bending-resistant version consisting of tinned copper wires (following DIN EN 60228).
Core insulation	Mechanically high-quality TPE mixture.
Core structure	According to measuring system specification.
Core identification	According to measuring system specification. ▶ Product range table
Element shield	Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90%
Element jacket	TPE mixture on pair shielding adapted to suit the requirements in e-chains®.
Inner jacket	TPE mixture adapted to suit the requirements in e-chains®.
Overall shield	Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90%
Outer jacket	Low-adhesion, extremely abrasion-resistant and highly flexible TPE mixture, adapted to suit the requirements in e-chains®. Colour: Yellow-green (similar to RAL 6018)
CFRIP®	Strip cables faster: a tear strip is moulded into the inner jacket Video ▶ www.igus.eu/CFRIP

Electrical information

Nominal voltage	50V 300V (following UL)
Testing voltage	500V

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 6.6.4.1

Basic requirements	low	1	2	3	4	5	**6**	7 highest
Travel distance	unsupported	1	2	3	4	5	**6**	≥ 400m
Oil resistance	none	1	2	3	**4**	highest		
Torsion	none	**1**	2	3	4	±360°		

Properties and approvals

UV resistance	Medium
Oil resistance	Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL AWM	See data sheet for details ▶ www.igus.eu/CF11D
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF9.15.07 - tested by IPA according to standard DIN EN ISO 14644-1
Dry cleanroom	Tested in "dry cleanroom" according to DIN EN ISO 14644-1
DESINA	According to VDW, DESINA standardisation
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million		7.5 million		12.5 million	
Temperature, from/to [°C]	< 10m	≥ 10m	< 10m	≥ 10m	< 10m	≥ 10m
	R min. [x d]	R min. [x d]	R min. [x d]	R min. [x d]	R min. [x d]	R min. [x d]
-35/-25	8.5	10	9.5	11	10.5	12
-25/+80	6.8	7.5	7.5	8.5	8.5	9.5
+80/+90	8.5	10	9.5	11	10.5	12

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For heavy-duty applications, Class 6
- Unsupported travels and up to 400m and more for gliding applications, Class 6
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- No torsion, Class 1
- Indoor and outdoor applications without direct sun radiation
- Storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, cleanroom, semiconductor insertion, indoor cranes, low temperature applications

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Measuring system cable | TPE outer jacket

chainflex® CF11.D

Strip cables 50% faster with CFRIP® tear strip

Image exemplary

Class 6.6.4.1

Basic requirements	low	1	2	3	4	5	**6**	7 highest
Travel distance	unsupported	1	2	3	4	5	**6**	≥ 400m
Oil resistance	none	1	2	3	**4**	highest		
Torsion	none	**1**	2	3	4	±360°		

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CF11.001.D	(3x(2x0.14)C+(4x0.14)+(2x0.5))C	10.0	71	119
CF11.002.D	(3x(2x0.14)C+2x(0.5)C)C	10.0	74	125
CF11.003.D	(3x(2x0.14)+2x1.0)C	8.0	56	86
CF11.004.D	(2x(2x(2x0.14))+(4x0.14)C +(4x0.5))C	11.0	78	127
CF11.005.D	(4x(2x0.14)+4x0.5)C	9.0	60	97
CF11.006.D	(3x(2x0.14)C+(4x0.14)+(4x0.25) +(2x0.5))C	10.5	85	139
CF11.007.D [2)]	(4x0.34)C	6.0	31	48
CF11.008.D	(3x(2x0.25))C	7.5	36	60
CF11.009.D	(4x(2x0.25)+2x0.5)C	8.5	57	91
CF11.010.D	(4x(2x0.25)+2x1.0)C	9.0	68	105
CF11.011.D	(4x(2x0.34)+4x0.5)C	10.0	81	124
CF11.012.D	(3x(2x0.14)C+(3x0.14)C +(4x0.14)+(2x0.14+2x0.5))C	11.0	89	140
CF11.013.D	(3x(2x0.14)C+2x0.5)C	9.0	62	104
CF11.014.D	(4x(2x0.25)C+(2x0.5))C	11.0	86	138
CF11.015.D	(4x(2x0.14)+4x0.5)C	9.0	60	97

Shop and prices online

CF-F-0006

www.igus.eu/CF11D

Part No.	Core group	Colour code
CF11.001.D	3x(2x0.14)C	green/yellow, black/brown, red/orange
	(4x0.14)	grey/blue/white-yellow/white-black
	(2x0.5)	brown-red/brown-blue
CF11.002.D	3x(2x0.14)C	green/yellow, black/brown, red/orange
	2x(0.5)C	black, red
CF11.003.D	3x(2x0.14)	white/brown, green/yellow, grey/pink
	2x1.0	blue, red
CF11.004.D	2x(2x(2x0.14))	(brown/green)/(yellow/violet), (grey/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)	white/brown, green/yellow, grey/pink, blue/red
	4x0.5	black, violet, grey-pink, red-blue
CF11.006.D	3x(2x0.14)C	green/yellow, black/brown, red/orange
	(4x0.14)	grey/blue/white-yellow/white-black
	(4x0.25)	brown-yellow/brown-grey/green-black/green-red
	(2x0.5)	brown-red/brown-blue
CF11.007.D [2)]	4x0.34	white, green, brown, yellow (star-quad)
CF11.008.D	3x(2x0.25)	white/brown, green/yellow, grey/pink
CF11.009.D	4x(2x0.25)	brown/green, blue/violet, grey/pink, red/black
	2x0.5	white, brown
CF11.010.D	4x(2x0.25)	brown/green, blue/violet, grey/pink, red/black
	2x1.0	white, brown
CF11.011.D	4x(2x0.34)	black/brown, red/orange, green/yellow, blue/violet
	4x0.5	black-white, red-white, yellow-white, blue-white
CF11.012.D	3x(2x0.14)C	green/yellow, white/grey, blue/red
	(3x0.14)C	red/green/brown
	(4x0.14)	grey/yellow/pink/violet
	(2x0.14+2x0.5)	blue/brown-blue/grey/brown-red
CF11.013.D	3x(2x0.14)C	white/brown, green/yellow, grey/pink
	2x0.5	blue, red
CF11.014.D	4x(2x0.25)C	white/brown, green/yellow, grey/pink, blue/red
	(2x0.5)	black no. 1/black no. 2
CF11.015.D	4x(2x0.14)	brown/green, yellow/violet, grey/pink, red/black
	4x0.5	blue, white, brown-green, white-green

The chainflex® types marked with [2)] are cables designed as a star-quad.

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Further cable types ▶ Page 230

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

Measuring system cable | TPE outer jacket

chainflex® CF11.D

Strip cables 50% faster with CFRIP® tear strip

Image exemplary

Class 6.6.4.1

Basic requirements	low	1	2	3	4	5	**6**	7 highest
Travel distance	unsupported	1	2	3	4	5	**6**	≥ 400m
Oil resistance	none	1	2	3	**4**	highest		
Torsion	none	**1**	2	3	4	±360°		

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Shop and prices online
CF11.017.D [4]	(4x(2x0.14)+(4x0.14)C+4x1.0)C	10.0	100	126	
CF11.018.D [4]	(2x(2x0.25)+2x0.5)C	6.5	41	51	
CF11.019.D [4]	(3x(2x0.25)C+(3x0.25)+2x1.0)C	10.0	93	120	
CF11.021.D	((4x0.25)+3x(2x0.25+2x0.5))C	10.0	88	130	
CF11.022.D	((2x0.25)+5x0.5)C	7.5	54	79	
CF11.025.D	(3x(2x0.14)C+(2x0.5)C)C	10.0	72	123	
CF11.027.D	(5x(2x0.14)+2x0.5)C	8.5	52	88	
CF11.028.D	(2x(2x0.20)+(2x0.38))C	7.5	44	63	
CF11.031.D	(2x(2x0.25)C+2x1.0)C	9.5	69	116	
CF11.032.D [5]	3x(2x0.14)C+(3x0.14)C	8.0	35	71	
CF11.033.D [5]	4x(2x0.14)C+2x(1.0)C	9.5	64	104	
CF11.038.D	(3x(2x0.14)+(2x0.34))C	8.0	36	71	

CF-F-0006

www.igus.eu/CF11D

Part No.	Core group	Colour code
CF11.017.D [4]	4x(2x0.14)	red/black, brown/green, yellow/violet, grey/pink
	(4x0.14)C	blue-black/yellow-black/red-black/green-black
	4x1.0	white-green, brown-green, blue, white
CF11.018.D [4]	2x(2x0.25)	red/black, grey/pink
	2x0.5	white, brown
CF11.019.D [4]	3x(2x0.25)C	brown/green, grey/pink, red/black
	(3x0.25)	blue/violet/yellow
	2x1.0	white, brown
CF11.021.D	(4x0.25)	white/brown/grey/black
	3x2x0.25	white/yellow, white/grey, black/orange
	3x2x0.5	black no. 1/black no. 2, black no. 3/black no. 4, black no. 5/black no. 6
CF11.022.D	(2x0.25)	white/brown
	5x0.5	green, yellow, grey, pink, blue
CF11.025.D	3x(2x0.14)C	green/yellow, blue/red, grey/pink
	(2x0.5)	white/brown
CF11.027.D	5x(2x0.14)	brown/green, yellow/grey, white/violet, red/black, pink/blue
	2x0.5	white-green, white-red
CF11.028.D	2x(2x0.20)	green/yellow, pink/blue
	(2x0.38)	red/black
CF11.031.D	2x(2x0.25)C	white/brown, green/yellow
	2x1.0	black no. 1, black no. 2
CF11.032.D [5]	3x(2x0.14)C	green/black, yellow/black, red/black
	(3x0.14)C	grey/pink/black
CF11.033.D [5]	4x(2x0.14)C	yellow/black, red/black, blue/black, green/black
	2x(1.0)C	white, brown
CF11.038.D	3x(2x0.14)	white/brown, green/yellow, grey/pink
	(2x0.34)	blue/red

[4] Manufactured without inner jacket
[5] Manufactured without overall shield

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

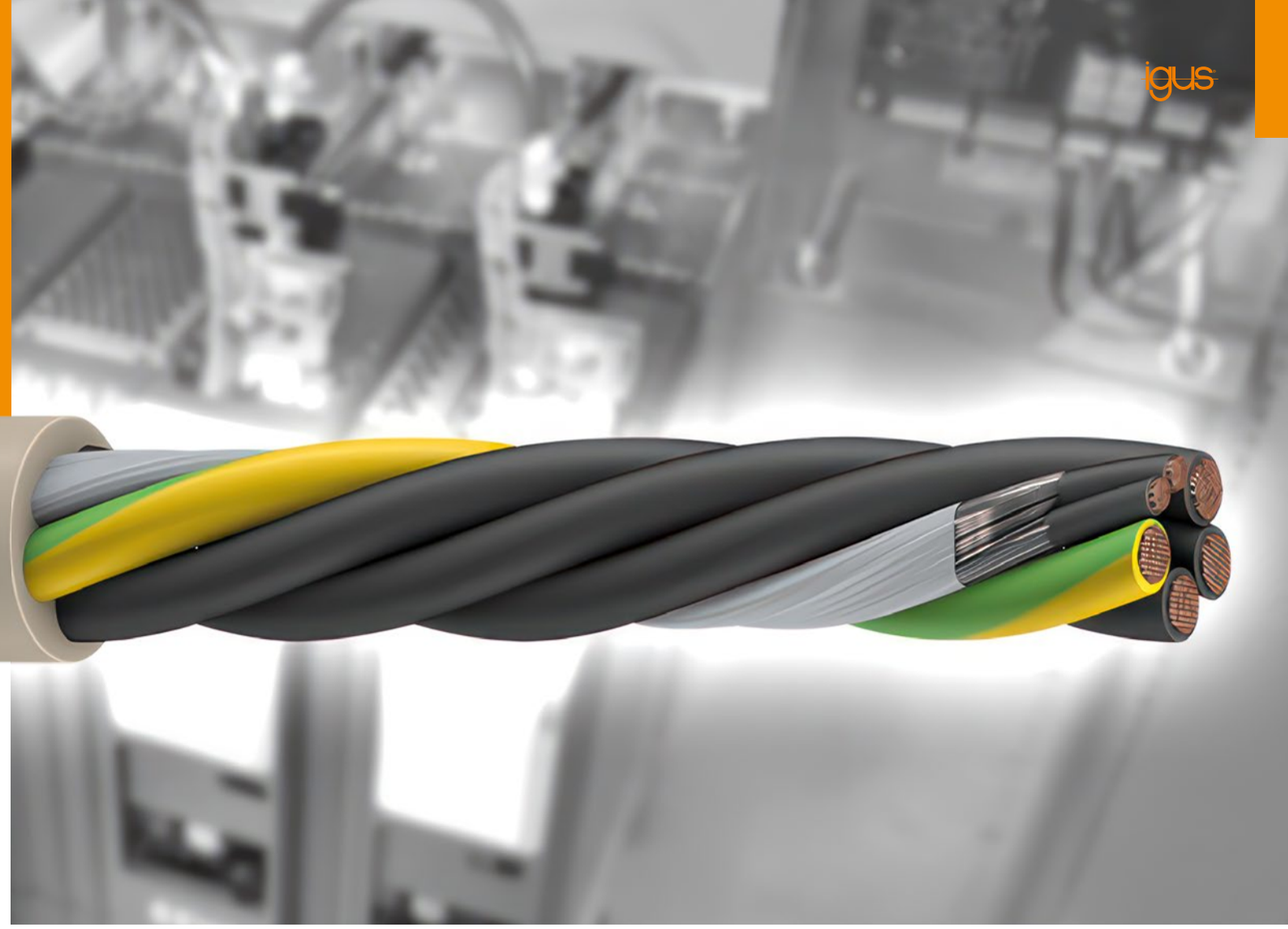
More on this online: www.igus.eu/cf-case

Further cable types ▶ Page 228

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

Servo cables/ hybrid servo cables



Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

PTFE FREE · cULus · UL · NFPA · DNV · REACH · RoHS · Clean-Room · dry cleanroom · DESINA · CE

Servo cables for energy chains

Specially designed for use in e-chains®. Various structures with one or two control pair, suitable for motor requirements. With the innovative shield pair structure and high-end overall shield for movements. Tested and with up to 4-year chainflex® guarantee

- With the innovative shield pair structure and high-end overall shield for movements
- Various structures with one or two control pairs, suitable for motor requirements.
- Special core insulation for greater current flow
- Sustainability thanks to a longer service life is practical resource protection, enhancing economic efficiency and protecting the environment.
- Calculate the exact service life online: igus.eu/chainflexlife

Background

chainflex® servo cables design

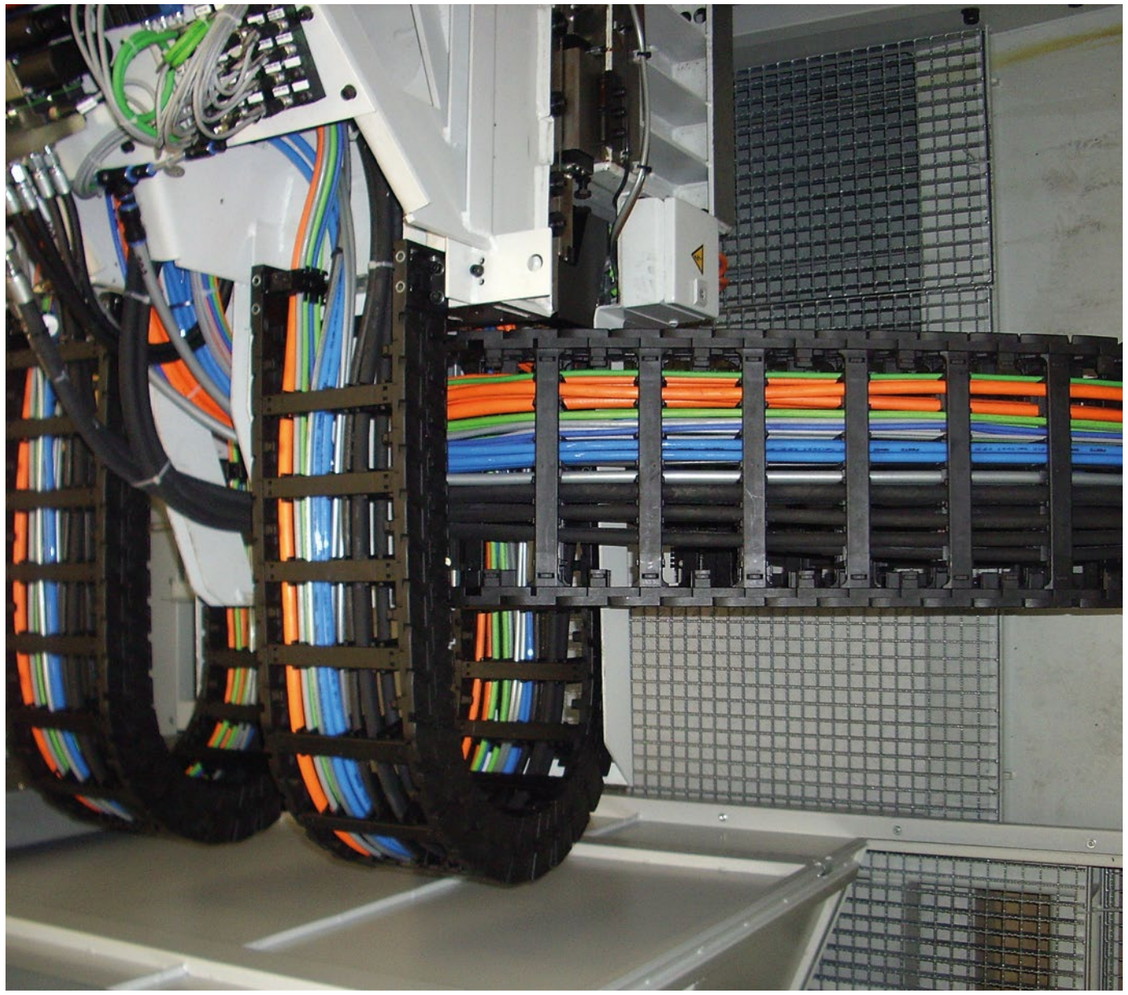
Servo cables design

There are two different shields in the servo cable. One is the overall shield, which ensures that EMC behaviour towards the outside is correct. This prevents damage to other machine components. As for the other, the brake and temperature sensor pairs are shielded to ensure that interference from the energy cores does not enter the control circuit of the frequency converter. These shields are designed differently depending on mechanical stress. The greater the cable's mechanical stress level, the higher the quality of shielding design necessary. In practice, this means that, for our high-end cables, the shielding must have much higher mechanical coverage (up to 90%). Moreover, for the control pairs in the cable, we use a special layer that has not only good EMC properties, but also a special design that allows it to be machined very quickly.

Design

1. Overall shield with optimised braiding angle
2. Optimised single wire diameter
3. Tensile stress-resistant centre element
4. Gusset-filling extruded inner jacket
5. Cores wound with optimised pitch length and pitch direction
6. Pair braid shield over optimised wound pair
7. Highly abrasion-resistant pressure extruded outer jacket

A wide range of applications in the tool industry



An area of application that demonstrates the various capabilities of servo cables in the chainflex® product range is that of the interlinked machine tool. There is so little room in the various axes of such machines that our CF270.UL.D cable series is usually used.

In the main axis, the radius is frequently larger, which means reduced costs if the CF897 series is used. This series has longer pitch lengths in its stranding and is optimised for larger bend radii. The gantry above the interlinked machines uses e-chains® for long travels, and this application, with its high dynamics and gliding chain, requires an inner jacket, with which the CF27.UL is equipped.

All series have a few things in common that are of elementary importance to machine tools. For one thing, each cable has UL certification, and for another, it has an oil-resistant outer jacket. A third advantage is the up to four-year guarantee with a clear service life declaration of up to 12 million double strokes.

Let's embark on this journey together and take advantage of our wide selection to develop the most cost-effective solution. Please feel free to contact our specialists at any time.

Phone +49-2203 9649-0, info@igus.eu

Manufacturer differences

Hybrid technology is the biggest trend in the cable industry in the last few years. Key terms here are One Cable Connection (Siemens) and One Cable Technology (Beckhoff). This technology usually combines four power cores (L1, L2, L3 and PE), a pair for temperature monitoring, for example, and cores for a bus system in a cable. Every large drive manufacturer uses its own bus system. Beckhoff, for example, uses SICK's Hiperface DSL, and Siemens uses an Ethernet derivative. We at igus® have joined this technological trend and optimised the mechanical cable design for energy chains. Our CF220.UL.H and CF280.UL.H hybrid cables can be connected to drive systems from the major OEMs without any problem.

What are the advantages and disadvantages of hybrid cables

Each drive requires two cables - the motor cable and the encoder cable. The combination in a single cable creates room in the energy chain and the motor connection area, since half of the components can be dispensed with. Disruptions caused by proximity of sensitive data cores to energy cores are avoided if possible. The EMC properties of the shielding in the cables and a good plug concept help out here. We achieve good shielding effects by high coverage of necessary elements and a flat braid angle that ensures that the properties are retained for a long time, even in moving applications.

Hybrid cables in woodworking

A major manufacturer of woodworking machines converted its drive technology to the new Beckhoff hybrid technology, capitalising on the advantages of the

more compact design. The challenge was with the cables, which in their machines have to perform a great many movements with very tight radii. This is where igus® entered the race with a challenging service life test. It was challenging because the requirement was to also measure the Hiperface DSL bus data transmission over its use. That is why we worked very closely with our customer to achieve reliable results for both of us. Feel free to send us a query when you need to test cable solution durability.

chainflex® servo cables

Mechanical parameters

chainflex® cables	Jacket	Shield	Bend radius e-chain® min. [xd]	Temperature e-chain® from/to [°C]	v max. [m/s] unsupported	v max. [m/s] gliding	a max. [m/s²]	Travel distance [m]	Page
CF887	PVC	●	15	+5/+70	3	-	20	≤ 10	240
CF210.UL New	PVC	●	10	+5/+70	10	2	50	≤ 10	242
CF21.UL	PVC	●	7.5	+5/+70	10	5	80	≤ 100	246
CF897	iguPUR	●	15	-20/+80	3	-	20	≤ 10	250
CF270.UL.D New	PUR	●	10	-25/+80	10	2	50	≤ 10	252
CF27.D	PUR	●	7.5	-25/+80	10	5	80	≤ 100	256
CF29.D	TPE	●	6.8	-35/+100	10	5	80	> 400	260
CF220.UL.H New	PVC	●	10	+5/+70	10	2	50	≤ 10	262
CF280.UL.H New	PUR	●	10	-25/+80	10	2	50	≤ 10	266

Approvals/resistance

chainflex® cables	oil	4x	PTFE free	Approvals and standards																Page
CF887			●				●			●			●	●					●	240
CF210.UL New	●		●				●			●			●	●	●				●	242
CF21.UL	●		●				●			●			●	●	●				●	246
CF897	●		●				●			●			●	●					●	250
CF270.UL.D New	●		●				●			●			●	●	●			●	●	252
CF27.D	●		●				●			●		●	●	●	●			●	●	256
CF29.D	●		●					●					●	●	●	●	●	●	●	260
CF220.UL.H New	●		●				●			●			●	●	●				●	262
CF280.UL.H New	●		●				●			●			●	●	●			●	●	266

Guaranteed service life

chainflex® cables	Temperature, from/to [°C]	Min. bend radius [xd] for travel distance < 10m	Min. bend radius [xd] for travel distance ≥ 10m	Min. bend radius [xd] for travel distance < 10m	Min. bend radius [xd] for travel distance ≥ 10m	Min. bend radius [xd] for travel distance < 10m	Min. bend radius [xd] for travel distance ≥ 10m	Page
		5 million (1 million) double strokes *		7.5 million (3 million) double strokes *		10 million (5 million) double strokes *		
CF887	+5 / +15	17.5		18.5		19.5		
	+15 / +60	15		16		17		240
	+60 / +70	17.5		18.5		19.5		
CF210.UL New	+5 / +15	12.5		13.5		14.5		
	+15 / +60	10		11		12		242
	+60 / +70	12.5		13.5		14.5		
CF21.UL	+5 / +15	10		11		12		
	+15 / +60	7.5		8.5		9.5		246
	+60 / +70	10		11		12		
CF897	-20 / -10	17.5		18.5		19.5		
	-10 / +70	15		16		17		250
	+70 / +80	17.5		18.5		19.5		
CF270.UL.D New	-25 / -15	12.5		13.5		14.5		
	-15 / +70	10		11		12		252
	+70 / +80	12.5		13.5		14.5		
CF27.D	-25 / -15	10		11		12		
	-15 / +70	7.5		8.5		9.5		256
	+70 / +80	10		11		12		
		5 million		7.5 million		12.5 million		
CF29.D	-35 / -25	8.5	10	9.5	11	10.5	12	
	-25 / +90	6.8	7.5	7.5	8.5	8.5	9.5	260
	+90 / +100	7.5	10	9.5	11	10.5	12	
		5 million		7.5 million		10 million		
CF220.UL.H New	+5 / +15	12.5		13.5		14.5		
	+15 / +60	10		11		12		262
	+60 / +70	12.5		13.5		14.5		
CF280.UL.H New	-25 / -15	12.5		13.5		14.5		
	-15 / +70	10		11		12		266
	+70 / +80	12.5		13.5		14.5		

* Higher number of double strokes? Calculate service life online ▶ www.igus.eu/chainflexlife
Figures in brackets refer to series CF887 and CF897

... for single-cable solutions in drive technology

In chainflex® series CF220.UL.H and CF280.UL.H, you will see system cables for intelligent drive concepts for many well known system manufacturers.

To save installation space in e-chain systems® some manufacturers combine the servo cable for power with the measuring system cable for position data to make a so-called hybrid cable. The feedback of the position data to the servo controller is done frequently by various digital bus technologies.

When combining these two cables into a hybrid cable, it is necessary to guarantee the data transmission properties and the EMC behavior of the cable for many millions of movement cycles.

High optical coverage shielding designs are used in igus® chainflex® servo hybrid cables because of the close proximity of the power cores carrying high interference square-wave signals to the bus cores.

A secure transmission of bus signals at maximum cable length and at maximum speed makes high demands on the insulating materials of the bus or data cores.

In the 5,500m² large igus® laboratory, electrical parameters such as capacitance, impedance, attenuation and crosstalk are measured over the entire test period of several million double strokes and monitored for compliance with the specifications.

igus® chainflex® servo hybrid cables are available in cost-effective PVC and oil-resistant, halogen-free PUR.

As with all chainflex® cables, igus® also offers a guarantee of 4 years or 10 million double strokes.

In the chart on the opposite page you will find an overview of all currently available hybrid cables grouped by system manufacturer.

The companies listed are drive systems manufacturers or technology providers whose rotation sensors are commonly available.

Two become one: hybrid servo cables combine servo and measuring system cables.

Selection table hybrid servo cables

Hybrid technology/ manufacturer	CF220.UL.H PVC 10 x d Page 262	CF280.UL.H PUR 10 x d Page 266
SICK (HIPERFACE DSL)		
ABB	CF220.UL.H100-.H102	CF280.UL.H100-.H102
AMK		
B&R		
Baumüller		
BCB		
Beckhoff		
BMP		
CEDS		
Fertig		
Fine		
Han´s		
Harmonic Drive AG		
Heidrive		
Infranor		
IRT		
Jetter		
KEBA		
Kinavo		
Kollmorgen		
Lafert		
LTi DRiVES		
Mavilor		
Maxsine		
metronix		
NUM		
Parker		
PowerMotor		
ROBOX		
Selema		
Siboni		
Sigmatek		
STEP		
TG-Drives		
WEG		
SEW cable type A, B, C, D, E		
SEW	CF220.UL.H203	CF280.UL.H200-.H206
MOVILINK DDI		
SEW	-	CF280.UL.H207
SINAMICS S210		
Siemens	CF220.UL.H300-.H304	CF280.UL.H300-.H304
IndraDrive / crtlXDRIVE		
Bosch Rexroth	CF220.UL.H402	CF280.UL.H400-.H402
HEIDENHAIN		
B&R	CF220.UL.H501	CF280.UL.H501-.H502

Servo cable | PVC outer jacket

chainflex® CF887

Image exemplary

5,000,000 Double strokes guaranteed

15 x d Bend radius, e-chain®

10m Travel distance, e-chain®

- For flexing applications
- PVC outer jacket
- Shielded
- Flame-retardant

Dynamic information

Bend radius	**e-chain® linear**	minimum 15 x d
	flexible	minimum 12 x d
	fixed	minimum 8 x d
Temperature	**e-chain® linear**	+5°C up to +70°C
	flexible	-5°C up to +70°C (following DIN EN 60811-504)
	fixed	-15°C up to +70°C (following DIN EN 50305)
v max.	**unsupported**	3m/s
a max.		20m/s²
Travel distance		Unsupported travels up to 10m, Class 1

Cable structure

Conductor	Conductor consisting of bare copper wires (according to DIN EN 60228).
Core insulation	Mechanically high-quality, especially low-capacitance TPE mixture.
Core structure	Power cores and control pair elements wound together in an optimised pitch length.
Core identification	**Power cores:** Black cores with white numbers, one green-yellow core. 1. Core: U / L1 / C / L+ 2. Core: V / L2 3. Core: W / L3 / D / L- **1 control pair:** Black cores with white numbers. 1. Control core: 5 2. Control core: 6 **2 control pairs:** Black cores with white numbers. 1. Control core: 5 2. Control core: 6 3. Control core: 7 4. Control core: 8
Element shield	Foil taping of optimised, bending-resistant foil shield.
Overall shield	Braiding made of tinned copper wires. Coverage approx. 60% optical
Outer jacket	Low-adhesion PVC mixture, adapted to suit the requirements in e-chains®. Colour: Pastel orange (similar to RAL 2003)

Electrical information

Nominal voltage	600/1,000V (following DIN VDE 0298-3) 1,000V (following UL)
Testing voltage	4,000V (following DIN EN 50395)

Class 3.1.1.1

Basic requirements	low	1	2	**3**	4	5	6	7	highest
Travel distance	unsupported	**1**	2	3	4	5	6		≥ 400m
Oil resistance	none	**1**	2	3	4				highest
Torsion	none	**1**	2	3	4				±360°

Properties and approvals

Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF887
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	1 million	3 million	5 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
+5/+15	17.5	18.5	19.5
+15/+60	15	16	17
+60/+70	17.5	18.5	19.5

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For flexing applications, Class 3
- Especially for unsupported travels, Class 1
- Without influence of oil, Class 1
- No torsion, Class 1
- Preferably indoor applications
- Wood/stone processing, packaging industry, feeding, handling, adjusting devices

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Shop and prices online
1 control pair shielded					
CF887.07.05.02.01	(4G0.75+(2x0.5)C)C	10.0	69	119	CF-G-0001
CF887.15.15.02.01	(4G1.5+(2x1.5)C)	12.5	124	200	
CF887.25.15.02.01	(4G2.5+(2x1.5)C)C	13.5	182	254	
CF887.40.15.02.01	(4G4.0+(2x1.5)C)C	14.5	236	340	
2 control pairs shielded					
CF887.10.07.02.02	(4G1.0+2x(2x0.75)C)	11.5	110	184	www.igus.eu/CF887
CF887.15.15.02.02	(4G1.5+2x(2x1.5)C)C	13.5	164	253	
CF887.25.15.02.02	(4G2.5+2x(2x1.5)C)C	14.5	217	325	

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Servo cable | PVC outer jacket

chainflex® CF210.UL

Image exemplary

10 million
Double strokes guaranteed

10 x d
Bend radius, e-chain®

10m
Travel distance, e-chain®

- For medium duty applications
- PVC outer jacket
- Shielded
- Oil-resistant
- Flame-retardant

Now with 90°C UL/CSA AWM approval

Dynamic information

Bend radius	**e-chain® linear**	minimum 10 x d
	flexible	minimum 8 x d
	fixed	minimum 5 x d
Temperature	**e-chain® linear**	+5°C up to +70°C
	flexible	-5°C up to +70°C (following DIN EN 60811-504)
	fixed	-15°C up to +70°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	2m/s
a max.		50m/s²
Travel distance		Unsupported travels and up to 10m for gliding applications, Class 2

Cable structure

Conductor
Stranded conductor in bending-resistant version consisting of bare copper wires (following DIN EN 60228).

Core insulation
Mechanically high-quality, especially low-capacitance XLPE mixture.

Core structure
Power cores and control pair elements wound with a short pitch length around a high tensile strength centre element.

Core identification
Power cores: Black cores with white numbers, one green-yellow core.
1. Core: U / L1 / C / L+
2. Core: V / L2
3. Core: W / L3 / D / L-
1 control pair: Black cores with white numbers.
1. Control core: 4 2. Control core: 5
2 control pairs: Black cores with white numbers.
1. Control core: 5 2. Control core: 6
3. Control core: 7 4. Control core: 8

Element shield
Bending-resistant braiding made of tinned copper wires.

Intermediate layer
Foil taping over the outer layer.

Overall shield
Bending-resistant braiding made of tinned copper wires.
Coverage linear approx. 55%, optical approx. 80%

Outer jacket
Low-adhesion, oil-resistant PVC mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-4-1).
Colour: Pastel orange (similar to RAL 2003)

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 4.2.2.1

Basic requirements	low	1	2	3	**4**	5	6	7	highest
Travel distance	unsupported	1	**2**	3	4	5	6		≥ 400m
Oil resistance	none	1	**2**	3	4				highest
Torsion	none	**1**	2	3	4				±360°

Electrical information

Nominal voltage	600/1,000V (following DIN VDE 0298-3) 1,000V (following UL)
Testing voltage	4,000V (following DIN EN 50395)

Properties and approvals

UV resistance	Medium
Oil resistance	Oil-resistant (following DIN EN 50363-4-1), Class 2
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF210UL
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 2. The outer jacket material of this series complies with CF5.10.07 - tested by IPA according to standard DIN EN ISO 14644-1
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	7.5 million	10 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
+5/+15	12.5	13.5	14.5
+15/+60	10	11	12
+60/+70	12.5	13.5	14.5

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For medium duty applications, Class 4
- Unsupported travels and up to 10m for gliding applications, Class 2
- Light oil influence, Class 2
- No torsion, Class 1
- Preferably indoor applications, but also outdoor ones at temperatures > 5 °C
- Wood/stone processing, packaging industry, feeding, handling, adjusting devices

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Servo cable | PVC outer jacket

chainflex® CF210.UL

Class 4.2.2.1

Basic requirements	low	1	2	3	**4**	5	6	7	highest
Travel distance	unsupported	1	**2**	3	4	5	6		≥ 400m
Oil resistance	none	1	**2**	3	4				highest
Torsion	none	**1**	2	3	4				±360°

Image exemplary

	Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
	1 control pair shielded				
New	**CF210.UL.07.03.02.01**	(4G0.75+(2x0.34)C)C	9.0	72	108
	CF210.UL.15.15.02.01	(4G1.5+(2x1.5)C)	12.5	154	245
	CF210.UL.25.15.02.01	(4G2.5+(2x1.5)C)C	14.0	210	299
	CF210.UL.40.15.02.01	(4G4.0+(2x1.5)C)C	15.0	255	383
	CF210.UL.60.15.02.01	(4G6.0+(2x1.5)C)C	16.5	343	488
	2 control pairs shielded				
	CF210.UL.15.07.02.02	(4G1.5+2x(2x0.75)C)C	13.5	161	278
	CF210.UL.25.15.02.02	(4G2.5+2x(2x1.5)C)C	16.0	244	381
	CF210.UL.40.15.02.02	(4G4.0+2x(2x1.5)C)C	17.0	332	428
	CF210.UL.60.15.02.02	(4G6.0+2x(2x1.5)C)C	19.0	403	598
	without control pair				
	CF210.UL.05.04	(4G0.5)C	7.0	34	63
	CF210.UL.15.04	(4G1.5)C	10.0	86	140
	CF210.UL.25.04	(4G2.5)C	11.5	146	209
	CF210.UL.40.04	(4G4.0)C	13.0	195	288

Shop and prices online

CF-G-0002

www.igus.eu/CF210UL

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Order example: CF210.UL.40.15.02.01 - to your required length (0.5m steps)
CF210.UL **chainflex® series** .40 **Code nominal cross section** .15 **Code nominal cross section signal pairs** .02 **Identification pairs** .01 **Number of pairs**

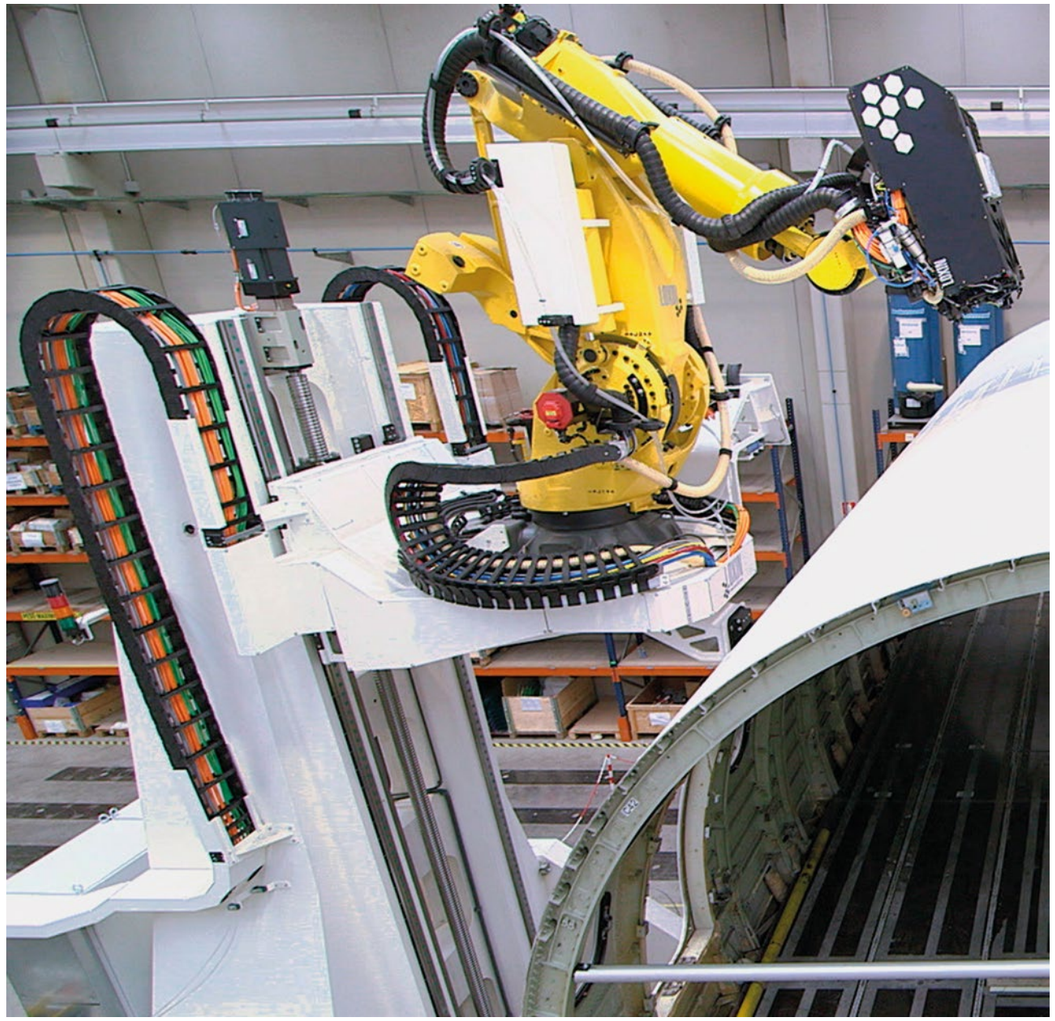
Order online ▶ www.igus.eu/CF210UL

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case



chainflex® servo cable in a vertical e-chain®

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Servo cable | PVC outer jacket

chainflex® CF21.UL

Image exemplary

10 million Double strokes guaranteed

7.5 x d Bend radius, e-chain®

100m Travel distance, e-chain®

- For heavy duty applications
- PVC outer jacket
- Shielded
- Oil-resistant
- Flame-retardant

Now with 90°C UL/CSA AWM approval

Dynamic information

Bend radius	**e-chain® linear**	minimum 7.5 x d
	flexible	minimum 6 x d
	fixed	minimum 4 x d
Temperature	**e-chain® linear**	+5°C up to +70°C
	flexible	-5°C up to +70°C (following DIN EN 60811-504)
	fixed	-15°C up to +70°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	5m/s
a max.		80m/s²
Travel distance		Unsupported travels and up to 100m for gliding applications, Class 5

Cable structure

Conductor	Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228).
Core insulation	Mechanically high-quality, especially low-capacitance XLPE mixture.
Core structure	Power cores with control pair elements wound with elements for high tensile stresses.
Core identification	**Power cores:** Black cores with white numbers, one green-yellow core. 1. Core: U / L1 / C / L+ 2. Core: V / L2 3. Core: W / L3 / D / L- **1 control pair:** Black cores with white numbers. 1. Control core: 4 2. Control core: 5 **2 control pairs:** Black cores with white numbers. 1. Control core: 5 2. Control core: 6 3. Control core: 7 4. Control core: 8
Element shield	Extremely bending-resistant braiding made of tinned copper wires.
Inner jacket	PVC mixture adapted to suit the requirements in e-chains®.
Overall shield	Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90%
Outer jacket	Low-adhesion, oil-resistant PVC mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-4-1). Colour: Moss green (similar to RAL 6005)
CFRIP®	Strip cables faster: a tear strip is moulded into the inner jacket Video ▶ www.igus.eu/CFRIP

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 5.5.2.1

Basic requirements	low	1	2	3	4	**5**	6	7	highest
Travel distance	unsupported	1	2	3	4	**5**	6		≥ 400m
Oil resistance	none	1	**2**	3	4	highest			
Torsion	none	**1**	2	3	4	±360°			

Electrical information

Nominal voltage	600/1,000V (following DIN VDE 0298-3) 1,000V (following UL)
Testing voltage	4,000V (following DIN EN 50395)

Properties and approvals

UV resistance	Medium
Oil resistance	Oil-resistant (following DIN EN 50363-4-1), Class 2
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF21UL
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 2. The outer jacket material of this series complies with CF5.10.07 - tested by IPA according to standard DIN EN ISO 14644-1
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	7.5 million	10 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
+5/+15	10	11	12
+15/+60	7.5	8.5	9.5
+60/+70	10	11	12

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For heavy-duty applications, Class 5
- Unsupported travels and up to 100m for gliding applications, Class 5
- Light oil influence, Class 2
- No torsion, Class 1
- Preferably indoor applications, but also outdoor ones at temperatures > 5 °C
- Storage and retrieval units, machining units/packaging machines, quick handling, indoor cranes

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Servo cable | PVC outer jacket

chainflex® CF21.UL

Strip cables 50% faster with CFRIP® tear strip

Basic requirements
Travel distance
Oil resistance
Torsion

low 1 2 3 4 **5** 6 7 highest
unsupported 1 2 3 4 **5** 6 ≥ 400m
none 1 **2** 3 4 highest
none **1** 2 3 4 ±360°

Class 5.5.2.1

Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
1 control pair shielded				
CF21.07.05.02.01.UL	(4G0.75+(2x0.5)C)C	11.0	76	159
CF21.15.15.02.01.UL	(4G1.5+(2x1.5)C)	13.0	145	256
CF21.25.15.02.01.UL	(4G2.5+(2x1.5)C)C	14.5	199	330
CF21.40.15.02.01.UL	(4G4.0+(2x1.5)C)C	16.0	256	406
CF21.60.15.02.01.UL	(4G6.0+(2x1.5)C)C	18.0	343	546
CF21.100.15.02.01.UL	(4G10+(2x1.5)C)C	21.5	536	828
2 control pairs shielded				
CF21.07.03.02.02.UL	(4G0.75+2x(2x0.34)C)C	12.5	103	208
CF21.10.07.02.02.UL	(4G1.0+2x(2x0.75)C)	13.5	148	269
CF21.15.07.02.02.UL	(4G1.5+2x(2x0.75)C)C	14.5	167	309
CF21.25.15.02.02.UL	(4G2.5+2x(2x1.5)C)C	17.0	254	434
CF21.40.15.02.02.UL	(4G4.0+2x(2x1.5)C)C	18.0	308	515
CF21.60.15.02.02.UL	(4G6.0+2x(2x1.5)C)C	21.0	412	695
CF21.100.15.02.02.UL	(4G10+2x(2x1.5)C)C	23.0	592	925
CF21.160.15.02.02.UL	(4G16+2x(2x1.5)C)C	26.5	878	1287

Shop and prices online

CF-G-0003

www.igus.eu/CF21UL

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Order example: CF21.40.15.02.01.UL - to your required length (0.5m steps)
CF21.UL **chainflex® series** .40 **Code nominal cross section** .15 **Code nominal cross section signal pairs**
.02 **Identification pairs** .01 **Number of pairs**

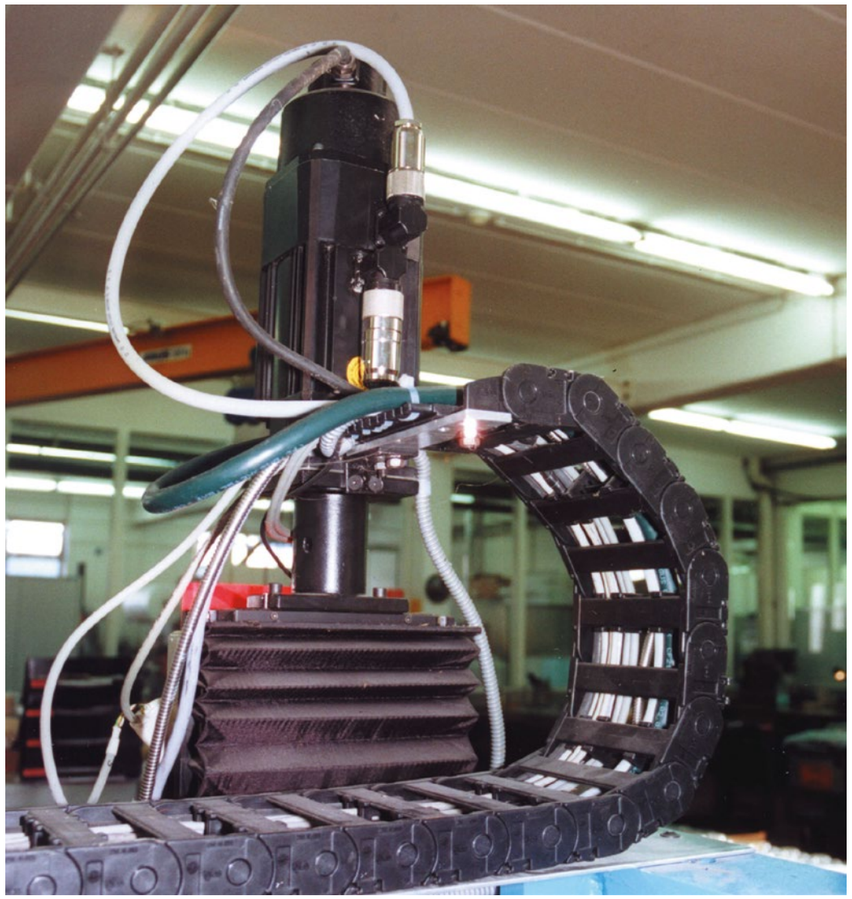
Order online ▶ www.igus.eu/CF21UL

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case



chainflex® CF21.UL: cables for energy supply systems in spinneret production. e-chain®: E2/000

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

CFRIP

PTFE FREE

NFPA

REACH

RoHS

clean-room

CE

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Servo cable | iguPUR outer jacket

chainflex® CF897

Image exemplary

5,000,000 Double strokes guaranteed

15 x d Bend radius, e-chain®

10m Travel distance, e-chain®

- For flexing applications
- iguPUR outer jacket
- Oil-resistant
- Shielded
- Flame-retardant

Dynamic information

Bend radius	**e-chain® linear**	minimum 15 x d
	flexible	minimum 12 x d
	fixed	minimum 8 x d
Temperature	**e-chain® linear**	-20°C up to +80°C
	flexible	-40°C up to +80°C (following DIN EN 60811-504)
	fixed	-50°C up to +80°C (following DIN EN 50305)
v max.	**unsupported**	3m/s
a max.		20m/s²
Travel distance		Unsupported travels up to 10m, Class 1

Cable structure

Conductor	Conductor consisting of bare copper wires (according to DIN EN 60228).
Core insulation	Mechanically high-quality, especially low-capacitance TPE mixture.
Core structure	Power cores and control pair elements wound together in an optimised pitch length.
Core identification	**Power cores:** Black cores with white numbers, one green-yellow core. 1. Core: U / L1 / C / L+ 2. Core: V / L2 3. Core: W / L3 / D / L- **1 control pair:** Black cores with white numbers. 1. Control core: 5 2. Control core: 6 **2 control pairs:** Black cores with white numbers. 1. Control core: 5 2. Control core: 6 3. Control core: 7 4. Control core: 8
Element shield	Foil taping of optimised, bending-resistant foil shield.
Overall shield	Braiding made of tinned copper wires. Coverage approx. 60% optical
Outer jacket	Low-adhesion iguPUR mixture, adapted to suit the requirements in e-chains®. Colour: Pastel orange (similar to RAL 2003)

Electrical information

Nominal voltage	600/1,000V (following DIN VDE 0298-3) 1,000V (following UL)
Testing voltage	4,000V (following DIN EN 50395)

Class 3.1.3.1

Basic requirements	low	1	2	**3**	4	5	6	7 highest
Travel distance	unsupported	**1**	2	3	4	5	6	≥ 400m
Oil resistance	none	1	2	**3**	4	highest		
Torsion	none	**1**	2	3	4	±360°		

Properties and approvals

UV resistance	Medium
Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF897
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	1 million	3 million	5 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
-20/-10	17.5	18.5	19.5
-10/+70	15	16	17
+70/+80	17.5	18.5	19.5

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For flexing applications, Class 3
- Especially for unsupported travels, Class 1
- With influence of oil, Class 3
- No torsion, Class 1
- Indoor and outdoor applications without direct sun radiation
- Machining units/machine tools, low temperature applications

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
1 control pair shielded				
CF897.15.15.02.01	(4G1.5+(2x1.5)C)	12.5	124	201
CF897.25.15.02.01	(4G2.5+(2x1.5)C)C	13.5	182	248
CF897.40.15.02.01	(4G4.0+(2x1.5)C)C	14.5	236	329
2 control pairs shielded				
CF897.15.15.02.02	(4G1.5+2x(2x1.5)C)C	13.5	164	246

Shop and prices online

CF-G-0004

www.igus.eu/CF897

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Servo cable | PUR outer jacket

chainflex® CF270.UL.D

Image exemplary

10 million
Double strokes guaranteed

10 x d
Bend radius, e-chain®

10m
Travel distance, e-chain®

- For medium duty applications
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Notch-resistant
- Flame-retardant
- Hydrolysis and microbe-resistant
- PVC and halogen-free

Now with 90°C UL/CSA AWM approval

Dynamic information

Bend radius	**e-chain® linear**	minimum 10 x d
	flexible	minimum 8 x d
	fixed	minimum 5 x d
Temperature	**e-chain® linear**	-25°C up to +80°C
	flexible	-40°C up to +80°C (following DIN EN 60811-504)
	fixed	-50°C up to +80°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	2m/s
a max.		50m/s²
Travel distance		Unsupported travels and up to 10m for gliding applications, Class 2

Cable structure

Conductor
Multicore: Stranded conductor in bending-resistant version consisting of bare copper wires (following DIN EN 60228).
Single core: Conductor cable consisting of pre-leads (following DIN EN 60228).

Core insulation
Multicore: Mechanically high-quality, especially low-capacitance XLPE mixture.
Single core: Mechanically high-quality TPE mixture.

Core structure
Power cores and control pair elements wound with a short pitch length around a high tensile strength centre element.

Core identification
Power cores: Black cores with white numbers, one green-yellow core.
1. Core: U / L1 / C / L+ 2. Core: V / L2 3. Core: W / L3 / D / L-
1 control pair: Black cores with white numbers.
1. Control core: 4 2. Control core: 5
2 control pairs: Black cores with white numbers.
1. Control core: 5 2. Control core: 6
3. Control core: 7 4. Control core: 8

Element shield
Bending-resistant braiding made of tinned copper wires.

Intermediate layer
Foil taping over the outer layer.

Overall shield
Bending-resistant braiding made of tinned copper wires.
Coverage linear approx. 55%, optical approx. 80%

Outer jacket
Low-adhesion, halogen-free, highly abrasion resistant PUR mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2)
Colour: Pastel orange (similar to RAL 2003)

Class 4.2.3.1

Basic requirements	low	1	2	3	**4**	5	6	7	highest
Travel distance	unsupported	1	**2**	3	4	5	6		≥ 400m
Oil resistance	none	1	2	**3**	4	highest			
Torsion	none	**1**	2	3	4	±360°			

Electrical information

Nominal voltage	600/1,000V (following DIN VDE 0298-3) 1,000V (following UL)
Testing voltage	4,000V (following DIN EN 50395)

Properties and approvals

UV resistance	Medium
Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3
Offshore	MUD-resistant following NEK 606 - status 2016
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF270ULD
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1
DESINA	According to VDW, DESINA standardisation
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	7.5 million	10 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
-25/-15	12.5	13.5	14.5
-15/+70	10	11	12
+70/+80	12.5	13.5	14.5

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For medium duty applications, Class 4
- Unsupported travels and up to 10m for gliding applications, Class 2
- Almost unlimited resistance to oil, Class 3
- No torsion, Class 1
- Indoor and outdoor applications without direct sun radiation
- Machining units/machine tools, low temperature applications

Servo cable | PUR outer jacket

chainflex® CF270.UL.D

Class 4.2.3.1

Basic requirements	low	1	2	3	**4**	5	6	7 highest
Travel distance	unsupported	1	**2**	3	4	5	6	≥ 400m
Oil resistance	none	1	2	**3**	4	highest		
Torsion	none	**1**	2	3	4	±360°		

Image exemplary

	Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
	1 control pair shielded				
New	**CF270.UL.07.03.02.01.D**	(4G0.75+(2x0.34)C)C	9.0	72	108
	CF270.UL.15.15.02.01.D	(4G1.5+(2x1.5)C)	11.5	146	190
	CF270.UL.25.15.02.01.D	(4G2.5+(2x1.5)C)C	13.0	195	248
	CF270.UL.40.15.02.01.D	(4G4.0+(2x1.5)C)C	15.0	260	328
	CF270.UL.60.15.02.01.D	(4G6.0+(2x1.5)C)C	16.5	350	430
	CF270.UL.100.15.02.01.D	(4G10+(2x1.5)C)C	19.0	541	624
	CF270.UL.160.15.02.01.D	(4G16+(2x1.5)C)C	22.0	786	900
	2 control pairs shielded				
	CF270.UL.07.03.02.02.D	(4G0.75+2x(2x0.34)C)C	11.0	96	151
	CF270.UL.10.07.02.02.D	(4G1.0+2x(2x0.75)C)	12.5	139	200
	CF270.UL.15.07.02.02.D	(4G1.5+2x(2x0.75)C)C	12.5	162	210
	CF270.UL.25.15.02.02.D	(4G2.5+2x(2x1.5)C)C	15.5	265	322
	CF270.UL.40.15.02.02.D	(4G4.0+2x(2x1.5)C)C	16.5	322	403
	CF270.UL.60.15.02.02.D	(4G6.0+2x(2x1.5)C)C	18.5	407	505
	CF270.UL.100.15.02.02.D	(4G10+2x(2x1.5)C)C	21.0	604	703
	CF270.UL.160.15.02.02.D	(4G16+2x(2x1.5)C)C	24.0	857	997
	CF270.UL.250.15.02.02.D	(4G25+2x(2x1.5)C)C	27.5	1219	1422
	without control pair				
	CF270.UL.07.04.D	(4G0.75)C	8.0	47	81
	CF270.UL.10.06.D	(6G1.0)C	9.5	87	133
	CF270.UL.15.04.D	(4G1.5)C	9.0	78	116
	CF270.UL.25.04.D	(4G2.5)C	10.5	129	173
	CF270.UL.40.04.D	(4G4.0)C	12.5	193	255
	CF270.UL.60.04.D	(4G6.0)C	14.5	297	356
	CF270.UL.100.04.D	(4G10)C	17.0	495	551
	CF270.UL.160.04.D	(4G16)C	20.5	755	819
	CF270.UL.250.04.D	(4G25)C	25.0	1117	1256
	CF270.UL.350.04.D	(4G35)C	28.0	1597	1696
	Spindle cable/Single core				
	CF270.UL.60.01.D	(1x6.0)C	7.5	72	95
	CF270.UL.100.01.D	(1x10)C	8.5	114	145
	CF270.UL.160.01.D	(1x16)C	9.5	178	209
	CF270.UL.250.01.D	(1x25)C	11.0	269	304
	CF270.UL.350.01.D	(1x35)C	13.0	374	419
	CF270.UL.500.01.D	(1x50)C	15.0	525	579
	CF270.UL.700.01.D	(1x70)C	17.0	751	804

Shop and prices online

CF-G-0005

www.igus.eu/CF270ULD

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x** = without earth core

Order example: CF270.UL.40.15.02.01.D - to your required length (0.5m steps)
CF270.UL.D chainflex® series .40 Code nominal cross section .15 Code nominal cross section signal pairs .02 Identification pairs .01 Number of pairs

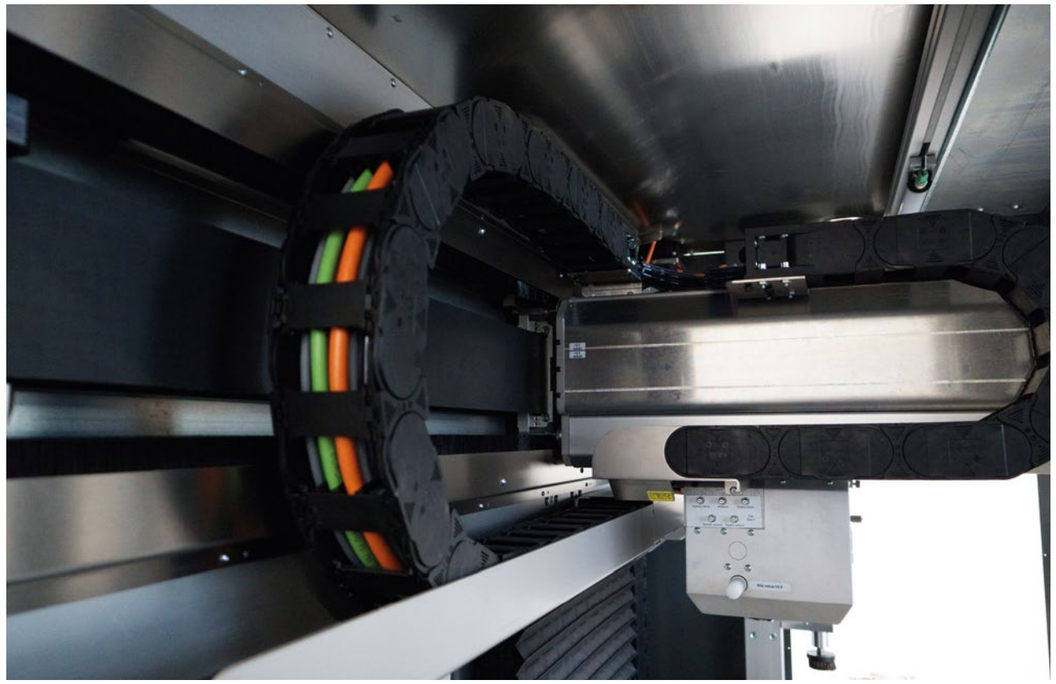
Order online ▶ www.igus.eu/CF270ULD

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case



Linear robot with chainflex® servo and measuring system cables, short travel distance

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Servo cable | PUR outer jacket

chainflex® CF27.D

Image exemplary

10 million Double strokes guaranteed

7.5 x d Bend radius, e-chain®

100m Travel distance, e-chain®

- For extremely heavy duty applications
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Notch-resistant
- Flame-retardant
- Hydrolysis and microbe-resistant
- PVC and halogen-free

Now with 90°C UL/CSA AWM approval

Dynamic information

Bend radius	**e-chain® linear**	minimum 7.5 x d
	flexible	minimum 6 x d
	fixed	minimum 4 x d
Temperature	**e-chain® linear**	-25°C up to +80°C
	flexible	-40°C up to +80°C (following DIN EN 60811-504)
	fixed	-50°C up to +80°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	5m/s
a max.		80m/s²
Travel distance		Unsupported travels and up to 100m for gliding applications, Class 5

Cable structure

Conductor	Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228).
Core insulation	Mechanically high-quality, especially low-capacitance XLPE mixture.
Core structure	Power cores with control pair elements wound with elements for high tensile stresses.
Core identification	**Power cores:** Black cores with white numbers, one green-yellow core. 1. Core: U / L1 / C / L+ 2. Core: V / L2 3. Core: W / L3 / D / L- **1 control pair:** Black cores with white numbers. 1. Control core: 4 2. Control core: 5 **2 control pairs:** Black cores with white numbers. 1. Control core: 5 2. Control core: 6 3. Control core: 7 4. Control core: 8 **Star quad:** yellow, black, red, white
Element shield	Extremely bending-resistant braiding made of tinned copper wires.
Inner jacket	TPE mixture adapted to suit the requirements in e-chains®.
Overall shield	Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90%
Outer jacket	Low-adhesion, halogen-free, highly abrasion resistant PUR mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2) Colour: Pastel orange (similar to RAL 2003)
CFRIP®	Strip cables faster: a tear strip is moulded into the inner jacket Video ▶ www.igus.eu/CFRIP

Electrical information

Nominal voltage	600/1,000V (following DIN VDE 0298-3) 1,000V (following UL)
Testing voltage	4,000V (following DIN EN 50395)

Class 6.5.3.1

Basic requirements	low	1	2	3	4	5	**6**	7 highest
Travel distance	unsupported	1	2	3	4	**5**	6	≥ 400m
Oil resistance	none	1	2	**3**	4	highest		
Torsion	none	**1**	2	3	4	±360°		

Properties and approvals

UV resistance	Medium
Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3
Offshore	MUD-resistant following NEK 606 - status 2016
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF27D
NFPA	Following NFPA 79-2018, chapter 12.9
DNV	Type Approval Certificate TAE00003XA (Issue 04/2025) Current information in the data sheet ▶ www.igus.eu/CF27D
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1
DESINA	According to VDW, DESINA standardisation
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	7.5 million	10 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
-25/-15	10	11	12
-15/+70	7.5	8.5	9.5
+70/+80	10	11	12

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For heavy-duty applications, Class 6
- Unsupported travels and up to 100m for gliding applications, Class 5
- Almost unlimited resistance to oil, Class 3
- No torsion, Class 1
- Indoor and outdoor applications, UV-resistant
- Storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, cleanroom, semiconductor insertion, outdoor cranes, low-temperature applications

Servo cable | PUR outer jacket

chainflex® CF27.D

Strip cables 50% faster with CFRIP® tear strip

Basic requirements	low	1	2	3	4	5	**6**	7	highest
Travel distance	unsupported	1	2	3	4	**5**	6	≥ 400m
Oil resistance	none	1	2	**3**	4	highest		
Torsion	none	**1**	2	3	4	±360°		

Class 6.5.3.1

Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
1 control pair shielded				
CF27.07.05.02.01.D	(4G0.75+(2x0.5)C)C	11.5	76	169
CF27.15.15.02.01.D	(4G1.5+(2x1.5)C)	13.0	145	244
CF27.25.15.02.01.D	(4G2.5+(2x1.5)C)C	14.5	199	306
CF27.40.15.02.01.D	(4G4.0+(2x1.5)C)C	16.0	256	403
CF27.60.15.02.01.D	(4G6.0+(2x1.5)C)C	17.5	343	505
CF27.100.15.02.01.D	(4G10+(2x1.5)C)C	21.0	536	746
CF27.160.15.02.01.D	(4G16+(2x1.5)C)C	24.0	797	1086
CF27.250.15.02.01.D	(4G25+(2x1.5)C)C	28.0	1173	1528
CF27.350.15.02.01.D	(4G35+(2x1.5)C)C	32.0	1618	1998
2 control pairs shielded				
CF27.07.03.02.02.D	(4G0.75+2x(2x0.34)C)C	12.5	103	196
CF27.10.07.02.02.D	(4G1.0+2x(2x0.75)C)	13.5	148	245
CF27.15.07.02.02.D	(4G1.5+2x(2x0.75)C)C	14.5	167	287
CF27.25.15.02.02.D	(4G2.5+2x(2x1.5)C)C	16.0	254	383
CF27.40.15.02.02.D	(4G4.0+2x(2x1.5)C)C	17.5	308	459
CF27.60.15.02.02.D	(4G6.0+2x(2x1.5)C)C	19.5	412	604
CF27.100.15.02.02.D	(4G10+2x(2x1.5)C)C	22.5	592	842
CF27.160.15.02.02.D	(4G16+2x(2x1.5)C)C	26.0	878	1223
CF27.250.15.02.02.D	(4G25+2x(2x1.5)C)C	31.0	1250	1699
1 star-quad shielded				
CF27.15.05.04.D	(4G1.5+(4x0.5)C)C	12.5	131	231
CF27.25.05.04.D	(4G2.5+(4x0.5)C)C	14.0	176	292
CF27.40.05.04.D	(4G4.0+(4x0.5)C)	16.0	244	376
without control pair				
CF27.07.04.D	(4G0.75)C	9.5	55	115
CF27.15.04.D	(4G1.5)C	11.0	90	165
CF27.25.04.D	(4G2.5)C	12.5	135	231
CF27.500.04.D	(4G50)C	37.0	2244	2817

Shop and prices online

CF-G-0006

www.igus.eu/CF27D

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case

Order example: CF27.40.15.02.01.D - to your required length (0.5m steps)
CF27.D chainflex® series .40 Code nominal cross section .10 Code nominal cross section signal pairs .02 Identification pairs .01 Number of pairs

Order online ▶ www.igus.eu/CF27D

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

cost down...

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Reduce cost, improve technology, now!
Do the chainflex® price check ...
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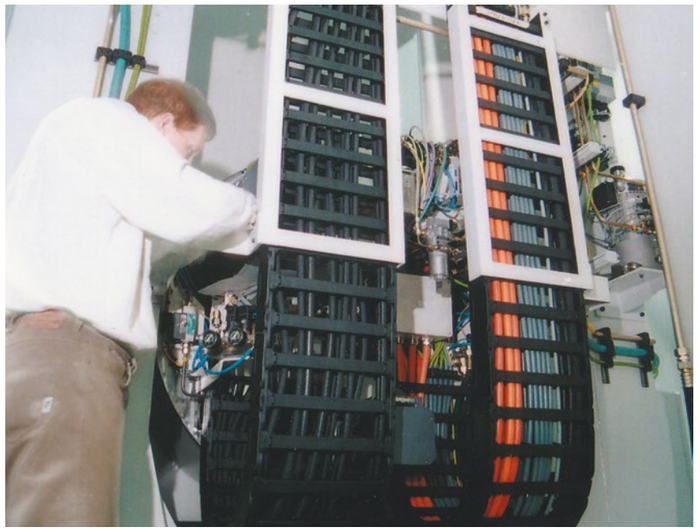
… for example: reduce cost with CF21.UL ...



Modular design, easy to retrofit: igus® E4 e-chain® and chainflex® cables.

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Servo cable | TPE outer jacket

chainflex® CF29.D

12.5 million Double strokes guaranteed

6.8 x d Bend radius, e-chain®

400m Travel distance, e-chain®

- For heaviest duty applications
- TPE outer jacket
- Shielded
- Oil and bio-oil-resistant
- PVC and halogen-free
- UV-resistant
- Hydrolysis and microbe-resistant

Now with 90°C UL/CSA AWM approval

Dynamic information

Bend radius	**e-chain® linear**	minimum 6.8 x d
	flexible	minimum 5 x d
	fixed	minimum 4 x d
Temperature	**e-chain® linear**	-35°C up to +100°C
	flexible	-50°C up to +100°C (following DIN EN 60811-504)
	fixed	-55°C up to +100°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	5m/s
a max.		80m/s²
Travel distance		Unsupported travels and up to 400m and more for gliding applications, Class 6

Cable structure

Conductor Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228).

Core insulation Mechanically high-quality, especially low-capacitance XLPE mixture.

Core structure Power cores with control pair elements wound with elements for high tensile stresses.

Core identification **Power cores:** Black cores with white numbers, one green-yellow core.
1. Core: U / L1 / C / L+ 2. Core: V / L2 3. Core: W / L3 / D / L-
1 control pair: Black cores with white numbers.
1. Control core: 4 2. Control core: 5

Element shield Extremely bending-resistant braiding made of tinned copper wires.

Inner jacket TPE mixture adapted to suit the requirements in e-chains®.

Overall shield Extremely bending-resistant braiding made of tinned copper wires.
Coverage linear approx. 70%, optical approx. 90%

Outer jacket Low-adhesion, extremely abrasion-resistant and highly flexible TPE mixture, adapted to suit the requirements in e-chains®.
Colour: Pastel orange (similar to RAL 2003)

CFRIP® Strip cables faster: a tear strip is moulded into the inner jacket
Video ▶ www.igus.eu/CFRIP

Electrical information

Nominal voltage 600/1,000V (following DIN VDE 0298-3)
1,000V (following UL)

Testing voltage 4,000V (following DIN EN 50395)

Class 7.6.4.1

Basic requirements	low	1	2	3	4	5	6	**7** highest
Travel distance	unsupported	1	2	3	4	5	**6**	≥ 400m
Oil resistance	none	1	2	3	**4** highest			
Torsion	none	**1**	2	3	4	±360°		

Properties and approvals

UV resistance	Medium
Oil resistance	Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL AWM	See data sheet for details ▶ www.igus.eu/CF29D (from production date 01/2022)
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF9.15.07 - tested by IPA according to standard DIN EN ISO 14644-1
Dry cleanroom	Tested in "dry cleanroom" according to DIN EN ISO 14644-1
DESINA	According to VDW, DESINA standardisation
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million		7.5 million		12.5 million	
Temperature, from/to [°C]	< 10m	≥ 10m	< 10m	≥ 10m	< 10m	≥ 10m
	R min. [x d]	R min. [x d]	R min. [x d]	R min. [x d]	R min. [x d]	R min. [x d]
-35/-25	8.5	10	9.5	11	10.5	12
-25/+90	6.8	7.5	7.5	8.5	8.5	9.5
+90/+100	8.5	10	9.5	11	10.5	12

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For heavy-duty applications, Class 7
- Unsupported travels and up to 400m and more for gliding applications, Class 6
- Almost unlimited resistance to oil, also with bio-oils
- No torsion, Class 1
- Indoor and outdoor applications, UV-resistant, Class 4
- Storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, cleanroom, semiconductor insertion, outdoor cranes, low-temperature applications

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
1 control pair shielded				
CF29.15.15.02.01.D	(4G1.5+(2x1.5)C)	13.0	145	231
CF29.25.15.02.01.D	(4G2.5+(2x1.5)C)C	14.0	199	291
CF29.40.15.02.01.D	(4G4.0+(2x1.5)C)C	15.5	256	367

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Shop and prices online

CF-G-0007

www.igus.eu/CF29D

Hybrid servo cable | PVC outer jacket

chainflex® CF220.UL.H

Image exemplary

10 million
Double strokes guaranteed

10 x d
Bend radius, e-chain®

10m
Travel distance, e-chain®

- For medium duty applications
- PVC outer jacket
- Shielded
- Oil-resistant
- Flame-retardant

New cable suitable for Siemens SINAMICS S210

Dynamic information

Bend radius	**e-chain® linear**	minimum 10 x d
	flexible	minimum 8 x d
	fixed	minimum 5 x d
Temperature	**e-chain® linear**	+5°C up to +70°C
	flexible	-5°C up to +70°C (following DIN EN 60811-504)
	fixed	-15°C up to +70°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	2m/s
a max.		50m/s²
Travel distance		Unsupported travels and up to 10m for gliding applications, Class 2

Cable structure

Conductor	Stranded conductor in bending-resistant version consisting of bare copper wires (following DIN EN 60228).
Core insulation	Mechanically high-quality, especially low-capacitance XLPE mixture.
Core structure	Power cores and control pair elements wound with a short pitch length around a high tensile strength centre element.
Core identification	According to Servo-Hybrid specification. Current data sheet ▶ www.chainflex.eu/CF220ULH
Element shield	Bending-resistant braiding made of tinned copper wires.
Intermediate layer	Foil taping over the outer layer.
Overall shield	Bending-resistant braiding made of tinned copper wires. Coverage linear approx. 55%, optical approx. 80%
Outer jacket	Low-adhesion, oil-resistant PVC mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-4-1). Colour: Pastel orange (similar to RAL 2003) Variants ▶ Product range table

Electrical information

Nominal voltage	600/1,000V (following DIN VDE 0298-3) 1,000V (following UL) Variants ▶ Product range table
Testing voltage	4,000V (following DIN EN 50395)

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 4.2.2.1

Basic requirements	low	1	2	3	**4**	5	6	7 highest
Travel distance	unsupported	1	**2**	3	4	5	6	≥ 400m
Oil resistance	none	1	**2**	3	4	highest		
Torsion	none	**1**	2	3	4	±360°		

Properties and approvals

UV resistance	Medium
Oil resistance	Oil-resistant (following DIN EN 50363-4-1), Class 2
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF220ULH
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 2. The outer jacket material of this series complies with CF5.10.07 - tested by IPA according to standard DIN EN ISO 14644-1
CE	Following 2014/35/EU
Info	As hybrid cables are always designed for specific drive systems, additional electrotechnical data may need to be considered. You will find more information in the latest data sheet for the cable series.

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	7.5 million	10 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
+5/+15	12.5	13.5	14.5
+15/+60	10	11	12
+60/+70	12.5	13.5	14.5

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For medium duty applications, Class 4
- Unsupported travels and up to 10m for gliding applications, Class 2
- Light oil influence, Class 2
- No torsion, Class 1
- Preferably indoor applications, but also outdoor ones at temperatures > 5 °C
- Wood/stone processing, packaging industry, feeding, handling, adjusting devices

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Hybrid servo cable | PVC outer jacket

chainflex® CF220.UL.H

Basic requirements	low	1	2	3	**4**	5	6	7	highest
Travel distance	unsupported	1	**2**	3	4	5	6	≥ 400m
Oil resistance	none	1	**2**	3	4	highest		
Torsion	none	**1**	2	3	4	±360°		

Class 4.2.2.1

igus® chainflex® CF220.UL.H

Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Shop and prices online
SICK (HIPERFACE DSL)					
CF220.UL.H100.07.04	(4G0.75+(2x0.34)C +(2xAWG22)C)C	11.5	106	166	
CF220.UL.H101.10.04	(4G1.0+(2x0.75)C +(2xAWG22)C)C	12.0	129	200	
CF220.UL.H101.15.04	(4G1.5+(2x0.75)C +(2xAWG22)C)C	13.0	151	226	
CF220.UL.H102.25.04	(4G2.5+(2x1.0)C +(2xAWG22)C)C	14.5	199	289	
SEW cable type E/1.5					
CF220.UL.H203.15.04	(4G1.5+(3x1.0)C)C	11.5	133	201	
SINAMICS S210					
CF220.UL.H300.03.04	(4Gx0.34+(2x0.34)C +(4xAWG26)C)C	10.0	78	128	
CF220.UL.H301.07.04	(4Gx0.75+(2x0.5)C +(4xAWG26)C)C	11.0	99	149	
CF220.UL.H304.15.04	(4G1.5+(2x1.5)C +(4xAWG26)C)C	13.0	159	234	
ctrlX DRIVE					
New **CF220.UL.H402.15.04**	(4G1.5+(2x0.75) +(4xAWG24)C)C	13.0	147	236	
HEIDENHAIN					
CF220.UL.H501.15.04	(4G1.5+(2x0.75)C +(2x2x0.14+2x0.25)C)C	13.5	150	240	

CF-H-0001

www.igus.eu/CF220ULH

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Drilling machine for wooden plates equipped with latest hybrid cable technology with Hiperface DSL

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Part No.	Hybrid technology	Hybrid manufacturer
SICK (HIPERFACE DSL)		
CF220.UL.H100.07.04	SICK (HIPERFACE DSL)	please see selection table on page 239
CF220.UL.H101.10.04	SICK (HIPERFACE DSL)	please see selection table on page 239
CF220.UL.H101.15.04	SICK (HIPERFACE DSL)	please see selection table on page 239
CF220.UL.H102.25.04	SICK (HIPERFACE DSL)	please see selection table on page 239
SEW cable type E/1.5		
CF220.UL.H203.15.04	SEW cable type E/1.5	SEW
SINAMICS S210		
CF220.UL.H300.03.04	SINAMICS S210	Siemens
CF220.UL.H301.07.04	SINAMICS S210	Siemens
CF220.UL.H304.15.04	SINAMICS S210	Siemens
ctrlX DRIVE		
CF220.UL.H402.15.04	ctrlX DRIVE	Bosch Rexroth
HEIDENHAIN		
CF220.UL.H501.15.04	HEIDENHAIN	B&R

chainflex CASE

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Hybrid servo cable | PUR outer jacket

chainflex® CF280.UL.H

Image exemplary

10 million
Double strokes guaranteed

10 x d
Bend radius, e-chain®

10m
Travel distance, e-chain®

- For medium duty applications
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

New cable suitable for Bosch Rexroth ctrlX DRIVE

Dynamic information

Bend radius	**e-chain® linear**	minimum 10 x d
	flexible	minimum 8 x d
	fixed	minimum 5 x d
Temperature	**e-chain® linear**	-25°C up to +80°C
	flexible	-40°C up to +80°C (following DIN EN 60811-504)
	fixed	-50°C up to +80°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	2m/s
a max.		50m/s²
Travel distance		Unsupported travels and up to 10m for gliding applications, Class 2

Cable structure

Conductor
Stranded conductor in bending-resistant version consisting of bare copper wires (following DIN EN 60228).

Core insulation
Mechanically high-quality, especially low-capacitance XLPE mixture.

Core structure
Power cores and control pair elements wound with a short pitch length around a high tensile strength centre element.

Core identification
According to Servo-Hybrid specification.
Current data sheet ▶ www.chainflex.eu/CF220ULH

Element shield
Bending-resistant braiding made of tinned copper wires.

Intermediate layer
Foil taping over the outer layer.

Overall shield
Bending-resistant braiding made of tinned copper wires.
Coverage linear approx. 55%, optical approx. 80%

Outer jacket
Low-adhesion, halogen-free, highly abrasion resistant PUR mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2)
Colour: Pastel orange (similar to RAL 2003)
Variants ▶ Product range table

Electrical information

Nominal voltage
600/1,000V (following DIN VDE 0298-3)
1,000V (following UL)
Variants ▶ Product range table

Testing voltage
4,000V (following DIN EN 50395)

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 4.2.3.1

Basic requirements	low	1	2	3	**4**	5	6	7	highest
Travel distance	unsupported	1	**2**	3	4	5	6	≥ 400m	
Oil resistance	none	1	2	**3**	4	highest			
Torsion	none	**1**	2	3	4	±360°			

Properties and approvals

UV resistance	Medium
Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3
Offshore	MUD-resistant following NEK 606 - status 2016
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF280ULH
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1
DESINA	According to VDW, DESINA standardisation
CE	Following 2014/35/EU
Info	As hybrid cables are always designed for specific drive systems, additional electrotechnical data may need to be considered. You will find more information in the latest data sheet for the cable series.

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	7.5 million	10 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
-25/-15	12.5	13.5	14.5
-15/+70	10	11	12
+70/+80	12.5	13.5	14.5

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For medium duty applications, Class 4
- Unsupported travels and up to 10m for gliding applications, Class 2
- Almost unlimited resistance to oil, Class 3
- No torsion, Class 1
- Indoor and outdoor applications without direct sun radiation
- Machining units/machine tools, low temperature applications

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Hybrid servo cable | PUR outer jacket

chainflex® CF280.UL.H

Basic requirements	low	1	2	3	**4**	5	6	7	highest
Travel distance	unsupported	1	**2**	3	4	5	6	≥ 400m	
Oil resistance	none	1	2	**3**	4	highest			
Torsion	none	**1**	2	3	4	±360°			

Class 4.2.3.1

igus® chainflex® CF280.UL.H

Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Shop and prices online
SICK (HIPERFACE DSL)					
CF280.UL.H100.07.04.D	(4G0.75+(2x0.34)C +(2xAWG22)C)C	12.0	106	168	
CF280.UL.H101.10.04.D	(4G1.0+(2x0.75)C +(2xAWG22)C)C	12.5	129	202	
CF280.UL.H101.15.04.D	(4G1.5+(2x0.75)C +(2xAWG22)C)C	13.0	151	228	
CF280.UL.H102.25.04.D	(4G2.5+(2x1.0)C +(2xAWG22)C)C	14.5	199	291	
CF280.UL.H102.40.04.D	(4G4.0+(2x1.0)C +(2xAWG22)C)C	16.0	268	363	
CF280.UL.H102.60.04.D	(4G6.0+(2x1.0)C +(2xAWG22)C)C	17.5	343	475	
SEW cable type A, B, C, D, E					
CF280.UL.H200.15.07.D [15]	(7x1.5+(2x0.75)C)C	15.0	182	266	
CF280.UL.H200.25.07.D [15]	(7x2.5+(2x0.75)C)C	18.0	263	368	
CF280.UL.H201.15.04.D [15]	4G1.5+(2x0.75)C +(3x0.75)C	12.5	132	210	
CF280.UL.H201.25.04.D [15]	4G2.5+(2x0.75)C +(3x0.75)	14.5	170	270	
CF280.UL.H203.15.04.D	(4G1.5+(3x1.0)C)C	11.5	133	200	
CF280.UL.H203.25.04.D	(4G2.5+(3x1.0)C)C	13.0	177	262	
CF280.UL.H204.15.04.D	(4G1.5+(2x0.75)C +(3x1.0)C)C	13.5	178	263	
CF280.UL.H206.40.04.D	(4G4.0+(2x0.75)C +(3x1.5)C)C	17.0	311	424	
CF280.UL.H206.60.04.D	(4G6.0+(2x0.75)C +(3x1.5)C)C	18.5	398	517	
MOVILINK DDI					
CF280.UL.H207.15.04.D	(4G1.5+2x(2x1.0)C +HF50-0.9/2.95)C	15.5	191	304	
CF280.UL.H207.25.04.D	(4G2.5+2x(2x1.0)C +HF50-0.9/2.95)C	16.5	232	354	

CF-H-0002

www.igus.eu/CF280ULH

[15] Colour outer jacket: Jet black (RAL 9005)

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Part No.	Hybrid technology	Hybrid manufacturer
SICK (HIPERFACE DSL)		
CF280.UL.H100.07.04.D	SICK (HIPERFACE DSL)	please see selection table on page 239
CF280.UL.H101.10.04.D	SICK (HIPERFACE DSL)	please see selection table on page 239
CF280.UL.H101.15.04.D	SICK (HIPERFACE DSL)	please see selection table on page 239
CF280.UL.H102.25.04.D	SICK (HIPERFACE DSL)	please see selection table on page 239
CF280.UL.H102.40.04.D	SICK (HIPERFACE DSL)	please see selection table on page 239
CF280.UL.H102.60.04.D	SICK (HIPERFACE DSL)	please see selection table on page 239
SEW cable type A, B, C, D, E		
CF280.UL.H200.15.07.D [15]	SEW cable type A/1.5	SEW
CF280.UL.H200.25.07.D [15]	SEW cable type A/2.5	SEW
CF280.UL.H201.15.04.D [15]	SEW cable type B/1.5	SEW
CF280.UL.H201.25.04.D [15]	SEW cable type B/2.5	SEW
CF280.UL.H203.15.04.D	SEW cable type E/1.5	SEW
CF280.UL.H203.25.04.D	SEW cable type E/2.5	SEW
CF280.UL.H204.15.04.D	SEW cable type D/1.5	SEW
CF280.UL.H206.40.04.D	SEW cable type D/4.0	SEW
CF280.UL.H206.60.04.D	SEW cable type D/6.0	SEW
MOVILINK DDI		
CF280.UL.H207.15.04.D	MOVILINK DDI	SEW
CF280.UL.H207.25.04.D	MOVILINK DDI	SEW

Further cable types ▶ Page 270

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

Hybrid servo cable | PUR outer jacket

chainflex® CF280.UL.H

Class 4.2.3.1

Basic requirements	low	1	2	3	**4**	5	6	7	highest
Travel distance	unsupported	1	**2**	3	4	5	6		≥ 400m
Oil resistance	none	1	2	**3**	4				highest
Torsion	none	**1**	2	3	4				±360°

Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Shop and prices online
SINAMICS S210					
CF280.UL.H300.03.04.D	(4G0.34+(2x0.34)C +(4xAWG26)C)C	10.0	78	130	
CF280.UL.H301.07.04.D	(4G0.75+(2x0.5)C +(4xAWG26)C)C	11.0	99	151	
CF280.UL.H304.15.04.D	(4G1.5+(2x1.5)C +(4xAWG26)C)C	13.0	159	236	
CF280.UL.H304.25.04.D	(4G2.5+(2x1.5)C +(4xAWG26)C)C	14.5	205	286	
IndraDrive					
CF280.UL.H400.25.05.D	(5x2.5+(5x0.35) +(4xAWG22)C)C	15.5	222	338	CF-H-0002
ctrlX DRIVE					www.igus.eu/ CF280ULH
CF280.UL.H401.07.04.D	(4G0.75+(2x0.5)C +(4xAWG24)C)C	12.5	106	193	
New **CF280.UL.H402.15.04.D**	(4G1.5+(2x0.75)C +(4xAWG24)C)C	13.5	147	235	
HEIDENHAIN					
CF280.UL.H501.15.04.D	(4G1.5+(2x0.75)C +(2x2x0.14+2x0.25)C)C	13.5	150	240	
CF280.UL.H502.40.04.D	(4G4.0+(2x1.0)C +(2x2x0.14+2x0.25)C)C	16.5	266	378	

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Further cable types ▶ Page 268

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case

Part No.	Hybrid technology	Hybrid manufacturer
SINAMICS S210		
CF280.UL.H300.03.04.D	SINAMICS S210	Siemens
CF280.UL.H301.07.04.D	SINAMICS S210	Siemens
CF280.UL.H304.15.04.D	SINAMICS S210	Siemens
CF280.UL.H304.25.04.D	SINAMICS S210	Siemens
IndraDrive		
CF280.UL.H400.25.05.D	IndraDrive	Bosch Rexroth
ctrlX DRIVE		
CF280.UL.H401.07.04.D	ctrlX DRIVE	Bosch Rexroth
CF280.UL.H402.15.04.D	ctrlX DRIVE	Bosch Rexroth
HEIDENHAIN		
CF280.UL.H501.15.04.D	HEIDENHAIN	B&R
CF280.UL.H502.40.04.D	HEIDENHAIN	B&R

Order example: CF280.UL.H101.10.04 to your required length (0.5m steps)
CF280.UL.H chainflex® series .101.10.04 Code hybrid bus element

Order online ▶ www.igus.eu/CF280ULH

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

chainflex®

Motor cables

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

Motor cables for energy chains

Specially designed for use in e-chains®. Free selection between multi-core cables and single cores. Six different outer jacket materials, shielded and unshielded options. Tested with a chainflex® guarantee of up to 4 years.

- Electrical design according to manufacturer standards for bend radius up to 7.5xd
- Always find the most cost-effective motor cable made from various jacket materials that is guaranteed to work.
- Developed, tested and optimised for longest life in e-chains®
- Sustainability thanks to a longer service life is practical resource protection, enhancing economic efficiency and protecting the environment.
- Calculate the exact service life online: igus.eu/chainflexlife

Background

Why motor cables?

When we talk about motor cables, we not just mean the supply cable for a motor. A four-core control cable can do that. We are talking about connecting a frequency converter to the motor.

The requirement for this is that the core insulation fulfils the 600/1,000V voltage levels. This is necessary because the frequency converter uses the principle of pulse width modulation to control frequency and thus motor speed. This leads to voltage peaks, which the insulation must be able to handle. This is why a higher voltage class is chosen than for a control cable.

Multicore vs. single-core

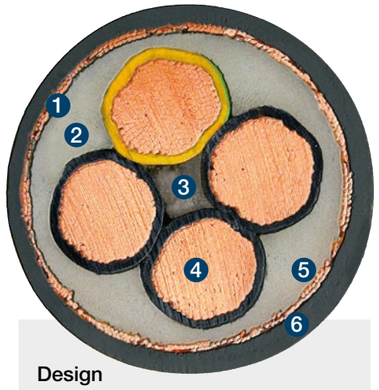
It is now possible to design cables with single cores, especially for large drives. This solution offers several advantages over classical four-core versions. Probably the biggest advantage is the much lower price that can be offered due to a different, more cost-effective manufacturing process. The single-core solution is also more robust, making it suitable for small installation spaces in energy chains, while still delivering a longer service life. This is particularly noticeable on long travels. Thinner single-core cables make connection to the motor easier, but they require special bolted

Benefits

- Multicore or single-core
- Shielded and unshielded
- For the most demanding applications
- Jacket materials: PVC, PUR, TPE
- Tested with a 4-year guarantee

Typical application areas

- Storage and retrieval units, machining units/packaging machines, quick handling
- Machine tools
- Indoor cranes
- Outdoor cranes
- Low temperature applications



Design

1. Overall shield with optimised braiding angle
2. Gusset-filling extruded inner jacket
3. Tensile stress-resistant centre element
4. Optimised strand-wire diameter
5. Cores wound with optimised pitch length and pitch direction
6. Highly abrasion-resistant pressure extruded outer jacket

connections. We have plenty of experience with this type of challenge, and we always keep the necessary products in stock to provide a solution. Using single cores for motors has led to a considerable increase in cable service life in various contexts. Moreover, cable costs have often been reduced significantly. In this section, our aim is to make this knowledge much more widely available and demonstrate some clear solutions.

Single core - multicore motor cables

In industrial applications, ruptured cores or broken shields are a hazard. This often causes machine downtime. igus® designs its chainflex® cables with mechanically high-quality copper conductors in optimised pitch length to avoid such downtimes. This core structure provides a high load capacity compared to conventional motor cables. For energy chain systems, it is recommended to switch to single cores with a core cross section of 10 mm^2, as these can be used in smaller installation spaces. This also benefits the mechanical design of the entire energy chain system. The two primary characteristics that give a single core its advantage over a multicore motor cable are cost-effectiveness and compactness. Single cores can be produced at significantly lower cost than the multicore alternative. The small diameter enables faster processing, resulting in more favourable production costs. In addition to reducing costs, they also take up less space, which is important in tight installation spaces. These two factors make single cores especially attractive for use in energy chains in different applications.

Advantages of TPE include abrasion resistance, cold resistance and a long service life.

The majority of our motor cables have outer jackets made of the TPE high-end material, which is especially well-suited to applications in extreme temperature ranges. The temperature range for TPE motor cables is defined as -35°C to +90°C in energy chains. This means that this material is ideal for use in deep-freeze areas or very warm environments. Another feature of TPE is its extremely high abrasion resistance. Direct comparisons of TPE with PVC and PUR show that TPE has superior abrasion resistance, making it ideal for high-end applications with the longest service life.

Application example

Motor cables in crane systems

Problem

In Lumut, Malaysia, the planned construction of a new modern coal-fired power plant for the operator Lekir Bulk Terminal Sdn Bhd. is a major project. The coal for the power plant is delivered by ships; for further processing, berths for the cargo ships have been built on an artificial island about 2 km off the coast, which are served by two large ship unloaders. The ship unloaders each have a travel of 441m and were built by the Koch company in Wadgassen in Saarland. For the energy supply system, the operator was looking for a sophisticated system that could also withstand the local environmental conditions and cope with the high load caused by the continuous operation of the plant.

Solution

The operator finally decided on an e-chain system® from igus®. The crane operator's cabin is supplied with a chain of type 4040.25.150.0. Due to the high travel speed in combination with the very high fill weight of 41.03kg/m, a 4-band energy chain with 2 extension links was used for the trolley. This application uses role-chains® with stainless steel bearings, which can withstand the highly corrosive salty sea air. The weight of an e-chain® including cables is almost 2.5 tons. The e-chains® are equipped with CFCRANE 50/6.6/10KV medium-voltage cables or CFCRANE 35/6.6/10KV, a Fibre Optic Cable with 6 fibres 62.5/125 as well as a water hose. This is because water mist is constantly used to suppress dust during the unloading of the ships due to the high dust generation. Furthermore, all energy chains come fully equipped with stainless steel guide troughs and are protected from the weather and high levels of UV radiation by an enclosure.

Profile

- **What was needed:** Crane operator cabin: E4/4 e-chain® (4040 series), load carrying equipment (trolley): rol e-chain®
- 5050R.21/21/21.250.0, chainflex® cables, stainless steel guide troughs and enclosure
- **Requirements:** Corrosive environmental conditions, dust generation
- **Industry:** Crane, ship unloader
- **Success for the customer:** complete energy supply solution from one source, reliable solution for highly corrosive ambient conditions

chainflex® motor cables

Mechanical parameters

chainflex® cables	Jacket	Shield	Bend radius e-chain® min. [xd]	Temperature e-chain® from/to [°C]	v max. [m/s] unsupported	v max. [m/s] gliding	a max. [m/s²]	Travel distance [m]	Page
CF885	PVC		15	+5/+70	3	-	20	≤ 10	280
CF886	PVC	●	15	+5/+70	3	-	20	≤ 10	282
CF210.UL New	PVC	●	10	+5/+70	10	2	50	≤ 10	284
CF30 New	PVC		7.5	+5/+70	10	5	80	≤ 100	286
CF31 New	PVC	●	7.5	+5/+70	10	5	80	≤ 100	290
CF895	iguPUR		15	-20/+80	3	-	20	≤ 10	294
CF896	iguPUR	●	15	-20/+80	3	-	20	≤ 10	296
CF270.UL.D New	PUR	●	10	-25/+80	10	2	50	≤ 10	298
CF27.D New	PUR	●	7.5	-25/+80	10	5	80	≤ 100	302
CF34.UL.D New	TPE		7.5	-35/+90	10	6	80	≤ 400	306
CF35.UL New	TPE	●	7.5	-35/+90	10	6	80	≤ 400	310
CF37.D New	TPE		7.5	-35/+90	10	6	80	≤ 400	314
CF38 New	TPE	●	7.5	-35/+90	10	6	80	≤ 400	318

Approvals/resistance

chainflex® cables	Approvals and standards																		Page
CF885			●				●			●			●	●				●	280
CF886			●				●			●			●	●				●	282
CF210.UL New	●		●				●			●			●	●	●			●	284
CF30 New	●	●	●				●			●			●	●	●			●	286
CF31 New	●		●				●			●			●	●	●			●	290
CF895	●		●				●			●			●	●				●	294
CF896	●		●				●			●			●	●				●	296
CF270.UL.D New	●		●				●			●			●	●	●		●	●	298
CF27.D New	●		●				●			●		●	●	●	●		●	●	302
CF34.UL.D New	●	●	●				●			●		●	●	●	●		●	●	306
CF35.UL New	●		●				●			●		●	●	●	●			●	310
CF37.D New	●	●	●					●					●	●	●	●	●	●	314
CF38 New	●		●					●					●	●	●	●		●	318

Guaranteed service life

chainflex® cables	Temperature, from/to [°C]	Min. bend radius [xd]	Min. bend radius [xd]	Min. bend radius [xd]	Page
		5 million (1 million) double strokes *	7.5 million (3 million) double strokes *	10 million (5 million) double strokes *	
CF885	+5 / +15	17.5	18.5	19.5	
	+15 / +60	15	16	17	280
	+60 / +70	17.5	18.5	19.5	
CF886	+5 / +15	17.5	18.5	19.5	
	+15 / +60	15	16	17	282
	+60 / +70	17.5	18.5	19.5	
CF210.UL New	+5 / +15	12.5	13.5	14.5	
	+15 / +60	10	11	12	284
	+60 / +70	12.5	13.5	14.5	
CF30 New	+5 / +15	10	11	12	
	+15 / +60	7.5	8.5	9.5	286
	+60 / +70	10	11	12	
CF31 New	+5 / +15	10	11	12	
	+15 / +60	7.5	8.5	9.5	290
	+60 / +70	10	11	12	
CF895	-20 / -10	17.5	18.5	19.5	
	-10 / +70	15	16	17	294
	+70 / +80	17.5	18.5	19.5	
CF896	-20 / -10	17.5	18.5	19.5	
	-10 / +70	15	16	17	296
	+70 / +80	17.5	18.5	19.5	
CF270.UL.D New	-25 / -15	12.5	13.5	14.5	
	-15 / +70	10	11	12	298
	+70 / +80	12.5	13.5	14.5	
CF27.D New	-25 / -15	10	11	12	
	-15 / +70	7.5	8.5	8.5	302
	+70 / +80	10	11	12	
CF34.UL.D New	-35 / -25	10	11	12	
	-25 / +80	7.5	8.5	9.5	306
	+80 / +90	10	11	12	
CF35.UL New	-35 / -25	10	11	12	
	-25 / +80	7.5	8.5	9.5	310
	+80 / +90	10	11	12	
		5 million	7.5 million	12.5 million	
CF37.D New	-35 / -25	10	11	12	
	-25 / +80	7.5	8.5	9.5	314
	+80 / +90	10	11	12	
CF38 New	-35 / -25	10	11	12	
	-25 / +80	7.5	8.5	9.5	318
	+80 / +90	10	11	12	

* Higher number of double strokes? Calculate service life online ▶ www.igus.eu/chainflexlife
Figures in brackets refer to series CF885/CF886 and CF895/CF896

chainflex® Spindle cables/Single cores/Medium voltage

Mechanical parameters

chainflex® cables	Jacket	Shield	Bend radius e-chain® min. [xd]	Temperature e-chain® from/to [°C]	v max. [m/s] unsupported	v max. [m/s] gliding	a max. [m/s²]	Travel distance [m]	Page
CF885	PVC		15	+5/+70	3	-	20	≤ 10	322
CF885.PE	PVC		15	+5/+70	3	-	20	≤ 10	324
CF886	PVC	●	15	+5/+70	3	-	20	≤ 10	326
CF270.UL.D	PUR	●	10	-25/+80	10	2	50	≤ 10	328
CF300.UL.D	TPE		7.5	-35/+90	10	6	100	≤ 400	330
CFPE	TPE		7.5	-35/+90	10	6	100	≤ 400	334
CF310.UL	TPE	●	7.5	-35/+90	10	6	100	≤ 400	336
CF330.D New	TPE		7.5	-35/+90	10	6	100	≤ 400	340
CF340 New	TPE	●	7.5	-35/+90	10	6	100	≤ 400	342
CFCRANE.PUR	PUR	●	10	-20/+80	10	6	50	≤ 400	344
CFCRANE New	igupren	●	10	-20/+80	10	6	50	≤ 400	346

Approvals/resistance

chainflex® cables	oil	UV	PTFE free	Approvals and standards																Page
CF885			●				●			●			●	●					●	322
CF885.PE			●				●			●			●	●					●	324
CF886			●				●			●			●	●					●	326
CF270.UL.D	●		●				●			●			●	●	●		●	●	●	328
CF300.UL.D	●	●	●				●			●		●	●	●	●		●	●	●	330
CFPE	●	●	●				●			●		●	●	●	●				●	334
CF310.UL	●		●				●			●		●	●	●	●				●	336
CF330.D New	●	●	●					●					●	●	●	●	●	●	●	340
CF340 New	●		●					●					●	●	●	●			●	342
CFCRANE.PUR	●		●										●	●					●	344
CFCRANE New	●		●										●	●					●	346

Guaranteed service life

chainflex® cables	Temperature, from/to [°C]	Min. bend radius [xd]	Min. bend radius [xd]	Min. bend radius [xd]	Page
		5 million (1 million) double strokes *	7.5 million (3 million) double strokes *	10 million (5 million) double strokes *	
CF885	+5 / +15	17.5	18.5	19.5	
	+15 / +60	15	16	17	322
	+60 / +70	17.5	18.5	19.5	
CF885.PE	+5 / +15	17.5	18.5	19.5	
	+15 / +60	15	16	17	324
	+60 / +70	17.5	18.5	19.5	
CF886	+5 / +15	17.5	18.5	19.5	
	+15 / +60	15	16	17	326
	+60 / +70	17.5	18.5	19.5	
CF270.UL.D	-25 / -15	12.5	13.5	14.5	
	-15 / +70	10	11	12	328
	+70 / +80	12.5	13.5	14.5	
CF300.UL.D	-35 / -25	10	11	12	
	-25 / +80	7.5	8.5	9.5	330
	+80 / +90	10	11	12	
CFPE	-35 / -25	10	11	12	
	-25 / +80	7.5	8.5	9.5	334
	+80 / +90	10	11	12	
CF310.UL	-35 / -25	10	11	12	
	-25 / +80	7.5	8.5	9.5	336
	+80 / +90	10	11	12	
		5 million	7.5 million	12.5 million	
CF330.D New	-35 / -25	10	11	12	
	-25 / +80	7.5	8.5	9.5	340
	+80 / +90	10	11	12	
CF340 New	-35 / -25	10	11	12	
	-25 / +80	7.5	8.5	9.5	342
	+80 / +90	10	11	12	
		5 million	7.5 million	10 million	
CFCRANE.PUR	-20 / -10	12.5	13.5	14.5	
	-10 / +70	10	11	12	344
	+70 / +80	12.5	13.5	14.5	
CFCRANE New	-20 / -10	12.5	13.5	14.5	
	-10 / +70	10	11	12	346
	+70 / +80	12.5	13.5	14.5	

* Higher number of double strokes? Calculate service life online ▶ www.igus.eu/chainflexlife
Figures in brackets refer to series CF885 and CF886

Motor cable | PVC outer jacket

chainflex® CF885

Image exemplary

5,000,000 Double strokes guaranteed

15 x d Bend radius, e-chain®

10m Travel distance, e-chain®

- For flexing applications
- PVC outer jacket
- Flame-retardant

Dynamic information

Bend radius	**e-chain® linear**	minimum 15 x d
	flexible	minimum 12 x d
	fixed	minimum 8 x d
Temperature	**e-chain® linear**	+5°C up to +70°C
	flexible	-5°C up to +70°C (following DIN EN 60811-504)
	fixed	-15°C up to +70°C (following DIN EN 50305)
v max.	**unsupported**	3m/s
a max.		20m/s²
Travel distance		Unsupported travels up to 10m, Class 1

Cable structure

Conductor	Conductor consisting of bare copper wires (according to DIN EN 60228).
Core insulation	Mechanically high-quality, especially low-capacitance TPE mixture.
Core structure	Cores wound with an optimised pitch length.
Core identification	Black cores with white numbers, one green-yellow core. 1. Core: U / L1 / C / L+ 2. Core: V / L2 3. Core: W / L3 / D / L-
Outer jacket	Low-adhesion PVC mixture, adapted to suit the requirements in e-chains®. Colour: Pastel orange (similar to RAL 2003)

Electrical information

Nominal voltage	600/1,000V (following DIN VDE 0298-3) 1,000V (following UL)
Testing voltage	4,000V (following DIN EN 50395)

Properties and approvals

Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE

Class 3.1.1.1

Basic requirements	low	1 2 **3** 4 5 6 7 highest
Travel distance	unsupported	**1** 2 3 4 5 6 ≥ 400m
Oil resistance	none	**1** 2 3 4 highest
Torsion	none	**1** 2 3 4 ±360°

UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶**www.igus.eu/CF885**
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	1 million	3 million	5 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
+5/+15	17.5	18.5	19.5
+15/+60	15	16	17
+60/+70	17.5	18.5	19.5

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For flexing applications, Class 3
- Especially for unsupported travels, Class 1
- Without influence of oil, Class 1
- No torsion, Class 1
- Preferably indoor applications
- Wood/stone processing, packaging industry, feeding, handling, adjusting devices

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CF885.15.04	4G1.5	8.0	67	105
CF885.25.04	4G2.5	10.0	110	163
CF885.40.04	4G4.0	11.5	175	244
CF885.60.04	4G6.0	13.5	237	360
CF885.100.04	4G10	17.0	412	514
CF885.160.04	4G16	20.0	690	857

Shop and prices online

CF-I-0001

www.igus.eu/CF885

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case

Motor cable | PVC outer jacket

chainflex® CF886

Image exemplary

5 million Double strokes guaranteed

15 x d Bend radius, e-chain®

10m Travel distance, e-chain®

- For flexing applications
- PVC outer jacket
- Shielded
- Flame-retardant

Dynamic information

Bend radius	**e-chain® linear**	minimum 15 x d
	flexible	minimum 12 x d
	fixed	minimum 8 x d
Temperature	**e-chain® linear**	+5°C up to +70°C
	flexible	-5°C up to +70°C (following DIN EN 60811-504)
	fixed	-15°C up to +70°C (following DIN EN 50305)
v max.	**unsupported**	3m/s
a max.		20m/s²
Travel distance		Unsupported travels up to 10m, Class 1

Cable structure

Conductor	Conductor consisting of bare copper wires (according to DIN EN 60228).
Core insulation	Mechanically high-quality, especially low-capacitance TPE mixture.
Core structure	Cores wound with an optimised pitch length.
Core identification	Black cores with white numbers, one green-yellow core. 1. Core: U / L1 / C / L+ 2. Core: V / L2 3. Core: W / L3 / D / L-
Overall shield	Braiding made of tinned copper wires. Coverage approx. 60% optical
Outer jacket	Low-adhesion PVC mixture, adapted to suit the requirements in e-chains®. Colour: Pastel orange (similar to RAL 2003)

Electrical information

Nominal voltage	600/1,000V (following DIN VDE 0298-3) 1,000V (following UL)
Testing voltage	4,000V (following DIN EN 50395)

Class 3.1.1.1

Basic requirements	low	1	2	**3**	4	5	6	7 highest
Travel distance	unsupported	**1**	2	3	4	5	6	≥ 400m
Oil resistance	none	**1**	2	3	4	highest		
Torsion	none	**1**	2	3	4	±360°		

Properties and approvals

Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶www.igus.eu/CF886
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	1 million	3 million	5 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
+5/+15	17.5	18.5	19.5
+15/+60	15	16	17
+60/+70	17.5	18.5	19.5

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For flexing applications, Class 3
- Especially for unsupported travels, Class 1
- Without influence of oil, Class 1
- No torsion, Class 1
- Preferably indoor applications
- Wood/stone processing, packaging industry, feeding, handling, adjusting devices

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CF886.15.04	(4G1.5)C	9.0	82	119
CF886.25.04	(4G2.5)C	10.5	132	181
CF886.40.04	(4G4.0)C	12.0	204	263
CF886.60.04	(4G6.0)C	14.5	269	377
CF886.100.04	(4G10)C	18.5	458	577
CF886.160.04	(4G16)C	21.0	760	829

Shop and prices online

CF-I-0002

www.igus.eu/CF886

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Motor cable | PVC outer jacket

chainflex® CF210.UL

New

Image exemplary

10 million
Double strokes guaranteed

10 x d
Bend radius, e-chain®

10m
Travel distance, e-chain®

- For medium duty applications
- PVC outer jacket
- Shielded
- Oil-resistant
- Flame-retardant

Now with 90°C UL/CSA AWM approval

Dynamic information

Bend radius	**e-chain® linear**	minimum 10 x d
	flexible	minimum 8 x d
	fixed	minimum 5 x d
Temperature	**e-chain® linear**	+5°C up to +70°C
	flexible	-5°C up to +70°C (following DIN EN 60811-504)
	fixed	-15°C up to +70°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	2m/s
a max.		50m/s²
Travel distance		Unsupported travels and up to 10m for gliding applications, Class 2

Cable structure

Conductor	Stranded conductor in bending-resistant version consisting of bare copper wires (following DIN EN 60228).
Core insulation	Mechanically high-quality, especially low-capacitance XLPE mixture.
Core structure	Cores wound with high tensile strength centre elements.
Core identification	Black cores with white numbers, one green-yellow core. 1. Core: U / L1 / C / L+ 2. Core: V / L2 3. Core: W / L3 / D / L-
Intermediate layer	Foil taping over the outer layer.
Overall shield	Bending-resistant braiding made of tinned copper wires. Coverage linear approx. 55%, optical approx. 80%
Outer jacket	Low-adhesion, oil-resistant PVC mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-4-1). Colour: Pastel orange (similar to RAL 2003)

Electrical information

Nominal voltage	600/1,000V (following DIN VDE 0298-3) 1,000V (following UL)
Testing voltage	4,000V (following DIN EN 50395)

Class 4.2.2.1

Basic requirements	low	1	2	3	**4**	5	6	7 highest
Travel distance	unsupported	1	**2**	3	4	5	6	≥ 400m
Oil resistance	none	1	**2**	3	4	highest		
Torsion	none	**1**	2	3	4	±360°		

Properties and approvals

UV resistance	Medium
Oil resistance	Oil-resistant (following DIN EN 50363-4-1), Class 2
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF210UL
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 2. The outer jacket material of this series complies with CF5.10.07 - tested by IPA according to standard DIN EN ISO 14644-1
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	7.5 million	10 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
+5/+15	12.5	13.5	14.5
+15/+60	10	11	12
+60/+70	12.5	13.5	14.5

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For medium duty applications, Class 4
- Unsupported travels and up to 10m for gliding applications, Class 2
- Light oil influence, Class 2
- No torsion, Class 1
- Preferably indoor applications, but also outdoor ones at temperatures > 5 °C
- Wood/stone processing, packaging industry, feeding, handling, adjusting devices

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CF210.UL.05.04	(4G0.5)C	7.0	34	63
CF210.UL.15.04	(4G1.5)C	10.0	86	140
CF210.UL.25.04	(4G2.5)C	11.5	146	209
CF210.UL.40.04	(4G4.0)C	13.0	195	288

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Shop and prices online

www.igus.eu/CF210UL

Motor cable | PVC outer jacket

chainflex® CF30

New

Image exemplary

10 million Double strokes guaranteed

7.5 x d Bend radius, e-chain®

100m Travel distance, e-chain®

- For heavy duty applications
- PVC outer jacket
- Oil-resistant
- Flame-retardant

Now with 90°C UL/CSA AWM approval

Dynamic information

Bend radius	**e-chain® linear**	minimum 7.5 x d
	flexible	minimum 6 x d
	fixed	minimum 4 x d
Temperature	**e-chain® linear**	+5°C up to +70°C
	flexible	-5°C up to +70°C (following DIN EN 60811-504)
	fixed	-15°C up to +70°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	5m/s
a max.		80m/s²
Travel distance		Unsupported travels and up to 100m for gliding applications, Class 5
Torsion		Torsion ±90°, with 1m cable length, Class 2

Cable structure

Conductor
Cores <10mm²: Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228).
Cores ≥ 10mm²: Conductor cable consisting of pre-leads (following DIN EN 60228).

Core insulation
Mechanically high-quality, especially low-capacitance XLPE mixture.

Core structure
Cores wound with a short pitch length around a high tensile strength centre element.

Core identification
Black cores with white numbers, one green-yellow core.
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 PVC mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-4-1).
Colour: jet black (similar to RAL 9005)

CFRIP®
Strip cables faster: a tear strip is moulded into the outer jacket
Video ▶ www.igus.eu/CFRIP

Electrical information

Nominal voltage
600/1,000V (following DIN VDE 0298-3)
1,000V (following UL)

Testing voltage
4,000V (following DIN EN 50395)

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Basic requirements low 1 2 3 4 **5** 6 7 highest
Travel distance unsupported 1 2 3 4 **5** 6 ≥ 400m
Oil resistance none 1 **2** 3 4 highest
Torsion none 1 **2** 3 4 ±360°

Class 5.5.2.2

Properties and approvals

UV resistance	Medium
Oil resistance	Oil-resistant (following DIN EN 50363-4-1), Class 2
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶www.igus.eu/CF30
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 2. The outer jacket material of this series complies with CF5.10.07 - tested by IPA according to standard DIN EN ISO 14644-1
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	7.5 million	10 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
+5/+15	10	11	12
+15/+60	7.5	8.5	9.5
+60/+70	10	11	12

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For heavy-duty applications, Class 5
- Unsupported travels and up to 100m for gliding applications, Class 5
- Light oil influence, Class 2
- Torsion ±90°, with 1m cable length, Class 2
- Preferably indoor applications, but also outdoor ones at temperatures > 5 °C
- Storage and retrieval units, machining units/packaging machines, quick handling, indoor cranes

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Motor cable | PVC outer jacket

chainflex® CF30

Strip cables 50% faster with CFRIP® tear strip

Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CF30.15.04	4G1.5	8.0	61	104
CF30.25.04	4G2.5	10.0	100	166
CF30.25.05	5G2.5	11.0	124	203
CF30.40.04	4G4.0	11.5	163	249
CF30.40.05	5G4.0	12.5	204	302
CF30.60.04	4G6.0	13.5	237	343
CF30.60.05	5G6.0	15.0	297	410
CF30.100.04	4G10	16.5	407	548
CF30.100.05	5G10	19.5	515	684
CF30.160.04	4G16	20.0	646	826
CF30.160.05	5G16	23.5	815	1067
CF30.250.04	4G25	25.0	1014	1320
CF30.350.04	4G35	28.5	1439	1795
CF30.500.04 [11)]	4G50	34.0	2061	2528

Shop and prices online

CF-I-0004

www.igus.eu/CF30

[11)] Phase-out model

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case

Class 5.5.2.2

Basic requirements	low 1 2 3 4 **5** 6 7 highest	
Travel distance	unsupported 1 2 3 4 **5** 6 ≥ 400m	
Oil resistance	none 1 **2** 3 4 highest	
Torsion	none 1 **2** 3 4 ±360°	

Order example: CF30.15.04 - to your required length (0.5m steps)
CF30 chainflex® series .15 Code nominal cross section .04 Number of cores

Order online ▶ www.igus.eu/CF30

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

cost down...

...life up

Reduce cost, improve technology, now!
Do the chainflex® price check ...
www.igus.eu/cf-price-check

... for example: reduce cost with CF885 ...

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Motor cable | PVC outer jacket

chainflex® CF31

New

Image exemplary

10 million Double strokes guaranteed

7.5 x d Bend radius, e-chain®

100m Travel distance, e-chain®

- For heavy duty applications
- PVC outer jacket
- Shielded
- Oil-resistant
- Flame-retardant

Now with 90°C UL/CSA AWM approval

Dynamic information

Bend radius	**e-chain® linear**	minimum 7.5 x d
	flexible	minimum 6 x d
	fixed	minimum 4 x d
Temperature	**e-chain® linear**	+5°C up to +70°C
	flexible	-5°C up to +70°C (following DIN EN 60811-504)
	fixed	-15°C up to +70°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	5m/s
a max.		80m/s²

Travel distance Unsupported travels and up to 100m for gliding applications, Class 5

Cable structure

Conductor **Cores <10mm²:** Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228).
Cores ≥ 10mm²: Conductor cable consisting of pre-leads (following DIN EN 60228).

Core insulation Mechanically high-quality, especially low-capacitance XLPE mixture.

Core structure Cores wound with a short pitch length around a high tensile strength centre element.

Core identification Black cores with white numbers, one green-yellow core.
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 e-chains®.

Overall shield Extremely bending-resistant braiding made of tinned copper wires.
Coverage linear approx. 70%, optical approx. 90%

Outer jacket Low-adhesion, oil-resistant PVC mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-4-1).
Colour: jet black (similar to RAL 9005)

CFRIP® Strip cables faster: a tear strip is moulded into the inner jacket
Video ▶ www.igus.eu/CFRIP

Electrical information

Nominal voltage 600/1,000V (following DIN VDE 0298-3)
1,000V (following UL)

Testing voltage 4,000V (following DIN EN 50395)

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 5.5.2.1

Basic requirements	low	1	2	3	4	**5**	6	7 highest
Travel distance	unsupported	1	2	3	4	**5**	6	≥ 400m
Oil resistance	none	1	**2**	3	4	highest		
Torsion	none	**1**	2	3	4	±360°		

Properties and approvals

UV resistance	Medium
Oil resistance	Oil-resistant (following DIN EN 50363-4-1), Class 2
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF31
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 2. The outer jacket material of this series complies with CF5.10.07 - tested by IPA according to standard DIN EN ISO 14644-1
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	7.5 million	10 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
+5/+15	10	11	12
+15/+60	7.5	8.5	9.5
+60/+70	10	11	12

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For heavy-duty applications, Class 5
- Unsupported travels and up to 100m for gliding applications, Class 5
- Light oil influence, Class 2
- No torsion, Class 1
- Preferably indoor applications, but also outdoor ones at temperatures > 5 °C
- Storage and retrieval units, machining units/packaging machines, quick handling, indoor cranes

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Motor cable | PVC outer jacket

chainflex® CF31

Strip cables 50% faster with CFRIP® tear strip

Basic requirements	low	1	2	3	4	**5**	6	7	highest
Travel distance	unsupported	1	2	3	4	**5**	6		≥ 400m
Oil resistance	none	1	**2**	3	4	highest			
Torsion	none	**1**	2	3	4	±360°			

Class 5.5.2.1

Image exemplary

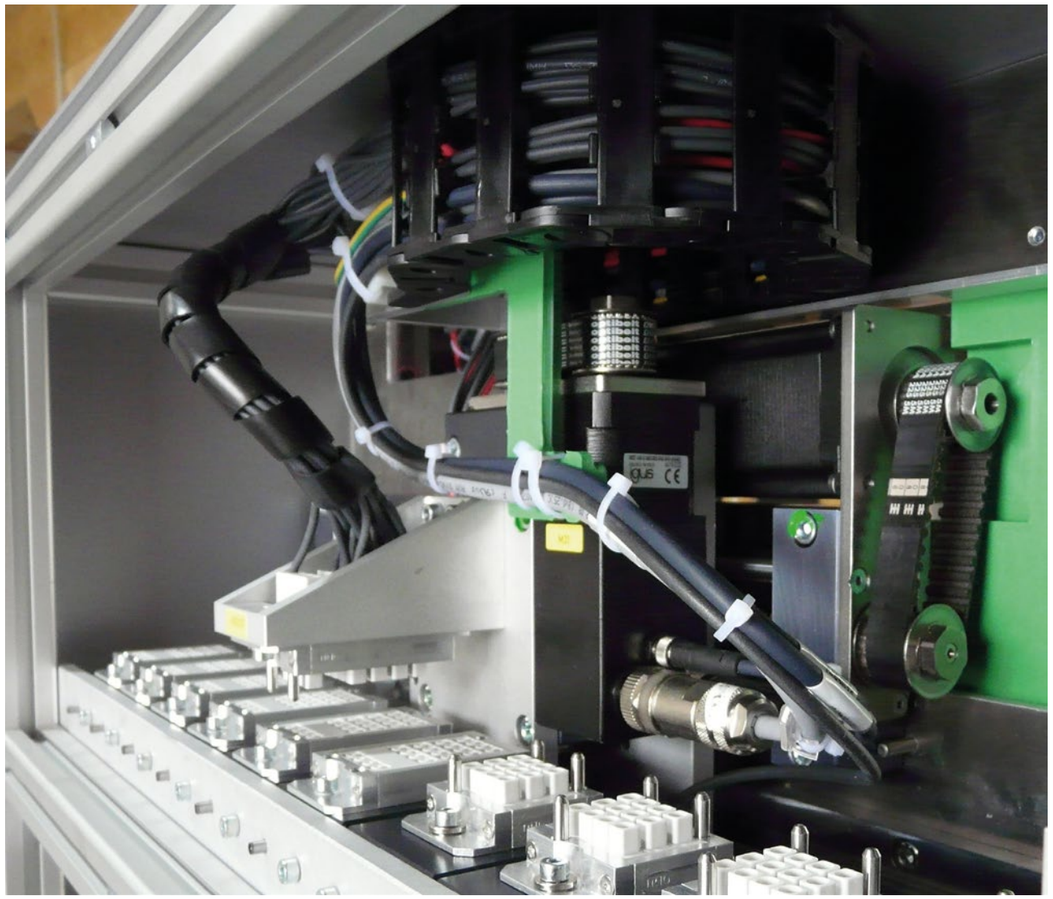
Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CF31.15.04	(4G1.5)C	10.0	89	157
CF31.25.04	(4G2.5)C	11.5	133	221
CF31.25.05	(5G2.5)C	13.0	163	271
CF31.40.04	(4G4.0)C	13.0	203	300
CF31.40.05	(5G4.0)C	14.5	258	354
CF31.60.04	(4G6.0)C	16.0	288	455
CF31.60.05	(5G6.0)C	17.0	356	532
CF31.100.04	(4G10)C	18.5	468	670
CF31.100.05	(5G10)C	21.5	609	857
CF31.160.04	(4G16)C	23.0	738	1035
CF31.250.04	(4G25)C	27.5	1153	1586
CF31.350.04	(4G35)C	31.0	1592	2104
CF31.500.04	(4G50)C	36.5	2224	2902
CF31.700.04	(4G70)C	43.0	3203	4173

Shop and prices online

CF-I-0005

www.igus.eu/CF31

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core



chainflex® CF31 motor cable in a fast picker

Order example: CF31.15.04 - to your required length (0.5m steps)
CF31 chainflex® series .15 Code nominal cross section .04 Number of cores

Order online ▶ www.igus.eu/CF31

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Motor cable | iguPUR outer jacket

chainflex® CF895

Image exemplary

5,000,000 Double strokes guaranteed

15 x d Bend radius, e-chain®

10m Travel distance, e-chain®

- For flexing applications
- iguPUR outer jacket
- Oil-resistant
- Flame-retardant

Dynamic information

Bend radius	**e-chain® linear**	minimum 15 x d
	flexible	minimum 12 x d
	fixed	minimum 8 x d
Temperature	**e-chain® linear**	-20°C up to +80°C
	flexible	-40°C up to +80°C (following DIN EN 60811-504)
	fixed	-50°C up to +80°C (following DIN EN 50305)
v max.	**unsupported**	3m/s
a max.		20m/s²
Travel distance		Unsupported travels up to 10m, Class 1

Cable structure

Conductor	Conductor consisting of bare copper wires (according to DIN EN 60228).
Core insulation	Mechanically high-quality, especially low-capacitance TPE mixture.
Core structure	Cores wound with an optimised pitch length.
Core identification	Black cores with white numbers, one green-yellow core. 1. Core: U / L1 / C / L+ 2. Core: V / L2 3. Core: W / L3 / D / L-
Outer jacket	Low-adhesion iguPUR mixture, adapted to suit the requirements in e-chains®. Colour: Pastel orange (similar to RAL 2003)

Electrical information

Nominal voltage	600/1,000V (following DIN VDE 0298-3) 1,000V (following UL)
Testing voltage	4,000V (following DIN EN 50395)

Class 3.1.3.1

Basic requirements	low	1	2	**3**	4	5	6	7 highest
Travel distance	unsupported	**1**	2	3	4	5	6	≥ 400m
Oil resistance	none	1	2	**3**	4	highest		
Torsion	none	**1**	2	3	4	±360°		

Properties and approvals

UV resistance	Medium
Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF895
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	1 million	3 million	5 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
-20/-10	17.5	18.5	19.5
-10/+70	15	16	17
+70/+80	17.5	18.5	19.5

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For flexing applications, Class 3
- Especially for unsupported travels, Class 1
- With influence of oil, Class 3
- No torsion, Class 1
- Indoor and outdoor applications without direct sun radiation
- Machining units/machine tools, low temperature applications

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CF895.15.04	4G1.5	8.0	67	101
CF895.25.04	4G2.5	10.0	110	153
CF895.40.04	4G4.0	11.5	175	239
CF895.60.04	4G6.0	13.5	262	353
CF895.100.04	4G10	17.0	436	543
CF895.160.04	4G16	20.0	653	824

Shop and prices online

CF-I-0007

www.igus.eu/CF895

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Motor cable | iguPUR outer jacket

chainflex® CF896

Image exemplary

5,000,000 Double strokes guaranteed

15 x d Bend radius, e-chain®

10m Travel distance, e-chain®

- For flexing applications
- iguPUR outer jacket
- Oil-resistant
- Shielded
- Flame-retardant

Dynamic information

Bend radius	**e-chain® linear**	minimum 15 x d
	flexible	minimum 12 x d
	fixed	minimum 8 x d
Temperature	**e-chain® linear**	-20°C up to +80°C
	flexible	-40°C up to +80°C (following DIN EN 60811-504)
	fixed	-50°C up to +80°C (following DIN EN 50305)
v max.	**unsupported**	3m/s
a max.		20m/s²
Travel distance		Unsupported travels up to 10m, Class 1

Cable structure

Conductor	Conductor consisting of bare copper wires (according to DIN EN 60228).
Core insulation	Mechanically high-quality, especially low-capacitance TPE mixture.
Core structure	Cores wound with an optimised pitch length.
Core identification	Black cores with white numbers, one green-yellow core. 1. Core: U / L1 / C / L+ 2. Core: V / L2 3. Core: W / L3 / D / L-
Overall shield	Braiding made of tinned copper wires. Coverage approx. 60% optical
Outer jacket	Low-adhesion iguPUR mixture, adapted to suit the requirements in e-chains®. Colour: Pastel orange (similar to RAL 2003)

Electrical information

Nominal voltage	600/1,000V (following DIN VDE 0298-3) 1,000V (following UL)
Testing voltage	4,000V (following DIN EN 50395)

Properties and approvals

UV resistance	Medium
Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3

Class 3.1.3.1

Basic requirements	low 1 2 **3** 4 5 6 7 highest
Travel distance	unsupported **1** 2 3 4 5 6 ≥ 400m
Oil resistance	none 1 2 **3** 4 highest
Torsion	none **1** 2 3 4 ±360°

Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF896
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	1 million	3 million	5 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
-20/-10	17.5	18.5	19.5
-10/+70	15	16	17
+70/+80	17.5	18.5	19.5

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For flexing applications, Class 3
- Especially for unsupported travels, Class 1
- With influence of oil, Class 3
- No torsion, Class 1
- Indoor and outdoor applications without direct sun radiation
- Machining units/machine tools, low temperature applications

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Shop and prices online
CF896.07.04	(4G0.75)C	7.5	52	79	CF-I-0008
CF896.15.04	(4G1.5)C	9.0	82	122	
CF896.25.04	(4G2.5)C	10.5	132	173	
CF896.40.04	(4G4.0)C	12.0	204	257	
CF896.60.04	(4G6.0)C	14.5	306	378	
CF896.100.04	(4G10)C	18.5	458	653	
CF896.160.04	(4G16)C	21.0	709	835	

www.igus.eu/CF896

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Motor cable | PUR outer jacket

chainflex® CF270.UL.D

New

Image exemplary

10 million
Double strokes guaranteed

10 x d
Bend radius, e-chain®

10m
Travel distance, e-chain®

- For medium duty applications
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Notch-resistant
- Flame-retardant
- Hydrolysis and microbe-resistant
- PVC and halogen-free

Now with 90°C UL/CSA AWM approval

Dynamic information

Bend radius	**e-chain® linear**	minimum 10 x d
	flexible	minimum 8 x d
	fixed	minimum 5 x d
Temperature	**e-chain® linear**	-25°C up to +80°C
	flexible	-40°C up to +80°C (following DIN EN 60811-504)
	fixed	-50°C up to +80°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	2m/s
a max.		50m/s²
Travel distance		Unsupported travels and up to 10m for gliding applications, Class 2

Cable structure

Conductor	Stranded conductor in bending-resistant version consisting of bare copper wires (following DIN EN 60228).
Core insulation	Mechanically high-quality, especially low-capacitance XLPE mixture.
Core structure	Cores wound with high tensile strength centre elements.
Core identification	Black cores with white numbers, one green-yellow core. 1. Core: U / L1 / C / L+ 2. Core: V / L2 3. Core: W / L3 / D / L-
Intermediate layer	Foil taping over the outer layer.
Overall shield	Bending-resistant braiding made of tinned copper wires. Coverage linear approx. 55%, optical approx. 80%
Outer jacket	Low-adhesion, halogen-free, highly abrasion resistant PUR mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2) Colour: Pastel orange (similar to RAL 2003)

Electrical information

Nominal voltage	600/1,000V (following DIN VDE 0298-3) 1,000V (following UL)
Testing voltage	4,000V (following DIN EN 50395)

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 4.2.3.1

Basic requirements	low	1	2	3	**4**	5	6	7 highest
Travel distance	unsupported	1	**2**	3	4	5	6	≥ 400m
Oil resistance	none	1	2	**3**	4	highest		
Torsion	none	**1**	2	3	4	±360°		

Properties and approvals

UV resistance	Medium
Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3
Offshore	MUD-resistant following NEK 606 - status 2016
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF270ULD
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1
DESINA	According to VDW, DESINA standardisation
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	7.5 million	10 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
-25/-15	12.5	13.5	14.5
-15/+70	10	11	12
+70/+80	12.5	13.5	14.5

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For medium duty applications, Class 4
- Unsupported travels and up to 10m for gliding applications, Class 2
- Almost unlimited resistance to oil, Class 3
- No torsion, Class 1
- Indoor and outdoor applications without direct sun radiation
- Machining units/machine tools, low temperature applications

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Motor cable | PUR outer jacket

chainflex® CF270.UL.D

Basic requirements
Travel distance
Oil resistance
Torsion

Class 4.2.3.1

low	1	2	3	**4**	5	6	7	highest
unsupported	1	**2**	3	4	5	6	≥ 400m	
none	1	2	**3**	4	highest			
none	**1**	2	3	4	±360°			

Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CF270.UL.07.04.D	(4G0.75)C	8.0	47	81
CF270.UL.10.06.D	(6G1.0)C	9.5	87	133
CF270.UL.15.04.D	(4G1.5)C	9.0	78	116
CF270.UL.25.04.D	(4G2.5)C	10.5	129	173
CF270.UL.40.04.D	(4G4.0)C	12.5	193	255
CF270.UL.60.04.D	(4G6.0)C	14.5	297	356
CF270.UL.100.04.D	(4G10)C	17.0	495	551
CF270.UL.160.04.D	(4G16)C	20.5	755	819
CF270.UL.250.04.D	(4G25)C	25.0	1117	1256
CF270.UL.350.04.D	(4G35)C	28.0	1597	1696

Shop and prices online

CF-I-0009

www.igus.eu/CF270ULD

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x** = without earth core

Order example: CF270.UL.07.04.D - to your required length (0.5m steps)
CF270.UL.D chainflex® series .07 Code nominal cross section .04 Number of cores

Order online ▶ www.igus.eu/CF270ULD

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

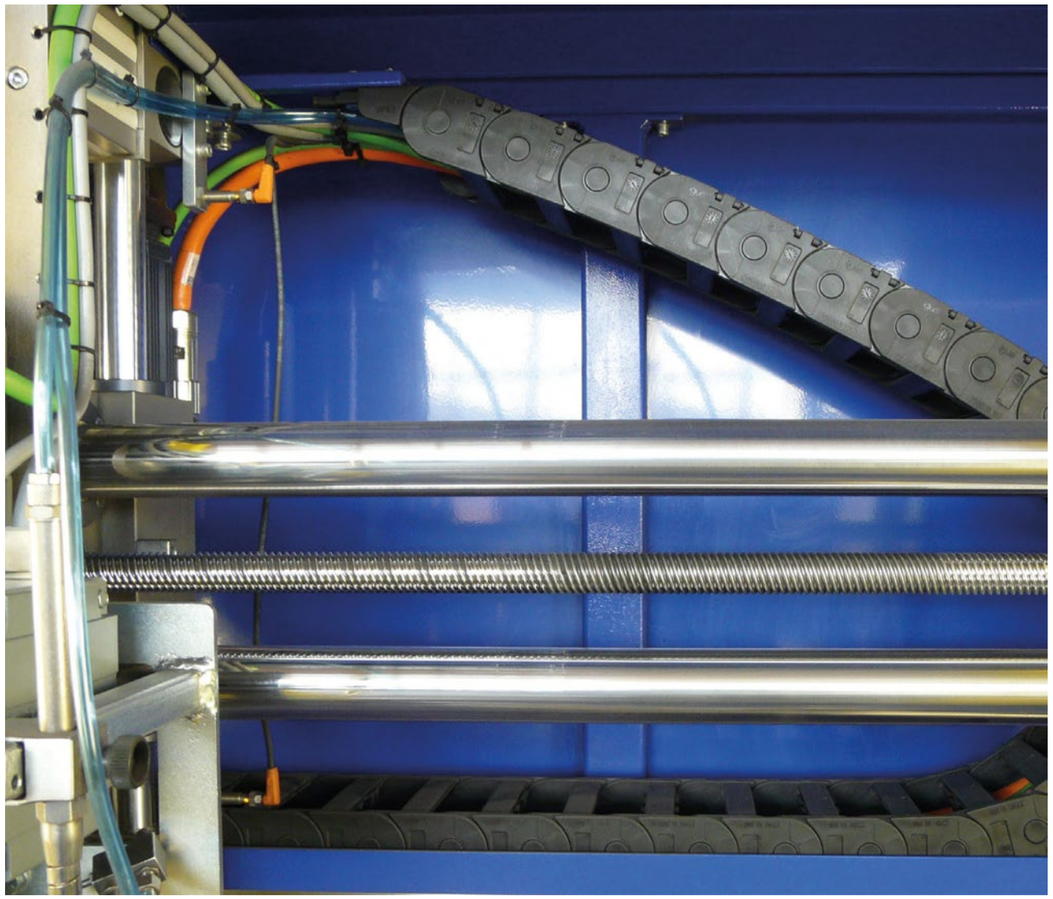
More on this online: www.igus.eu/cf-case

cost down...

...life up

Reduce cost, improve technology, now!
Do the chainflex® price check ...
www.igus.eu/cf-price-check

… for example: reduce cost with CF31 ...



chainflex® CF270.UL.D motor cable in a system for sharpening knives

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Motor cable | PUR outer jacket

chainflex® CF27.D

New

Image exemplary

10 million Double strokes guaranteed

7.5 x d Bend radius, e-chain®

100m Travel distance, e-chain®

- For extremely heavy duty applications
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Notch-resistant
- Flame-retardant
- Hydrolysis and microbe-resistant
- PVC and halogen-free

Now with 90°C UL/CSA AWM approval

Dynamic information

Bend radius	**e-chain® linear**	minimum 7.5 x d
	flexible	minimum 6 x d
	fixed	minimum 4 x d
Temperature	**e-chain® linear**	-25°C up to +80°C
	flexible	-40°C up to +80°C (following DIN EN 60811-504)
	fixed	-50°C up to +80°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	5m/s
a max.		80m/s²
Travel distance		Unsupported travels and up to 100m for gliding applications, Class 5

Cable structure

Conductor	Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228).
Core insulation	Mechanically high-quality, especially low-capacitance XLPE mixture.
Core structure	Cores wound around a high tensile strength centre element.
Core identification	Black cores with white numbers, one green-yellow core. 1. Core: U / L1 / C / L+ 2. Core: V / L2 3. Core: W / L3 / D / L-
Inner jacket	TPE mixture adapted to suit the requirements in e-chains®.
Overall shield	Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90%
Outer jacket	Low-adhesion, halogen-free, highly abrasion resistant PUR mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2) Colour: Pastel orange (similar to RAL 2003)
CFRIP®	Strip cables faster: a tear strip is moulded into the inner jacket Video ▶ www.igus.eu/CFRIP

Electrical information

Nominal voltage	600/1,000V (following DIN VDE 0298-3) 1,000V (following UL)
Testing voltage	4,000V (following DIN EN 50395)

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 6.5.3.1

Basic requirements	low	1	2	3	4	5	**6**	7	highest
Travel distance	unsupported	1	2	3	4	**5**	6		≥ 400m
Oil resistance	none	1	2	**3**	4				highest
Torsion	none	**1**	2	3	4				±360°

Properties and approvals

UV resistance	Medium
Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3
Offshore	MUD-resistant following NEK 606 - status 2016
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF27D
NFPA	Following NFPA 79-2018, chapter 12.9
DNV	Type Approval Certificate TAE00003XA (Issue 04/2025) Current information in the data sheet ▶ www.igus.eu/CF27D
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1
DESINA	According to VDW, DESINA standardisation
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	7.5 million	10 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
-25/-15	10	11	12
-15/+70	7.5	8.5	9.5
+70/+80	10	11	12

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For heavy-duty applications, Class 6
- Unsupported travels and up to 100m for gliding applications, Class 5
- Almost unlimited resistance to oil, Class 3
- No torsion, Class 1
- Indoor and outdoor applications, UV-resistant
- Storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, cleanroom, semiconductor insertion, outdoor cranes, low-temperature applications

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igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Motor cable | PUR outer jacket

chainflex® CF27.D

Strip cables 50% faster with CFRIP® tear strip

Class 6.5.3.1

Basic requirements	low	1	2	3	4	5	**6**	7	highest
Travel distance	unsupported	1	2	3	4	**5**	6		≥ 400m
Oil resistance	none	1	2	**3**	4				highest
Torsion	none	**1**	2	3	4				±360°

Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CF27.07.04.D	(4G0.75)C	9.5	55	115
CF27.15.04.D	(4G1.5)C	11.0	90	165
CF27.25.04.D	(4G2.5)C	12.5	135	231
CF27.500.04.D	(4G50)C	37.0	2244	2817

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Shop and prices online

CF-I-0010

www.igus.eu/CF27D

Order example: CF27.07.04.D - to your required length (0.5m steps)
CF27.D chainflex® series .07 Code nominal cross section .04 Number of cores

Order online ▶ www.igus.eu/CF27D

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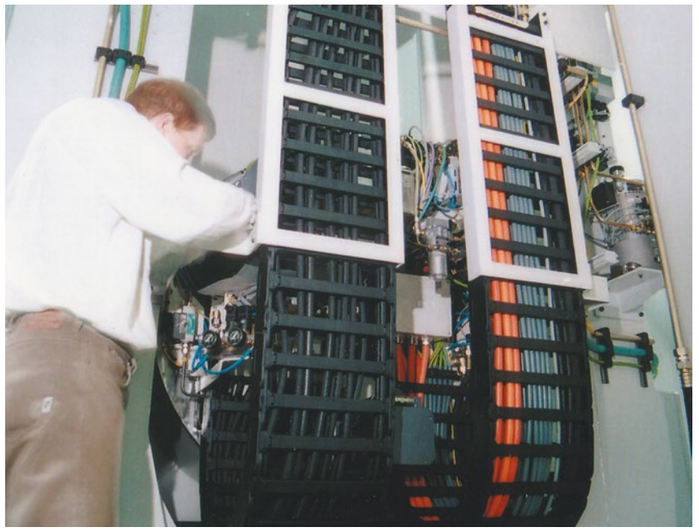
... here's an idea for you: highest abrasion resistance with CF38 ...



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4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Motor cable | TPE outer jacket

chainflex® CF34.UL.D

New

Image exemplary

10 million
Double strokes guaranteed

7.5 x d
Bend radius, e-chain®

400m
Travel distance, e-chain®

- For extremely heavy duty applications
- TPE outer jacket
- Oil and bio-oil-resistant
- Flame-retardant
- UV-resistant
- Hydrolysis and microbe-resistant

Now with 90°C UL/CSA AWM approval

Dynamic information

Bend radius	**e-chain® linear**	minimum 7.5 x d
	flexible	minimum 6 x d
	fixed	minimum 4 x d
Temperature	**e-chain® linear**	-35°C up to +90°C
	flexible	-45°C up to +90°C (following DIN EN 60811-504)
	fixed	-50°C up to +90°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	6m/s
a max.		80m/s²
Travel distance		Unsupported travels and up to 400m and more for gliding applications, Class 6
Torsion		Torsion ±90°, with 1m cable length, Class 2

Cable structure

Conductor	**Cores <10mm²:**Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228). **Cores ≥ 10mm²:**Conductor cable consisting of pre-leads (following DIN EN 60228).
Core insulation	Mechanically high-quality, especially low-capacitance XLPE mixture.
Core structure	Cores wound with a short pitch length around a high tensile strength centre element.
Core identification	Black cores with white numbers, one green-yellow core. 1. Core: U / L1 / C / L+ 2. Core: V / L2 3. Core: W / L3 / D / L- 4. Core: 4 / N
Outer jacket	Low-adhesion, extremely abrasion-resistant and highly flexible TPE mixture, adapted to suit the requirements in e-chains®. Colour: Signal black (similar to RAL 9004)
CFRIP®	Strip cables faster: a tear strip is moulded into the outer jacket Video ▶www.igus.eu/CFRIP

Electrical information

Nominal voltage	600/1,000V (following DIN VDE 0298-3) 1,000V (following UL)
Testing voltage	4,000V (following DIN EN 50395)

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 6.6.4.2

Basic requirements	low	1	2	3	4	5	**6**	7 highest
Travel distance	unsupported	1	2	3	4	5	**6**	≥ 400m
Oil resistance	none	1	2	3	**4**	highest		
Torsion	none	1	**2**	3	4	±360°		

Properties and approvals

UV resistance	High
Oil resistance	Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF34ULD
NFPA	Following NFPA 79-2018, chapter 12.9
DNV	Type Approval Certificate TAE00003X9 (Issue 04/2025) Current information in the data sheet ▶ www.igus.eu/CF34ULD
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1, material/cable tested by IPA according to DIN EN ISO standard 14644-1
DESINA	According to VDW, DESINA standardisation
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	7.5 million	10 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
-35/-25	10	11	12
-25/+80	7.5	8.5	9.5
+80/+90	10	11	12

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For heavy-duty applications, Class 6
- Unsupported travels and up to 400m and more for gliding applications, Class 6
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- Torsion ±90°, with 1m cable length, Class 2
- Indoor and outdoor applications, UV-resistant
- Storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, cleanroom, semiconductor insertion, outdoor cranes, low-temperature applications

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igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Motor cable | TPE outer jacket

chainflex® CF34.UL.D

Strip cables 50% faster with CFRIP® tear strip

Image exemplary

Class 6.6.4.2

Basic requirements	low	1	2	3	4	5	6	7	highest
Travel distance	unsupported	1	2	3	4	5	6		≥ 400m
Oil resistance	none	1	2	3	4				highest
Torsion	none	1	2	3	4				±360°

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CF34.UL.15.04.D	4G1.5	8.0	61	102
CF34.UL.25.04.D	4G2.5	10.0	100	159
CF34.UL.40.04.D	4G4.0	11.5	163	236
CF34.UL.60.04.D	4G6.0	13.5	237	332
CF34.UL.60.05.D	5G6.0	15.0	297	406
CF34.UL.100.04.D	4G10	16.5	407	537
CF34.UL.100.05.D	5G10	19.5	515	670
CF34.UL.160.04.D	4G16	20.0	646	819
CF34.UL.160.05.D	5G16	22.5	815	1009
CF34.UL.250.04.D	4G25	24.5	1014	1271

Shop and prices online

CF-I-0011

www.igus.eu/CF34ULD

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x** = without earth core

Order example: CF34.UL.15.04.D - to your required length (0.5m steps)
CF33.UL.D chainflex® series .15 Code nominal cross section .04 Number of cores

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4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Motor cable | TPE outer jacket

chainflex® CF35.UL

New

Image exemplary

10 million
Double strokes guaranteed

7.5 x d
Bend radius, e-chain®

400m
Travel distance, e-chain®

- For extremely heavy duty applications
- TPE outer jacket
- Shielded
- Oil and bio-oil-resistant
- Flame-retardant
- UV-resistant
- Hydrolysis and microbe-resistant

Now with 90°C UL/CSA AWM approval

Dynamic information

Bend radius	**e-chain® linear**	minimum 7.5 x d
	flexible	minimum 6 x d
	fixed	minimum 4 x d
Temperature	**e-chain® linear**	-35°C up to +90°C
	flexible	-45°C up to +90°C (following DIN EN 60811-504)
	fixed	-50°C up to +90°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	6m/s
a max.		80m/s²
Travel distance		Unsupported travels and up to 400m and more for gliding applications, Class 6

Cable structure

Conductor	**Cores <10mm²:**Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228). **Cores ≥ 10mm²:**Conductor cable consisting of pre-leads (following DIN EN 60228).
Core insulation	Mechanically high-quality, especially low-capacitance XLPE mixture.
Core structure	Cores wound with a short pitch length around a high tensile strength centre element.
Core identification	Black cores with white numbers, one green-yellow core. 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 e-chains®.
Overall shield	Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90%
Outer jacket	Low-adhesion, extremely abrasion-resistant and highly flexible TPE mixture, adapted to suit the requirements in e-chains®. Colour: Signal black (similar to RAL 9004)
CFRIP®	Strip cables faster: a tear strip is moulded into the inner jacket Video ▶ www.igus.eu/CFRIP

Electrical information

Nominal voltage	600/1,000V (following DIN VDE 0298-3) 1,000V (following UL)
Testing voltage	4,000V (following DIN EN 50395)

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 6.6.4.1

Basic requirements	low	1	2	3	4	5	**6**	7 highest
Travel distance	unsupported	1	2	3	4	5	**6**	≥ 400m
Oil resistance	none	1	2	3	**4**			highest
Torsion	none	**1**	2	3	4			±360°

Properties and approvals

UV resistance	High
Oil resistance	Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF35UL
NFPA	Following NFPA 79-2018, chapter 12.9
DNV	Type Approval Certificate TAE00003X9 (Issue 04/2025) Current information in the data sheet ▶ www.igus.eu/CF35UL
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF34.UL.25.04.D - tested by IPA according to standard DIN EN ISO 14644-1
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	7.5 million	10 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
-35/-25	10	11	12
-25/+80	7.5	8.5	9.5
+80/+90	10	11	12

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For heavy-duty applications, Class 6
- Unsupported travels and up to 400m and more for gliding applications, Class 6
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- No torsion, Class 1
- Indoor and outdoor applications, UV-resistant
- Storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, cleanroom, semiconductor insertion, outdoor cranes, low-temperature applications

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Motor cable | TPE outer jacket

chainflex® CF35.UL

Strip cables 50% faster with CFRIP® tear strip

Image exemplary

Class 6.6.4.1

Basic requirements	low	1	2	3	4	5	**6**	7	highest
Travel distance	unsupported	1	2	3	4	5	**6**		≥ 400m
Oil resistance	none	1	2	3	**4**				highest
Torsion	none	**1**	2	3	4				±360°

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Shop and prices online
CF35.UL.05.04	(4G0.5)C	7.5	42	79	
CF35.UL.07.04	(4G0.75)C	8.0	58	90	
CF35.UL.15.04	(4G1.5)C	10.0	89	146	
CF35.UL.25.04	(4G2.5)C	11.5	133	207	
CF35.UL.40.04	(4G4.0)C	13.0	203	290	
CF35.UL.60.04	(4G6.0)C	16.0	288	423	
CF35.UL.100.04	(4G10)C	18.5	468	632	
CF35.UL.160.04	(4G16)C	23.0	738	974	
CF35.UL.250.04	(4G25)C	27.5	1153	1481	
CF35.UL.60.03.O.PE [11]	(3x6.0)C	14.5	229	344	
CF35.UL.250.03.O.PE [11]	(3x25)C	24.5	880	1163	

CF-L0012

www.igus.eu/CF35UL

[11] Phase-out model

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Order example: CF35.UL.05.04 - to your required length (0.5m steps)
CF35.UL chainflex® series .05 Code nominal cross section .04 Number of cores

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Delivery time means time until goods are shipped.

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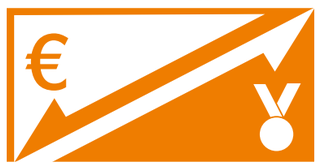

...life up

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4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Motor cable | TPE outer jacket

chainflex® CF37.D

New

Image exemplary

12.5 million
Double strokes guaranteed

7.5 x d
Bend radius, e-chain®

400m
Travel distance, e-chain®

- For heaviest duty applications
- TPE outer jacket
- Oil and bio-oil-resistant
- PVC and halogen-free
- UV-resistant
- Hydrolysis and microbe-resistant

Now with 90°C UL/CSA AWM approval

Dynamic information

Bend radius	**e-chain® linear**	minimum 7.5 x d
	flexible	minimum 6 x d
	fixed	minimum 4 x d
Temperature	**e-chain® linear**	-35°C up to +90°C
	flexible	-50°C up to +90°C (following DIN EN 60811-504)
	fixed	-55°C up to +90°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	6m/s
a max.		80m/s²
Travel distance		Unsupported travels and up to 400m and more for gliding applications, Class 6
Torsion		Torsion ±90°, with 1m cable length, Class 2

Cable structure

Conductor	**Cores <10mm²:**Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228). **Cores ≥ 10mm²:**Conductor cable consisting of pre-leads (following DIN EN 60228).
Core insulation	Mechanically high-quality, especially low-capacitance XLPE mixture.
Core structure	Cores wound with a short pitch length around a high tensile strength centre element.
Core identification	Black cores with white numbers, one green-yellow core. 1. Core: U / L1 / C / L+ 2. Core: V / L2 3. Core: W / L3 / D / L- 4. Core: 4 / N
Outer jacket	Low-adhesion, extremely abrasion-resistant and highly flexible TPE mixture, adapted to suit the requirements in e-chains®. Colour: jet black (similar to RAL 9005)
CFRIP®	Strip cables faster: a tear strip is moulded into the outer jacket Video ▶ www.igus.eu/CFRIP

Electrical information

Nominal voltage	600/1,000V (following DIN VDE 0298-3) 1,000V (following UL)
Testing voltage	4,000V (following DIN EN 50395)

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 7.6.4.2

Basic requirements	low	1	2	3	4	5	6	**7** highest
Travel distance	unsupported	1	2	3	4	5	**6**	≥ 400m
Oil resistance	none	1	2	3	**4**	highest		
Torsion	none	1	**2**	3	4	±360°		

Properties and approvals

UV resistance	High
Oil resistance	Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL AWM	See data sheet for details ▶ www.igus.eu/CF37D
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF9.15.07 - tested by IPA according to standard DIN EN ISO 14644-1
Dry cleanroom	Tested in "dry cleanroom" according to DIN EN ISO 14644-1
DESINA	According to VDW, DESINA standardisation
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	7.5 million	12.5 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
-35/-25	10	11	12
-25/+80	7.5	8.5	9.5
+80/+90	10	11	12

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For heavy-duty applications, Class 7
- Unsupported travels and up to 400m and more for gliding applications, Class 6
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- Torsion ±90°, with 1m cable length, Class 2
- Indoor and outdoor applications, UV-resistant
- Storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, cleanroom, semiconductor insertion, outdoor cranes, low-temperature applications

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Motor cable | TPE outer jacket

chainflex® CF37.D

Class 7.6.4.2

Basic requirements	low	1	2	3	4	5	6	**7**	highest
Travel distance	unsupported	1	2	3	4	5	**6**		≥ 400m
Oil resistance	none	1	2	3	**4**				highest
Torsion	none	1	**2**	3	4				±360°

Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CF37.15.04.D	4G1.5	8.0	61	95
CF37.25.04.D	4G2.5	10.0	100	149
CF37.40.04.D	4G4.0	11.5	163	221
CF37.60.04.D	4G6.0	13.5	237	317
CF37.60.05.D	5G6.0	15.0	297	387
CF37.100.04.D	4G10	16.5	407	503
CF37.100.05.D	5G10	19.0	515	634
CF37.160.04.D	4G16	20.0	646	773
CF37.160.05.D	5G16	22.5	815	963
CF37.250.04.D	4G25	24.0	1014	1203

Shop and prices online

CF-I-0013

www.igus.eu/CF37D

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x** = without earth core

Order example: CF37.15.04.D - to your required length (0.5m steps)
CF37.D chainflex® series .15 Code nominal cross section .04 Number of cores

Order online ▶ www.igus.eu/CF37D

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

Cables available in the chainflex® CASE

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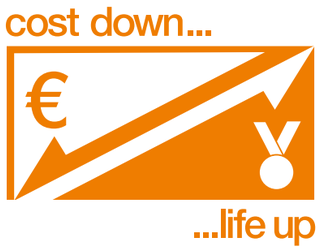

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… for example: reduce cost with CF330.D ...

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Motor cable | TPE outer jacket

chainflex® CF38

New

Image exemplary

12.5 million
Double strokes guaranteed

7.5 x d
Bend radius, e-chain®

400m
Travel distance, e-chain®

- For heaviest duty applications
- TPE outer jacket
- Shielded
- Oil and bio-oil-resistant
- PVC and halogen-free
- UV-resistant
- Hydrolysis and microbe-resistant

Now with 90°C UL/CSA AWM approval

Dynamic information

Bend radius	**e-chain® linear**	minimum 7.5 x d
	flexible	minimum 6 x d
	fixed	minimum 4 x d
Temperature	**e-chain® linear**	-35°C up to +90°C
	flexible	-50°C up to +90°C (following DIN EN 60811-504)
	fixed	-55°C up to +90°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	6m/s
a max.		80m/s²
Travel distance		Unsupported travels and up to 400m and more for gliding applications, Class 6

Cable structure

Conductor	**Cores <10mm²:**Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228). **Cores ≥ 10mm²:**Conductor cable consisting of pre-leads (following DIN EN 60228).
Core insulation	Mechanically high-quality, especially low-capacitance XLPE mixture.
Core structure	Cores wound with a short pitch length around a high tensile strength centre element.
Core identification	Black cores with white numbers, one green-yellow core. 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 e-chains®.
Overall shield	Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90%
Outer jacket	Low-adhesion, extremely abrasion-resistant and highly flexible TPE mixture, adapted to suit the requirements in e-chains®. Colour: jet black (similar to RAL 9005)
CFRIP®	Strip cables faster: a tear strip is moulded into the inner jacket Video ▶ www.igus.eu/CFRIP

Electrical information

Nominal voltage	600/1,000V (following DIN VDE 0298-3) 1,000V (following UL)
Testing voltage	4,000V (following DIN EN 50395)

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 7.6.4.1

Basic requirements	low	1	2	3	4	5	6	**7** highest
Travel distance	unsupported	1	2	3	4	5	**6**	≥ 400m
Oil resistance	none	1	2	3	**4**	highest		
Torsion	none	**1**	2	3	4	±360°		

Properties and approvals

UV resistance	High
Oil resistance	Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL AWM	See data sheet for details ▶www.igus.eu/CF38
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF9.15.07 - tested by IPA according to standard DIN EN ISO 14644-1
Dry cleanroom	Tested in "dry cleanroom" according to DIN EN ISO 14644-1
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	7.5 million	12.5 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
-35/-25	10	11	12
-25/+80	7.5	8.5	9.5
+80/+90	10	11	12

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For heavy-duty applications, Class 7
- Unsupported travels and up to 400m and more for gliding applications, Class 6
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- No torsion, Class 1
- Indoor and outdoor applications, UV-resistant
- Storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, cleanroom, semiconductor insertion, outdoor cranes, low-temperature applications

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Motor cable | TPE outer jacket

chainflex® CF38

New

Class 7.6.4.1

Basic requirements	low	1	2	3	4	5	6	**7**	highest
Travel distance	unsupported	1	2	3	4	5	**6**		≥ 400m
Oil resistance	none	1	2	3	**4**				highest
Torsion	none	**1**	2	3	4				±360°

Image exemplary

	Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
	CF38.15.04	(4G1.5)C	10.0	89	140
	CF38.25.04	(4G2.5)C	11.5	133	198
	CF38.40.04	(4G4.0)C	13.0	203	280
	CF38.60.04	(4G6.0)C	16.0	288	409
	CF38.100.04	(4G10)C	18.5	468	613
	CF38.160.04	(4G16)C	23.0	738	943
	CF38.250.04	(4G25)C	27.0	1153	1432
New	**CF38.60.03.O.PE**	(3x6.0)C	14.5	229	323
	CF38.100.03.O.PE	(3x10)C	17.0	358	494
	CF38.160.03.O.PE	(3x16)C	20.5	565	762
New	**CF38.250.03.O.PE**	(3x25)C	24.5	880	1122
	CF38.500.03.O.PE	(3x50)C	33.0	1714	2129

Shop and prices online

www.igus.eu/CF38

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Order example: CF38.15.04 - to your required length (0.5m steps)
CF38 chainflex® series .15 Code nominal cross section .04 Number of cores

Order online ▶ www.igus.eu/CF38

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

CFRIP

PTFE FREE

REACH

RoHS

Clean-Room

CE

chainflex CASE

Cables available in the chainflex® CASE
Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.
More on this online: www.igus.eu/cf-case

cost down... ...life up

Reduce cost, improve technology, now!
Do the chainflex® price check ...
www.igus.eu/cf-price-check

… for example: reduce cost with CF340 ...

Spindle cables/Single cores | PVC outer jacket

chainflex® CF885

5 million
Double strokes guaranteed

15 x d
Bend radius, e-chain®

10m
Travel distance, e-chain®

- For flexing applications
- PVC outer jacket
- Flame-retardant

Dynamic information

Bend radius	e-chain® linear	minimum 15 x d
	flexible	minimum 12 x d
	fixed	minimum 8 x d
Temperature	e-chain® linear	+5°C up to +70°C
	flexible	-5°C up to +70°C (following DIN EN 60811-504)
	fixed	-15°C up to +70°C (following DIN EN 50305)
v max.	unsupported	3m/s
a max.		20m/s²
Travel distance		Unsupported travels up to 10m, Class 1

Cable structure

Conductor	Conductor consisting of bare copper wires (according to DIN EN 60228).
Core insulation	Mechanically high-quality PVC mixture.
Outer jacket	Low-adhesion PVC mixture, adapted to suit the requirements in e-chains®. Colour: Pastel orange (similar to RAL 2003)

Electrical information

Nominal voltage	600/1,000V (following DIN VDE 0298-3) 600V (following UL)
Testing voltage	4,000V (following DIN EN 50395)

Properties and approvals

Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF885
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)

Image exemplary

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 3.1.1.1

Basic requirements	low	1	2	**3**	4	5	6	7 highest
Travel distance	unsupported	**1**	2	3	4	5	6	≥ 400m
Oil resistance	none	**1**	2	3	4	highest		
Torsion	none	**1**	2	3	4	±360°		

Lead-free Following 2011/65/EC (RoHS-II/RoHS-III)

CE Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	1 million	3 million	5 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
+5/+15	17.5	18.5	19.5
+15/+60	15	16	17
+60/+70	17.5	18.5	19.5

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For flexing applications, Class 3
- Especially for unsupported travels, Class 1
- Without influence of oil, Class 1
- No torsion, Class 1
- Preferably indoor applications
- Wood/stone processing, packaging industry, feeding, handling, adjusting devices

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Shop and prices online
CF885.40.01	1x4.0	7.5	41	78	
CF885.60.01	1x6.0	8.0	61	100	
CF885.100.01	1x10	9.5	100	157	
CF885.160.01	1x16	11.5	159	226	
CF885.250.01	1x25	12.5	248	325	
CF885.350.01	1x35	15.0	346	473	
CF885.500.01	1x50	16.5	495	644	
CF885.700.01	1x70	18.5	686	844	
CF885.950.01	1x95	20.5	931	1024	

CF-I-0015

www.igus.eu/CF885

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Spindle cables/Single cores | PVC outer jacket

chainflex® CF885.PE

Image exemplary

5,000,000 Double strokes guaranteed

15 x d Bend radius, e-chain®

10m Travel distance, e-chain®

- For flexing applications
- PVC outer jacket
- Flame-retardant

Dynamic information

Bend radius	**e-chain® linear**	minimum 15 x d
	flexible	minimum 12 x d
	fixed	minimum 8 x d
Temperature	**e-chain® linear**	+5°C up to +70°C
	flexible	-5°C up to +70°C (following DIN EN 60811-504)
	fixed	-15°C up to +70°C (following DIN EN 50305)
v max.	**unsupported**	3m/s
a max.		20m/s²
Travel distance		Unsupported travels up to 10m, Class 1

Cable structure

Conductor	Conductor consisting of bare copper wires (according to DIN EN 60228).
Core insulation	Mechanically high-quality PVC mixture.
Core identification	Green-yellow
Outer jacket	Low-adhesion PVC mixture, adapted to suit the requirements in e-chains®. Colour: Pastel orange (similar to RAL 2003)

Electrical information

Nominal voltage	600/1,000V (following DIN VDE 0298-3) 600V (following UL)
Testing voltage	4,000V (following DIN EN 50395)

Properties and approvals

Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF885PE
NFPA	Following NFPA 79-2018, chapter 12.9

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 3.1.1.1

Basic requirements	low	1	2	**3**	4	5	6	7 highest
Travel distance	unsupported	**1**	2	3	4	5	6	≥ 400m
Oil resistance	none	**1**	2	3	4	highest		
Torsion	none	**1**	2	3	4	±360°		

REACH In accordance with regulation (EC) No. 1907/2006 (REACH)

Lead-free Following 2011/65/EC (RoHS-II/RoHS-III)

CE Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	1 million	3 million	5 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
+5/+15	17.5	18.5	19.5
+15/+60	15	16	17
+60/+70	17.5	18.5	19.5

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For flexing applications, Class 3
- Especially for unsupported travels, Class 1
- Without influence of oil, Class 1
- No torsion, Class 1
- Preferably indoor applications
- Wood/stone processing, packaging industry, feeding, handling, adjusting devices

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CF885.PE.25.01	1G2.5	6.5	25	59
CF885.PE.40.01	1G4.0	7.5	41	78
CF885.PE.60.01	1G6.0	8.0	61	100
CF885.PE.100.01	1G10	9.5	100	157
CF885.PE.160.01	1G16	11.0	159	226
CF885.PE.250.01	1G25	12.5	248	325

Shop and prices online

CF-I-0016

www.igus.eu/CF885PE

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Spindle cables/Single cores | PVC outer jacket

chainflex® CF886

5,000,000 Double strokes guaranteed

15 x d Bend radius, e-chain®

10m Travel distance, e-chain®

- For flexing applications
- PVC outer jacket
- Shielded
- Flame-retardant

Dynamic information

Bend radius	**e-chain® linear**	minimum 15 x d
	flexible	minimum 12 x d
	fixed	minimum 8 x d
Temperature	**e-chain® linear**	+5°C up to +70°C
	flexible	-5°C up to +70°C (following DIN EN 60811-504)
	fixed	-15°C up to +70°C (following DIN EN 50305)
v max.	**unsupported**	3m/s
a max.		20m/s²
Travel distance		Unsupported travels up to 10m, Class 1

Cable structure

Conductor	Conductor consisting of bare copper wires (according to DIN EN 60228).
Core insulation	Mechanically high-quality PVC mixture.
Overall shield	Braiding made of tinned copper wires. Coverage approx. 60% optical
Outer jacket	Low-adhesion PVC mixture, adapted to suit the requirements in e-chains®. Colour: Pastel orange (similar to RAL 2003)

Electrical information

Nominal voltage	600/1,000V (following DIN VDE 0298-3) 600V (following UL)
Testing voltage	4,000V (following DIN EN 50395)

Image exemplary

Class 3.1.1.1

Basic requirements	low	1	2	**3**	4	5	6	7	highest
Travel distance	unsupported	**1**	2	3	4	5	6		≥ 400m
Oil resistance	none	**1**	2	3	4				highest
Torsion	none	**1**	2	3	4				±360°

Properties and approvals

Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF886
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	1 million	3 million	5 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
+5/+15	17.5	18.5	19.5
+15/+60	15	16	17
+60/+70	17.5	18.5	19.5

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For flexing applications, Class 3
- Especially for unsupported travels, Class 1
- Without influence of oil, Class 1
- No torsion, Class 1
- Preferably indoor applications
- Wood/stone processing, packaging industry, feeding, handling, adjusting devices

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CF886.160.01	(1x16)C	11.5	186	262
CF886.250.01	(1x25)C	13.0	280	363
CF886.350.01	(1x35)C	15.5	394	535

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Shop and prices online

www.igus.eu/CF886

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case

Spindle cables/Single cores | PUR outer jacket

chainflex® CF270.UL.D

Image exemplary

10 million Double strokes guaranteed

10 x d Bend radius, e-chain®

10m Travel distance, e-chain®

- For medium duty applications
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Notch-resistant
- Flame-retardant
- Hydrolysis and microbe-resistant
- PVC and halogen-free

Dynamic information

Bend radius	**e-chain® linear**	minimum 10 x d
	flexible	minimum 8 x d
	fixed	minimum 5 x d
Temperature	**e-chain® linear**	-25°C up to +80°C
	flexible	-40°C up to +80°C (following DIN EN 60811-504)
	fixed	-50°C up to +80°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	2m/s
a max.		50m/s²
Travel distance		Unsupported travels and up to 10m for gliding applications, Class 2

Cable structure

Conductor Conductor cable consisting of pre-leads (following DIN EN 60228).

Core insulation Mechanically high-quality TPE mixture.

Overall shield Bending-resistant braiding made of tinned copper wires.
Coverage linear approx. 55%, optical approx. 80%

Outer jacket Low-adhesion, halogen-free, highly abrasion resistant PUR mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2)
Colour: Pastel orange (similar to RAL 2003)

Electrical information

Nominal voltage 600/1,000V (following DIN VDE 0298-3)
1,000V (following UL)

Testing voltage 4,000V (following DIN EN 50395)

Properties and approvals

UV resistance Medium

Oil resistance Oil-resistant (following DIN EN 50363-10-2), Class 3

Offshore MUD-resistant following NEK 606 - status 2016

Flame-retardant According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame

Silicone-free Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)

Class 4.2.3.1

Basic requirements	low 1 2 3 **4** 5 6 7 highest
Travel distance	unsupported 1 **2** 3 4 5 6 ≥ 400m
Oil resistance	none 1 2 **3** 4 highest
Torsion	none **1** 2 3 4 ±360°

Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF270ULD
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1
DESINA	According to VDW, DESINA standardisation
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	7.5 million	10 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
-25/-15	12.5	13.5	14.5
-15/+70	10	11	12
+70/+80	12.5	13.5	14.5

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For medium duty applications, Class 4
- Unsupported travels and up to 10m for gliding applications, Class 2
- Almost unlimited resistance to oil, Class 3
- No torsion, Class 1
- Indoor and outdoor applications without direct sun radiation
- Machining units/machine tools, low temperature applications

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CF270.UL.60.01.D	(1x6.0)C	7.5	72	95
CF270.UL.100.01.D	(1x10)C	8.5	114	145
CF270.UL.160.01.D	(1x16)C	9.5	178	209
CF270.UL.250.01.D	(1x25)C	11.0	269	304
CF270.UL.350.01.D	(1x35)C	13.0	374	419
CF270.UL.500.01.D	(1x50)C	15.0	525	579
CF270.UL.700.01.D	(1x70)C	17.0	751	804

Shop and prices online
CF-I-0018
www.igus.eu/CF270ULD

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Spindle cables/Single cores | TPE outer jacket

chainflex® CF300.UL.D

Image exemplary

10 million
Double strokes guaranteed

7.5 x d
Bend radius, e-chain®

400m
Travel distance, e-chain®

- For extremely heavy duty applications
- TPE outer jacket
- Oil and bio-oil-resistant
- Flame-retardant
- UV-resistant
- Hydrolysis and microbe-resistant

Dynamic information

Bend radius	**e-chain® linear**	minimum 7.5 x d
	flexible	minimum 6 x d
	fixed	minimum 4 x d
Temperature	**e-chain® linear**	-35°C up to +90°C
	flexible	-45°C up to +90°C (following DIN EN 60811-504)
	fixed	-50°C up to +90°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	6m/s
a max.		100m/s²
Travel distance		Unsupported travels and up to 400m and more for gliding applications, Class 6
Torsion		Torsion ±90°, with 1m cable length, Class 2

Cable structure

Conductor	Conductor cable consisting of pre-leads (following DIN EN 60228).
Core insulation	Mechanically high-quality TPE mixture.
Outer jacket	Low-adhesion, extremely abrasion-resistant and highly flexible TPE mixture, adapted to suit the requirements in e-chains®. Colour: Signal black (similar to RAL 9004)

Electrical information

Nominal voltage	600/1,000V (following DIN VDE 0298-3) 1,000V (following UL)
Testing voltage	4,000V (following DIN EN 50395)

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 6.6.4.2

Basic requirements	low	1	2	3	4	5	**6**	7 highest
Travel distance	unsupported	1	2	3	4	5	**6**	≥ 400m
Oil resistance	none	1	2	3	**4**	highest		
Torsion	none	1	**2**	3	4	±360°		

Properties and approvals

UV resistance	High
Oil resistance	Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF300ULD
NFPA	Following NFPA 79-2018, chapter 12.9
DNV	Type Approval Certificate TAE00003XC (Issue 04/2025) Current information in the data sheet ▶ www.igus.eu/CF300ULD
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF34.UL.25.04.D - tested by IPA according to standard DIN EN ISO 14644-1
DESINA	According to VDW, DESINA standardisation
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	7.5 million	10 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
-35/-25	10	11	12
-25/+80	7.5	8.5	9.5
+80/+90	10	11	12

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For heavy-duty applications, Class 6
- Unsupported travels and up to 400m and more for gliding applications, Class 6
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- Torsion ±90°, with 1m cable length, Class 2
- Indoor and outdoor applications, UV-resistant
- Storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, cleanroom, semiconductor insertion, outdoor cranes, low-temperature applications

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Spindle cables/Single cores | TPE outer jacket

chainflex® CF300.UL.D

Class 6.6.4.2

Basic requirements	low	1	2	3	4	5	**6**	7	highest
Travel distance	unsupported	1	2	3	4	5	**6**		≥ 400m
Oil resistance	none	1	2	3	**4**				highest
Torsion	none	1	**2**	3	4				±360°

Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Shop and prices online
CF300.UL.40.01.D	1x4.0	6.0	41	59	
CF300.UL.60.01.D	1x6.0	7.0	61	83	
CF300.UL.100.01.D	1x10	7.5	100	124	
CF300.UL.160.01.D	1x16	9.5	159	195	
CF300.UL.250.01.D	1x25	11.5	248	294	
CF300.UL.350.01.D	1x35	12.5	347	395	
CF300.UL.500.01.D	1x50	14.5	495	551	
CF300.UL.700.01.D	1x70	16.5	710	769	
CF300.UL.950.01.D	1x95	20.0	936	1042	
CF300.UL.1200.01.D	1x120	21.5	1184	1295	
CF300.UL.1500.01.D	1x150	23.5	1469	1579	
CF300.UL.1850.01.D	1x185	26.5	1928	2052	

CF-I-0019

www.igus.eu/CF300ULD

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Order example: CF300.UL.40.01.D - to your required length (0.5m steps)
CF300.UL.D chainflex® series .40 Code nominal cross section .01 Number of cores

Order online ▶ www.igus.eu/CF300ULD

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Spindle cables/Single cores | TPE outer jacket

chainflex® CFPE

10 million
Double strokes guaranteed

7.5 x d
Bend radius, e-chain®

400m
Travel distance, e-chain®

- For extremely heavy duty applications
- TPE outer jacket
- Oil and bio-oil-resistant
- Flame-retardant
- UV-resistant
- Hydrolysis and microbe-resistant

Image exemplary

Dynamic information

Bend radius	**e-chain® linear**	minimum 7.5 x d
	flexible	minimum 6 x d
	fixed	minimum 4 x d
Temperature	**e-chain® linear**	-35°C up to +90°C
	flexible	-45°C up to +90°C (following DIN EN 60811-504)
	fixed	-50°C up to +90°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	6m/s
a max.		100m/s²
Travel distance		Unsupported travels and up to 400m and more for gliding applications, Class 6
Torsion		Torsion ±90°, with 1m cable length, Class 2

Cable structure

Conductor	Conductor cable consisting of pre-leads (following DIN EN 60228).
Core insulation	Mechanically high-quality TPE mixture.
Core identification	Green-yellow
Outer jacket	Low-adhesion, extremely abrasion-resistant and highly flexible TPE mixture, adapted to suit the requirements in e-chains®. Colour: Signal black (similar to RAL 9004)

Electrical information

Nominal voltage	600/1,000V (following DIN VDE 0298-3) 1,000V (following UL)
Testing voltage	4,000V (following DIN EN 50395)

Properties and approvals

UV resistance	High
Oil resistance	Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE

Class 6.6.4.2

Basic requirements	low	1 2 3 4 5 **6** 7 highest
Travel distance	unsupported	1 2 3 4 5 **6** ≥ 400m
Oil resistance	none	1 2 3 **4** highest
Torsion	none	1 **2** 3 4 ±360°

UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ See data sheet for details ▶www.igus.eu/CFPEE
UL/CSA AWM	
NFPA	Following NFPA 79-2018, chapter 12.9
DNV	Type Approval Certificate TAE00003XC (Issue 04/2025) Current information in the data sheet ▶ www.igus.eu/CFPE
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF34.UL.25.04.D - tested by IPA according to standard DIN EN ISO 14644-1
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	7.5 million	10 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
-35/-25	10	11	12
-25/+80	7.5	8.5	9.5
+80/+90	10	11	12

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For heavy-duty applications, Class 6
- Unsupported travels and up to 400m and more for gliding applications, Class 6
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- Torsion ±90°, with 1m cable length, Class 2
- Indoor and outdoor applications, UV-resistant
- Storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, cleanroom, semiconductor insertion, outdoor cranes, low-temperature applications

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CFPE.15.01	1G1.5	4.5	16	31
CFPE.25.01	1G2.5	5.5	25	42
CFPE.40.01	1G4.0	6.0	41	59
CFPE.60.01	1G6.0	7.0	61	83
CFPE.100.01	1G10	7.5	100	124
CFPE.160.01	1G16	9.5	159	195
CFPE.250.01	1G25	11.5	248	294
CFPE.350.01	1G35	12.5	347	395
CFPE.500.01	1G50	14.5	495	551
CFPE.700.01	1G70	16.5	725	813
CFPE.950.01	1G95	20.0	936	1080

Shop and prices online

CF-I-0020

www.igus.eu/CFPE

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Spindle cables/Single cores | TPE outer jacket

chainflex® CF310.UL

10 million
Double strokes guaranteed

7.5 x d
Bend radius, e-chain®

400m
Travel distance, e-chain®

- For extremely heavy duty applications
- TPE outer jacket
- Shielded
- Oil and bio-oil-resistant
- Flame-retardant
- UV-resistant
- Hydrolysis and microbe-resistant

Image exemplary

Dynamic information

Bend radius	**e-chain® linear**	minimum 7.5 x d
	flexible	minimum 6 x d
	fixed	minimum 4 x d
Temperature	**e-chain® linear**	-35°C up to +90°C
	flexible	-45°C up to +90°C (following DIN EN 60811-504)
	fixed	-50°C up to +90°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	6m/s
a max.		100m/s²
Travel distance		Unsupported travels and up to 400m and more for gliding applications, Class 6

Cable structure

Conductor	Conductor cable consisting of pre-leads (following DIN EN 60228).
Core insulation	Mechanically high-quality TPE mixture.
Overall shield	Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90%
Outer jacket	Low-adhesion, extremely abrasion-resistant and highly flexible TPE mixture, adapted to suit the requirements in e-chains®. Colour: Signal black (similar to RAL 9004)

Electrical information

Nominal voltage	600/1,000V (following DIN VDE 0298-3) 1,000V (following UL)
Testing voltage	4,000V (following DIN EN 50395)

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 6.6.4.1

Basic requirements	low	1	2	3	4	5	**6**	7 highest
Travel distance	unsupported	1	2	3	4	5	**6**	≥ 400m
Oil resistance	none	1	2	3	**4**	highest		
Torsion	none	**1**	2	3	4	±360°		

Properties and approvals

UV resistance	High
Oil resistance	Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF310UL
NFPA	Following NFPA 79-2018, chapter 12.9
DNV	Type Approval Certificate TAE00003XC (Issue 04/2025) Current information in the data sheet ▶ www.igus.eu/CF310UL
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF34.UL.25.04.D - tested by IPA according to standard DIN EN ISO 14644-1
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	7.5 million	10 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
-35/-25	10	11	12
-25/+80	7.5	8.5	9.5
+80/+90	10	11	12

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For heavy-duty applications, Class 6
- Unsupported travels and up to 400m and more for gliding applications, Class 6
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- No torsion, Class 1
- Indoor and outdoor applications, UV-resistant
- Storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, cleanroom, semiconductor insertion, outdoor cranes, low-temperature applications

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Spindle cables/Single cores | TPE outer jacket

chainflex® CF310.UL

Class 6.6.4.1

Basic requirements	low	1	2	3	4	5	**6**	7	highest
Travel distance	unsupported	1	2	3	4	5	**6**		≥ 400m
Oil resistance	none	1	2	3	**4**				highest
Torsion	none	**1**	2	3	4				±360°

Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CF310.UL.25.01	(1x2.5)C	6.0	41	58
CF310.UL.40.01	(1x4.0)C	6.5	57	77
CF310.UL.60.01	(1x6.0)C	7.0	80	101
CF310.UL.100.01	(1x10)C	8.5	121	146
CF310.UL.160.01	(1x16)C	10.0	184	223
CF310.UL.250.01	(1x25)C	12.0	280	329
CF310.UL.350.01	(1x35)C	13.0	395	444
CF310.UL.500.01	(1x50)C	15.0	536	587
CF310.UL.700.01	(1x70)C	18.0	779	851
CF310.UL.950.01	(1x95)C	21.0	1015	1125
CF310.UL.1200.01	(1x120)C	22.0	1270	1378
CF310.UL.1500.01	(1x150)C	24.5	1592	1700
CF310.UL.1850.01	(1x185)C	27.5	2066	2189

Shop and prices online

CF-I-0021

www.igus.eu/CF310UL

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Order example: CF310.UL.25.01 - to your required length (0.5m steps)
CF310.UL chainflex® series .25 Code nominal cross section .01 Number of cores

Order online ▶ www.igus.eu/CF310UL

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Spindle cables/Single cores | TPE outer jacket

chainflex® CF330.D

New

Image exemplary

12.5 million
Double strokes guaranteed

7.5 x d
Bend radius, e-chain®

400m
Travel distance, e-chain®

- For heaviest duty applications
- TPE outer jacket
- Oil and bio-oil-resistant
- PVC and halogen-free
- UV-resistant
- Hydrolysis and microbe-resistant

Now available with UL approval & 25% longer service life

Dynamic information

Bend radius	**e-chain® linear**	minimum 7.5 x d
	flexible	minimum 6 x d
	fixed	minimum 4 x d
Temperature	**e-chain® linear**	-35°C up to +90°C
	flexible	-50°C up to +90°C (following DIN EN 60811-504)
	fixed	-55°C up to +90°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	6m/s
a max.	100m/s²	
Travel distance	Unsupported travels and up to 400m and more for gliding applications, Class 6	
Torsion	Torsion ±90°, with 1m cable length, Class 2	

Cable structure

Conductor — Conductor cable consisting of pre-leads (following DIN EN 60228).

Core insulation — Mechanically high-quality TPE mixture.

Outer jacket — Low-adhesion, extremely abrasion-resistant and highly flexible TPE mixture, adapted to suit the requirements in e-chains®.
Colour: jet black (similar to RAL 9005)

Electrical information

Nominal voltage	600/1,000V (following DIN VDE 0298-3) 1,000V (following UL)
Testing voltage	4,000V (following DIN EN 50395)

Properties and approvals

UV resistance	High
Oil resistance	Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE

Class 7.6.4.2

Basic requirements	low	1 2 3 4 5 6 **7** highest
Travel distance	unsupported	1 2 3 4 5 **6** ≥ 400m
Oil resistance	none	1 2 3 **4** highest
Torsion	none	1 **2** 3 4 ±360°

UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ See data sheet for details ▶ **www.igus.eu/CF330D**
UL AWM	
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF9.15.07 - tested by IPA according to standard DIN EN ISO 14644-1
Dry cleanroom	Tested in "dry cleanroom" according to DIN EN ISO 14644-1
DESINA	According to VDW, DESINA standardisation
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	7.5 million	12.5 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
-35/-25	10	11	12
-25/+80	7.5	8.5	9.5
+80/+90	10	11	12

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For heavy-duty applications, Class 7
- Unsupported travels and up to 400m and more for gliding applications, Class 6
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- Torsion ±90°, with 1m cable length, Class 2
- Indoor and outdoor applications, UV-resistant
- Storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, cleanroom, semiconductor insertion, outdoor cranes, low-temperature applications

	Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
	CF330.60.01.D	1x6.0	7.0	61	77
	CF330.100.01.D	1x10	7.5	100	119
	CF330.160.01.D	1x16	9.5	159	181
	CF330.250.01.D	1x25	11.5	248	284
	CF330.350.01.D	1x35	12.5	347	385
	CF330.500.01.D	1x50	14.5	495	534
	CF330.700.01.D	1x70	16.5	710	754
	CF330.950.01.D	1x95	20.0	936	1015
	CF330.1200.01.D	1x120	21.5	1184	1265
	CF330.1500.01.D	1x150	23.5	1469	1548
	CF330.1850.01.D	1x185	26.5	1928	2016
New	**CF330.2400.01.D**	1x240	29.5	2351	2436

Shop and prices online
CF-I-0022
www.igus.eu/CF330D

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Spindle cables/Single cores | TPE outer jacket

chainflex® CF340

New

12.5 million Double strokes guaranteed

7.5 x d Bend radius, e-chain®

400m Travel distance, e-chain®

- For heaviest duty applications
- TPE outer jacket
- Shielded
- Oil and bio-oil-resistant
- PVC and halogen-free
- UV-resistant
- Hydrolysis and microbe-resistant

Now available with UL approval & 25% longer service life

Image exemplary

Dynamic information

Bend radius	e-chain® linear	minimum 7.5 x d
	flexible	minimum 6 x d
	fixed	minimum 4 x d
Temperature	e-chain® linear	-35°C up to +90°C
	flexible	-50°C up to +90°C (following DIN EN 60811-504)
	fixed	-55°C up to +90°C (following DIN EN 50305)
v max.	unsupported	10m/s
	gliding	6m/s
a max.		100m/s²
Travel distance		Unsupported travels and up to 400m and more for gliding applications, Class 6

Cable structure

Conductor	Conductor cable consisting of pre-leads (following DIN EN 60228).
Core insulation	Mechanically high-quality TPE mixture.
Overall shield	Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90%
Outer jacket	Low-adhesion, extremely abrasion-resistant and highly flexible TPE mixture, adapted to suit the requirements in e-chains®. Colour: jet black (similar to RAL 9005)

Electrical information

Nominal voltage	600/1,000V (following DIN VDE 0298-3) 1,000V (following UL)
Testing voltage	4,000V (following DIN EN 50395)

Properties and approvals

UV resistance	High
Oil resistance	Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE

Class 7.6.4.1

Basic requirements	low 1 2 3 4 5 6 **7** highest
Travel distance	unsupported 1 2 3 4 5 **6** ≥ 400m
Oil resistance	none 1 2 3 **4** highest
Torsion	none **1** 2 3 4 ±360°

UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ See data sheet for details ▶ www.igus.eu/CF340
UL AWM	
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF9.15.07 - tested by IPA according to standard DIN EN ISO 14644-1
Dry cleanroom	Tested in "dry cleanroom" according to DIN EN ISO 14644-1
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	7.5 million	12.5 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
-35/-25	10	11	12
-25/+80	7.5	8.5	9.5
+80/+90	10	11	12

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For heavy-duty applications, Class 7
- Unsupported travels and up to 400m and more for gliding applications, Class 6
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- No torsion, Class 1
- Indoor and outdoor applications, UV-resistant
- Storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, cleanroom, semiconductor insertion, outdoor cranes, low-temperature applications

	Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Shop and prices online
	CF340.40.01	(1x4.0)C	6.5	57	73	
New	**CF340.100.01**	(1x10)C	8.0	121	141	
	CF340.160.01	(1x16)C	10.0	184	215	
	CF340.250.01	(1x25)C	12.0	280	319	
	CF340.350.01	(1x35)C	13.0	395	433	
	CF340.500.01	(1x50)C	15.0	536	574	
	CF340.700.01	(1x70)C	17.5	779	832	
	CF340.950.01	(1x95)C	21.0	1015	1093	
	CF340.1200.01	(1x120)C	22.0	1270	1341	
	CF340.1500.01	(1x150)C	24.5	1592	1642	
	CF340.1850.01	(1x185)C	27.5	2066	2157	
	CF340.2400.01	(1x240)C	30.5	2566	2731	

CF-I-0023

www.igus.eu/CF340

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Medium voltage cable | PUR outer jacket

chainflex® CFCRANE.PUR

Phase-out model

Image exemplary

10 million Double strokes guaranteed

10 x d Bend radius, e-chain®

400m Travel distance, e-chain®

- For maximum voltages and outputs
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

Dynamic information

Bend radius	e-chain® linear	minimum 10 x d
	flexible	minimum 8 x d
	fixed	minimum 5 x d
Temperature	e-chain® linear	-20°C up to +80°C
	flexible	-25°C up to +80°C (following DIN EN 60811-504)
	fixed	-30°C up to +80°C (following DIN EN 50305)
v max.	unsupported	10m/s
	gliding	6m/s
a max.		50m/s²
Travel distance		Unsupported travels and up to 400m and more for gliding applications, Class 6

Cable structure

Conductor	Highly-flexible cable consisting of bare copper wires (according to DIN EN 60228).
Core insulation	Inner and outer semiconducting layer made of conductive rubber. Insulating sheath made of highly-quality, heat-resistant and ozone-proof ethylene propylene rubber (EPR).
Overall shield	Extremely bending-resistant wrapping made of tinned copper wires Coverage approx. 85% optical
Outer jacket	Low-adhesion, halogen-free, highly abrasion resistant PUR mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2) Colour: Fire red (similar to RAL 3000)

Electrical information

Nominal voltage	6/10kV or 8.7/15kV (following DIN VDE 0250), further voltages upon request.
Testing voltage	24kV (following DIN VDE 0250, Part 813)

Properties and approvals

UV resistance	Medium
Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3
Flame-retardant	According to IEC 60332-1-2
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Basic requirements	low	1	2	3	4	5	**6**	7 highest
Travel distance	unsupported	1	2	3	4	5	**6**	≥ 400m
Oil resistance	none	1	2	**3**	4	highest		
Torsion	none	**1**	2	3	4	±360°		

Class 6.6.3.1

Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	7.5 million	10 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
-20/-10	12.5	13.5	14.5
-10/+70	10	11	12
+70/+80	12.5	13.5	14.5

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For maximum voltages and outputs, Class 6
- Unsupported travels and up to 400m and more for gliding applications, Class 6
- Almost unlimited resistance to oil, Class 3
- No torsion, Class 1
- Indoor and outdoor applications, UV-resistant
- Ship to shore, crane applications, conveyor technology

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CFCRANE.PUR.350.01.6/10kV [11)]	(1x35/16)C	26.0	568	852
CFCRANE.PUR.500.01.6/10kV [11)]	(1x50/16)C	27.0	722	1025
CFCRANE.PUR.700.01.6/10kV [11)]	(1x70/16)C	29.0	941	1249
CFCRANE.PUR.950.01.6/10kV [11)]	(1x95/16)C	31.0	1166	1523

Shop and prices online

CF-I-0024

www.igus.eu/CFCRANEPUR

[11)] Phase-out model
Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Medium voltage cable | igupren outer jacket

chainflex® CFCRANE

New

Image exemplary

10 million Double strokes guaranteed

10 x d Bend radius, e-chain®

400m Travel distance, e-chain®

- For maximum voltages and outputs
- igupren outer jacket
- Shielded
- Oil-resistant
- Flame-retardant

Dynamic information

Bend radius	**e-chain® linear**	minimum 10 x d
	flexible	minimum 8 x d
	fixed	minimum 5 x d
Temperature	**e-chain® linear**	-20°C up to +80°C
	flexible	-25°C up to +80°C (following DIN EN 60811-504)
	fixed	-30°C up to +80°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	6m/s
a max.		50m/s²
Travel distance		Unsupported travels and up to 400m and more for gliding applications, Class 6

Cable structure

Conductor	Highly-flexible cable consisting of tinned copper wires (following DIN EN 60228).
Core insulation	Inner and outer semiconducting layer made of conductive rubber. Insulating sheath made of highly-quality, heat-resistant and ozone-proof ethylene propylene rubber (EPR).
Overall shield	Extremely bending-resistant, tinned copper shield. Coverage approx. 95% optical
Outer jacket	Low-adhesion iguprene mixture, especially abrasion resistant, adapted to suit the requirements in e-chains® (following VDE 0207, Part 21). Colour: Fire red (similar to RAL 3000)

Electrical information

Nominal voltage	6/10kV (following DIN VDE 0250), other voltages upon request.
Testing voltage	17kV (following DIN VDE 0250, Part 813)

Class 6.6.3.1

Basic requirements	low	1	2	3	4	5	**6**	7	highest
Travel distance	unsupported	1	2	3	4	5	**6**	≥ 400m	
Oil resistance	none	1	2	**3**	4	highest			
Torsion	none	**1**	2	3	4	±360°			

Properties and approvals

UV resistance	High
Oil resistance	Oil-resistant (following DIN EN 60811-404)
Flame-retardant	According to IEC 60332-1-2
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Double strokes*	5 million	7.5 million	10 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
-20/-10	12.5	13.5	14.5
-10/+70	10	11	12
+70/+80	12.5	13.5	14.5

* Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For maximum voltages and outputs, Class 6
- Unsupported travels and up to 400m and more for gliding applications, Class 6
- Almost unlimited resistance to oil, Class 3
- No torsion, Class 1
- Indoor and outdoor applications, UV-resistant
- Ship to shore, crane applications, conveyor technology

	Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
New	CFCRANE1x25/16-6/10kV	(1x25/16)C	25.5	526	977
New	CFCRANE1x35/16-6/10kV	(1x35/16)C	26.5	653	1123
New	CFCRANE1x50/16-6/10kV	(1x50/16)C	27.5	676	1279
New	CFCRANE1x70/16-6/10kV	(1x70/16)C	30.5	1036	1626
New	CFCRANE1x95/16-6/10kV	(1x95/16)C	33.5	1307	2,002
New	CFCRANE1X120/16-6/10KV	(1x120/16)C	35.0	1593	2332
New	CFCRANE1x185/25-6/10kV	(1x185/25)C	39.0	2311	3241

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

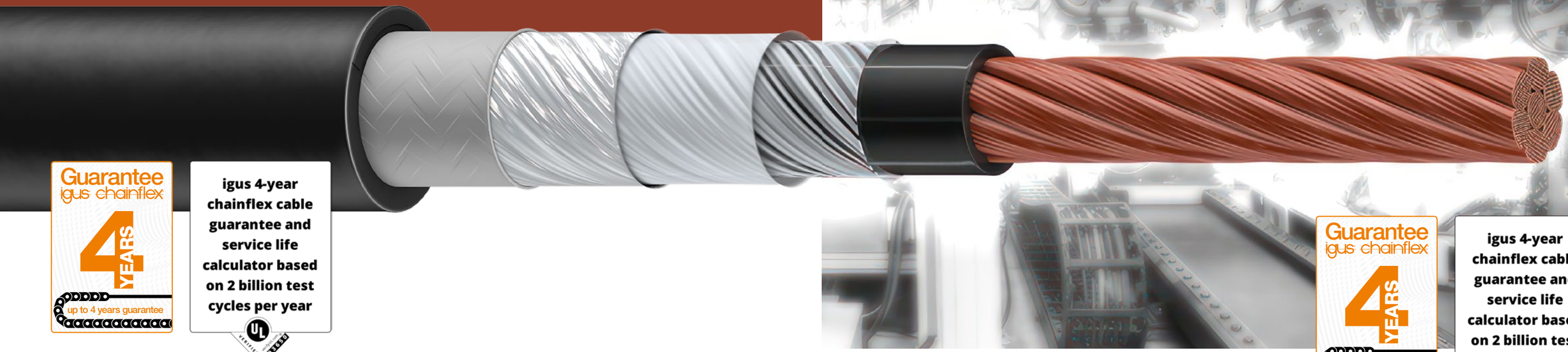
Shop and prices online

CF-I-0025

www.igus.eu/CFCRANE

chainflex® CFROBOT

Twistable cables



Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

PTFE FREE · cULus · NFPA · DNV · REACH · RoHS · Clean-Room · dry cleanroom tested · DESINA · CE

Cables for torsion and robot applications

Special design with a unique concept and soft design that absorbs internal movement in the cable, allowing for torsion movements of up to ± 360°. PUR or TPE outer jacket. Tested with a chainflex® guarantee of up to 4 years.

- Special design to withstand torsional motion
- Fail-safe operation on robots and in free movement
- Unique torsion information in the cable industry based on tests in the igus® laboratory
- Sustainability thanks to a longer service life is practical resource protection, enhancing economic efficiency and protecting the environment.
- Calculate the exact service life online: igus.eu/chainflexlife

Background

chainflex® cables for robots

Ever more complex sequences of movements in industrial applications demand twistable or multi-axis flexible cables with a long service life, similar to the classic chainflex® cables for use in linear e-chain systems®.

Stranding, structure, shields and jacket materials must compensate both for major changes in bending load and changes in diameter due to torsional movements. To achieve this, different “soft” structural elements and filling elements that absorb torsion forces are used in chainflex® CFROBOT cables. Special demands are made on the braided shielding in torsion cables.

Torsion-optimised shield structures are chosen that allow compensatory movements thanks to special gliding films.

With twistable bus cables in particular, the transmission characteristics such as attenuation, cable capacitance 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 capacitance values.

Benefits
- Up to ± 360° torsion
- With UL and CSA
- Jacket materials: PUR, TPE
- Tested with a 4-year guarantee

Typical application areas
- Robots/multi-axis movements
- Handling
- lead screw drives

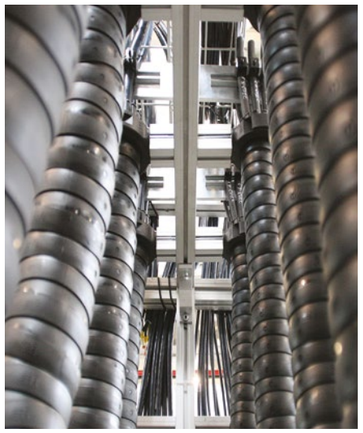
The highly abrasion-resistant, halogen-free and flame-resistant PUR jacket material in motor, hybrid/control cables and bus cables protects the torsion-optimised stranded elements from possible damage. The highly abrasion-resistant, halogen-free TPE jacket achieves the special requirements of the twistable FOC and individual as well as the single core cables.

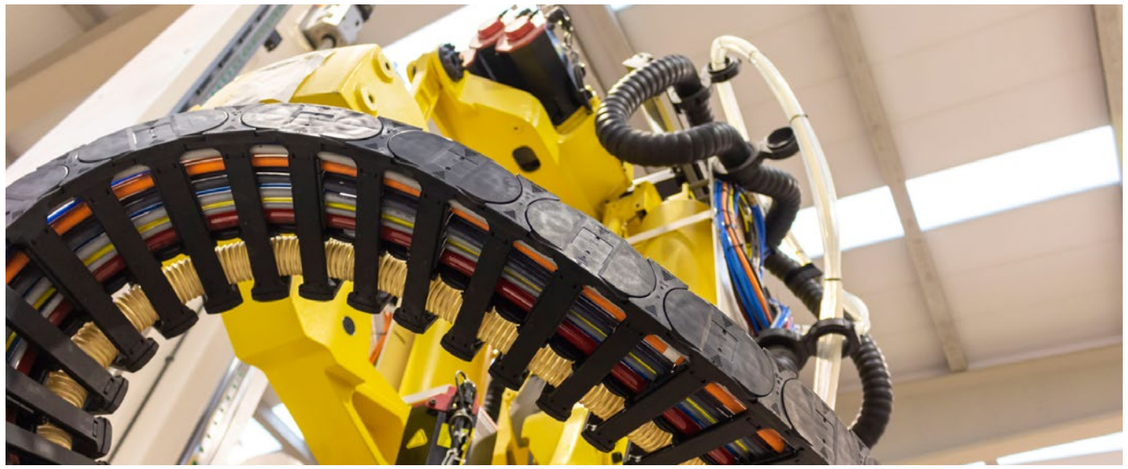
Unlike cables for linear e-chain systems®, the mechanical stress on these cables is in the combination of bending, torsion and centrifugal forces that cannot usually be determined by design or during use by means of measurement. For this reason, and unlike the situation with linear e-chain® applications, a clear “yes/no” statement cannot be made about the use of a particular cable in torsion applications.

To enable evaluation to take place, based on sensible and comparable test results, the igus® “torsion test standard” was developed.
According to this standard, all chainflex® CFROBOT cables of a triflex® energy chain are twisted over a distance of one metre and a torsion of ±180° at least 5 million times. In addition, a test is carried out on a test bench with a chain length of approx. 2,500mm with 270° torsion with an extreme load through centrifugal forces and heavy blows such as those that can occur on an industrial robot. All the non-shielded, gusset-filling extruded standard chainflex® control cables of the series CF130.UL, CF5, CF9 and CF9.UL correspond to the above igus® standard and have been approved for use in torsion applications.

The following twistable CFROBOT cable types are currently available:
- Control cable (shielded and unshielded)
- Data and measuring system cables
- Fibre Optic Cable (FOC)
- Motor and servo cables
- Bus cables
- Hybrid cables

We can also offer you chainflex® CFROBOT cables pre-harnessed with the connectors of your choice as a readycable®, or as a ready-to-install readychain® system.





Tested for torsion applications

Completely twisted!

chainflex® cables for e-chain system® are designed for application in linear movements and their efficiency has been proved a million times.

But industrial applications and their motion sequences are becoming increasingly complex, so that special cables are needed more and more for torsional movements. The service life of the different designs are even harder to calculate for torsion applications, as there are no fixed parameters such as radii, travels etc. Shielded cables however are particularly vulnerable in torsion applications. Braided shields are generally braided in the opposite directions. Whether a cable survives the torsional demands is very strongly dependent on the application and type of installation.

Unshielded cables, particularly bundled chainflex® types, can be successfully used in many twisted applications.

In twisting movements with a braided shield, the strand wires wound in one direction are in tension and the other direction in compression. This leads quickly to shield breakage.

The igus® development of a new twistable, shielded single core cable accounts for this and ensures, due to its special shield design and structure, that no, or absolutely minimal, forces act on the shield wire.

As the test clearly shows, massive service life extension can be observed when compared, for example, to a CF310.250.01. The new CFROBOT cable was tested at the igus® laboratory in a specially developed torsion test rig. The torsion angle is ±270° for a total cable length of about 2.5 m (tested within different versions of the triflex® R).

Cables tested:
- 3 cables of CFROBOT.037
- 3 cables of the series CF310.250.01.UL
- 3 cables of the series CF310.250.01

The initial test sample of the CF310 with braided shield and the CFROBOT were taken after 250,000 movements with a torsion angle of ± 270°.

The cable dissection was undertaken in three areas of the cable length. In the sample illustrated in Picture 1, distinct damage to the overall shield is noticeable in the upper third of the cable.
The samples (picture 2) of the CFROBOT.037 (so far samples were taken after 250,000, 1.5 million and 3 million movements) showed no damage in the area of the cable or the overall shield even after above 3 million torsional movements of ± 270°.

The detailed analyses (picture 3) of the shield wires, buffer fibres, film and the cable show no damage. The test is being continued further to determine the maximum service life of the cable.

chainflex® twistable cables

Mechanical parameters

chainflex® cables	Jacket	Shield	Bend radius e-chain® min. [xd]	Temperature e-chain® from/to [°C]	v max. [°/s] twisted	a max. [°/s²] twisted	Travel distance [m]	Page
CF77.UL.D	PUR		6.8	-25/+80	180	60	≤ 10	354
CFROBOT2	PUR	●	10	-25/+80	180	60	≤ 10	358
CFROBOT3	PUR	●	10	-25/+80	180	60	≤ 100	360
CFROBOT4	PUR	●	10	-25/+80	180	60	≤ 10	362
CFROBOT5	TPE		10	-35/+80	180	60	≤ 10	366
CFROBOT6	PUR		10	-25/+80	180	60	≤ 100	368
CFROBOT7	PUR	●	10	-25/+80	180	60	> 400	370
CFROBOT	TPE	●	10	-35/+90	180	60	≤ 10	374
CFROBOT8	PUR	●	10	-25/+70	180	60	≤ 10	376
CFROBOT8.PLUS	PUR	●	10	-25/+70	360	60	≤ 10	380
CFROBOT9	PUR	●	10	-25/+80	180	60	≤ 10	384

Approvals/resistance

chainflex® cables	oil	UV	PTFE free	Approvals and standards																Page
CF77.UL.D	●	●	●				●			●		●	●	●	●		●	●		354
CFROBOT2	●	●	●				●			●			●	●	●				●	358
CFROBOT3	●	●	●				●			●			●	●	●				●	360
CFROBOT4	●	●	●				●			●			●	●	●				●	362
CFROBOT5	●	●	●										●	●	●	●			●	366
CFROBOT6	●	●	●				●			●			●	●	●				●	368
CFROBOT7	●	●	●				●			●			●	●	●				●	370
CFROBOT	●	●					●			●			●	●	●				●	374
CFROBOT8	●	●	●				●						●	●	●				●	376
CFROBOT8.PLUS	●	●	●				●						●	●	●				●	380
CFROBOT9	●	●	●				●			●			●	●	●				●	384

Guaranteed service life

chainflex® cables	Temperature, from/to [°C]	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]	Page
		5 million cycles*	7.5 million cycles*	10 million cycles*	
CF77.UL.D	-25 / -15	±150	±90	±30	
	-15 / +70	±180	±120	±60	354
	+70 / +80	±150	±90	±30	
CFROBOT2	-25 / -15	±150	±90	±30	
	-15 / +70	±180	±120	±60	358
	+70 / +80	±150	±90	±30	
CFROBOT3	-25 / -15	±150	±90	±30	
	-15 / +70	±180	±120	±60	360
	+70 / +80	±150	±90	±30	
CFROBOT4	-25 / -15	±150	±90	±30	
	-15 / +70	±180	±120	±60	362
	+70 / +80	±150	±90	±30	
CFROBOT5	-25 / -15	±150	±90	±30	
	-15 / +70	±180	±120	±60	366
	+70 / +80	±150	±90	±30	
CFROBOT6	-25 / -15	±150	±90	±30	
	-15 / +70	±180	±120	±60	368
	+70 / +80	±150	±90	±30	
CFROBOT7	-25 / -15	±150	±90	±30	
	-15 / +70	±180	±120	±60	370
	+70 / +80	±150	±90	±30	
CFROBOT	-35 / -25	±150	±90	±30	
	-15 / +80	±180	±120	±60	374
	+80 / +90	±150	±90	±30	
CFROBOT8	-25 / -15	±150	±90	±30	
	-15 / +60	±180	±120	±60	376
	+60 / +70	±150	±90	±30	
CFROBOT8.PLUS	-25 / -15	±330	±240	±150	
	-15 / +60	±360	±270	±180	380
	+60 / +70	±330	±240	±150	
CFROBOT9	-25 / -15	±150	±90	±30	
	-15 / +70	±180	±120	±60	384
	+70 / +80	±150	±90	±30	

*** Higher number of cycles? Calculate service life online: ► www.igus.eu/chainflexlife**

Control cable | PUR outer jacket

chainflex® CF77.UL.D

Image exemplary

10 million Cycles guaranteed

6.8 x d Bend radius, e-chain®

±180°/m Torsion angle

- For torsion applications
- PUR outer jacket
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

Dynamic information

Bend radius	**flexible twisted**	minimum 6.8 x d
	fixed	minimum 4 x d
Temperature	**flexible twisted**	-25°C up to +80°C
	fixed	-50°C up to +80°C (following DIN EN 50305)
v max.	**twisted**	180°/s
a max.	**twisted**	60°/s²
Travel distance	Robots and multi-axis movements, Class 1	
Torsion	Torsion ±180°, with 1m cable length, Class 3 (except for 5-core types ≥ 4.0mm² ▶ Product range table)	

Cable structure

Conductor Finely stranded conductor consisting of bare copper wires (following DIN EN 60228).

Core insulation Mechanically high-quality TPE mixture.

Core structure **Number of cores < 12:** Cores wound in a layer with short pitch length.
Number of cores ≥ 12: Cores wound in bundles which are then wound around a high tensile strength centre element, all with optimised short pitch lengths and directions. Especially low-torsion structure.

Core identification **Cores < 0.5mm²:** Colour code in accordance with DIN 47100.
Cores ≥ 0.5mm²: Black cores with white numbers, one green-yellow core.
CF77.UL.02.03.INI: brown, blue, black
CF77.UL.03.04.INI: brown, blue, black, white
CF77.UL.03.05.INI: brown, blue, black, white, green-yellow

Outer jacket Low-adhesion, halogen-free, highly abrasion resistant PUR mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2)
Colour: Window-grey (similar to RAL 7040)
Variants ▶ Product range table

Electrical information

Nominal voltage 300/500V (following DIN VDE 0298-3)
Number of cores < 12:
Cores < 0.5mm²: 300V (following UL)
Cores ≥ 0.5mm²: 1000V (following UL)
Number of cores ≥ 12: 1000V (following UL)

Testing voltage 2,000V (following DIN EN 50395)

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 5.1.3.3

Basic requirements	low	1	2	3	4	**5**	6	7	highest
Travel distance	unsupported	**1**	2	3	4	5	6		≥ 400m
Oil resistance	none	1	2	**3**	4		highest		
Torsion	none	1	2	**3**	4		±360°		

Properties and approvals

UV resistance	Medium
Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3
Offshore	MUD-resistant following NEK 606 - status 2016
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CF77ULD
NFPA	Following NFPA 79-2018, chapter 12.9
DNV	Type Approval Certificate TAE00003X1 (Issue 04/2025) Current information in the data sheet ▶ www.igus.eu/CF77ULD
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1, material/cable tested by IPA according to DIN EN ISO standard 14644-1
DESINA	According to VDW, DESINA standardisation
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Cycles*	5 million	7.5 million	10 million
Temperature, from/to [°C]	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]
-25/-15	±150	±90	±30
-15/+70	±180	±120	±60
+70/+80	±150	±90	±30

* Higher number of cycles? Calculate service life online: ▶ www.igus.eu/chainflexlife

Typical application areas

- For heavy-duty applications, Class 5
- Especially for robots and multi-axis movements, Class 1
- Almost unlimited resistance to oil, Class 3
- Torsion ±180°, with 1m cable length, Class 3
- Indoor and outdoor applications with average sun radiation
- Robots, handling, lead screw drives

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Control cable | PUR outer jacket

chainflex® CF77.UL.D

Class 5.1.3.3

Basic requirements
Travel distance
Oil resistance
Torsion

low 1 2 3 4 **5** 6 7 highest
unsupported **1** 2 3 4 5 6 ≥ 400m
none 1 2 **3** 4 highest
none 1 2 **3** 4 ±360°

Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CF77.UL.02.03.INI [12]	3x0.25	5.0	9	29
CF77.UL.02.04.D	4x0.25	5.5	11	35
CF77.UL.02.05.D	5x0.25	6.0	13	39
CF77.UL.02.07.D	7x0.25	6.5	18	51
CF77.UL.02.12.D	12x0.25	9.0	32	78
CF77.UL.02.18.D	18x0.25	10.5	47	127
CF77.UL.02.25.D	25x0.25	11.5	63	155
CF77.UL.03.04.INI [12]	4x0.34	6.0	15	36
CF77.UL.03.05.INI [12]	5x0.34	6.0	19	44
CF77.UL.03.05.INI.D	5x0.34	6.0	19	44
CF77.UL.05.04.D	4G0.5	6.0	21	46
CF77.UL.05.05.D	5G0.5	6.5	26	53
CF77.UL.05.07.D	7G0.5	7.5	39	78
CF77.UL.05.12.D	12G0.5	10.0	63	130
CF77.UL.05.18.D	18G0.5	12.0	94	184
CF77.UL.05.25.D	25G0.5	14.0	129	243
CF77.UL.05.30.D	30G0.5	15.0	155	315
CF77.UL.07.03.D	3G0.75	6.5	23	52
CF77.UL.07.04.D	4G0.75	7.0	31	59
CF77.UL.07.05.D	5G0.75	7.5	38	71
CF77.UL.07.07.D	7G0.75	8.5	54	100
CF77.UL.07.12.D	12G0.75	12.0	91	180
CF77.UL.07.18.D	18G0.75	13.5	134	239
CF77.UL.07.20.D	20G0.75	14.5	149	269
CF77.UL.07.25.D	25G0.75	16.0	186	336
CF77.UL.07.36.D	36G0.75	19.0	279	506
CF77.UL.07.42.D	42G0.75	21.0	341	580
CF77.UL.10.02.D	2x1.0	6.5	21	51
CF77.UL.10.03.D	3G1.0	6.5	31	58
CF77.UL.10.04.D	4G1.0	7.0	41	73
CF77.UL.10.05.D	5G1.0	8.0	50	90
CF77.UL.10.07.D	7G1.0	9.0	71	120
CF77.UL.10.12.D	12G1.0	12.5	120	220
CF77.UL.10.18.D	18G1.0	15.0	179	314
CF77.UL.10.25.D	25G1.0	17.5	248	431
CF77.UL.10.42.D	42G1.0	22.5	433	699

Shop and prices online

CF-J-0001

www.igus.eu/CF77ULD

[12] Colour outer jacket: Colza yellow (similar to RAL 1021)

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CF77.UL.15.03.D	3G1.5	7.0	46	71
CF77.UL.15.04.D	4G1.5	7.5	61	88
CF77.UL.15.05.D	5G1.5	8.0	75	105
CF77.UL.15.07.D [17]	7G1.5	9.5	105	152
CF77.UL.15.12.D	12G1.5	13.0	179	297
CF77.UL.15.18.D	18G1.5	17.0	268	405
CF77.UL.15.25.D	25G1.5	19.5	297	564
CF77.UL.15.36.D	36G1.5	23.5	551	848
CF77.UL.25.03.D	3G2.5	8.5	75	132
CF77.UL.25.04.D	4G2.5	9.5	95	167
CF77.UL.25.05.D	5G2.5	10.0	124	196
CF77.UL.25.07.D [17]	7G2.5	12.0	174	270
CF77.UL.25.12.D	12G2.5	17.0	297	479
CF77.UL.40.04.D [90]	4G4.0	11.5	165	245
CF77.UL.40.05.D [90]	5G4.0	12.0	198	284
CF77.UL.60.05.D [90]	5G6.0	13.5	297	412

Shop and prices online

CF-J-0001

www.igus.eu/CF77ULD

[17] When using the cables with "7G1.5mm²" and "7G2.5mm²" minimum bend radius must be 17.5xd with gliding travel distance ≥ 5m.
[90] Torsion ± 90°

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Cables available in the chainflex® CASE

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More on this online: www.igus.eu/cf-case

Order example: CF77.UL.02.04.D - to your required length (0.5m steps)
CF77.UL.D chainflex® series .02 Code nominal cross section .04 Number of cores

Order online ▶ www.igus.eu/CF77ULD

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

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igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Control cable | PUR outer jacket

chainflex® CFROBOT2

Image exemplary

10 million Cycles guaranteed

10 x d Bend radius, e-chain®

±180°/m Torsion angle

- For torsion applications
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

Dynamic information

Bend radius	**flexible twisted**	minimum 10 x d
	fixed	minimum 5 x d
Temperature	**flexible twisted**	-25°C up to +80°C
	fixed	-50°C up to +80°C (following DIN EN 50305)
v max.	**twisted**	180°/s
a max.	**twisted**	60°/s²
Travel distance		Robots and multi-axis movements, Class 1
Torsion		Torsion ±180°, with 1m cable length, Class 3

Cable structure

Conductor	Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228).
Core insulation	Mechanically high-quality TPE mixture.
Core identification	Black cores with white numbers, one green-yellow core.
Overall shield	Extremely torsion-resistant tinned wound copper shield. Coverage approx. 85% optical
Outer jacket	Low-adhesion, halogen-free, highly abrasion resistant PUR mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2) Colour: Steel blue (similar to RAL 5011)

Electrical information

Nominal voltage	300/500V (following DIN VDE 0298-3) 300V (following UL)
Testing voltage	2,000V (following DIN EN 50395)

Properties and approvals

UV resistance	High
Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754

Basic requirements: low 1 2 3 4 5 **6** 7 highest
Travel distance: unsupported **1** 2 3 4 5 6 ≥ 400m
Oil resistance: none 1 2 **3** 4 highest
Torsion: none 1 2 **3** 4 ±360°

Class 6.1.3.3

PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ See data sheet for details ▶ www.igus.eu/CFROBOT2
UL/CSA AWM	
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Cycles*	5 million	7.5 million	10 million
Temperature, from/to [°C]	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]
-25/-15	±150	±90	±30
-15/+70	±180	±120	±60
+70/+80	±150	±90	±30

* Higher number of cycles? Calculate service life online: ▶ www.igus.eu/chainflexlife

Typical application areas

- For heaviest duty applications with torsion movements, Class 6
- Especially for robots and multi-axis movements, Class 1
- Almost unlimited resistance to oil, Class 3
- Torsion ±180°, with 1m cable length, Class 3
- Indoor and outdoor applications, UV-resistant
- Robots, handling, lead screw drives

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CFROBOT2.07.04.C	(4G0.75)C	8.0	43	78
CFROBOT2.07.05.C	(5G0.75)C	8.5	51	90
CFROBOT2.07.07.C	(7G0.75)C	10.0	71	120
CFROBOT2.07.12.C	(12G0.75)C	14.0	122	214
CFROBOT2.07.18.C	(18G0.75)C	16.5	185	301

Shop and prices online
CF-J-0002
www.igus.eu/CFROBOT2

Note: The given outer 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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Data cable | PUR outer jacket

chainflex® CFROBOT3

Image exemplary

10 million Cycles guaranteed

10 x d Bend radius, e-chain®

±180°/m Torsion angle

- For torsion applications
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

Dynamic information

Bend radius	**flexible twisted**	minimum 10 x d
	fixed	minimum 5 x d
Temperature	**flexible twisted**	-25°C up to +80°C
	fixed	-50°C up to +80°C (following DIN EN 50305)
v max.	**twisted**	180°/s
a max.	**twisted**	60°/s²
Travel distance		Robots and multi-axis movements, Class 1
Torsion		Torsion ±180°, with 1m cable length, Class 3

Cable structure

Conductor	Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228).
Core insulation	Mechanically high-quality TPE mixture.
Core structure	Cores twisted in pairs with a short pitch length, core pairs then wound with short pitch lengths.
Core identification	Colour code in accordance with DIN 47100.
Overall shield	Extremely torsion-resistant tinned wound copper shield. Coverage approx. 85% optical
Outer jacket	Low-adhesion, halogen-free, highly abrasion resistant PUR mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2) Colour: Steel blue (similar to RAL 5011)

Electrical information

Nominal voltage	300/500V (following DIN VDE 0298-3) 300V (following UL)
Testing voltage	2,000V (following DIN EN 50395)

Properties and approvals

UV resistance	High
Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)

Class 6.1.3.3

Basic requirements	low	1 2 3 4 5 **6** 7 highest
Travel distance	unsupported	**1** 2 3 4 5 6 ≥ 400m
Oil resistance	none	1 2 **3** 4 highest
Torsion	none	1 2 **3** 4 ±360°

Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ See data sheet for details ▶ www.igus.eu/CFROBOT3
UL/CSA AWM	
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Cycles*	5 million	7.5 million	10 million
Temperature, from/to [°C]	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]
-25/-15	±150	±90	±30
-15/+70	±180	±120	±60
+70/+80	±150	±90	±30

* Higher number of cycles? Calculate service life online: ▶ www.igus.eu/chainflexlife

Typical application areas

- For heaviest duty applications with torsion movements, Class 6
- Especially for robots and multi-axis movements, Class 1
- Almost unlimited resistance to oil, Class 3
- Torsion ±180°, with 1m cable length, Class 3
- Indoor and outdoor applications, UV-resistant
- Robots, handling, lead screw drives

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CFROBOT3.02.03.02	(3x(2x0.25))C	9.0	33	84
CFROBOT3.02.04.02	(4x(2x0.25))C	10.5	38	103
CFROBOT3.02.06.02	(6x(2x0.25))C	11.5	52	127
CFROBOT3.02.08.02	(8x(2x0.25))C	13.5	66	170
CFROBOT3.05.05.02	(5x(2x0.5))C	12.5	80	170

Shop and prices online

www.igus.eu/CFROBOT3

Note: The given outer 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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Measuring system cable | PUR outer jacket

chainflex® CFROBOT4

Image exemplary

10 million Cycles guaranteed

10 x d Bend radius, e-chain®

±180°/m Torsion angle

- For torsion applications
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

Dynamic information

Bend radius	**flexible twisted**	minimum 10 x d
	fixed	minimum 5 x d
Temperature	**flexible twisted**	-25°C up to +80°C
	fixed	-50°C up to +80°C (following DIN EN 50305)
v max.	**twisted**	180°/s
a max.	**twisted**	60°/s²
Travel distance	Robots and multi-axis movements, Class 1	
Torsion	Torsion ±180°, with 1m cable length, Class 3	

Cable structure

Conductor	Stranded conductor in especially bending-resistant version consisting of tinned copper wires (following DIN EN 60228).
Core insulation	Mechanically high-quality TPE mixture.
Core identification	According to measuring system specification. ▶ Product range table
Element shield	Extremely torsion-resistant tinned wound copper shield.
Overall shield	Extremely torsion-resistant tinned wound copper shield. Coverage approx. 80% optical
Outer jacket	Low-adhesion, halogen-free, highly abrasion resistant PUR mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2) Colour: Steel blue (similar to RAL 5011) Variants ▶ Product range table

Electrical information

Nominal voltage	50V 30V (following UL)
Testing voltage	500V

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 6.1.3.3

Basic requirements	low	1	2	3	4	5	**6**	7	highest
Travel distance	unsupported	**1**	2	3	4	5	6		≥ 400m
Oil resistance	none	1	2	**3**	4		highest		
Torsion	none	1	2	**3**	4		±360°		

Properties and approvals

UV resistance	High
Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ See data sheet for details ▶ www.igus.eu/CFROBOT4
UL/CSA AWM	
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Cycles*	5 million	7.5 million	10 million
Temperature, from/to [°C]	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]
-25/-15	±150	±90	±30
-15/+70	±180	±120	±60
+70/+80	±150	±90	±30

* Higher number of cycles? Calculate service life online: ▶ www.igus.eu/chainflexlife

Typical application areas

- For heaviest duty applications with torsion movements, Class 6
- Especially for robots and multi-axis movements, Class 1
- Almost unlimited resistance to oil, Class 3
- Torsion ±180°, with 1m cable length, Class 3
- Indoor and outdoor applications, UV-resistant
- Robots, handling, lead screw drives

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Measuring system cable | PUR outer jacket

chainflex® CFROBOT4

Class 6.1.3.3

Basic requirements	low	1	2	3	4	5	**6**	7	highest
Travel distance	unsupported	**1**	2	3	4	5	6		≥ 400m
Oil resistance	none	1	2	**3**	4				highest
Torsion	none	1	2	**3**	4				±360°

Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CFROBOT4.001	(3x(2x0.14)C +(4x0.14)+(2x0.5))C	10.5	62	115
CFROBOT4.006	(3x(2x0.14C+(4x0.14) +(4x0.22)+(2x0.5))C	11.5	74	135
CFROBOT4.009	(4x(2x0.25)+(2x0.5))C	9.0	48	90
CFROBOT4.015	(4x(2x0.14)+4x0.5)C	9.0	49	91
CFROBOT4.028 [13)]	(2x(2x0.20)+(2x0.38))C	7.5	44	72

Shop and prices online

CF-J-0004

www.igus.eu/CFROBOT4

Part No.	Core group	Colour code
CFROBOT4.001	3x(2x0.14)C	green/yellow, black/brown, red/orange
	4x0.14	grey/blue/white-yellow/white-black
	2x0.5	brown-red/brown-blue
CFROBOT4.006	3x(2x0.14)C	green/yellow, black/brown, red/orange
	(4x0.14)	grey/blue/white-yellow/white-black
	(4x0.22)	yellow-brown/grey-brown/green-black/green-red
	(2x0.5)	brown-red/brown-blue
CFROBOT4.009	4x(2x0.25)	brown/green, blue/violet, grey/pink, red/black
	2x0.5	white, brown
CFROBOT4.015	4x(2x0.14)	brown/green, yellow/violet, grey/pink, red/black
	4x0.5	blue, white, brown-green, white-green
CFROBOT4.028 [13)]	2x(2x0.20)	green/yellow, pink/blue
	(2x0.38)	red/black

[13)] Colour outer jacket: Yellow-green (RAL 6018)

Note: The given outer 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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DNV

REACH

RoHS

clean-room

CE

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More on this online: www.igus.eu/cf-case

Order example: CFROBOT4.009 - to your required length (0.5m steps)
CFROBOT4 chainflex® series .009 Code measuring system type

Online order ▶ www.igus.eu/CFROBOT4

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

Fibre Optic Cable | TPE outer jacket

chainflex® CFROBOT5

Image exemplary

10 million Cycles guaranteed

10 x d Bend radius, e-chain®

±180°/m Torsion angle

- For torsion applications
- TPE outer jacket
- Oil and bio-oil-resistant
- UV-resistant
- Low-temperature-flexible
- Hydrolysis and microbe-resistant
- PVC and halogen-free

Dynamic information

Bend radius	**flexible twisted**	minimum 10 x d
	fixed	minimum 5 x d
Temperature	**flexible twisted**	-25°C up to +80°C
	fixed	-55°C up to +80°C (following DIN EN 50305)
v max.	**twisted**	180°/s
a max.	**twisted**	60°/s²
Travel distance		Robots and multi-axis movements, Class 1
Torsion		Torsion ±180°, with 1m cable length, Class 3

Cable structure

Conductor	50/125µm, 62.5/125µm bending-resistant solid glass fibre optic cores, with aramid strain relief elements.
Core structure	FOC cores wound with high-tensile aramid dampers around a glass-fibre reinforced plastic central element.
Core identification	▶ Product range table
Outer jacket	Low-adhesion, extremely abrasion-resistant and highly flexible TPE mixture, adapted to suit the requirements in e-chains®. Colour: jet black (similar to RAL 9005)

Properties and approvals

UV resistance	High
Oil resistance	Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 6.1.4.3

Basic requirements	low 1 2 3 4 5 **6** 7 highest
Travel distance	unsupported **1** 2 3 4 5 6 ≥ 400m
Oil resistance	none 1 2 3 **4** highest
Torsion	none 1 2 **3** 4 ±360°

Cleanroom According to ISO Class 1. The outer jacket material of this series complies with CF9.15.07 - tested by IPA according to standard DIN EN ISO 14644-1

Dry cleanroom Tested in "dry cleanroom" according to DIN EN ISO 14644-1

CE Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Cycles*	5 million	7.5 million	10 million
Temperature, from/to [°C]	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]
-35/-25	±150	±90	±30
-25/+70	±180	±120	±60
+70/+80	±150	±90	±30

* Higher number of cycles? Calculate service life online: ▶ www.igus.eu/chainflexlife

Typical application areas

- For heaviest duty applications with torsion movements, Class 6
- Especially for robots and multi-axis movements, Class 1
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- Torsion ±180°, with 1m cable length, Class 3
- Indoor and outdoor applications, UV-resistant
- Robots, handling

Part No.	Number of fibres/ fibre diameter/ conductor nominal cross section	Outer diameter (d) max. [mm]	Weight [kg/km]
CFROBOT5.500 [11]	2x62.5/125	8.5	53
CFROBOT5.501	2x50/125	8.5	53

[11] Phase-out model

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Shop and prices online
www.igus.eu/CFROBOT5

Part No.	Bandwidth [MHz x km] @ 650nm	Attenuation [dB/km] @ 650nm	Bandwidth [MHz x km] @ 850nm	Attenuation [dB/km] @ 850nm	Fibre identification
CFROBOT5.500 [11]	≥ 200	≤ 3.0	≥ 500	≤ 0.7	orange with white numbers
CFROBOT5.501	≥ 500	≤ 2.5	≥ 500	≤ 0.7	blue with white numbers

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Motor cable | PUR outer jacket

chainflex® CFROBOT6

Phase-out model

Image exemplary

10 million Cycles guaranteed

10 x d Bend radius, e-chain®

±180°/m Torsion angle

- For torsion applications
- PUR outer jacket
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

Dynamic information

Bend radius	**flexible twisted**	minimum 10 x d
	fixed	minimum 5 x d
Temperature	**flexible twisted**	-25°C up to +80°C
	fixed	-55°C up to +80°C (following DIN EN 50305)
v max.	**twisted**	180°/s
a max.	**twisted**	60°/s²
Travel distance	Robots and multi-axis movements, Class 1	
Torsion	Torsion ±180°, with 1m cable length, Class 3	

Cable structure

Conductor	Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228).
Core insulation	Mechanically high-quality TPE mixture.
Core identification	Black cores with white numbers 1-2, one green-yellow core.
Outer jacket	Low-adhesion, halogen-free, highly abrasion resistant PUR mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2) Colour: Steel blue (similar to RAL 5011)

Electrical information

Nominal voltage	600/1,000V (following DIN VDE 0298-3) 1,000V (following UL)
Testing voltage	4,000V (following DIN EN 50395)

Properties and approvals

UV resistance	High
Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)

Class 6.1.3.3

Basic requirements	low 1 2 3 4 5 **6** 7 highest
Travel distance	unsupported **1** 2 3 4 5 6 ≥ 400m
Oil resistance	none 1 2 **3** 4 highest
Torsion	none 1 2 **3** 4 ±360°

Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ See data sheet for details ▶ www.igus.eu/CFROBOT6
UL/CSA AWM	
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Cycles*	5 million	7.5 million	10 million
Temperature, from/to [°C]	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]
-25/-15	±150	±90	±30
-15/+70	±180	±120	±60
+70/+80	±150	±90	±30

* Higher number of cycles? Calculate service life online: ▶ www.igus.eu/chainflexlife

Typical application areas

- For heaviest duty applications with torsion movements, Class 6
- Especially for robots and multi-axis movements, Class 1
- Almost unlimited resistance to oil, Class 3
- Torsion ±180°, with 1m cable length, Class 3
- Indoor and outdoor applications, UV-resistant
- Robots, handling, lead screw drives

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CFROBOT6.160.03 [11]	3G16	18.0	475	578
CFROBOT6.250.03 [11]	3G25	22.0	737	896

[11] Phase-out model

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Shop and prices online

CF-J-0006

www.igus.eu/CFROBOT6

Motor cable | PUR outer jacket

chainflex® CFROBOT7

Image exemplary

10 million Cycles guaranteed

10 x d Bend radius, e-chain®

±180°/m Torsion angle

- For torsion applications
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

Dynamic information

Bend radius	**flexible twisted**	minimum 10 x d
	fixed	minimum 5 x d
Temperature	**flexible twisted**	-25°C up to +80°C
	fixed	-55°C up to +80°C (following DIN EN 50305)
v max.	**twisted**	180°/s
a max.	**twisted**	60°/s²
Travel		Robots and multi-axis movements, Class 1
Torsion		Torsion ±180°, with 1m cable length, Class 3

Cable structure

Conductor	Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228).
Core insulation	Mechanically high-quality TPE mixture.
Core identification	**Power cores:** Black cores with white numbers, one green-yellow core. **2 control pairs:** Black cores with white numbers. 1. Control core: 5 2. Control core: 6 3. Control core: 74. Control core: 8 **4 Control pairs:** Colour code in accordance with DIN 47100
Overall shield	Extremely torsion-resistant tinned wound copper shield. Coverage approx. 85% optical
Outer jacket	Low-adhesion, halogen-free, highly abrasion resistant PUR mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2) Colour: Steel blue (similar to RAL 5011)

Electrical information

Nominal voltage	600/1,000V (following DIN VDE 0298-3) 1,000V (following UL)
Testing voltage	4,000V (following DIN EN 50395)

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 6.1.3.3

Basic requirements	low	1	2	3	4	5	**6**	7 highest
Travel distance	unsupported	**1**	2	3	4	5	6	≥ 400m
Oil resistance	none	1	2	**3**	4	highest		
Torsion	none	1	2	**3**	4	±360°		

Properties and approvals

UV resistance	High
Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ See data sheet for details ▶ www.igus.eu/CFROBOT7
UL/CSA AWM	
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Cycles*	5 million	7.5 million	10 million
Temperature, from/to [°C]	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]
-25/-15	±150	±90	±30
-15/+70	±180	±120	±60
+70/+80	±150	±90	±30

* Higher number of cycles? Calculate service life online: ▶ www.igus.eu/chainflexlife

Typical application areas

- For heaviest duty applications with torsion movements, Class 6
- Especially for robots and multi-axis movements, Class 1
- Almost unlimited resistance to oil, Class 3
- Torsion ±180°, with 1m cable length, Class 3
- Indoor and outdoor applications, UV-resistant
- Robots, handling, lead screw drives

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Motor cable | PUR outer jacket

chainflex® CFROBOT7

Class 6.1.3.3

Basic requirements	low	1	2	3	4	5	**6**	7	highest
Travel distance	unsupported	**1**	2	3	4	5	6		≥ 400m
Oil resistance	none	1	2	**3**	4				highest
Torsion	none	1	2	**3**	4				±360°

Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
2 control pairs				
CFROBOT7.07.03.02.02.C [11]	(4G0.75+2x(2x0.34)C)C	11.5	88	155
CFROBOT7.15.15.02.02.C	(4G1.5+2x(2x1.5)C)C	16.5	197	304
CFROBOT7.25.15.02.02.C	(4G2.5+2x(2x1.5)C)C	16.5	243	349
4 control pairs				
CFROBOT7.40.02.02.04.C	(4G4.0+4x(2x0.25)C)C	17.0	253	366
without control pair				
CFROBOT7.15.03.C	(3G1.5)C	8.5	61	98
CFROBOT7.15.04.C	(4G1.5)C	9.5	77	120
CFROBOT7.25.03.C	(3G2.5)C	10.0	93	142
CFROBOT7.25.04.C	(4G2.5)C	11.0	119	173
CFROBOT7.60.04.C	(4G6.0)C	15.0	278	374

Shop and prices online

CF-J-0007

www.igus.eu/CFROBOT7

[11] Phase-out model

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Order example: CFROBOT7.15.03.C – to your required length (0.5m steps)
CFROBOT7 chainflex® series .15 Code nominal cross section .03 Number of cores

Online order ▶ www.igus.eu/CFROBOT7

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Spindle cables/Single cores | TPE outer jacket

chainflex® CFROBOT

Image exemplary

10 million Cycles guaranteed

10 x d Bend radius, e-chain®

±180°/m Torsion angle

- For torsion applications
- TPE outer jacket
- Shielded
- Oil and bio-oil-resistant
- PVC-free
- UV-resistant
- Flame-retardant
- Hydrolysis and microbe-resistant

Dynamic information

Bend radius	**flexible twisted**	minimum 10 x d
	fixed	minimum 5 x d
Temperature	**flexible twisted**	-35°C up to +90°C
	fixed	-50°C up to +100°C (following DIN EN 50305)
v max.	**twisted**	180°/s
a max.	**twisted**	60°/s²
Travel distance		Robots and multi-axis movements, Class 1
Torsion		Torsion ±180°, with 1m cable length, Class 3

Cable structure

Conductor	Extremely bend-resistant cable.
Core insulation	Mechanically high-quality TPE mixture.
Overall shield	Extremely torsion-resistant tinned wound copper shield. Coverage approx. 90% optical
Outer jacket	Low-adhesion, extremely abrasion-resistant and highly flexible TPE mixture, adapted to suit the requirements in e-chains®. Colour: jet black (similar to RAL 9005)

Electrical information

Nominal voltage	600/1,000V (following DIN VDE 0298-3) 1,000V (following UL)
Testing voltage	4,000V (following DIN EN 50395)

Properties and approvals

UV resistance	High
Oil resistance	Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“

Basic requirements: low 1 2 3 4 5 **6** 7 highest
Travel distance: unsupported **1** 2 3 4 5 6 ≥ 400m
Oil resistance: none 1 2 3 **4** highest
Torsion: none 1 2 **3** 4 ±360°

Class 6.1.4.3

UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CFROBOT
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF34.UL.25.04.D - tested by IPA according to standard DIN EN ISO 14644-1
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Cycles*	5 million	7.5 million	10 million
Temperature, from/to [°C]	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]
-35/-25	±150	±90	±30
-25/+70	±180	±120	±60
+70/+80	±150	±90	±30

* Higher number of cycles? Calculate service life online: ▶ www.igus.eu/chainflexlife

Typical application areas

- For heaviest duty applications with torsion movements, Class 6
- Especially for robots and multi-axis movements, Class 1
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- Torsion ±180°, with 1m cable length, Class 3
- Indoor and outdoor applications, UV-resistant
- Robots, handling, lead screw drives

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CFROBOT.035	(1x10)C	10.5	125	194
CFROBOT.036	(1x16)C	12.0	189	269
CFROBOT.037	(1x25)C	14.5	298	392
CFROBOT.038	(1x35)C	15.5	403	528

Shop and prices online
CF-I-0008
www.igus.eu/CFROBOT

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case

Bus cable | PUR outer jacket

chainflex® CFROBOT8

Phase-out model

Image exemplary

10 million Cycles guaranteed

10 x d Bend radius, e-chain®

±180°/m Torsion angle

- For torsion applications
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- Notch-resistant
- Hydrolysis and microbe-resistant

Dynamic information

Bend radius	**flexible twisted**	minimum 10 x d
	fixed	minimum 5 x d
Temperature	**flexible twisted**	-25°C up to +70°C
	fixed	-50°C up to +70°C (following DIN EN 50305)
v max.	**twisted**	180°/s
a max.	**twisted**	60°/s²
Travel distance	Robots and multi-axis movements, Class 1	
Torsion	Torsion ±180°, with 1m cable length, Class 3	

Cable structure

Conductor	Stranded conductor in especially bending-resistant version consisting of tinned or bare copper wires (following DIN EN 60228).
Core insulation	According to bus specification.
Core structure	According to bus specification.
Core identification	According to bus specification. ▶ Product range table
Intermediate layer	Foil taping over the outer layer.
Overall shield	Torsion resistant tinned braided copper shield. Coverage approx. 80% optical
Outer jacket	Low-adhesion, halogen-free, highly abrasion resistant PUR mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2) Colour: Steel blue (similar to RAL 5011)

Electrical information

Nominal voltage	50V 300V (following UL)
Testing voltage	500V

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 6.1.3.3

Basic requirements	low	1	2	3	4	5	**6**	7 highest
Travel distance	unsupported	**1**	2	3	4	5	6	≥ 400m
Oil resistance	none	1	2	**3**	4	highest		
Torsion	none	1	2	**3**	4	±360°		

Properties and approvals

UV resistance	High
Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CFROBOT8
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Cycles*	5 million	7.5 million	10 million
Temperature, from/to [°C]	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]
-25/-15	±150	±90	±30
-15/+60	±180	±120	±60
+60/+70	±150	±90	±30

* Higher number of cycles? Service life calculation online ▶ www.igus.eu/chainflexlife

Typical application areas

- For heaviest duty applications with torsion movements, Class 6
- Especially for robots and multi-axis movements, Class 1
- Almost unlimited resistance to oil, Class 3
- Torsion ±180°, with 1m cable length, Class 3
- Indoor and outdoor applications, UV-resistant
- Robots, handling, lead screw drives

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Bus cable | PUR outer jacket

chainflex® CFROBOT8

Phase-out model

Basic requirements
Travel distance
Oil resistance
Torsion

low 1 2 3 4 5 **6** 7 highest
unsupported **1** 2 3 4 5 6 ≥ 400m
none 1 2 3 **4** highest
none 1 2 3 **4** ±360°

Class 6.1.3.3

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Shop and prices online
Profibus (1x2x0.64mm)					
CFROBOT8.001 [11]	(2x0.35)C	8.0	28	63	
CAN-Bus					
CFROBOT8.022 [11]	(4x0.5)C	7.5	41	78	
DeviceNet					
CFROBOT8.030 [11]	(2xAWG24)C +(2xAWG22)C	9.5	31	77	
Ethernet/CAT5e/PoE					
CFROBOT8.045 [11]	4x(2x0.15)C	9.5	48	96	
Ethernet/CAT6/PoE					
CFROBOT8.049 [11]	4x(2x0.15)C	9.5	48	96	
Ethernet/CAT7					
CFROBOT8.052 [11]	4x(2x0.15)C	10.5	51	134	

www.igus.eu/CFROBOT8

Part No.	Characteristic wave impedance approx. [Ω]	Core group	Colour code
Profibus (1x2x0.64mm)			
CFROBOT8.001	150	2x0.35	red, green
CAN-Bus			
CFROBOT8.022	120	4x0.5	white, green, brown, yellow (star-quad)
DeviceNet			
CFROBOT8.030	120	(2xAWG24)C	white/blue
		(2xAWG22)C	red/black
Ethernet/CAT5e/PoE			
CFROBOT8.045	100	4x(2x0.15)C	white-green/green, white-orange/orange, white-blue/blue, white-brown/brown
Ethernet/CAT6/PoE			
CFROBOT8.049	100	4x(2x0.15)C	white-green/green, white-orange/orange, white-blue/blue, white-brown/brown
Ethernet/CAT7			
CFROBOT8.052	100	4x(2x0.15)C	white-green/green, white-orange/orange, white-blue/blue, white-brown/brown

[11] Phase-out model (new generation CFROBOT8.PLUS ▶ Page 380)

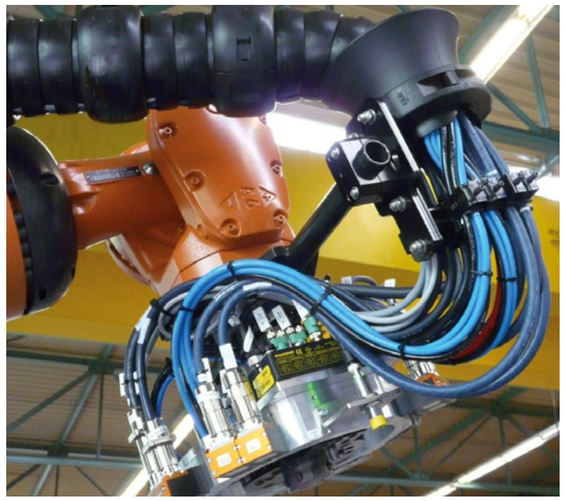
Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case

Technical note on bus cables
chainflex® bus cables have been specially developed and tested for continuously moving use in e-chains®. Depending on the material used for the outer jacket and on the underlying construction principle, the bus cables are designed for different mechanical requirements and resistance to diverse media.
The cables have been electrically designed in such a way that, on the one hand, the electrical requirements of the respective bus specification are reliably met and, on the other, that greater value is placed on a high degree of EMC reliability.
It is also ensured that the electrical values remain stable over the long term in spite of permanent movement.
The overall quality of transmission in a complete bus communication system, however, is not solely dependent on the cable used. What is also essential is that all components (electronic parts, connecting system and cable) are precisely matched to each other and that the maximum transmission lengths, which are dependent on the respective system, are adhered to with regard to the data transmission rates needed. A cable is thus not solely responsible for the reliable transmission of signals.
igus® advises you when you are designing your bus system to take all these factors into account and, with extensive tests, helps you to ensure the process reliability of your system from the very beginning.



CFROBOT® cables used in robots for the automated systems in fuel tank production. These are supplied as fully harnessed readychain® systems.

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

Bus cable | PUR outer jacket

chainflex® CFROBOT8.PLUS

Image exemplary

10 million Cycles guaranteed

10 x d Bend radius, e-chain®

±360°/m Torsion angle

- For torsion applications
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

Dynamic information

Bend radius	**flexible twisted**	minimum 10 x d
	fixed	minimum 5 x d
Temperature	**flexible twisted**	-25°C up to +70°C
	fixed	-50°C up to +70°C (following DIN EN 50305)
v max.	**twisted**	360°/s
a max.	**twisted**	60°/s²
Travel distance	Robots and multi-axis movements, Class 1	
Torsion	Torsion ±360°, with 1m cable length, Class 4	

Cable structure

Conductor	Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228).
Core insulation	According to bus specification.
Core structure	According to bus specification.
Core identification	According to bus specification. ▶ Product range table
Intermediate layer	Foil taping over the outer layer.
Overall shield	Torsion resistant tinned braided copper shield. Coverage approx. 80% optical
Outer jacket	Low-adhesion, halogen-free, highly abrasion resistant PUR mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2) Colour: Steel blue (similar to RAL 5011)

Electrical information

Nominal voltage	50V 30V (following UL)
Testing voltage	500V

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 6.1.3.4

Basic requirements	low	1	2	3	4	5	**6**	7	highest
Travel distance	unsupported	**1**	2	3	4	5	6	≥ 400m	
Oil resistance	none	1	2	**3**	4	highest			
Torsion	none	1	2	3	**4**	±360°			

Properties and approvals

UV resistance	High
Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CFROBOT8PLUS
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Cycles*	5 million	7.5 million	10 million
Temperature, from/to [°C]	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]
-25/-15	±330	±240	±150
-15/+60	±360	±270	±180
+60/+70	±330	±240	±150

* Higher number of cycles? Calculate service life online: ▶ www.igus.eu/chainflexlife

Typical application areas

- For heaviest duty applications with torsion movements, Class 6
- Especially for robots and multi-axis movements, Class 1
- Almost unlimited resistance to oil, Class 3
- Torsion ±360°, with 1m cable length, Class 4
- Indoor and outdoor applications, UV-resistant
- Robots, handling, lead screw drives

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Bus cable | PUR outer jacket

chainflex® CFROBOT8.PLUS

Basic requirements low 1 2 3 4 5 **6** 7 highest
Travel distance unsupported **1** 2 3 4 5 6 ≥ 400m
Oil resistance none 1 2 **3** 4 highest
Torsion none 1 2 3 **4** ±360°

Class 6.1.3.4

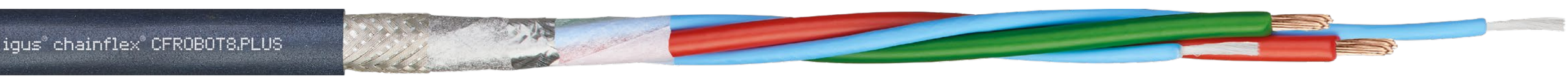


Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Shop and prices online
Profibus (1x2x0.64mm)					
CFROBOT8.PLUS.001	(2x0.25)C	9.0	30	80	
CAN-Bus					
CFROBOT8.PLUS.022	(2x0.5)C	9.5	47	103	
Ethernet/CAT5e/PoE					
CFROBOT8.PLUS.045	(4x(2x0.15))C	7.5	32	67	
Ethernet/CAT6/PoE					
CFROBOT8.PLUS.049	(4x(2x0.15))C	7.5	32	67	
Ethernet/CAT6A					
CFROBOT8.PLUS.050	(4x(2x0.15)C)C	10.5	49	115	
Ethernet/CAT7					
New **CFROBOT8.PLUS.052**	4x(2x0.15)C	10.5	49	115	
Profinet					
CFROBOT8.PLUS.060 [2)]	(4x0.34)C	7.0	32	64	

CF-J-0010
www.igus.eu/CFROBOT8PLUS

Part No.	Characteristic wave impedance approx. [Ω]	Core group	Colour code
Profibus (1x2x0.64mm)			
CFROBOT8.PLUS.001	150	(2x0.25)C	red, green
CAN-Bus			
CFROBOT8.PLUS.022	120	(4x0.5)C	white, green, brown, yellow (star-quad)
Ethernet/CAT5e/PoE			
CFROBOT8.PLUS.045	100	(4x(2x0.15))C	white-blue/blue, white-orange/orange, white-green/green, white-brown/brown
Ethernet/CAT6/PoE			
CFROBOT8.PLUS.049	100	(4x(2x0.15))C	white-blue/blue, white-orange/orange, white-green/green, white-brown/brown
Ethernet/CAT6A			
CFROBOT8.PLUS.050	100	4x(2x0.15)C	white-blue/blue, white-orange/orange, white-green/green, white-brown/brown
Ethernet/CAT7			
CFROBOT8.PLUS.052	100	4x(2x0.15)C	white-blue/blue, white-orange/orange, white-green/green, white-brown/brown
Profinet			
CFROBOT8.PLUS.060 [2)]	100	(4x0.34)C	white, orange, blue, yellow (star-quad)

The chainflex® types marked with [2)] are cables designed as a star-quad.

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case

Technical note on bus cables
chainflex® bus cables have been specially developed and tested for continuously moving use in e-chains®. Depending on the material used for the outer jacket and on the underlying construction principle, the bus cables are designed for different mechanical requirements and resistance to diverse media.
The cables have been electrically designed in such a way that, on the one hand, the electrical requirements of the respective bus specification are reliably met and, on the other, that greater value is placed on a high degree of EMC reliability.
It is also ensured that the electrical values remain stable over the long term in spite of permanent movement.
The overall quality of transmission in a complete bus communication system, however, is not solely dependent on the cable used. What is also essential is that all components (electronic parts, connecting system and cable) are precisely matched to each other and that the maximum transmission lengths, which are dependent on the respective system, are adhered to with regard to the data transmission rates needed. A cable is thus not solely responsible for the reliable transmission of signals.
igus® advises you when you are designing your bus system to take all these factors into account and, with extensive tests, helps you to ensure the process reliability of your system from the very beginning.

Order example: CFROBOT8.PLUS.060 – to your required length (0.5m steps)
CFROBOT8.PLUS chainflex® series .060 Code bus type

Order online ▶ www.igus.eu/CFROBOT8PLUS

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

Hybrid cable | PUR outer jacket

chainflex® CFROBOT9

Image exemplary

10 million Cycles guaranteed

10 x d Bend radius, e-chain®

±180°/m Torsion angle

- For torsion applications
- PUR outer jacket
- Unshielded/shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

Dynamic information

Bend radius	flexible twisted	minimum 10 x d
	fixed	minimum 5 x d
Temperature	flexible twisted	-25°C up to +80°C
	fixed	-50°C up to +80°C (following DIN EN 50305)
v max.	twisted	180°/s
a max.	twisted	60°/s²
Travel distance	Robots and multi-axis movements, Class 1	
Torsion	Torsion ±180°, with 1m cable length, Class 3	

Cable structure

Conductor	Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228).
Core insulation	Mechanically high-quality TPE mixture.
Core identification	▶ Product range table
Element shield	Extremely torsion-resistant tinned wound copper shield. Coverage approx. 85% optical
Outer jacket	Low-adhesion, halogen-free, highly abrasion resistant PUR mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2) Colour: Steel blue (similar to RAL 5011)

Electrical information

Nominal voltage	300/500V (following DIN VDE 0298-3) 300V (following UL)
Testing voltage	2,000V (following DIN EN 50395)

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Class 6.1.3.3

Basic requirements	low	1	2	3	4	5	**6**	7 highest
Travel distance	unsupported	**1**	2	3	4	5	6 ≥ 400m	
Oil resistance	none	1	2	**3**	4 highest			
Torsion	none	1	2	**3**	4 ±360°			

Properties and approvals

UV resistance	High
Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CFROBOT9
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1
CE	Following 2014/35/EU

Guaranteed service life (details see page 14-15)

Cycles*	5 million	7.5 million	10 million
Temperature, from/to [°C]	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]
-25/-15	±150	±90	±30
-15/+70	±180	±120	±60
+70/+80	±150	±90	±30

* Higher number of cycles? Calculate service life online: ▶ www.igus.eu/chainflexlife

Typical application areas

- For heaviest duty applications with torsion movements, Class 6
- Especially for robots and multi-axis movements, Class 1
- Almost unlimited resistance to oil, Class 3
- Torsion ±180°, with 1m cable length, Class 3
- Indoor and outdoor applications, UV-resistant
- Robots, handling, lead screw drives

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Hybrid cable | PUR outer jacket

chainflex® CFROBOT9

Class 6.1.3.3

Basic requirements	low	1	2	3	4	5	**6**	7	highest
Travel distance	unsupported	**1**	2	3	4	5	6		≥ 400m
Oil resistance	none	1	2	**3**	4				highest
Torsion	none	1	2	**3**	4				±360°

Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CFROBOT9.007	(15x(2x0.25)C+(4x0.25)C)C	18.5	229	369
CFROBOT9.010	(4x(2x0.25)C)C	10.5	63	116

Shop and prices online

CF-J-0011

www.igus.eu/CFROBOT9

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

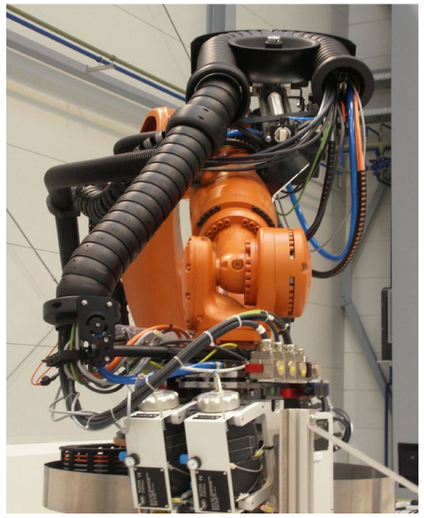
Part No.	Core group	Colour code
CFROBOT9.007	15x(2x0.25)C	colour code in accordance with DIN 47100
	(4x0.25)C	white/green/brown/yellow (CAN-Bus)
CFROBOT9.010	4x(2x0.25)C	white/brown, green/yellow, grey/pink, blue/red

chainflex CASE

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case



igus® chainflex® cables in a triflex® R multi-dimensionally moving energy supply system for 6-axis robots

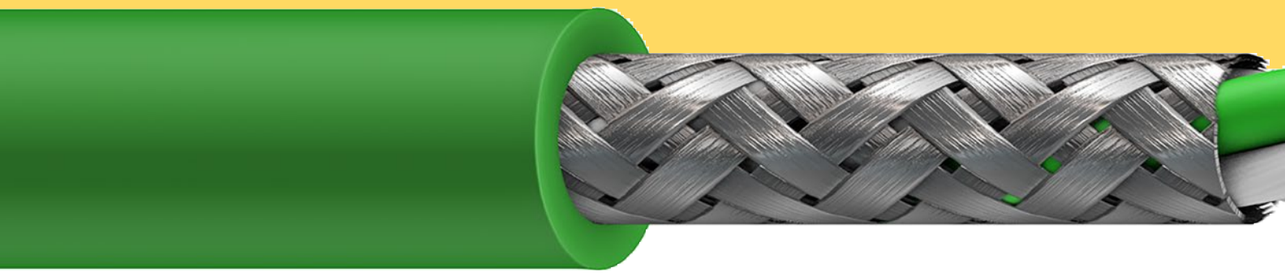
Guarantee igus chainflex 4 YEARS up to 4 years guarantee

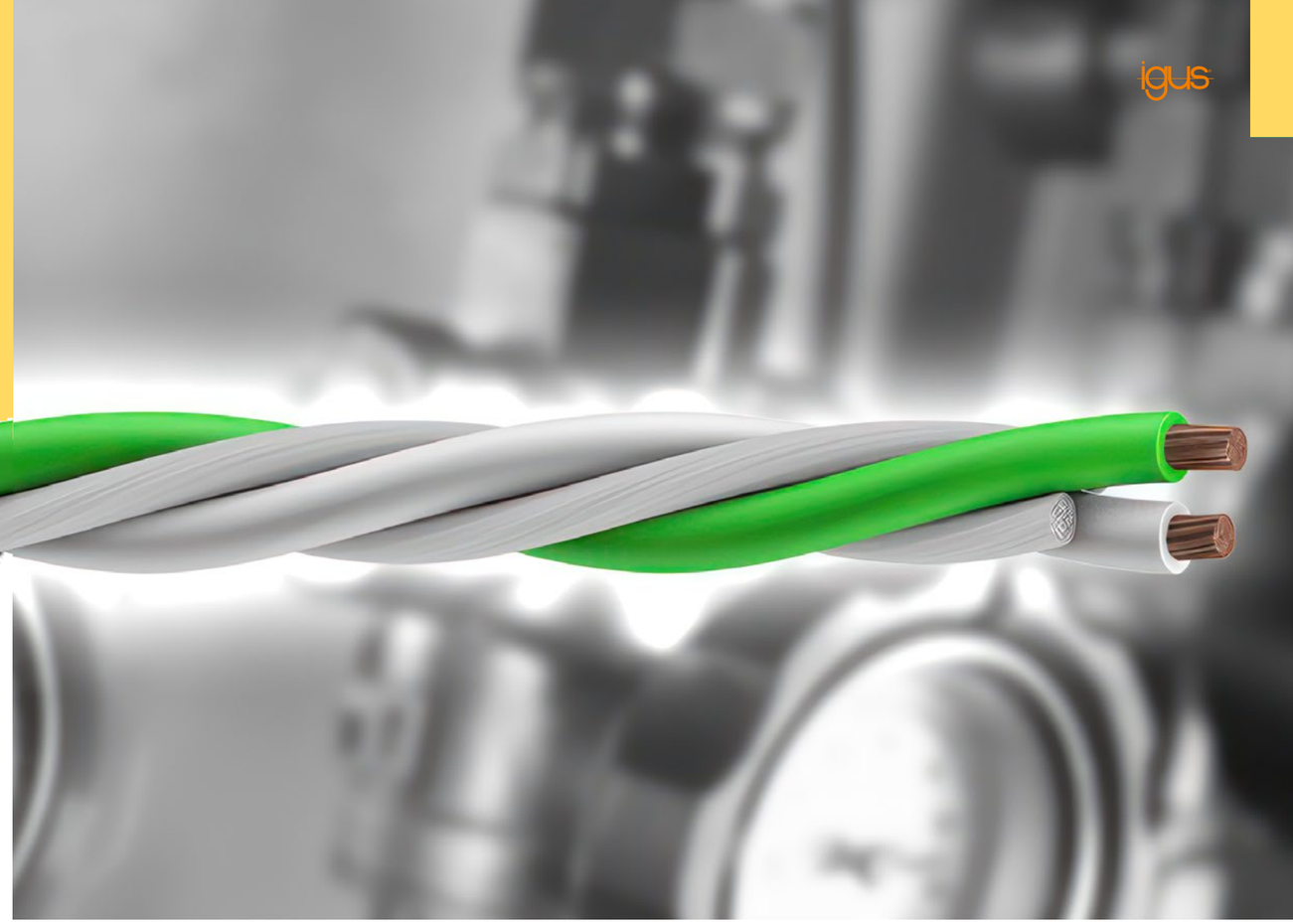
igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

CFRIP | PTFE FREE | c UL us LISTED | c UL us | nec | NFPA | CLP A | DNV | REACH | RoHS | clean-room | oil & chemical resistant | FT 1 | CE

chainflex®

Special cables





Cables for special applications

igus® developed the CFSPECIAL cable group for use in special applications. For special moving applications, only special cables can be used as they go beyond normal energy supply. However, this always means a minimum production quantity, which is usually unrealistic, especially for maintenance customers or very small applications. What is special about the CFSPECIAL family is that it is available as standard catalogue cables and can therefore be supplied quickly. This product range is slightly narrower, but we can expand it quickly if required. So, if you have trouble finding the right cable for your specific application, we would be pleased to hear from you directly.

- Cables for special applications, developed from our extensive cable expertise
- Tailored to specific challenges
- Experience from over two billion test cycles in the igus® test laboratory
- Sustainability thanks to a longer service life is practical resource protection, enhancing economic efficiency and protecting the environment

Background

The best cable for every challenge

The constantly growing program of chainflex® special cables is in response to our customer requirements.

At the same time this can be an inspiration for users. igus® can make cables for special applications using many different materials and production processes. Depending on the construction this is already possible from a length of 500m.

Use our comprehensive knowledge about cables plus the experience of 2 billion test cycles that are annually achieved in the company's chainflex® laboratory.

The technical and material details of the CFSPECIAL families are documented in data sheets and are available on the internet. The respective web links can be recalled on the summary pages of the CFSPECIAL cables.

Thermal compensation cable
A thermal compensation cable is the connection between a thermocouple and a measuring instrument.

The thermal compensation cable must have the same materials as the thermocouple. The measurement would otherwise be distorted due to unwanted additional thermoelectric voltages.

CFFLAT
This cable has been specially developed for small installation spaces where large core cross sections are required. We use a flat cable design with a braided conductor in the core.

Cable for high-tensile-strength applications
Article Number CFSPECIAL.182 features our high-tensile-strength cable. The aramid braid built into the outer jacket allows this cable to withstand tensile forces of up to 15,000% higher than the norm.

Cable for axis 7 on robots
A cable for supplying the entire robot when it is mounted on a so-called seventh axis. This axis allows a robot to move along with the workpiece. The structure of the cable complies with the electrical specifications of the robot manufacturer.

Cables for top drive systems
Service loops for top drive systems must withstand dynamic loads caused by vibrations and environmental influences.

The specially developed and tested chainflex® CFSPECIAL.5xx-series is the perfect solution for vertical applications with high tensile forces.
With DNV approval, this series also offers tested safety for these applications.

chainflex® special cables

chainflex® cables		Page
CFTHERMO New	Thermocouple cable	392
CFFLAT	Single core flat cable	394
CFSPECIAL.182	Bus cable for hanging applications	396
CFSPECIAL.192	Hybrid cable for hanging applications	398
CFSPECIAL.532	Data cable for top drive applications	400
CFSPECIAL.562.PE	Motor cable for top drive applications	402
CFSPECIAL.572	Motor cable for top drive applications	404
CFSPECIAL.592	Hybrid cable for top drive applications	406
CFSPECIAL.792	Cable for axis 7 on robots	408

Mechanical parameters

chainflex® cables	Jacket	Shield	Bend radius e-chain® min. [xd]	Temperature e-chain® from/to [°C]	v max. [m/s] unsupported	v max. [m/s] gliding	a max. [m/s²]	Travel distance [m]	Page
CFTHERMO New	PUR	●	12.5	-25/+80	2	1	20	≤ 50	392
CFFLAT	TPE		5	-35/+90	10	6	100	≤ 100	394
CFSPECIAL.182	PUR	●	10	-25/+80	10	6	100	≤ 50	396
CFSPECIAL.192	PUR	●	10	-25/+80	10	2	50	≤ 50	398
CFSPECIAL.532	PUR	●	10	-25/+80	10	2	50	≤ 50	400
CFSPECIAL.562.PE	PUR		10	-25/+80	10	2	50	≤ 50	402
CFSPECIAL.572	PUR	●	10	-25/+80	10	2	50	≤ 50	404
CFSPECIAL.592	PUR	●	10	-25/+80	10	2	50	≤ 50	406
CFSPECIAL.792	PUR	●	10	-25/+80	3	2	20	≤ 100	408

Approvals/resistance

chainflex® cables	oil		PTFE free	Approvals and standards																Page
CFTHERMO New	●		●										●	●	●			●		392
CFFLAT	●		●										●	●	●	●		●		394
CFSPECIAL.182	●		●				●			●			●	●				●		396
CFSPECIAL.192	●		●				●			●			●	●			●	●		398
CFSPECIAL.532	●		●				●			●		●	●	●				●		400
CFSPECIAL.562.PE	●		●				●			●		●	●	●				●		402
CFSPECIAL.572	●		●				●			●		●	●	●				●		404
CFSPECIAL.592	●		●				●			●		●	●	●				●		406
CFSPECIAL.792	●		●				●			●			●	●				●		408

chainflex® guarantee

As these are special cables for special applications, we ask you to contact us for information on the guaranteed lifetime:

Phone +49-2203 9649-0, info@igus.eu

Thermocouple cable | PUR outer jacket

chainflex® CFTHERMO

Image exemplary

- For heavy duty applications
- PUR outer jacket
- Oil-resistant and coolant-resistant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

Dynamic information

Bend radius	**e-chain® linear**	minimum 12.5 x d
	flexible	minimum 10 x d
	fixed	minimum 5 x d
Temperature	**e-chain® linear**	-25°C up to +80°C
	flexible	-40°C up to +80°C (following DIN EN 60811-504)
	fixed	-50°C up to +80°C (following DIN EN 50305)
v max.	**unsupported**	2m/s
	gliding	1m/s
a max.		20m/s²
Travel distance		Unsupported travels and up to 50m for gliding applications, Class 4

Cable structure

Conductor	Conductor consisting of a flexible special alloy. ▶ Product range table
Core insulation	Mechanically high-quality TPE mixture.
Core structure	The individual cores are wound in layers with a short pitch length.
Core identification	According to thermo specification. ▶ Product range table
Intermediate layer	Fleece taping over the external layer.
Element shield	Bending-resistant braiding made of tinned copper wires.
Overall shield	Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90%
Outer jacket	Low-adhesion, halogen-free, highly abrasion resistant PUR mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2) Colour: According to thermo specification ▶ Product range table

Electrical information

Nominal voltage	300/300V (following DIN VDE 0298-3)
Testing voltage	1,500V

Class 5.4.3.1

Basic requirements	low	1	2	3	4	**5**	6	7 highest
Travel distance	unsupported	1	2	3	**4**	5	6	≥ 400m
Oil resistance	none	1	2	**3**	4	highest		
Torsion	none	**1**	2	3	4	±360°		

Properties and approvals

UV resistance	Medium
Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF77.UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1
CE	Following 2014/35/EU

Typical application areas

- For heavy-duty applications, Class 5
- Unsupported travels and up to 50m for gliding applications, Class 4
- Almost unlimited resistance to oil, Class 3
- No torsion, Class 1
- Indoor and outdoor applications with average sun radiation
- Machining units/machine tools, storage and retrieval units for high-bay warehouses, packaging industry, quick handling, refrigerating sector

	Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Shop and prices online
	CFTHERMO.J.001	(2x0.23)C	5.5	9	36	
	CFTHERMO.K.001	(2x0.23)C	5.5	9	37	
	CFTHERMO.K.002 *	(2x0.23)C+3G0.5	7.5	24	67	CF-K-0001
New	**CFTHERMO.N.001**	(2x0.23)C	5.5	14	39	

* The cross-section of the copper conductor is equivalent to the electrically effective cross-section.

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Part No.	Jacket colour	Thermo materials	Core group	Colour code
CFTHERMO.J.001 *	black	Fe-CuNi	(2x0.23)C	+ black, - white
CFTHERMO.K.001	green	NiCr-Ni	(2x0.23)C	+ green, - white
CFTHERMO.K.002	green	NiCr-Ni	(2x0.23)C	+ green, - white
		Cu	3G0.5	brown, blue, yellow-green
CFTHERMO.N.001	pink	NiCrSi-NiSi	(2x0.23)C	+ pink, - white

Single core flat cable | PUR outer jacket

chainflex® CFFLAT

Image exemplary

- For heaviest duty applications
- TPE outer jacket
- Oil and bio-oil-resistant
- PVC and halogen-free
- UV-resistant
- Hydrolysis and microbe-resistant

Dynamic information

Bend radius	**e-chain® linear**	minimum 5 x d
	flexible	minimum 4 x d
	fixed	minimum 3 x d
Temperature	**e-chain® linear**	-35°C up to +90°C
	flexible	-50°C up to +90°C (following DIN EN 60811-504)
	fixed	-55°C up to +90°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	6m/s
a max.		100m/s²
Travel distance		Unsupported travels and up to 100m for gliding applications, Class 5

Cable structure

Conductor	Highly flexible braided special conductor.
Core insulation	Mechanically high-quality TPE mixture.
Outer jacket	Low-adhesion, extremely abrasion-resistant and highly flexible TPE mixture, adapted to suit the requirements in e-chains®. Colour: Steel blue (similar to RAL 5011)

Electrical information

Nominal voltage	600/1,000V (following DIN VDE 0298-3)
Testing voltage	4,000V (following DIN EN 50395)

Class 7.5.4.1

Basic requirements	low	1	2	3	4	5	6	**7**	highest
Travel distance	unsupported	1	2	3	4	**5**	6	≥ 400m
Oil resistance	none	1	2	3	**4**	highest		
Torsion	none	**1**	2	3	4	±360°		

Properties and approvals

UV resistance	High
Oil resistance	Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	According to ISO Class 1. The outer jacket material of this series complies with CF9.15.07 - tested by IPA according to standard DIN EN ISO 14644-1
Dry cleanroom	Tested in "dry cleanroom" according to DIN EN ISO 14644-1
CE	Following 2014/35/EU

Typical application areas

- For heavy-duty applications, Class 7
- Unsupported travels and up to 100m for gliding applications, Class 5
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- No torsion, Class 1
- Indoor and outdoor applications, UV-resistant
- Storage and retrieval units for high-bay warehouses, for small installation spaces and bend radii, machining units/machine tools, quick handling, cleanroom, semiconductor insertion, low-temperature applications

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer dimensions [mm]	Copper index [kg/km]	Weight [kg/km]
CFFLAT.40.01	1x4.0	14.0x5.5	48	117

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Shop and prices online

CF-K-0002

www.igus.eu/CFFLAT

Bus cable for hanging applications | PUR outer jacket

chainflex® CFSPECIAL.182

Image exemplary

- For high tensile strain
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

Dynamic information

Bend radius	**e-chain® linear**	minimum 10 x d
	flexible	minimum 8 x d
	fixed	minimum 5 x d
Temperature	**e-chain® linear**	-25°C up to +80°C
	flexible	-40°C up to +80°C (following DIN EN 60811-504)
	fixed	-50°C up to +80°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	6m/s
a max.		100m/s²
Travel distance		For hanging applications up to 50 m

Cable structure

Conductor	Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228).
Core insulation	According to bus specification.
Core structure	According to bus specification.
Core identification	According to bus specification.
Inner jacket	TPE mixture adapted to suit the requirements in e-chains®.
Overall shield	Bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90%
Outer jacket	**1. Outer jacket:** PUR mixture adapted to suit the requirements in e-chains®. **Reinforcement:** High tensile strength aramid braid embedded in the outer jacket. **2. Outer jacket:** Low-adhesion, halogen-free PUR mixture, highly abrasion and bending-resistant, adapted to suit the requirements in hanging applications (following DIN EN 50363-10-2). Colour: jet black (similar to RAL 9005)

Electrical information

Nominal voltage	50V 300V (following UL)
Testing voltage	500V

Properties and approvals

UV resistance	High
Oil resistance	Oil-resistant (in accordance with DIN EN 50363-10-2)
Offshore	MUD-resistant following NEK 606 - status 2016
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CFSPECIAK182
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
CE	Following 2014/35/EU

Typical application areas

- For high tensile strain
- For hanging applications up to 50 m
- Almost unlimited resistance to oil
- Storage and retrieval units, hanging control units, lifts

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Shop and prices online
CFSPECIAL.182.045	(4x(2x0.15))C	9.5	42	136	CF-K-0003
CFSPECIAL.182.060 [13]	(4x0.38)C	8.5	37	125	

[13] Colour outer jacket: Yellow-green (RAL 6018)

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Part No.	Characteristic wave impedance approx. [Ω]	Core group	Colour code
Ethernet/CAT5e/PoE			
CFSPECIAL.182.045	100	(4x(2x0.15))C	white-blue/blue, white-orange/orange, white-green/green, white-brown/brown
Profinet			
CFSPECIAL.182.060	100	(4x0.38)C	white, orange, blue, yellow (star-quad)

Hybrid cable for hanging applications | PUR outer jacket

chainflex® CFSPECIAL.192

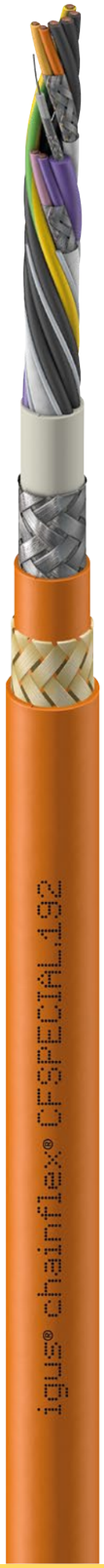


Image exemplary

- For high tensile strain
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

Especially for MOVILINK® DDI technology from SEW-EURODRIVE

Dynamic information

Bend radius	**e-chain® linear**	minimum 10 x d
	flexible	minimum 8 x d
	fixed	minimum 5 x d
Temperature	**e-chain® linear**	-25°C up to +80°C
	flexible	-40°C up to +80°C (following DIN EN 60811-504)
	fixed	-50°C up to +80°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	2m/s
a max.		50m/s²
Travel distance		For hanging applications up to 50 m

Cable structure

Conductor	Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228).
Core insulation	Mechanically high-quality, especially low-capacitance XLPE mixture. **HF50-0.9/2.95:** Special PE mixture.
Core structure	Power cores and control pair elements wound with a short pitch length around a high tensile strength centre element.
Core identification	According to Servo-Hybrid specification. Current data sheet ▶ www.igus.eu/CFSPECIAL192
Element shield	Bending-resistant braiding made of tinned copper wires.
Inner jacket	TPE mixture adapted to suit the requirements in e-chains®.
Overall shield	Bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90%
Outer jacket	**1. Outer jacket:** PUR mixture adapted to suit the requirements in e-chains®. **Reinforcement:** High tensile strength aramid braid embedded in the outer jacket. **2. Outer jacket:** Low-adhesion, halogen-free PUR mixture, highly abrasion and bending-resistant, adapted to suit the requirements in hanging applications (following DIN EN 50363-10-2). Colour: Pastel orange (similar to RAL 2003)

Electrical information

Nominal voltage	600/1,000V (following DIN VDE 0298-3) 1,000V (following UL)
Testing voltage	4,000V (following DIN EN 50395)

Properties and approvals

Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3
Offshore	MUD-resistant following NEK 606 - status 2016
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CFSPECIAL192
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
DESINA	According to VDW, DESINA standardisation
CE	Following 2014/35/EU

Typical application areas

- For high tensile strain
- For hanging applications up to 50 m
- Almost unlimited resistance to oil
- Storage and retrieval units, hanging control units, lifts

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Shop and prices online
CFSPECIAL.192. H207.15.04.D	(4G1.5+2x(2x1.0)C +HF50-0.9/2.95)C	17.0	199	377	CF-K-0004

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Data cable for top drive applications | PUR outer jacket

chainflex® CFSPECIAL.532

Image exemplary

- For top drive applications
- For heavy duty applications
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- UV-resistant
- Hydrolysis and microbe-resistant

Now with DNV approval for top drive hanging applications up to 50m

Dynamic information

Bend radius	e-chain® linear	minimum 10 x d
	flexible	minimum 8 x d
	fixed	minimum 5 x d
Temperature	e-chain® linear	-25°C up to +80°C
	flexible	-40°C up to +80°C (following DIN EN 60811-504)
	fixed	-50°C up to +80°C (following DIN EN 50305)
v max.	unsupported	10m/s
	gliding	2m/s
a max.		50m/s²
Travel distance		For top drive hanging applications up to 50m

Cable structure

Conductor	Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228).
Core insulation	Mechanically high-quality, especially low-capacitance XLPE mixture.
Core structure	Cores twisted in pairs with a short pitch length, core pairs then wound with short pitch lengths.
Core identification	Black cores with white numbers.
Inner jacket	Mechanically high-quality TPE mixture.
Element shield	Bending-resistant braiding made of tinned copper wires.
Overall shield	Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90%
Outer jacket	**1. Outer jacket:** PUR mixture adapted to suit the requirements in e-chains®. **Reinforcement:** High tensile strength aramid braid embedded in the outer jacket. **2. Outer jacket:** Low-adhesion, halogen-free PUR mixture, highly abrasion and bending-resistant, adapted to suit the requirements in top drive hanging applications (following DIN EN 50363-10-2). Colour: jet black (similar to RAL 9005)

Electrical information

Nominal voltage	600/1,000V (following DIN VDE 0298-3)
Testing voltage	4,000V (following DIN EN 50395)

Properties and approvals

UV resistance	High
Oil resistance	Oil-resistant (in accordance with DIN EN 50363-10-2)
Offshore	MUD-resistant following NEK 606 - status 2016
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CFSPECIAL532
NFPA	Following NFPA 79-2018, chapter 12.9
DNV	Type Approval Certificate TAE00004G4
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II)
CE	Following 2014/35/EU

Typical application areas

- For high tensile strain
- Almost unlimited resistance to oil
- For top drive hanging applications up to 50m

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CFSPECIAL.532.15.08.02	(8x(2x1.5)C)C	30.0	513	1014
CFSPECIAL.532.15.16.02	(16x(2x1.5)C)C	36.5	972	1669
CFSPECIAL.532.15.18.02	(18x(2x1.5)C)C	40.0	1122	1972

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Shop and prices online

www.igus.eu/CFSPECIAL532

Motor cable for top drive applications | PUR outer jacket

chainflex® CFSPECIAL.562.PE

Image exemplary

- For top drive applications
- For heavy duty applications
- PUR outer jacket
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- UV-resistant
- Hydrolysis and microbe-resistant

Now with DNV approval for top drive hanging applications up to 50m

Dynamic information

Bend radius	**e-chain® linear**	minimum 10 x d
	flexible	minimum 8 x d
	fixed	minimum 5 x d
Temperature	**e-chain® linear**	-25°C up to +80°C
	flexible	-40°C up to +80°C (following DIN EN 60811-504)
	fixed	-50°C up to +80°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	2m/s
a max.		50m/s²
Travel distance		For top drive hanging applications up to 50m

Cable structure

Conductor	Conductor cable consisting of pre-leads (following DIN EN 60228).
Core insulation	Mechanically high-quality TPE mixture.
Core identification	Green-yellow
Outer jacket	**1. Outer jacket:** PUR mixture adapted to suit the requirements in e-chains®. **Reinforcement:** High tensile strength aramid braid embedded in the outer jacket. **2. Outer jacket:** Low-adhesion, halogen-free PUR mixture, highly abrasion and bending-resistant, adapted to suit the requirements in top drive hanging applications (following DIN EN 50363-10-2). Colour: jet black (similar to RAL 9005)

Electrical information

Nominal voltage	600/1,000V (following DIN VDE 0298-3)
Testing voltage	4,000V (following DIN EN 50395)

Properties and approvals

UV resistance	High
Oil resistance	Oil-resistant (in accordance with DIN EN 50363-10-2)
Offshore	MUD-resistant following NEK 606 - status 2016
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CFSPECIAL562PE
NFPA	Following NFPA 79-2018, chapter 12.9
DNV	Type Approval Certificate TAE00004G3
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II)
CE	Following 2014/35/EU

Typical application areas

- For high tensile strain
- Almost unlimited resistance to oil
- For top drive hanging applications up to 50m

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CFSPECIAL.562.PE.700.01	1G70	19.5	713	867

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Shop and prices online

CF-K-0006

www.igus.eu/CFSPECIAL562PE

Motor cable for top drive applications | PUR outer jacket

chainflex® CFSPECIAL.572

Image exemplary

- For top drive applications
- For heavy duty applications
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- UV-resistant
- Hydrolysis and microbe-resistant

Now with DNV approval for top drive hanging applications up to 50m

Dynamic information

Bend radius	**e-chain® linear**	minimum 10 x d
	flexible	minimum 8 x d
	fixed	minimum 5 x d
Temperature	**e-chain® linear**	-25°C up to +80°C
	flexible	-40°C up to +80°C (following DIN EN 60811-504)
	fixed	-50°C up to +80°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	2m/s
a max.	50m/s²	
Travel distance	For top drive hanging applications up to 50m	

Cable structure

Conductor Conductor cable consisting of pre-leads (following DIN EN 60228).

Core insulation Mechanically high-quality TPE mixture.

Overall shield Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90%

Outer jacket **1. Outer jacket:** PUR mixture adapted to suit the requirements in e-chains®.
Reinforcement: High tensile strength aramid braid embedded in the outer jacket.
2. Outer jacket: Low-adhesion, halogen-free PUR mixture, highly abrasion and bending-resistant, adapted to suit the requirements in top drive hanging applications (following DIN EN 50363-10-2).
Colour: jet black (similar to RAL 9005)

Electrical information

Nominal voltage 600/1,000V (following DIN VDE 0298-3)

Testing voltage 4,000V (following DIN EN 50395)

Properties and approvals

UV resistance	High
Oil resistance	Oil-resistant (in accordance with DIN EN 50363-10-2)
Offshore	MUD-resistant following NEK 606 - status 2016
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CFSPECIAL572
NFPA	Following NFPA 79-2018, chapter 12.9
DNV	Type Approval Certificate TAE00004G3
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II)
CE	Following 2014/35/EU

Typical application areas

- For high tensile strain
- Almost unlimited resistance to oil
- For top drive hanging applications up to 50m

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Shop and prices online
Multi core Motor cables					
CFSPECIAL.572.25.37	(37x2.5)C	39.5	1086	1901	
CFSPECIAL.572.40.07	(7G4.0)C	19.5	350	540	
Spindle cables/Single cores					
CFSPECIAL.572.2400.01	(1x240)C	34.5	2581	3081	www.igus.eu/CFSPECIAL572
CFSPECIAL.572.3000.01	(1x300)C	37.5	3189	3799	
CFSPECIAL.572.4000.01	(1x400)C	42.0	4269	5007	

CF-K-0007

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Hybrid cable for top drive applications | PUR outer jacket

chainflex® CFSPECIAL.592

Image exemplary

- For top drive applications
- For heavy duty applications
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- UV-resistant
- Hydrolysis and microbe-resistant

Now with DNV approval for top drive hanging applications up to 50m

Dynamic information

Bend radius	**e-chain® linear**	minimum 10 x d
	flexible	minimum 8 x d
	fixed	minimum 5 x d
Temperature	**e-chain® linear**	-25°C up to +80°C
	flexible	-40°C up to +80°C (following DIN EN 60811-504)
	fixed	-50°C up to +80°C (following DIN EN 50305)
v max.	**unsupported**	10m/s
	gliding	2m/s
a max.		50m/s²
Travel distance		For top drive hanging applications up to 50m

Cable structure

Conductor	Stranded conductor in especially bending-resistant version consisting of bare opper wires (following DIN EN 60228).
Core insulation	Mechanically high-quality, especially low-capacitance XLPE mixture.
Core structure	According to CFSPECIAL-specification. ▶ Product range table
Core identification	Black cores with white numbers, one green-yellow core
Inner jacket	Mechanically high-quality TPE mixture.
Element shield	Bending-resistant braiding made of tinned copper wires.
Overall shield	Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90%
Outer jacket	**1. Outer jacket:** PUR mixture adapted to suit the requirements in e-chains®. **Reinforcement:** High tensile strength aramid braid embedded in the outer jacket. **2. Outer jacket:** Low-adhesion, halogen-free PUR mixture, highly abrasion and bending-resistant, adapted to suit the requirements in top drive hanging applications (following DIN EN 50363-10-2). Colour: jet black (similar to RAL 9005)

Electrical information

Nominal voltage	600/1,000V (following DIN VDE 0298-3) 1,000V (following UL)
Testing voltage	4,000V (following DIN EN 50395)

Properties and approvals

UV resistance	High
Oil resistance	Oil-resistant (in accordance with DIN EN 50363-10-2)
Offshore	MUD-resistant following NEK 606 - status 2016
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CFSPECIAL592
NFPA	Following NFPA 79-2018, chapter 12.9
DNV	Type Approval Certificate TAE00004KR
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II)
CE	Following 2014/35/EU

Typical application areas

- For high tensile strain
- Almost unlimited resistance to oil
- For top drive hanging applications up to 50m

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CFSPECIAL.592.001	(30G4.0+4x(2x2.5)C)C	44.0	1,750	2630

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Shop and prices online

CF-K-0008

www.igus.eu/CFSPECIAL592

Cable for the 7th robot axis | PUR outer jacket

chainflex® CFSPECIAL.792

Image exemplary

- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

Dynamic information

Bend radius	**e-chain® linear**	minimum 10 x d
	flexible	minimum 8 x d
	fixed	minimum 5 x d
Temperature	**e-chain® linear**	-25°C up to +80°C
	flexible	-40°C up to +80°C (following DIN EN 60811-504)
	fixed	-50°C up to +80°C (following DIN EN 50305)
v max.	**unsupported**	3m/s
	gliding	2m/s
a max.		20m/s²
Travel distance		Unsupported travels and up to 100m for gliding applications, Class 5

Cable structure

Conductor	Finely stranded conductor consisting of bare copper wires (following DIN EN 60228).
Core insulation	Mechanically high-quality TPE mixture.
Core structure	According to CFSPECIAL-specification. ▶ Product range table
Core identification	▶ Product range table
Inner jacket	TPE mixture adapted to suit the requirements in e-chains®.
Element shield	Bending-resistant braiding made of tinned copper wires.
Overall shield	Bending-resistant braiding made of tinned copper wires. Coverage linear approx. 50%, optical approx. 80%
Outer jacket	Low-adhesion, halogen-free, highly abrasion resistant PUR mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2) Colour: jet black (similar to RAL 9005)

Electrical information

Nominal voltage	600/1,000V (following DIN VDE 0298-3) 1,000V (following UL)
Testing voltage	4,000V (following DIN EN 50395)

Properties and approvals

UV resistance	High
Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3
Offshore	MUD-resistant following NEK 606 - status 2016
Flame-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
UL/CSA AWM	See data sheet for details ▶ www.igus.eu/CFSPECIAL792
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
CE	Following 2014/35/EU

Typical application areas

- Reliable e-chain® cable for the seventh robot axis
- Electrical properties in line with Kuka (.011/.013/.014), ABB (.012) and Fanuc (.015/.016)

Cable for the 7th robot axis | PUR outer jacket

chainflex® CFSPECIAL.792

Image exemplary

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Shop and prices online
ABB					
CFSPECIAL.792.012	(18G2.5)C	25.5	545	882	
Fanuc					
CFSPECIAL.792.015	(7x(6x2.0))C	36.5	999	1747	
CFSPECIAL.792.016	(5x(4x0.25)+10x(3x0.75))C	26.5	422	877	
KUKA					
CFSPECIAL.792.011	(5x(2x6.0+2x2.5)+2x(6x1.0)C)C	35.5	1250	2033	
CFSPECIAL.792.013	((6x1.5)C+3x(3x4)+1G6)C	28.0	679	1220	
CFSPECIAL.792.014	(2x(3x1.5)C+3x(3x10)+1G10)C	35.5	1340	2122	

CF-K-0009

www.igus.eu/CFSPECIAL792

Part No.	Core group	Colour code
ABB		
CFSPECIAL.792.012	(18G2.5)C	Black cores with white numbers 1-17, one green-yellow core
Fanuc		
CFSPECIAL.792.015	(7x(6x2.0))C	Cores black with white digits 1-29 Cores blue with white digits 1-4 Cores yellow with black digits 1-9
CFSPECIAL.792.016	5x(4x0.25)	(blue/violet/brown/green), (grey/violet/yellow/brown), (grey/blue/brown/green), (grey/blue/green/yellow), (green/violet/brown/yellow)
	10x(3x0.75)	Cores brown with white digits 1, 7, 24 & 30 Cores black with white digits 16-21 Cores blue with white digits 2, 8 & 25 Cores green with black digits 3, 9 & 26 Cores yellow with black digits 5, 22 & 28 Cores red with white digits 11-15 Cores violet with white digits 4, 10 & 27 Cores grey with black digits 6, 23 & 29
KUKA		
CFSPECIAL.792.011	10x6.0	Black cores with white numbers 1-9, one green-yellow core
	10x2.5	Black cores with white numbers 10-18, one green-yellow core
	2x(6x1.0)C	Black cores with white numbers 19-30
CFSPECIAL.792.013	(6x1.5)C	Black cores with white numbers 10-15
	3x(3x4)	Black cores with white numbers 1-9
	1G6	Green-yellow core
CFSPECIAL.792.014	2x(3x1.5)C	Black cores with white numbers 10-15
	3x(3x10)	Black cores with white numbers 1-9
	1G10	Green-yellow core

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

chainflex®

CFCLEAN

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

REACH RoHS Clean-Room CE

Cables for cleanroom applications

Developed for use with the e-skin® flat, the CFCLEAN cable elements can be used very flexibly and replaced quickly. Omitting the outer jacket makes them 39% thinner and 43% lighter. All industry-standard core/cross-section combinations (data, bus, control, motor) are available from stock, with a guarantee of up to four years (40 million double strokes guaranteed at a bend radius of 70mm).

- Extremely bend-resistant, therefore very low reset forces
- Flexible and cost-effective thanks to cable elements that can be replaced in seconds
- Test 5497: Interim status: 130 million strokes (test continues successfully)
- Very thin (16% smaller diameter) and light (21% lower weight, for significant reduction in installation space)
- Configure and request CFCLEAN with e-skin® flat in just a few steps

Background

Highest flexibility and reliability for cleanrooms

The e-skin® flat cable guidance system, in combination with the CFCLEAN chainflex® cable solution, represents a logical further development of the commercially available PTFE trackless cables for cable guidance in flat panel displays (FPD) and semiconductor production, as well as in the production of microelectronic components and medical technology. The strengths of the PTFE flat ribbon cables have been enhanced and the weaknesses eliminated. The new e-skin® flat cable guide system is the result of this development.

- No bending of the system due to stiff jacket cables
- Low forces thanks to highly flexible stranded structure
  ... special conductors
  ... and no outer jacket
- chainflex® CFCLEAN cables adapted to the application with up to 21% weight reduction compared to conventional cables
- Approx. 16% smaller diameter compared to standard cables with jacket
- Minimum order length 1m
- All industry-standard core/cross-section combinations: data, bus, control and motor - available from stock, with a guarantee of up to four years

Benefits

- Made for the e-skin® flat
- Great flexural strength thanks to very finely stranded special conductors
- Protected by highly abrasion-resistant heat-sealed film
- Has no outer jacket, so it is thin and lightweight
- Transmits power, bus and data
- Available from stock

Team power for cleanrooms

The chainflex® CFCLEAN elements together with the e-skin® flat form a strong team for the moving energy supply in the cleanroom. Both in the semiconductor industry, display production and medical technology. In order to make the cable lighter and more flexible, the outer jacket was dispensed with. The e-skin® flat performs this function. The CFCLEAN elements are therefore designed for use in the e-skin® flat, as this constitutes the outer jacket.

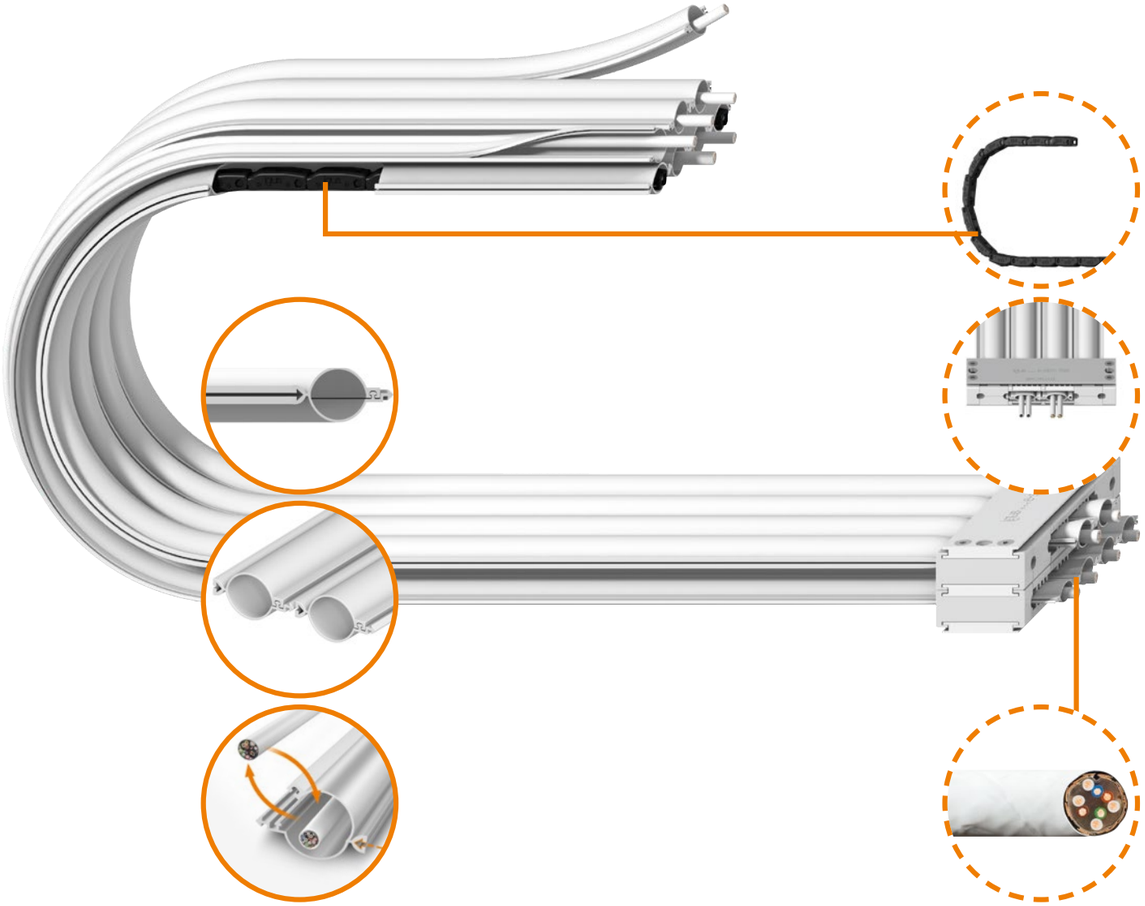
The big advantage over conventional flat cable solutions: thanks to the modular design of the e-skin® flat, replacing chambers and cable structures is easy. The combination of CFCLEAN and e-skin® flat has even a cleanroom "Class 1" certification!

Further advantages of CFCLEAN:
By omitting the outer jacket, it is 39% thinner and 43% lighter. The durability and sustainability of the CFCLEAN has been further proven through extensive ongoing test program with coordinated test procedures in the igus® laboratory (5,000m²-large testing area)! As a result, igus® can now offer a service life guarantee of 40 million strokes with a radius of just 70mm. And that in combination with the new, increased chainflex® guarantee period of four years.

Higher current carrying capacity
Due to the high-temperature insulation materials used, a 20% higher current load is now permitted (compared to comparable cables with PVC insulation, calculated with a cross section of 1.0mm²). The consequence of this is that in many cases it is possible to switch to a smaller cross-section.

Current carrying capacity CFCLEAN

Nominal cross section	Current carrying
0.14mm²	4A
0.25mm²	7A
0.34mm²	9A
0.5mm²	12A
0.75mm²	15A
1mm²	18A
1.5mm²	22 A
2.5mm²	30A



CFCLEAN elements for cleanroom applications

Mechanical parameters

chainflex® cables	Shield	Bend radius e-skin® flat min. [mm]	Temperature e-skin® flat from/to [°C]	v max. [m/s] unsupported	a max. [m/s²]	Page
CFCLEAN1	●	40	-10/+80	2	40	416
CFCLEAN2	●	40	-10/+80	2	40	418
CFCLEAN3	●	40	-10/+80	2	40	420
CFCLEAN4	●	40	-10/+80	2	40	422
CFCLEAN7	●	70	-10/+80	2	40	424
CFCLEAN8	●	40	-10/+80	2	40	426

Approvals/resistance

chainflex® cables	Approvals and standards																		Page
	oil	4x	PTFE	cULus LISTED	cUL LISTED	UL LISTED				NFPA	CLP A		REACH	RoHS	Clean Room		DESINA	CE	
CFCLEAN1								●					●	●	●			●	416
CFCLEAN2													●	●	●			●	418
CFCLEAN3								●					●	●	●			●	420
CFCLEAN4								●					●	●	●			●	422
CFCLEAN7								●					●	●	●			●	424
CFCLEAN8								●					●	●	●			●	426

chainflex® CFCLEAN1

Image exemplary

20 million
Double strokes guaranteed

Min. 40mm
Bend radius e-skin® flat

3m
Travel distance, e-skin® flat

- For heaviest duty applications in e-skin® flat
- PTFE foil wrap
- Shielded
- Highly abrasion-resistant
- PVC-free

Dynamic information

Bend radius	**e-skin® flat linear**	minimum 40mm (further radii in preparation, please see data sheet)
	fixed	minimum 3 x d
Temperature	**e-skin® linear**	-10°C up to +80°C
	fixed	-25°C up to +90°C (following DIN EN 50305)
v max.	**unsupported**	2m/s
a max.		40m/s²
Travel distance		Short, very fast applications with small radii and restricted installation space in an e-skin® flat

Cable structure

Conductor	Very finely stranded special conductors with especially soft and bending resistant design, made of bare copper wires.
Core insulation	Mechanically high-quality FEP mixture.
Core structure	Cores wound in a layer with especially short pitch length.
Core identification	**Cores < 0.5mm²:** Colour code in accordance with DIN 47100. **Cores ≥ 0.5mm²:** White cores with black numbers, one green-yellow core.
Overall shield	Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90%
Outer film	Low-adhesion, extremely abrasion-resistant and highly flexible PTFE wrap, adapted to suit the requirements in e-skin® flat. Colour: White

Electrical information

Nominal voltage	300/300V 300V (following UL)
Testing voltage	2,000V

Properties and approvals

Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL AWM	See data sheet for details ▶ www.igus.eu/CFCLEAN1
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	Air Purity Class 1, material/stranded structure tested by IPA according to ISO 14644-14, test report IG 2107-1242
CE	Following 2014/35/EU

Typical application areas

- For heaviest duty applications and especially small radii in cleanroom with e-skin® flat
- Especially for short, very fast applications with small radii and restricted installation space
- Indoor applications with e-skin® flat
- Semi-conductor/OLED manufacturing, medical cleanroom

chainflex® CFCLEAN are not cables in the sense of the normal standards for cables. Due to the absence of the outer jacket in CFCLEAN, which provides mechanical protection for cables, the use of chainflex® CFCLEAN is only permitted inside e-skin® flat.

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Shop and prices online
CFCLEAN1.02.04	(4x0.25)C	3.5	21	27	CF-L-0001 www.igus.eu/CFCLEAN1
CFCLEAN1.03.02	(2x0.34)C	3.5	17	22	
CFCLEAN1.03.07	(7x0.34)C	5.0	40	50	
CFCLEAN1.05.04	(4G0.5)C	5.0	36	49	
CFCLEAN1.07.04	(4G0.75)C	5.0	50	63	
CFCLEAN1.07.05	(5G0.75)C	5.5	58	74	
CFCLEAN1.10.02	(2x1.0)C	5.0	37	49	

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

chainflex® CFCLEAN2

20 million
Double strokes guaranteed

Min. 40mm
Bend radius e-skin® flat

3m
Travel distance, e-skin® flat

- For heaviest duty applications in e-skin® flat
- PTFE foil wrap
- Shielded
- Highly abrasion-resistant
- PVC-free

Dynamic information

Bend radius	**e-skin® flat linear**	minimum 40mm (further radii in preparation, please see data sheet)
	fixed	minimum 3 x d
Temperature	**e-skin® linear**	-10°C up to +80°C
	fixed	-25°C up to +90°C (following DIN EN 50305)
v max.	**unsupported**	2m/s
a max.		40m/s²
Travel distance		Short, very fast applications with small radii and restricted installation space in an e-skin® flat

Cable structure

Conductor	Very finely stranded special conductors with especially soft and bending resistant design, made of bare copper wires.
Core insulation	Mechanically high-quality PTFE mixture.
Core structure	Cores wound in a layer with especially short pitch length.
Core identification	White core with black imprint ▶ Product range table
Element shield	Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90%
Outer film	Low-adhesion, extremely abrasion-resistant and highly flexible PTFE wrap, adapted to suit the requirements in e-skin® flat. Colour: White

Electrical information

Nominal voltage	300/300V
Testing voltage	2,000V

Image exemplary

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

Properties and approvals

Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	Air Purity Class 1, material/stranded structure tested by IPA according to ISO 14644-14, test report IG 2107-1242
CE	Following 2014/35/EU

Typical application areas

- For heaviest duty applications and especially small radii in cleanroom with e-skin® flat
- Especially for short, very fast applications with small radii and restricted installation space
- Indoor applications with e-skin® flat
- Semi-conductor/OLED manufacturing, medical cleanroom

chainflex® CFCLEAN are not cables in the sense of the normal standards for cables. Due to the absence of the outer jacket in CFCLEAN, which provides mechanical protection for cables, the use of chainflex® CFCLEAN is only permitted inside e-skin® flat.

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CFCLEAN2.KOAX1.03	3xHF75-0.3/1.6	6.5	23	57

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Shop and prices online
CF-L-0002
www.igus.eu/CFCLEAN2

Part No.	Characteristic wave impedance approx. [Ω]	Core identification
CFCLEAN2.KOAX1.03	75	Coax 75Ohm -1-, Coax 75Ohm -2-, Coax 75Ohm -3-

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

chainflex® CFCLEAN3

Image exemplary

20 million
Double strokes guaranteed

Min. 40mm
Bend radius e-skin® flat

3m
Travel distance, e-skin® flat

- For heaviest duty applications in e-skin® flat
- PTFE foil wrap
- Shielded
- Highly abrasion-resistant
- PVC-free

Dynamic information

Bend radius	**e-skin® flat linear**	minimum 40mm (further radii in preparation, please see data sheet)
	fixed	minimum 3 x d
Temperature	**e-skin® linear**	-10°C up to +80°C
	fixed	-25°C up to +90°C (following DIN EN 50305)
v max.	**unsupported**	2m/s
a max.		40m/s²
Travel distance		Short, very fast applications with small radii and restricted installation space in an e-skin® flat

Cable structure

Conductor	Very finely stranded special conductors with especially soft and bending resistant design, made of bare copper wires.
Core insulation	Mechanically high-quality FEP mixture.
Core structure	Cores twisted in pairs with a short pitch length, core pairs then wound with short pitch lengths.
Core identification	▶ Product range table
Overall shield	Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90%
Outer film	Low-adhesion, extremely abrasion-resistant and highly flexible PTFE wrap, adapted to suit the requirements in e-skin® flat. Colour: White

Electrical information

Nominal voltage	300/300V 300V (following UL)
Testing voltage	2,000V

Properties and approvals

Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL AWM	See data sheet for details ▶ www.igus.eu/CFCLEAN3
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	Air Purity Class 1, material/stranded structure tested by IPA according to ISO 14644-14, test report IG 2107-1242
CE	Following 2014/35/EU

Typical application areas

- For heaviest duty applications and especially small radii in cleanroom with e-skin® flat
- Especially for short, very fast applications with small radii and restricted installation space
- Indoor applications with e-skin® flat
- Semi-conductor/OLED manufacturing, medical cleanroom

chainflex® CFCLEAN are not cables in the sense of the normal standards for cables. Due to the absence of the outer jacket in CFCLEAN, which provides mechanical protection for cables, the use of chainflex® CFCLEAN is only permitted inside e-skin® flat.

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Shop and prices online
CFCLEAN3.01.05.02	(5x(2x0.14))C	5.0	33	43	
CFCLEAN3.01.06.02	(6x(2x0.14))C	5.5	36	50	
CFCLEAN3.01.08.02	(8x(2x0.14))C	6.0	47	61	
CFCLEAN3.02.03.02	(3x(2x0.25))C	5.0	34	44	CF-L-0003
CFCLEAN3.02.04.02	(4x(2x0.25))C	5.5	42	58	
CFCLEAN3.02.05.02	(5x(2x0.25))C	5.5	50	63	www.igus.eu/CFCLEAN3
CFCLEAN3.02.06.02	(6x(2x0.25))C	6.0	52	70	

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Part No.	Core identification
CFCLEAN3.01.05.02	brown/white, green/white, yellow/white, grey/white, pink/white
CFCLEAN3.01.06.02	brown/white, green/white, yellow/white, grey/white, pink/white, blue/white
CFCLEAN3.01.08.02	brown/white, green/white, yellow/white, grey/white, pink/white, blue/white, red/white black/white
CFCLEAN3.02.03.02	brown/white, green/white, yellow/white
CFCLEAN3.02.04.02	brown/white, green/white, yellow/white, grey/white
CFCLEAN3.02.05.02	brown/white, green/white, yellow/white, grey/white, pink/white
CFCLEAN3.02.06.02	brown/white, green/white, yellow/white, grey/white, pink/white, blue/white

chainflex® CFCLEAN4

Image exemplary

20 million
Double strokes guaranteed

Min. 40mm
Bend radius e-skin® flat

3m
Travel distance, e-skin® flat

- For heaviest duty applications in e-skin® flat
- PTFE foil wrap
- Shielded
- Highly abrasion-resistant
- PVC-free

Dynamic information

Bend radius	**e-skin® flat linear**	minimum 40mm (further radii in preparation, please see data sheet)
	fixed	minimum 3 x d
Temperature	**e-skin® linear**	-10°C up to +80°C
	fixed	-25°C up to +90°C (following DIN EN 50305)
v max.	**unsupported**	2m/s
a max.		40m/s²
Travel distance		Short, very fast applications with small radii and restricted installation space in an e-skin® flat

Cable structure

Conductor	Very finely stranded special conductors with especially soft and bending resistant design, made of bare copper wires.
Core insulation	Mechanically high-quality FEP mixture.
Core structure	According to measuring system specification.
Core identification	According to measuring system specification.
Overall shield	Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90%
Outer film	Low-adhesion, extremely abrasion-resistant and highly flexible PTFE wrap, adapted to suit the requirements in e-skin® flat. Colour: White

Electrical information

Nominal voltage	300/300V 300V (following UL)
Testing voltage	2,000V

Properties and approvals

Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL AWM	See data sheet for details ▶ www.igus.eu/CFCLEAN4
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	Air Purity Class 1, material/stranded structure tested by IPA according to ISO 14644-14, test report IG 2107-1242
CE	Following 2014/35/EU

Typical application areas

- For heaviest duty applications and especially small radii in cleanroom with e-skin® flat
- Especially for short, very fast applications with small radii and restricted installation space
- Indoor applications with e-skin® flat
- Semi-conductor/OLED manufacturing, medical cleanroom

chainflex® CFCLEAN are not cables in the sense of the normal standards for cables. Due to the absence of the outer jacket in CFCLEAN, which provides mechanical protection for cables, the use of chainflex® CFCLEAN is only permitted inside e-skin® flat.

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CFCLEAN4.015	(4x(2x0.14)+4x0.5)C	6.5	60	77

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Shop and prices online
CF-L-0004
www.igus.eu/CFCLEAN4

Part No.	Core group	Colour code
CFCLEAN4.015	4x(2x0.14)	brown/green, yellow/violet, grey/pink, red/black
	4x0.5	blue, white, brown-green, white-green

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

chainflex® CFCLEAN7

Image exemplary

40 million
Double strokes guaranteed

Min. 70mm
Bend radius e-skin® flat

3m
Travel distance, e-skin® flat

- For heaviest duty applications in e-skin® flat
- PTFE foil wrap
- Shielded
- Highly abrasion-resistant
- PVC-free

Dynamic information

Bend radius	**e-skin® flat linear**	minimum 70mm (further radii in preparation, please see data sheet)
	fixed	minimum 3 x d
Temperature	**e-skin® linear**	-10°C up to +80°C
	fixed	-25°C up to +90°C (following DIN EN 50305)
v max.	**unsupported**	2m/s
a max.		40m/s²
Travel distance		Short, very fast applications with small radii and restricted installation space in an e-skin® flat

Cable structure

Conductor	Very finely stranded special conductors with especially soft and bending resistant design, made of bare copper wires.
Core insulation	Mechanically high-quality FEP mixture.
Core structure	Cores wound in a layer with especially short pitch length.
Core identification	**Power cores:** White cores with black numbers 1-3, one green-yellow core. **1 Control pair:** white, black
Overall shield	Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90%
Outer film	Low-adhesion, extremely abrasion-resistant and highly flexible PTFE wrap, adapted to suit the requirements in e-skin® flat. Colour: White

Electrical information

Nominal voltage	600/1,000V 600V (following UL)
Testing voltage	3,000V

Properties and approvals

Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL AWM	See data sheet for details ▶ www.igus.eu/CFCLEAN7
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	Air Purity Class 1, material/stranded structure tested by IPA according to ISO 14644-14, test report IG 2107-1242
CE	Following 2014/35/EU

Typical application areas

- For heaviest duty applications and especially small radii in cleanroom with e-skin® flat
- Especially for short, very fast applications with small radii and restricted installation space
- Indoor applications with e-skin® flat
- Semi-conductor/OLED manufacturing, medical cleanroom

chainflex® CFCLEAN are not cables in the sense of the normal standards for cables. Due to the absence of the outer jacket in CFCLEAN, which provides mechanical protection for cables, the use of chainflex® CFCLEAN is only permitted inside e-skin® flat.

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CFCLEAN7.15.03.02.01	(4G1.5+(2x0.34)C)C	9.5	126	176
CFCLEAN7.15.04	(4G1.5)C	8.0	94	131
CFCLEAN7.PE.25.01	(1G2.5)C	4.5	41	73

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Shop and prices online
CF-L-0005
www.igus.eu/CFCLEAN7

4-year guarantee ... more than 1,350 cable types from stock ... no cutting costs

UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

chainflex® CFCLEAN8

Image exemplary

20 million
Double strokes guaranteed

Min. 40mm
Bend radius e-skin® flat

3m
Travel distance, e-skin® flat

- For heaviest duty applications in e-skin® flat
- PTFE foil wrap
- Shielded
- Highly abrasion-resistant
- PVC-free

Dynamic information

Bend radius	**e-skin® flat linear**	minimum 40mm (further radii in preparation, please see data sheet)
	fixed	minimum 3 x d
Temperature	**e-skin® linear**	-10°C up to +80°C
	fixed	-25°C up to +90°C (following DIN EN 50305)
v max.	**unsupported**	2m/s
a max.		40m/s²
Travel distance		Short, very fast applications with small radii and restricted installation space in an e-skin® flat

Cable structure

Conductor	Very finely stranded special conductors with especially soft and bending resistant design, made of bare copper wires.
Core insulation	Mechanically high-quality FEP mixture.
Core structure	According to bus specification.
Core identification	According to bus specification. ▶ Product range table
Overall shield	Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90%
Outer film	Low-adhesion, extremely abrasion-resistant and highly flexible PTFE wrap, adapted to suit the requirements in e-skin® flat. Colour: White

Electrical information

Nominal voltage	300/300V
Testing voltage	2,000V

Properties and approvals

Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
UL-verified	Certificate No. V293650: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL AWM	See data sheet for details ▶ www.igus.eu/CFCLEAN8
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	Air Purity Class 1, material/stranded structure tested by IPA according to ISO 14644-14, test report IG 2107-1242
CE	Following 2014/35/EU

Typical application areas

- For heaviest duty applications and especially small radii in cleanroom with e-skin® flat
- Especially for short, very fast applications with small radii and restricted installation space
- Indoor applications with e-skin® flat
- Semi-conductor/OLED manufacturing, medical cleanroom

chainflex® CFCLEAN are not cables in the sense of the normal standards for cables. Due to the absence of the outer jacket in CFCLEAN, which provides mechanical protection for cables, the use of chainflex® CFCLEAN is only permitted inside e-skin® flat.

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
Ethernet/CAT5e				
CFCLEAN8.045	(4x(2x0.14))C	5.5	34	47

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Shop and prices online
CF-L-0006
www.igus.eu/CFCLEAN8

Part No.	Characteristic wave impedance approx. [Ω]	Core group	Colour code
Ethernet/CAT5e			
CFCLEAN8.045	100	4x(2x0.14)	white/blue, white/orange, white/green, white/brown

chainflex® CFAIR

Image exemplary

- For heaviest duty applications
- PUR hose
- Oil-resistant and coolant-resistant
- Abrasion-resistant
- Outside-toleranced
- PVC and halogen-free

Dynamic information

Bend radius	flexible	minimum 10 x d
	fixed	minimum 7.5 x d
Temperature	flexible	-25°C up to +80°C
	fixed	-40°C up to +85°C
v max.	unsupported	10m/s
	gliding	6m/s
a max.		50m/s²

Technical data

Material	Abrasion-resistant polyurethane adapted to suit the requirements in e-chains®. Colour: Blue
Dimensions	Outside-toleranced
Operating pressure	12 bar at 20°C
Vacuum	-1 bar at 20°C

Properties and approvals

Oil resistance	Oil-resistant
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
Lead-free	Following 2011/65/EC (RoHS-II)

Part No.	Max. package length [km]	Inner diameter [mm]	Wall thickness [mm]	Outer diameter (d) max. [mm]	Weight [g/m]
CAPU.A.04.0	1.0	2.7	0.65	4.0	8
CAPU.A.06.0	0.5	4.0	1.00	6.0	19
CAPU.A.08.0	0.5	5.7	1.15	8.0	30
CAPU.A.10.0	0.3	7.0	1.5	10.0	48
CAPU.A.12.0	0.2	8.0	2.00	12.0	76
CAPU.A.16.0	0.1	11.0	2.50	16.0	127

Shop and prices online

www.igus.eu/CFAIR

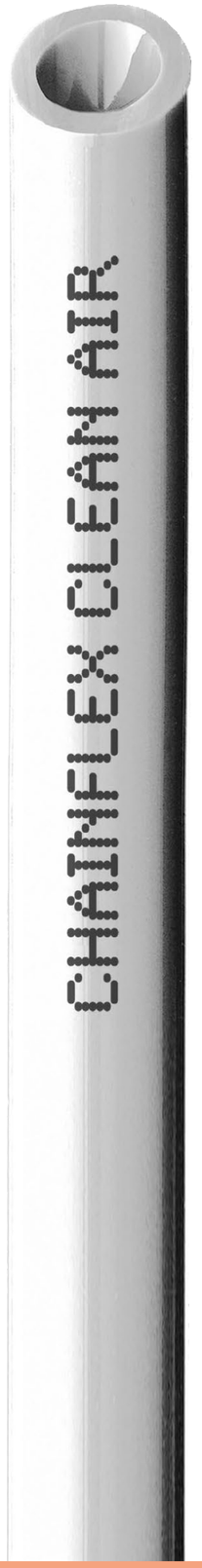
igus® chainflex® CFAir pneumatic hoses were tested over several million bending cycles in e-chains®. Their outstanding features include flexibility, high abrasion resistance and very good resistance to oil and coolants.

Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this online: www.igus.eu/cf-case

chainflex® CFCleanAIR



- For heaviest duty applications
- PE hose
- Oil-resistant and coolant-resistant
- Highly abrasion-resistant
- Outside-toleranced
- PVC and halogen-free

Dynamic information

Bend radius	**flexible**	minimum 10 x d
	fixed	minimum 7.5 x d
Temperature	**flexible**	-25°C up to +60°C
	fixed	-30°C up to +65°C
v max.	**unsupported**	10m/s
	gliding	6m/s
a max.		50m/s²

Technical data

Material	Highly abrasion-resistant polyurethane adapted to suit the requirements in e-chains®. Colour: White
Dimensions	Outside-toleranced
Operating pressure	10 bar at 20°C
Vacuum	-0.95 bar at 20°C

Properties and approvals

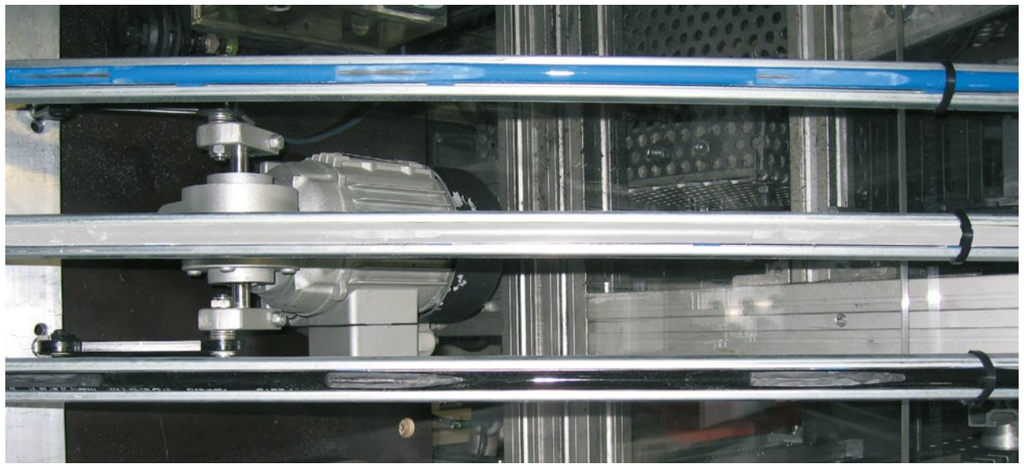
Oil resistance	Oil-resistant
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following DIN EN 60754
PTFE-free	The design of these products does not contain PTFE
Lead-free	Following 2011/65/EC (RoHS-II)
Cleanroom	According to ISO Class 1, material/hose tested by IPA according to DIN EN ISO standard 14644-1

Image exemplary

Part No.	Max. package length [km]	Inner diameter [mm]	Wall thickness [mm]	Outer diameter (d) max. [mm]	Weight [g/m]
CAPE.A.04.0	1.0	2.7	0.65	4.0	8
CAPE.A.06.0	0.5	4.0	1.00	6.0	15
CAPE.A.08.0	0.5	5.7	1.15	8.0	21
CAPE.A.10.0	0.3	7.0	1.5	10.0	38
CAPE.A.12.0	0.2	8.4	1.80	12.0	54
CAPE.A.16.0	0.1	10.8	2.60	16.0	90

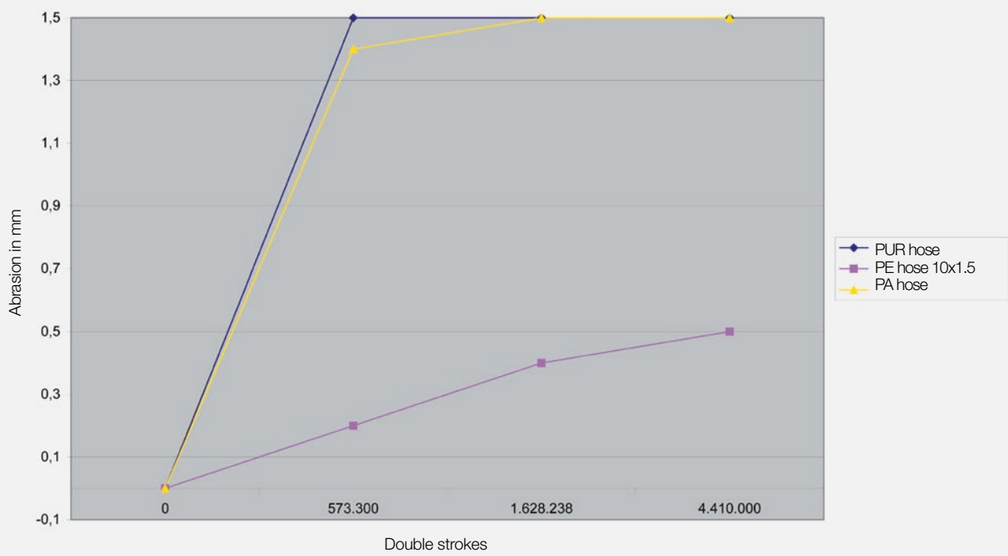
Shop and prices online

www.igus.eu/CFCLEANAIR



igus® material abrasion test

Comparison: Abrasion of pneumatic hoses PUR, PE und PA in combination with igus® e-chain® (with crossbar 450.30)



readycable® and readychain®

Harnessed solutions

Minimise process costs, everything from one source

igus® offers a wide range of harnessing options for cables. A key element is the use of highly flexible chainflex® cables with a guarantee of up to 4 years. These cables can be fitted with connectors from reputable manufacturers.
readychain® systems are completely pre-assembled energy chain modules including cable/hose packages that are specially tailored to customer requirements. They help save time and effort during assembly on site and optimise production processes.

- Everything from one source: cable, connector, expertise
- Reduce your throughput times from days to hours and reduce overhead costs
- 100% inspection of harnessed products and guarantee of up to 4 years
- One order, one invoice, one delivery
- Individual service life calculation online:
  igus.eu/readychain

Ready-to-install harnessed energy supplies

Ready-to-install systems, from connectors through harnessed cables up to complex energy supply modules.

The harnessing of cables is one of the core competencies of igus®. The cables are manufactured according to individual specifications or industrial standards. igus® uses highly flexible chainflex® cables, which are used in combination with products from well-known connector manufacturers such as HARTING, Binder, TE Intercontec, Yamaichi and many others. Upon request, igus® can also produce customised harnessed cables according to application requirements (no minimum order quantity). Another advantage of the harnessed igus® cables is the wide range of jacket materials, which are optimally tailored to the respective application and can therefore help you save costs.

readychain® is an innovative concept from igus® that improves efficiency and reliability in cable harnessing and energy chain systems. It offers pre-assembled cable and hose packages that are specifically adapted to your requirements. By using readychain® systems, you save time and effort during on-site harnessing. Overall, readychain® is an efficient solution for cable harnessing and helps you optimise production processes.

readycable®
Industrial cable harnessing involves cutting the cable to a defined length and attaching clearly specified connectors. Standardised processes and maximum machine optimisation result in cables that are ready for connection.

readychain®
To ensure easy installation and long, safe operation of a machine, it is extremely important that the energy chain and cables work together perfectly.
In the readychain area®, all components are planned, assembled and tested together and are usually ready for connection upon receipt.

Customised production

From one off to mass production

The igus® readychain® factory in Cologne covers more than 3,500m²

The igus® readychain® factory

100% safety thanks to industrial harnessing

Experience the readycable® factory
Harnessed and ready-to-connect cables in energy chains or on robots require unique specifications to operate flawlessly over long periods of time despite many cycles, high speeds and accelerations as well as challenging environmental conditions.

The chainflex® cables used for readycable® products are thoroughly tested in the company's own 5,500m² test laboratory, the largest in the industry.

Cable assembly from igus® guarantees a long and predictable service life thanks to extensive testing, quality checks in our own laboratory and more than 25 years of experience in cable assembly.

Benefits
- Large stocks
- No minimum order quantity
- 100% tested
- Long product life
- The product range is available over the long term
- Ready to ship within five working days
- Capacity for 750,000 harnessed cables per year
- Over 18,000 test programs
- 2,500 test adapters

Video: **How does the cable-harnessing process work?**

Up-to-date production processes, custom-build or serial production

Customised cable assembling

Full service from system acceptance to installation

You decide ...
the degree of harnessing
... igus® provides
harnessed energy chain modules

3 Benefits: readychain® basic

1. Everything from one source
2. Reduced assembly time
3. Reduce failures

6 Benefits: readychain® standard

4. No electrical termination needed
5. 100% digitally tested
6. No cable surplus

9 Benefits: readychain® standard+

7. Reduce interfaces
8. Optimise points of connection/interfaces
9. Ready-to-install multi-axis system

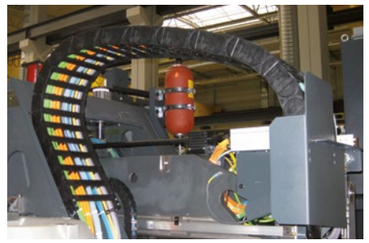
13 Benefits: readychain® premium

10. Optimise your transport/assembly
11. One single assembly
12. One Part No./Product group
13. Plug & Play

Configured ... assembled ... with system guarantee

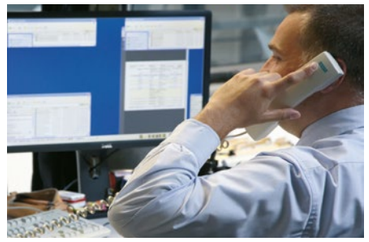
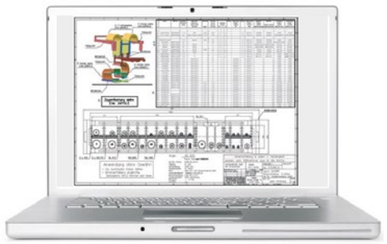
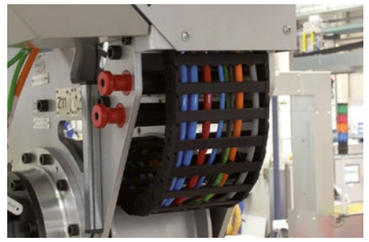
1 System acceptance

readychain® service
- We visit you
- Define interfaces
- Planning and logistics
- Cycle integration
- Time schedule



2 Project phase

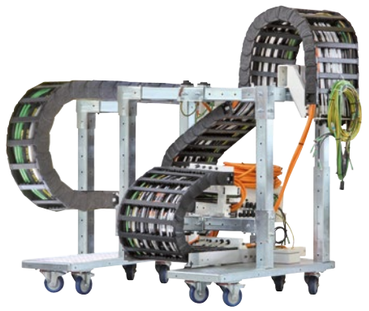
readychain® service
- Component selection
- Interface optimisation
- Documentation
- Integrated project management
- Cost optimisation

3 Initial acceptance of prototype

Remote service
- Initial acceptance from your work place
- Build your prototype with an igus® project engineer, live in your meeting
- Your requests for changes explained with a model

... or visit us for production acceptance

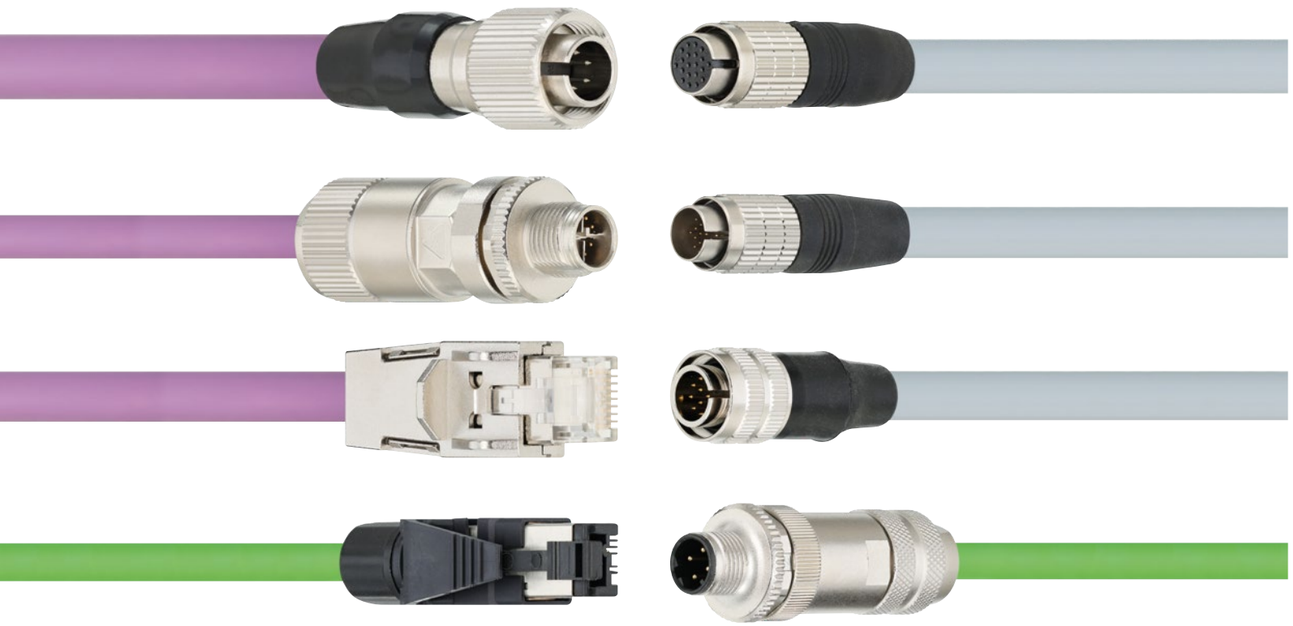


4 igus® installation

Assembly
- System installation by igus® specialists
- igus® supervision service for your own installation
- Transparent, fixed price

igus.eu/ready-to-install

Industrial camera technology



Harnessed video cables for e-chains®

Harnessed cables for use in all aspects of industrial camera technology. From USB 2.0, USB 3.0 to FireWire and GigE, DVI/ HDMI to coax cables, we offer all connection options for the most common camera systems. Thanks to the use of chainflex® cables, these ready-to-connect cables are ideal for dynamic applications.

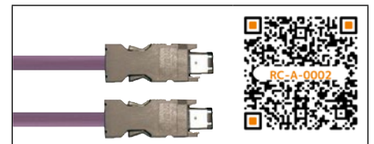
- Ready-to-connect, harnessed and optimised for continuous use in energy chains
- Always find the video cable that works for less
- 100% tested (test seal of approval and test report) in the 5,500m² igus® test laboratory
- Long-lasting cable materials, high-quality connectors
- Individual service life calculation online: igus.eu/readycable

Harnessed video cables

Harnessed bus and coax cables

Keyence
Harnessed connection cables suitable for Keyence

Jacket	**PVC/PUR**
Bend radius, e-chain®	**Min. 7.5 x d**
Number of variants	**37**



FireWire
Harnessed cable

Jacket	**TPE**
Bend radius, e-chain®	**Min. 12.5 x d**
Number of variants	**10**

USB 2.0
Harnessed cables according to USB 2.0 specification

Jacket	**PVC/PUR/TPE**
Bend radius, e-chain®	**Min. 12.5 x d**
Number of variants	**12**

USB 3.0
Harnessed cables according to USB 3.0 specification

Jacket	**PVC/PUR**
Bend radius, e-chain®	**Min. 12.5 x d**
Number of variants	**8**

GigE
Harnessed cables according to GigE specification

Jacket	**PUR-ROBOT/TPE**
Bend radius, e-chain®	**Min. 10 x d**
Number of variants	**4**

DVI-D/HDMI
Harnessed cable according to DVI-D/HDMI specification

Jacket	**TPE**
Bend radius, e-chain®	**Min. 12.5 x d**
Number of variants	**3**

Coax
Harnessed coax cable (BNC/SMA)

Jacket	**TPE**
Bend radius, e-chain®	**Min. 10 x d**
Number of variants	**24**

VGA
Harnessed VGA cable

Jacket	**TPE**
Bend radius, e-chain®	**Min. 10 x d**
Number of variants	**4**

Harnessed Fibre Optic Cables for cameras

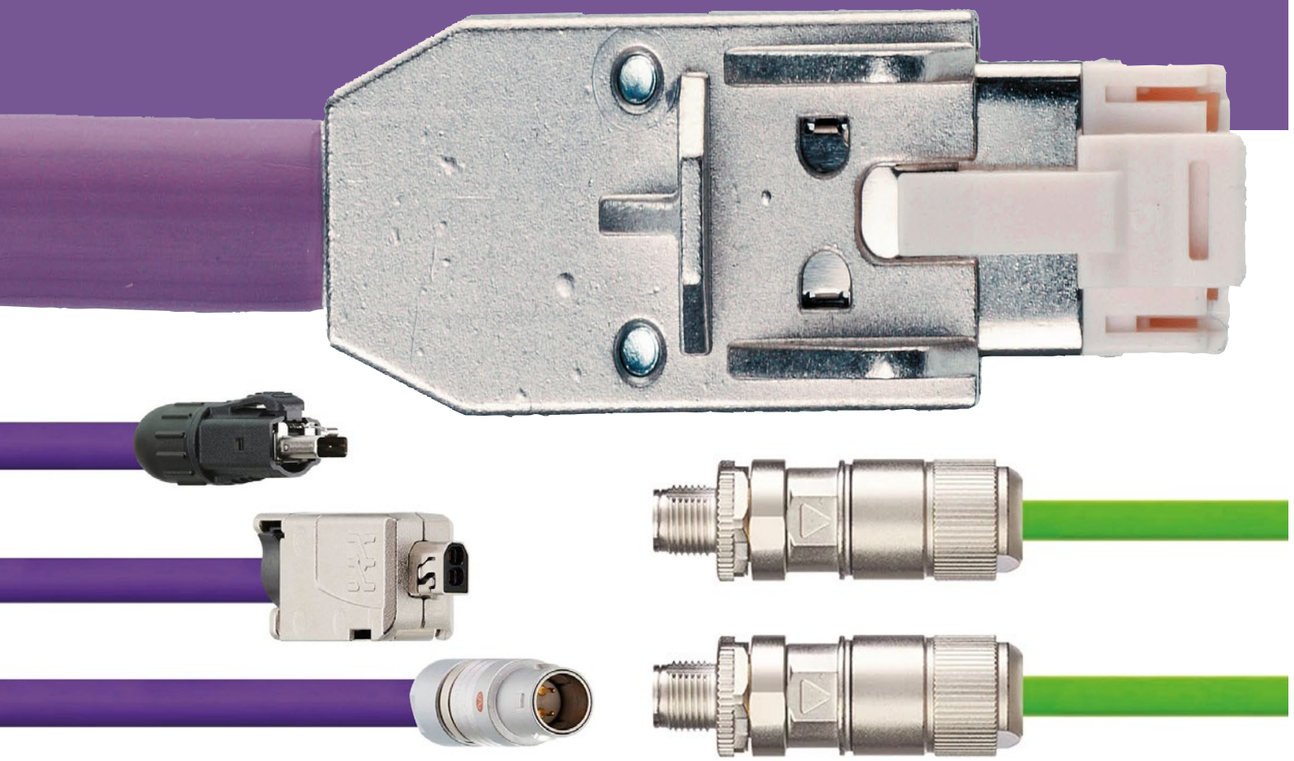
FOC
2 fibres

Jacket	**PVC/TPE**
Bend radius, e-chain®	**Min. 5 x d**
Number of variants	**24**

FOC
4 fibres

Jacket	**TPE**
Bend radius, e-chain®	**Min. 5 x d**
Number of variants	**6**

Network technology



Harnessed network cables for e-chains®

The appropriately harnessed Ethernet, FOC, and bus cable for all data volumes and motion types. Your machine can be networked at optimal cost from CAT5 to CAT7 to Single Pair Ethernet and the selection of the outer jacket material.
All harnessed cables are 100% tested before shipping, which increases your safety even further.

- Ready-to-connect, harnessed and optimised for continuous use in energy chains
- Always find the network cable that works for less
- 100% tested (test seal of approval and test report) in the 5,500m² igus® test laboratory
- Long-lasting cable materials, high-quality connectors
- Individual service life calculation online:
  igus.eu/readycable

The right cable for every bus system, ready to connect!

Harnessed Single Pair Ethernet (SPE cables)
Digitalisation and data exchange have become indispensable in modern production. With only one core pair in the Single Pair Ethernet, igus® offers you the possibility of a guaranteed future data exchange. Transmission rates of up to 1GBit/s are easily possible and reducing the cable to only one pair of cores offers further advantages. You can use the 25% thinner cable compared to the CAT5e cable (CFBUS.PUR.045) in a confined installation space. It saves a lot of space, which has a great influence on dynamic motion sequences in the machinery.

The newly developed, industrial-grade connectors from Yamaichi and Weidmüller offer an excellent shield connection and thus reduce electro-magnetic interference (EMC). igus® offers a chainflex® type with a highly abrasion-resistant and notch-resistant PUR outer jacket, which is sold by the metre. All ready-to-connect Single Pair Ethernet (SPE) cables are 100% tested by igus® and ensure safe and reliable data communication.

Harnessed Ethernet cables
For your system, we offer ready-to-connect Ethernet cables from CAT5 to CAT7 so that you have the right solution for all data volumes. With that you can safely use Bus systems such as Ethernet/IP, Profinet, EtherCAT, Sercos and many other derivatives. The different qualities of cable (CAT5, CAT5e, CAT6, CAT6A, CAT7) mean that there are opportunities for very large savings or for the cabling of your equipment in a way that meet your needs in the future.

Another special feature of this data cable harnessed with the Yamaichi Y-Con 40 PP is that the RJ45 specification also includes two additional, fully integrated contacts for the power supply. This means that the industrial connector for Industrial Ethernet, Profinet and field bus can reliably transmit up to 3.1A without an additional power supply.

Behind the harnessed Drive Cliq cable is a measuring system cable, which is usually easy to recognise on every drive unit due to its bright green colour. This colour has its origin in DESINA and in the meantime has established itself beyond machine tools.

Harnessed Profinet cables
igus® offers industrially harnessed Profinet cables with M12 D coded connectors in your required lengths. Transfer your dynamic application data securely and in real time. With the 4-year chainflex® guarantee, you can choose the right product from over seven cable qualities that is guaranteed to last for your application.

Harnessed DeviceNet cables
Ready-to-connect igus® cables enable you to securely transmit the field bus data in your system. Industrial, process-optimised cable harnessing enables us to offer high-quality cables at required lengths, no minimum order quantity.

Harnessed network cables

Harnessed Ethernet cables

CAT5
Harnessed Ethernet cables according to CAT5 and CAT5e specification

Jacket	**PVC/PUR/TPE**
Bend radius, e-chain®	**Min. 10 x d**
Number of variants	**194**

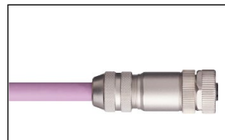
CAT6
Harnessed Ethernet cables according to CAT6 and CAT6A specification

Jacket	**PVC/PUR/TPE**
Bend radius, e-chain®	**Min. 10 x d**
Number of variants	**62**

CAT7
Harnessed Ethernet cables according to CAT7 specification

Jacket	**PUR/TPE**
Bend radius, e-chain®	**Min. 10 x d**
Number of variants	**10**

Harnessed Profibus cables



Profibus
Harnessed Profibus cables with M12 connectors

Jacket	**PVC/PUR/TPE**
Bend radius, e-chain®	**Min. 10 x d**
Number of variants	**90**

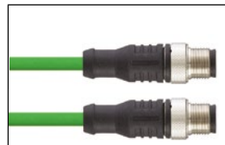
Harnessed Profinet cables

Profinet
Harnessed Profinet cables with RJ45- and M12 connectors

Jacket	**PVC/PUR/TPE**
Bend radius, e-chain®	**Min. 10 x d**
Number of variants	**120**

Industrial Profinet
moulded

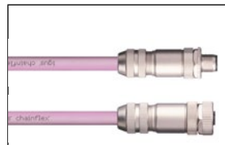
Jacket	**PVC/PUR**
Bend radius, e-chain®	**12.5 x d**
Number of variants	**18**



Profinet
moulded

Jacket	**PVC/PUR/TPE**
Bend radius, e-chain®	**Min. 10 x d**
Number of variants	**12**

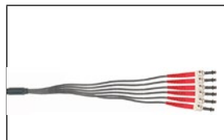
Harnessed DeviceNet cables



DeviceNet
with Binder M12 A-coded

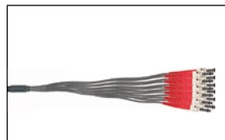
Jacket	**TPE**
Bend radius, e-chain®	**Min. 10 x d**
Number of variants	**1**

Harnessed Fibre Optic Cables for network



FOC
6 fibres

Jacket	**TPE**
Bend radius, e-chain®	**Min. 5 x d**
Number of variants	**12**

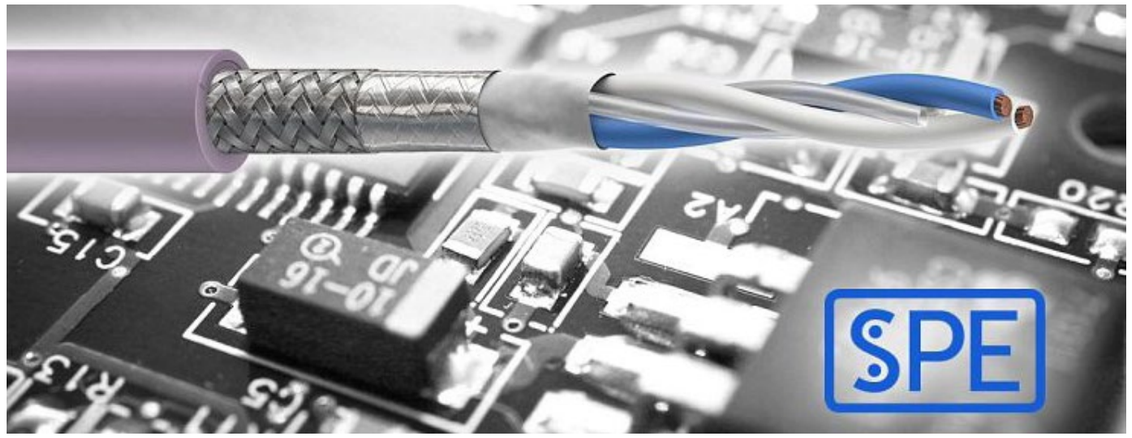


FOC
12 fibres

Jacket	**TPE**
Bend radius, e-chain®	**Min. 5 x d**
Number of variants	**12**

The SPE Industrial Partner Network

igus® continues to advance SPE together with strong partners



Single Pair Ethernet allows maximum data transmission with just one core pair, ideal for small installation spaces

Single Pair Ethernet is the infrastructure foundation that makes IIoT and Industry 4.0 possible. In order to promote Single Pair Ethernet technology for the rapidly growing IIoT market, igus® is participating in the SPE Industrial Partner Networks with other established partners such as HARTING and TE Connectivity.

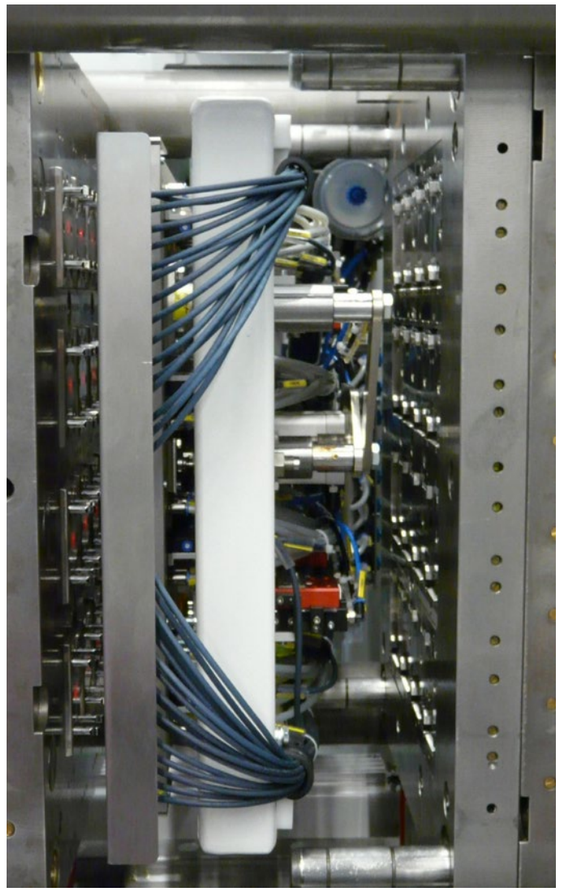
For the reliable establishment of the entire future SPE ecosystem, standards for transmission protocols, cabling and device components are also jointly developed and adopted and published in IEEE 802.3 and IEC SC46C.

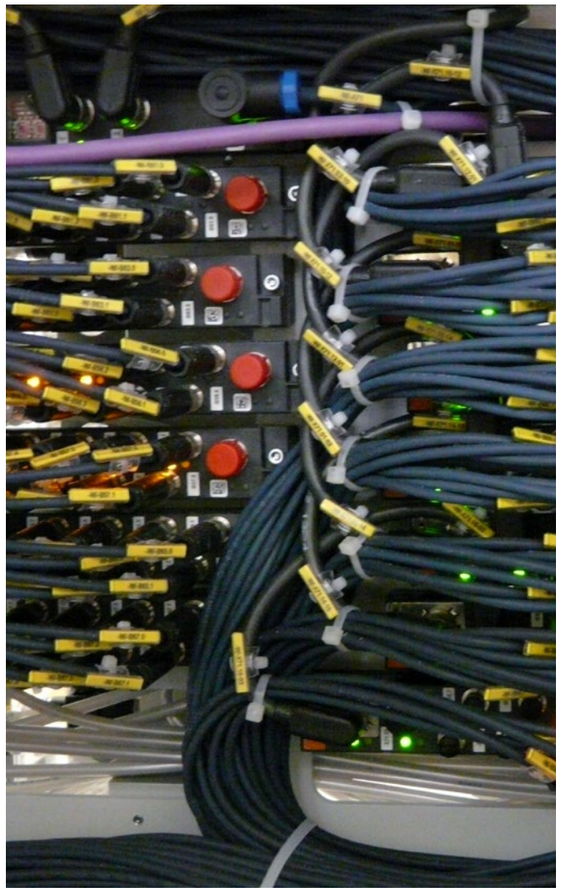
In this way, the new cable could also be constructed in partnership for the T1 connector interface. As a result, the durable shield has reliable transference to the connector, ensuring optimal high electromagnetic compatibility (EMC). The combination of chainflex® cable and SPE connector is extremely robust: igus® uses a highly abrasion-resistant and notch-resistant PUR jacket, and the connector has tough metal latches with a PCB socket.

Single Pair Ethernet (SPE)
Harnessed Single Pair Ethernet cables

Jacket	**PUR**
Bend radius, e-chain®	**Min. 12.5 x d**
Number of variants	**4**

Sensor cables





chainflex® CF9.INI cables in a high-speed automation for plastics processing with cycle times in seconds

Harnessed sensor cables for e-chains®

Sensor cables, also called sensor/actuator cables, provide the connection between the control unit and various sensors - or if the measuring principle is reversed - actuators. Frequently used abbreviations include ini or ini cable (plural: inis).

Ready-to-connect, harnessed and optimised for continuous use in energy chains

Extremely small bend radii of down to 3xd make automation possible in the smallest of spaces

100% tested (test seal of approval and test report) in the 5,500m² igus® test laboratory

Long-lasting cable materials, high-quality connectors

Individual service life calculation online:
igus.eu/readycable

Sensor or measurement transducers transform physical quantities such as rotation, speed, distance or length into analogue electric impulses. In the case of an actuator, the measured electric current (symbol: I, unit: ampere; A) or voltage (symbol: U, unit: volt; V) is transformed into temperature, pressure or torque.

The connection cable consists of at least three cores (3-pole sensor cable) up to 5-pole sensor cables with a relatively small cross-section of between 0.14mm² and 0.34mm². In the simplest case, two cores are required for supplying the voltage, while the last core transmits an I/O signal. For sensitive applications, there are shielded versions in addition to the traditional ini cables to avoid EMC disruptions (electromagnetic compatibility).

Sensor and actuator cables for energy chains are cables for bend radii from 3xd. The CF.INI cables are tested with many millions of cycles in e-chains®. They have various approvals and conformities, such as UL, CSA, CE Desina as well as oil resistance. Various cable ends are available for the sensor and actuator cables.

Connector sizes vary from M8 to M12 and even up to M23 for a corresponding sensor cable.

Benefits
- Optimised and tested for continuous operation in e-chains®
- Smallest bend radii: minimum 3 x d

Typical application areas
- Automation Technology and Robotics
- Industrial machinery and equipment
- Vehicle technology

Harnessed sensor/actuator cables

Sensor/ actuator CF9 - CF.INI
Bend radius
min. 5 x d

Connection cable M12 x 1
straight

Jacket	**TPE**
Number of poles	**4, 5**
Cable length	**3, 5, 7, 10, 15m**

Connection cable M12 x 1
angled

Jacket	**TPE**
Number of poles	**4, 5**
Cable length	**3, 5, 7, 10, 15m**

Linking cable M12 x 1
straight

Jacket	**TPE**
Number of poles	**4, 5**
Cable length	**2, 5, 10m**

Linking cable M12 x 1
angled

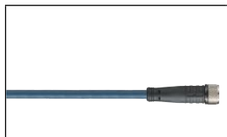
Jacket	**TPE**
Number of poles	**4, 5**
Cable length	**2, 5, 10m**

Connection cable M12 x 1
straight, LED

Jacket	**TPE**
Number of poles	**4**
Cable length	**3, 5, 7, 10, 15m**

Connection cable M12 x 1
angled, LED

Jacket	**TPE**
Number of poles	**4**
Cable length	**3, 5, 7, 10, 15m**



Connection cable M8 x 1
straight

Jacket	**TPE**
Number of poles	**3, 4**
Cable length	**3, 5, 7, 10, 15m**

Connection cable M8 x 1
angled

Jacket	**TPE**
Number of poles	**3, 4**
Cable length	**3, 5, 7, 10, 15m**

Linking cable M8 x1
straight

Jacket	**TPE**
Number of poles	**3, 4**
Cable length	**2, 5, 10m**

Linking cable M8 x1
angled

Jacket	**TPE**
Number of poles	**3, 4**
Cable length	**2, 5, 10m**

Connection cable M8 x 1
angled, LED

Jacket	**TPE**
Number of poles	**3**
Cable length	**3, 5, 7, 10, 15m**

Sensor/ actuator CF10 - CF.INI
Bend radius
min. 5 x d
360° shielded

Connection cable M12 x 1
straight

Jacket	**TPE**
Number of poles	**5 (4+PE)**
Cable length	**3, 5, 7, 10, 15m**

Connection cable M12 x 1
angled

Jacket	**TPE**
Number of poles	**5 (4+PE)**
Cable length	**3, 5, 7, 10, 15m**

Linking cable M12 x 1
straight

Jacket	**TPE**
Number of poles	**5 (4+PE)**
Cable length	**2, 5, 10m**

Linking cable M12 x 1
angled

Jacket	**TPE**
Number of poles	**5 (4+PE)**
Cable length	**2, 5, 10m**

Sensor/ actuator CF98.PLUS - CF.INI
Bend radius
min. 3 x d

Connection cable M12 x 1
straight

Jacket	**TPE**
Number of poles	**4**
Cable length	**3, 5, 7, 10, 15m**

Connection cable M12 x 1
angled

Jacket	**TPE**
Number of poles	**4**
Cable length	**3, 5, 7, 10, 15m**

Linking cable M12 x 1
straight

Jacket	**TPE**
Number of poles	**4**
Cable length	**2, 5, 10m**

Linking cable M12 x 1
angled

Jacket	**TPE**
Number of poles	**4**
Cable length	**2, 5, 10m**

Connection cable M8 x 1
straight

Jacket	**TPE**
Number of poles	**3**
Cable length	**3, 5, 7, 10, 15m**

Connection cable M8 x 1
angled

Jacket	**TPE**
Number of poles	**3**
Cable length	**3, 5, 7, 10, 15m**

Harnessed sensor/actuator cables

RC-C-0022

Linking cable M8 x1
straight

Jacket	**TPE**
Number of poles	**3**
Cable length	**2, 5, 10m**

RC-C-0023

Linking cable M8 x1
angled

Jacket	**TPE**
Number of poles	**3**
Cable length	**2, 5, 10m**

Sensor/ actuator distribution box

RC-C-0024

Connection cable M23
straight

Jacket	**TPE**
Number of poles	**16+3**
Cable length	**variable**

RC-C-0025

Connection cable M23
straight

Jacket	**TPE**
Number of poles	**16+3**
Cable length	**variable**

RC-C-0026

Connection cable M23
angled

Jacket	**TPE**
Number of poles	**16+3**
Cable length	**variable**

RC-C-0027

Connection cable M12
straight

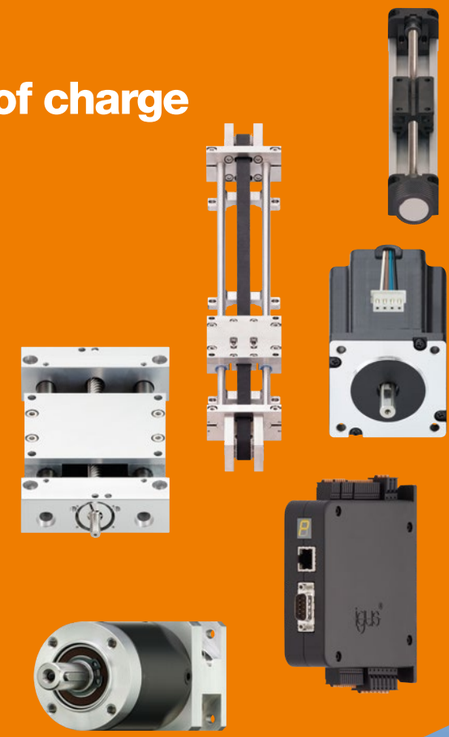
Jacket	**TPE**
Number of poles	**8, 12**
Cable length	**variable**

drylin® drive technology

Simple and cost-effective automation

Drive technology roadshow free of charge

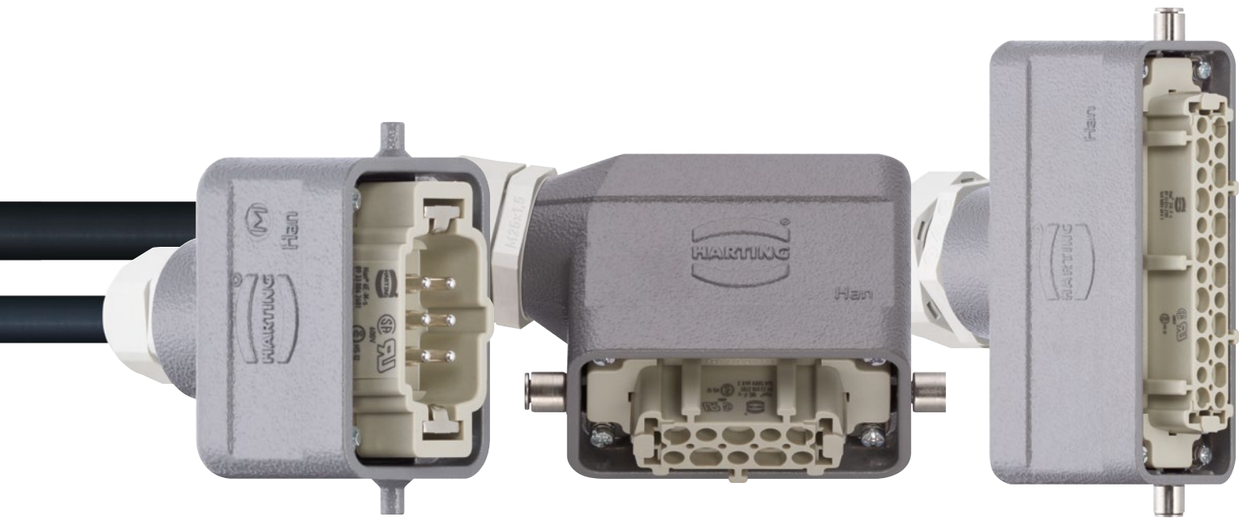
- All drylin® drive technology products including all innovations in your company
- drylin® linear axes, motors and motor controls you can try out directly
- Individual on-site consultation
- 100% free service



Further information and booking
igus.eu/drylin-roadshow

readycable® cables with industrial connectors

Industrial control cables



Harnessed cables with HARTING connectors

Industrial cable harnessing of chainflex® cables with industrial connectors from HARTING. Whether harnessed control cables or individually tailored solutions from batch size 1 - the thoroughly tested chainflex® cable quality combined with the HARTING types of connector Han 3A, 6B, 10B, 16B and 24B as a ready-to-connect readycable® solution for industrial applications, helps avoid time-consuming connector assembly and guarantees reliable components.

- Ready to connect directly from the cable manufacturer
- No minimum order value. No minimum order quantity
- 100% tested (test seal of approval and test report) in the 5,500m² igus® test laboratory
- To your required length, with centimetre accuracy, with no waste
- Individual service life calculation online: igus.eu/readycable

Monoblock or modular system

Variable cable harnessing based on Han-Modular in all conventional installation sizes (3A, 6B, 10B, 16B and 24B)

What is monoblock technology?
Only one insert is installed per connector housing. We offer housing sizes 6B, 10B, 16B and 24B for these HARTING connectors.

The HARTING connectors of the Han EE series are designed for 500V contamination degree 3 when fully assembled. A modified contact arrangement allows use in the same degree of contamination for higher voltages of up to 1,000V.

When the HARTING connectors are fully assembled, a higher reference voltage is also possible, but with a lower degree of contamination.

What does modular system mean?
Han-Modular combines several HARTING connector modules within a single housing. It is possible to combine signals, power, data and even pneumatics in one connector housing.
The standard housing sizes remain the same and instead of a monoblock, various inserts can be combined within one housing.
In addition, space requirements are reduced, as the number of housings is reduced and functionality is increased at the same time.

Would you also like to configure your modular system?
Then feel free to contact us.

Benefits
- Ready to connect directly from the cable manufacturer
- To your required length, with centimetre accuracy
- No minimum order value, from quantity 1
- Ready to ship within five working days
- Custom assembly is part of our daily business

Harnessed industrial control cables

HARTING Han 6B

Han 6B connector housing (pin) to Han 6B connector housing (socket)
single locking lever at both ends, straight

Jacket	**PVC/PUR/TPE**
Bend radius, e-chain®	**Min. 5 x d**
Number of variants	**8**

Han 6B connector housing (pin) to Han 6B connector housing (socket)
single locking lever at both ends, angled

Jacket	**PVC/PUR/TPE**
Bend radius, e-chain®	**Min. 5 x d**
Number of variants	**8**

HARTING Han 10B

Han 10B connector housing (pin) to Han 10B connector housing (socket)
single locking lever at both ends, straight

Jacket	**PVC/PUR/TPE**
Bend radius, e-chain®	**Min. 5 x d**
Number of variants	**8**

Han 10B connector housing (pin) to Han 10B connector housing (socket)
single locking lever at both ends, angled

Jacket	**PVC/PUR/TPE**
Bend radius, e-chain®	**Min. 5 x d**
Number of variants	**8**

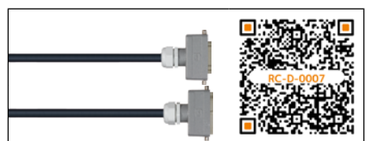
Han 10B connector housing (pin) to Han 10B connector housing (socket)
double locking lever at both ends, straight

Jacket	**PVC/PUR/TPE**
Bend radius, e-chain®	**Min. 5 x d**
Number of variants	**8**

Han 10B connector housing (pin) to Han 10B connector housing (socket)
double locking lever at both ends, angled

Jacket	**PVC/PUR/TPE**
Bend radius, e-chain®	**Min. 5 x d**
Number of variants	**8**

HARTING Han 16B



Han 16B connector housing (pin) to Han 16B connector housing (socket)
single locking lever at both ends, straight

Jacket	**PVC/PUR/TPE**
Bend radius, e-chain®	**Min. 5 x d**
Number of variants	**8**

Han 16B connector housing (pin) to Han 16B connector housing (socket)
single locking lever at both ends, angled

Jacket	**PVC/PUR/TPE**
Bend radius, e-chain®	**Min. 5 x d**
Number of variants	**8**

Han 16B connector housing (pin) to Han 16B connector housing (socket)
double locking lever at both ends, straight

Jacket	**PVC/PUR/TPE**
Bend radius, e-chain®	**Min. 5 x d**
Number of variants	**8**

Han 16B connector housing (pin) to Han 16B connector housing (socket)
double locking lever at both ends, angled

Jacket	**PVC/PUR/TPE**
Bend radius, e-chain®	**Min. 5 x d**
Number of variants	**8**

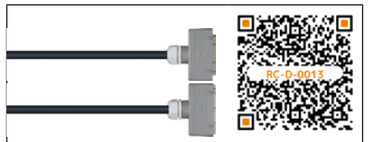
HARTING Han 24B

Han 24B connector housing (pin) to Han 24B connector housing (socket)
single locking lever at both ends, straight

Jacket	**PVC/PUR/TPE**
Bend radius, e-chain®	**Min. 5 x d**
Number of variants	**8**

Han 24B connector housing (pin) to Han 24B connector housing (socket)
single locking lever at both ends, angled

Jacket	**PVC/PUR/TPE**
Bend radius, e-chain®	**Min. 5 x d**
Number of variants	**8**



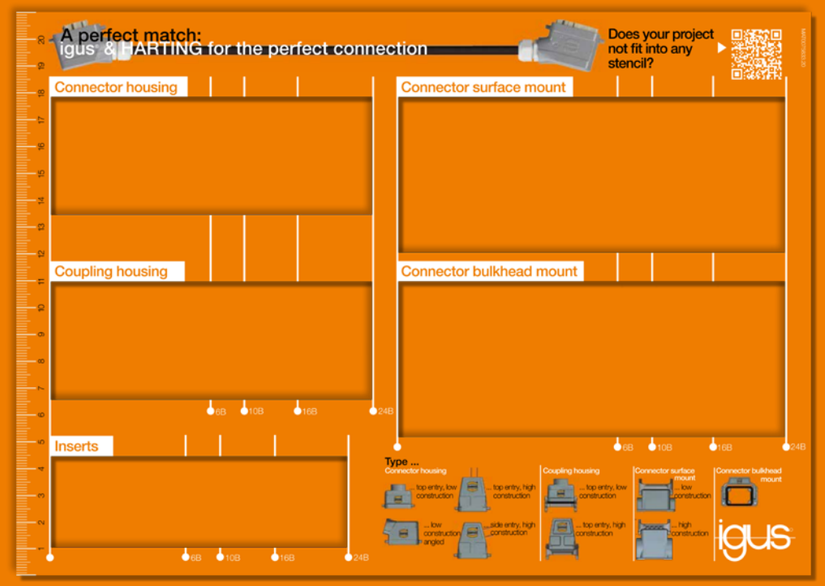
Han 24B connector housing (pin) to Han 24B connector housing (socket)
double locking lever at both ends, straight

Jacket	**PVC/PUR/TPE**
Bend radius, e-chain®	**Min. 5 x d**
Number of variants	**8**

Han 24B connector housing (pin) to Han 24B connector housing (socket)
double locking lever at both ends, angled

Jacket	**PVC/PUR/TPE**
Bend radius, e-chain®	**Min. 5 x d**
Number of variants	**8**

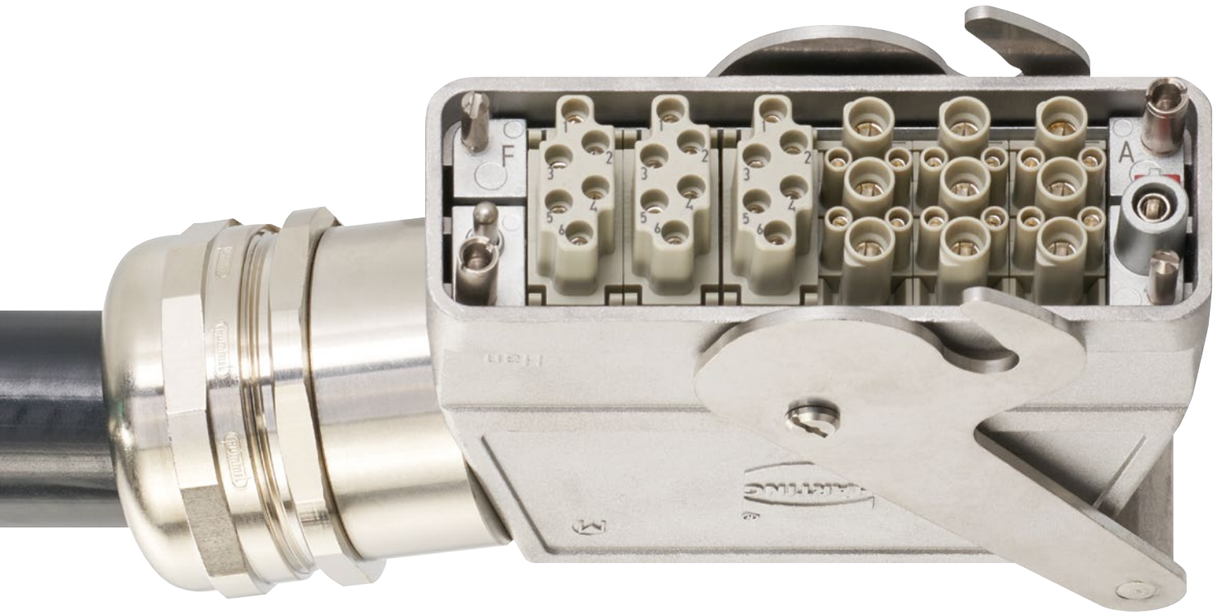
Measuring template for rectangular connectors



The template allows you to quickly and easily determine the type and size of rectangular connectors in everyday use. To do so, hold the rectangular connector in the template and read the size. In addition, a small explanation helps you identify the design.

Request your personal copy now: **igus.eu/measuring-template**

Robotics and automation



Moving energy made easy – even for robot applications

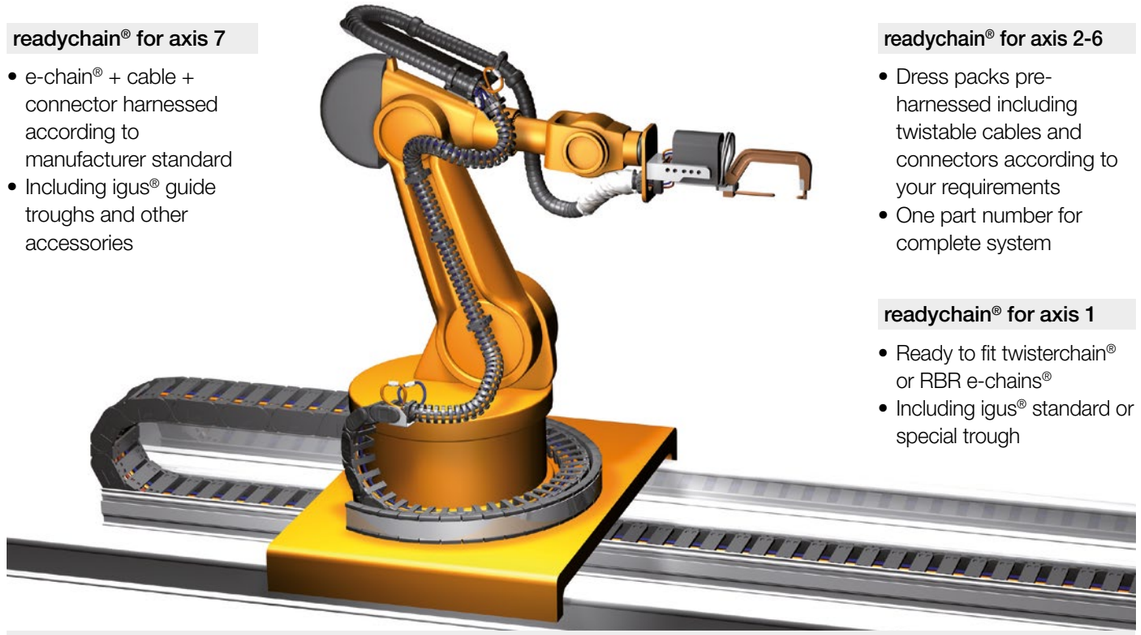
Harnessed, ready-to-connect cables suitable for common industrial robots from Kuka, Fanc and ABB.
The AIDA (Automation Initiative of German Automobile Manufacturers) was formed to establish standardised cables for the German automobile industry. Here we offer harnessed cables according to the AIDA standard for dynamic applications.

- Assembled energy supply systems, connectors and cables from igus®
- Everything from one source, direct from the manufacturer
- Optional system guarantee
- Worldwide readychain® specialists and production sites for fast support and short transport routes
- Individual service life calculation online: igus.eu/readycable

Harnessed dress packs and cables for robots

readychain® for axis 7

- e-chain® + cable + connector harnessed according to manufacturer standard
- Including igus® guide troughs and other accessories



readychain® for axis 2-6

- Dress packs pre-harnessed including twistable cables and connectors according to your requirements
- One part number for complete system

readychain® for axis 1

- Ready to fit twisterchain® or RBR e-chains®
- Including igus® standard or special trough

Additional services for you

- Survey of existing systems on your robot by our sales engineers
- Optional system guarantee
- Worldwide readychain® specialists and 14 production sites for fast maintenance and spare part support

Harnessed cables for robots

readycable® Kuka
Harnessed cables for KUKA robots

suitable for Kuka Quantec, Fortec and Titan

Number of variants **26**

readycable® Fanuc
Harnessed cables for Fanuc robots

suitable for Fanuc M-900iB and R-2000iC

Number of variants **9**

readycable® ABB
Harnessed cables for ABB robots

suitable for ABB IRB 6620, IRB 6640, IRB 6650S, IRB 7600 and IRB 8700

Number of variants **13**

Cables according to AIDA specifications

readycable® AIDA
Harnessed connection and extension cables according to AIDA specifications

suitable for AIDA Power, Profinet, signal

Number of variants **19**

readycable® cables for drive technology

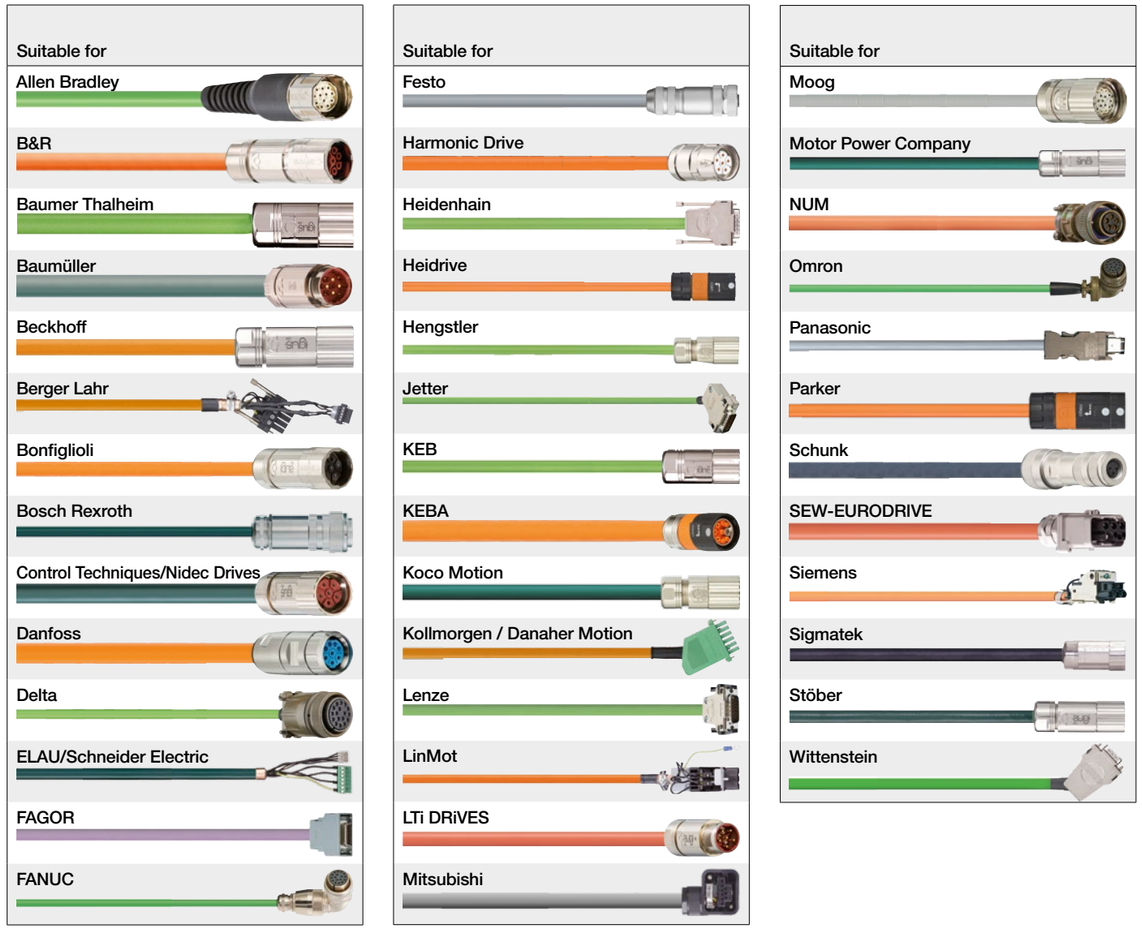
Suitable for 40 manufacturers

Harnessed cables for drive technology

Extensive readycable® product range for drive technology with over 6,000 ready-to-connect, harnessed and quality-checked motor, servo, signal and encoder cables suitable for 40 manufacturer standards.
Ready to ship in 5 working days, in the desired length, with no minimum order quantity, without cutting charges, industrially harnessed and available for online calculation and order 24/7.

- The seven qualities always give you the most cost-effective cable that is guaranteed to work in your application
- Reduce storage space: ready to ship in 5 business days, to your required length, no minimum order quantity, no cutting charges
- 100% tested (test seal of approval and test report) in the 5,500m² igus® test laboratory
- Individual service life calculation, exactly what you need
- Get the right drive cable in just two steps, online: igus.eu/readycable

Almost 6,000 drive cables ready for connection with a guarantee of up to 4 years



Utilise igus® manufacturing capacities and respond flexibly to order fluctuations. We are happy to support you with state-of-the-art manufacturing technology and specialised employees, which in turn frees up resources to support your manufacturing capacities.

Flexible production planning
Special tools used across projects and customers guarantee consistent quality at low cost. All employees are trained for both readychain® assembly and cable harnessing. Flexible production planning secures your delivery times.

readycable® factories worldwide
igus® manufactures more than 12,500 readycable® each week at 14 readycable® factories around the world. In the Cologne factory alone, 180 people are available to manufacture readychain® and readycable®. The goal is to reduce transport routes, time, and resources while ensuring consistently high quality. The same production standards apply at all 14 sites.

Benefits
- Customised length
- Up to 7 cable qualities
- Industrial, machine-supported cable harnessing with crimp force and depth monitoring
- 14 globally networked production sites
- 100% functional check with digital and logic test

Typical application areas
- Woodworking
- Machine Tool industry
- Outdoor areas

Get the right drive cable in just two steps

The readycable® Product Finder was developed to quickly find the right cable from a large selection (40 drive manufacturers and up to seven cable qualities).

In just a few clicks, or by entering the drive manufacturer number, you can use this finder to reduce the selection to a minimum. Finally, choose the quality that is right for your application from one of the seven cable qualities. Nowhere else is this faster or easier.

EPLAN Makros for readycable® drive cables suitable for eight manufacturers

Load our readycable® quickly and easily via the EPLAN data portal into your electrical design using EPLAN macros. These macros already contain parts lists and assignment diagrams.

Siemens, SEW, Bosch Rexroth are now followed by five other manufacturers. By adding Allen Bradley, Beckhoff, B&R, Heidenhain, and FANUC, we are expanding our online range by 2,046 data sets. This means that with the new macros, the customer can already bring complete readycable® product data into their EPLAN during the electrical design phase and complete their parts list.

While the electrical details are being worked out in the design department, the user can go online to the EPLAN data portal and filter for e.g. 0198 9308 and find all igus® cables in the known qualities, which can then be selected according to their application and use in their personal product range.

- Automatic generation of cable plan, parts list and further design documents in CAE system
- 7 qualities per cable directly available in EPLAN

- Select cables, calculate service life and order online: www.igus.eu/readycable
- Reduce design time by 50% with ready-to-use EPLAN macros
- Easily designed digitally & can be ordered online immediately
- No minimum quantity surcharges, no cutting charges
- 4-year guarantee on cables sold by the metre
- Predefined modules or macros directly usable in EPLAN as can be seen in the video tutorial:

www.igus.eu/eplan-macro

Harnessed cables for drive technology

Example: chainflex® PVC cables for the woodworking industry

Typical application areas – PVC
- For heavy duty applications
- Light oil influence
- Preferably indoor applications, but also outdoor ones at temperatures > 5 °C
- Unsupported travels and up to 100 m for gliding applications
- Storage and retrieval units, machining units/packaging machines, quick handling, indoor cranes, woodworking

Example: chainflex® PUR cables for the machine tools industry

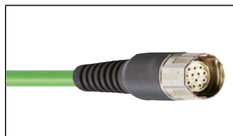
Typical application areas – PUR
- For heaviest duty applications
- Almost unlimited resistance to oil
- Indoor and outdoor applications, UV-resistant
- Unsupported travels and up to 100 m for gliding applications
- Storage and retrieval units for high-bay warehouses, machining units/ machine tools, quick handling, cleanroom, semiconductor insertion, outdoor cranes, low-temperature applications

Example: chainflex® TPE cables for outdoor use

Typical application areas – TPE
- For heaviest duty applications
- Almost unlimited resistance to oil, also with bio-oils
- Indoor and outdoor applications, UV-resistant
- Unsupported travels and up to 400m and more for gliding applications
- Storage and retrieval units for high-bay warehouses, machining units/ machine tools, quick handling, cleanroom, semiconductor insertion, ship to shore, outdoor cranes, low-temperature applications

Harnessed cables for drive technology

Harnessed drive cables suitable for ...



Allen Bradley
Motor cables, servo cables, hybrid servo cables, brake cables, feedback cables, adapter cables (transition cable)

Cable quality	**PVC/PUR/TPE**
Number of variants	**257**

B&R
Motor cables, servo cables, EnDat cables, encoder cables, resolver cables, bus cables

Cable quality	**PVC/PUR/TPE**
Number of variants	**75**

Baumer Thalheim
Encoder cables

Cable quality	**PVC/PUR/TPE**
Number of variants	**9**

Baumüller
Servo cables, resolver cables, pulse encoder cables
SpeedTec: servo cables, resolver cables, pulse encoder cables

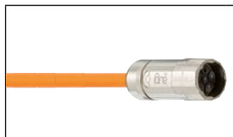
Cable quality	**PVC/PUR/TPE**
Number of variants	**858**

Beckhoff
motor cables, servo cables, hybrid servo cables, encoder cables, thermal protection cables, resolver cables, network cables, EtherCat

Cable quality	**PVC/PUR/TPE**
Number of variants	**89**

Berger Lahr
Servo cables, resolver cables

Cable quality	**PVC/PUR/TPE**
Number of variants	**22**



Bonfiglioli
Servo cables

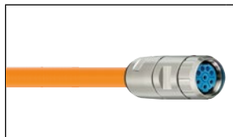
Cable quality	**PVC/PUR**
Number of variants	**6**

Bosch Rexroth
Motor cables, servo cables, hybrid servo cables, encoder cables

Cable quality	**PVC/PUR/TPE**
Number of variants	**541**

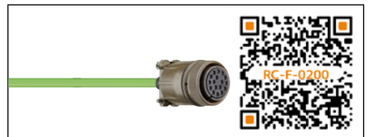
Control Techniques/Nidec Drives
Motor cables, servo cables, encoder cables

Cable quality	**PVC/PUR/TPE**
Number of variants	**210**



Danfoss
Servo cables

Cable quality	**PVC/PUR**
Number of variants	**10**

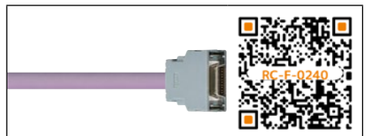


Delta
Measuring system cables, servo cables, motor cables

Cable quality	**PVC/PUR/TPE**
Number of variants	**8**

ELAU/Schneider Electric
Servo cables, hybrid servo cables, encoder cables

Cable quality	**PVC/PUR/TPE**
Number of variants	**34**



Fagor
Path measuring cables

Cable quality	**PUR/TPE**
Number of variants	**30**

Fanuc
Motor cables, servo cables, brake cables, signal cables

Cable quality	**PVC/PUR/TPE**
Number of variants	**123**

Festo
Servo cables, control cables, encoder cables, data cables, bus cables

Cable quality	**PVC/PUR/TPE**
Number of variants	**48**

Harmonic Drive
Measuring system cables, servo cables

Cable quality	**PVC/PUR/TPE**
Number of variants	**24**

Heidenhain
Servo cables, adapter cables

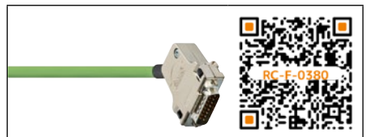
Cable quality	**PVC/PUR/TPE**
Number of variants	**118**

Heidrive
Data cables, servo cables

Cable quality	**PVC/PUR**
Number of variants	**15**

Hengstler
Measuring system cables

Cable quality	**PVC/PUR**
Number of variants	**24**



Jetter
Motor cables, servo cables, resolver cables

Cable quality	**PVC/PUR/TPE**
Number of variants	**43**

KEB
Measuring system cables, servo cable

Cable quality	**PVC/PUR**
Number of variants	**8**

KEBA
Data cables, servo cables

Cable quality	**PVC/PUR/TPE**
Number of variants	**4**

Koco Motion
Data cables, servo cables

Cable quality	**PVC/PUR**
Number of variants	**5**

Harnessed cables for drive technology

RC-F-0460

Kollmorgen/Danaher Motion

Motor cables, servo cables, signal cables

Cable quality	**PVC/PUR/TPE**
Number of variants	**499**

RC-F-0480

Lenze

Servo cables, fan cables, decoder cables, encoder cables, feedback cables, resolver cables

Cable quality	**PVC/PUR/TPE**
Number of variants	**258**

RC-F-0500

LinMot

Motor cables, servo cables

Cable quality	**PVC/PUR**
Number of variants	**7**

RC-F-0520

LTiDRiVES

Servo cable, encoder cables

Cable quality	**PVC/PUR/TPE**
Number of variants	**54**

RC-F-0540

Mitsubishi Electric

Motor cables, control cables, encoder cables

Cable quality	**PVC/PUR**
Number of variants	**40**

RC-F-0560

Moog

Data cables, servo cables

Cable quality	**PVC/PUR/TPE**
Number of variants	**7**

RC-F-0580

Motor Power Company

Servo cables

Cable quality	**PVC/PUR**
Number of variants	**5**

RC-F-0600

NUM

Power cables, servo cables, fan cables, encoder cables

Cable quality	**PVC/PUR/TPE**
Number of variants	**49**

RC-F-0620

Omron

Motor cables, control cables, encoder cables

Cable quality	**PVC/PUR/TPE**
Number of variants	**59**

RC-F-0640

Panasonic

Servo cables, motor cables, control cables, data cables

Cable quality	**PVC/PUR/TPE**
Number of variants	**8**

RC-F-0660

Parker

Motor cables, resolver cables

Cable quality	**PVC/PUR/TPE**
Number of variants	**60**

RC-F-0680

Schunk

Bus cables, data cables, control cables

Cable quality	**PVC/PUR/TPE**
Number of variants	**11**

RC-F-0700

SEW-EURODRIVE

Motor cables, servo cables, hybrid servo cables, control cables, encoder cables

Cable quality	**PVC/PUR/TPE**
Number of variants	**304**

RC-F-0720

Siemens

Power cables, servo cables, signal cables, signal cables DriveCliq SpeedTec: power cables, servo cables, signal cables

Cable quality	**PVC/PUR/TPE**
Number of variants	**1,172**

RC-F-0740

Sigmatek

Servo cables, encoder cables

Cable quality	**PVC/PUR/TPE**
Number of variants	**8**

RC-F-0760

Stöber

Servo cable, encoder cables

Cable quality	**PVC/PUR/TPE**
Number of variants	**52**

RC-F-0780

Wittenstein

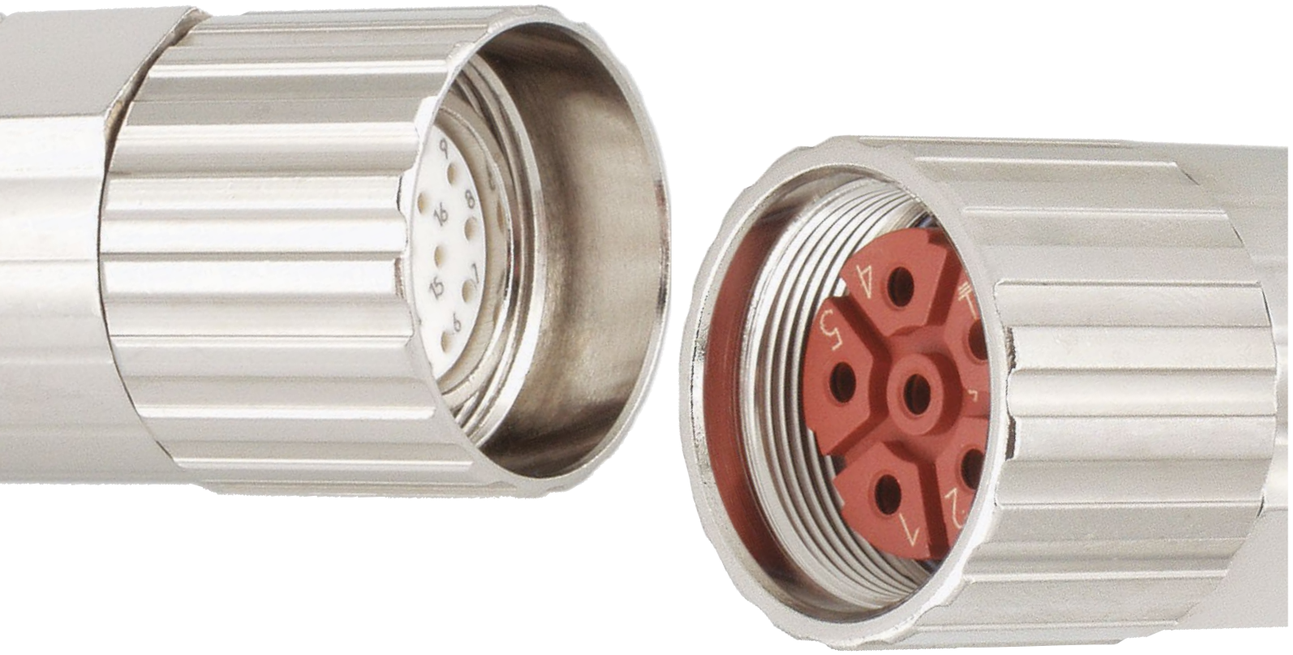
Servo cables, motor cables, measuring system cables, data cables

Cable quality	**PVC/PUR/TPE**
Number of variants	**13**

Find and order the right drive cable online in 2 steps

Select with the new readycable® finder, ready to ship in 5 working days

Industrial connectors

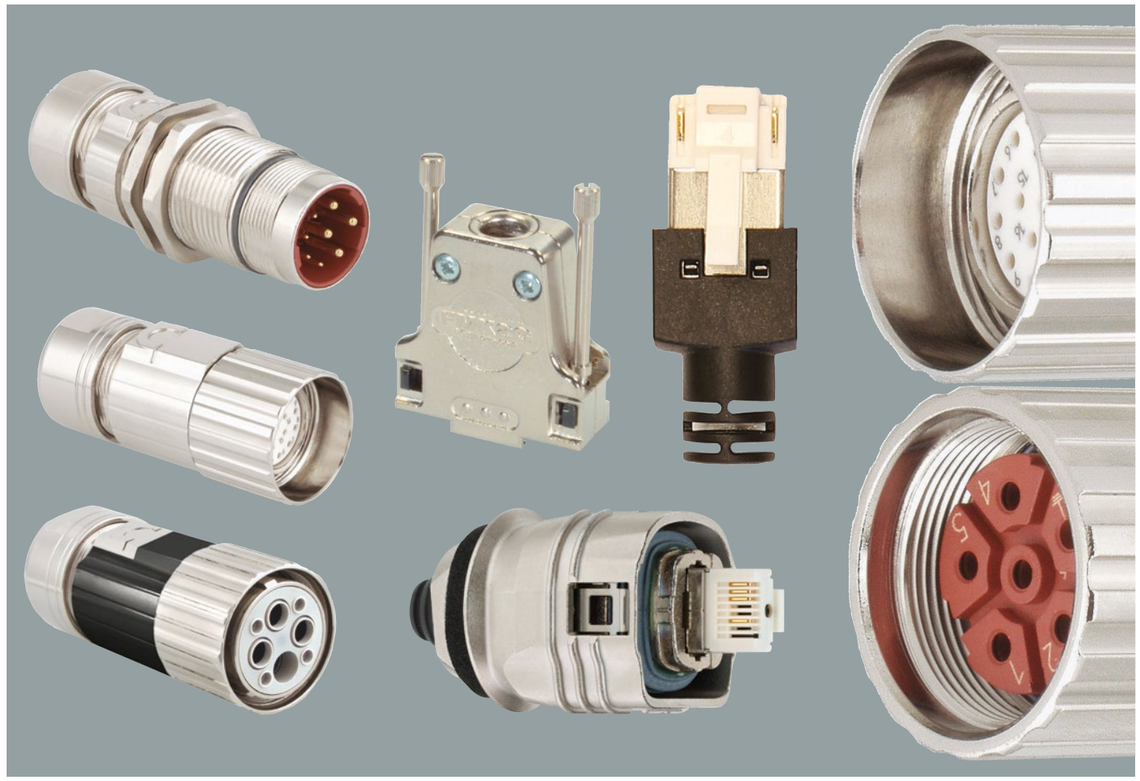


The wide variety of industrial connectors at igus®

High-performance connectors, signal connectors and several thousands of connector components – the range of industrial connectors in stock allows igus® to provide a high level of availability with short delivery times.

- Thousands of connectors from leading manufacturers
- High material availability and fast delivery reduce logistics work for customers
- Proven in countless industrial applications
- From batch size 1 to high volumes for optimum application dimensioning, fully harnessed upon request
- Order the complete product range of connectors online:
  igus.eu/connectors

Benefits of igus® connectors



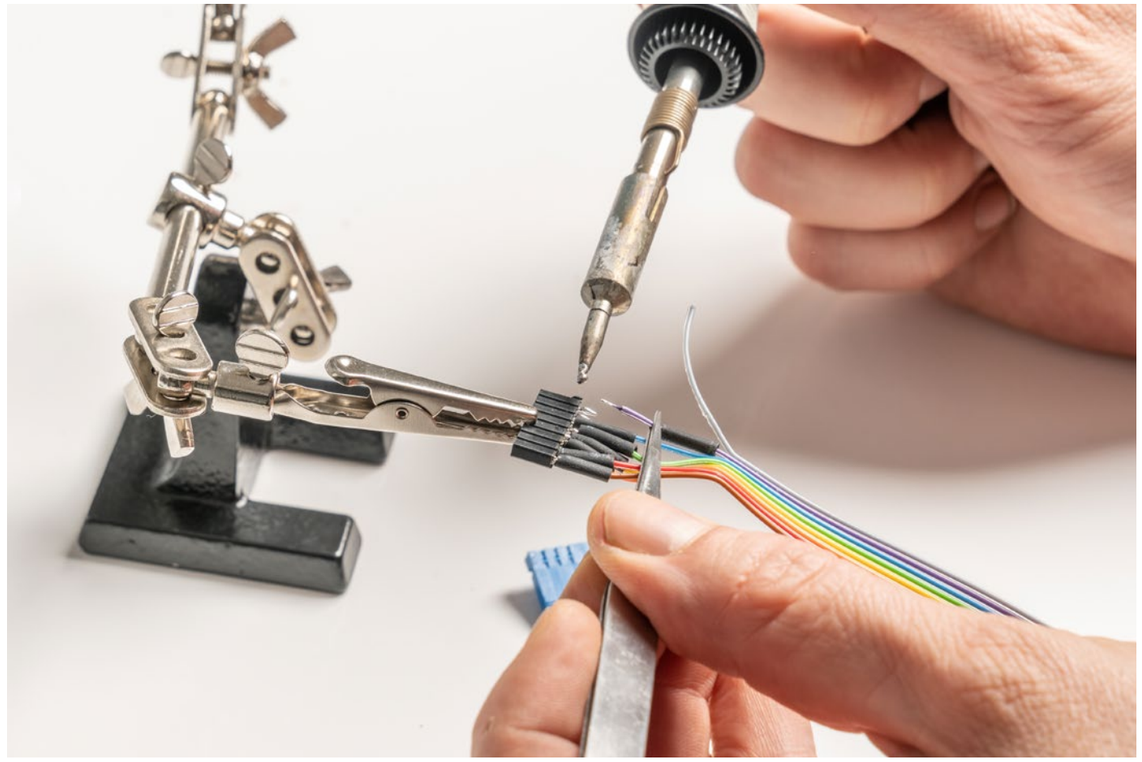
With connectors, igus® relies on companies that have proven that they can provide the necessary product quality and reliability. From the product range of TE Connectivity (Intercontec), Harting, FCT, Binder, Hummel, Yamaichi, igus® offers industrial connectors that also meet demanding tasks.

As a leading manufacturer of cables for signal transmission in machines, igus® naturally also focusses on the quality and reliability of the industrial connectors on offer. We source all connectors for power and signals from manufacturers who have proven their capabilities on the market and deliver high-quality products. The igus® online shop offers products from the tried-and-tested companies Intercontec, HARTING, HUMMEL, FCT electronic and Yamaichi.

What are the advantages of machine-supported soldering or solder connections?
If machine engineers and system integrators cannot rely entirely on crimp connections, they have to pay special attention to the quality of the solder connections. That is the only way to ensure constant electric conductivity over a long period of time and to permanently protect the connection point, e.g. against gases or liquids.

Benefits
- Fast delivery
- High level of availability
- Useful tools, such as for crimping
- Can also be harnessed with cables
- Quantities from 1 to high volume production

Soldering is a skill that must be learned



Soldering makes it easy to harness cables and produce electrical connections. However, special skill is required to meet the individual wishes of igus® customers.

Soldering is particularly advantageous when a permanent seal and electrical conductivity are required. Reproducibility is firmly in focus.

What exactly is a soldered joint? What happens during soldering? It seems simple: it is a thermal process in which a solder is used to create a permanent bond between materials. A distinction is generally made between soft soldering and hard soldering. While soft soldering takes place at temperatures below 450°C, hard soldering exceeds this range and can reach up to 900°C. However, upon closer inspection, all of this is not as simple as it seemed at first glance. Soldering is a complicated process that requires learning. There are various soldering processes involving a wide range of materials, all of which have their own advantages and disadvantages and influence the quality.

Would you like to know more?
Our white paper explains things in detail: we describe the complex soldering process and demonstrate the differences between the various soldering methods and materials. The factors influencing the quality of solder joints are also considered. We focus on the most common mistakes made during soldering and how to avoid them. You can find out how clean soldering processes also offer economic benefits - read our white paper!

One connector module instead of many individual connectors

The fast *interface*

Safe and efficient.

The Module Connect is a new type of connector for connecting electrical cables, fibre-optic cables and pneumatic hoses. Due to its space-saving, flat housing, it is used wherever a large number of cables are to be plugged into the smallest possible space.

igus.eu/module-connect

Connectors & accessories

igus® connectors

TE Connectivity series A 623
Signal connector
M23 standard [6 to 19-pole] standard or Speedtec

Number of poles	**6, 7, [8+1], 9, 10, 12, 16, 17, [16+3]**
Number of variants	**39**

TE Connectivity series B 923
Signal connector
Size 1 [6, 8 and 9-pole] standard or Speedtec

Number of poles	**6, 8, 9**
Number of variants	**24**

TE Connectivity series C 940
Power connector
Size 1.5 [6, 8 and 9-pole] standard or Speedtec

Number of poles	**6, 8, 9**
Number of variants	**12**

TE Connectivity series D 958
Power connector
Size 3 [6 and 8-pole] standard

Number of poles	**6, 8**
Number of variants	**4**

TE Connectivity series 615
Signal and power connector
Signal [12-pole] and power connector [9-pole] plastic/metal clamping ring

Number of poles	**12**
Number of variants	**14**

TE Connectivity series 915
Signal and power connector
Signal [12-pole] and power connector [9-pole] plastic/metal clamping ring

Number of poles	**9**
Number of variants	**14**

TE Connectivity series M17 617
Signal connector
M17 signal [17-pole] and power connector [4 to 9-pole] standard/Speedtec

Number of poles	**4, 7, 9**
Number of variants	**4**

TE Connectivity series 917
Power connector
Standard or Speedtec

Number of poles	**17**
Number of variants	**12**

TE Connectivity series S 623
Power connector
Standard

Number of poles	**1**
Number of variants	**2**

FCT Molex SUB-D
Signal connector
Standard (straight) or angular connector

Number of poles	Standard: **9, 15, 25** High Density: **15, 26, 44**
Number of variants	**24**

Yamaichi
Y-CONKIT
Zinc die-casting and PA66

Number of poles	**4, 4+2**
Number of variants	**11**

HARTING connector sets
Standard and Premium

Number of poles	**6, 10, 12, 16, 24**
Number of variants	**24**

Binder connector
Series 768
PBT/PA/CuZn (brass)

Number of poles	**3, 4**
Number of variants	**12**

Binder connector
Series 820

Number of poles	**3+PE, 4+PE**
Number of variants	**4**

Binder connector
Series 825

Number of poles	**4**
Number of variants	**4**

Binder connector
Series 713

Number of poles	**3, 4, 5, 8**
Number of variants	**22**

Hummel cable glands
Cable glands and counter nuts

Protection class	**IP 68 – 10 bar / IP 69K**
Number of variants	**84**

Tools/ accessories

Tools/accessories and connector packs
Individual connector sets from quantity 1

Number of variants	**33**

igus® ibow®
angle adapter
Slide on connector, bend the cable, fix it, done

for power connector 923 and signal connector 623

Module Connect
Modular connector system
Connect your energy supply with just ONE connector

Number of modules	**48**
Suitable for	**Power & signal, Data/bus, pneumatics**

Facts, figures and data

Technical appendix

Technical appendix

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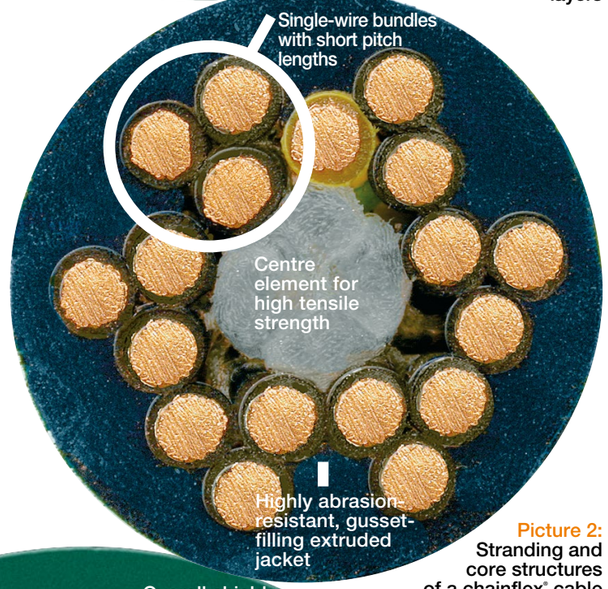
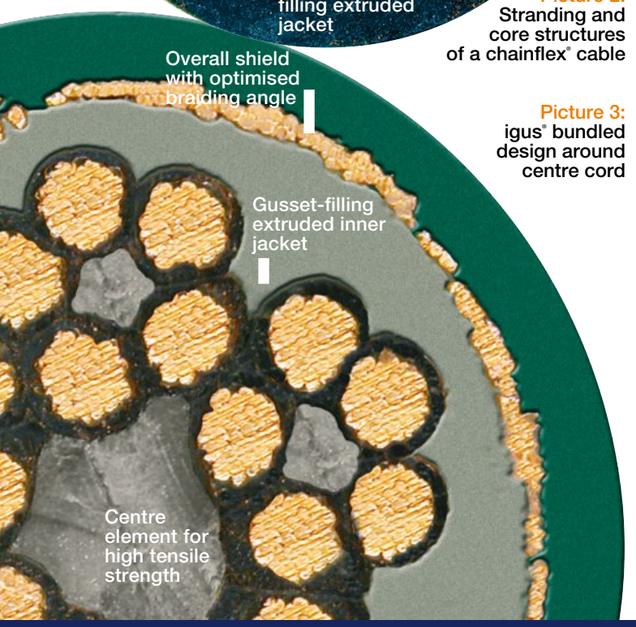
The tricks and ingenious features of...

Picture 1: Chain-suitable cable wound in layers



Picture 2: Stranding and core structures of a chainflex® cable



Picture 3: igus® bundled design around centre cord

From the customer's point of view, a flexible energy supply system needs to function properly. However, this demand assumes 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 increasing loads resulting from the constant movement, guided cables often failed even though 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 problem for its customers, igus® decided to take the initiative. As the first worldwide company to do so, igus® began to develop complete energy chain systems. chainflex® cables and energy chains are now being offered from one source and with a system guarantee depending on the individual application. 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 still are, being developed that help prevent machine downtime in factories throughout the world today.

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, moving cables caused by excessive strain - 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 cables. Simply speaking, a clear distinction can be made between cables braided in bundles and cables wound in layers ▶ see pictures 1 and 2.

Properties of winding in layers

Winding 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" immobilises the system being operated with these cables. How do these problems arise? Looking at the cable structure can be quite helpful ▶ see picture 1.
In the case of winding in layers, the cable cores are mostly wound more or less firmly and relatively long in several layers around a centre 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 happens to a similarly structured 12-core cable, for example, during normal operation?

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

... lasts or your money back! igus

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

Bundled design tried and tested millions of times since 1989

The bundled design eliminates these problems by means of its very sophisticated, internal structure. Here, the core wires are wound with a special pitch length first and then the resulting cores are bundled. For large cross sections, this is done around a strain relief element. The next step is the winding of these bundles around a tension-proof centre cord ▶ see picture 2.

Due to this multiple winding of the cores, all cores move through the inner radius and the outer radius of the cable several times at identical spacing distances. Tensile and compressive forces balance one another around the high-tensile centre cord giving the structure its stability. In this way, the structure remains stable even under maximum bending stress ▶ see picture 3.

Picture 4: Shielded "chain-suitable" control cable after only 400,000 double strokes with a bending factor of 10 x d

What are EMC problems and shield wire breakage?

In principle, cable shields must fulfill two tasks:
- Preventing interference getting into the cable
- Preventing interference being transmitted out of the cable

Both tasks are equally important because faulty signals can cause considerable consequential damage in the system itself as well as to any external systems. Furthermore, this is especially problematic 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 do 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, an intermediate layer is formed with foils or fleeces. This layer 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 quite insufficient for moving cables. This has to do with the fact that the foils and fleeces do not stay put between the cores, shield and jacket and may fall apart under stress. Consequently, the metallic shield then rubs on the insulation of the cores - short circuits can then be expected.

Dictionary of defects

Broken wires

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

Insulation damage

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

Corkscrew

An externally detectable corkscrew-like deformation of the entire cable due to broken copper wires as the result of subjecting the individual cores to mechanical load during the bending process. In most cases, the causes are poor structure (winding in layers, missing centre, loose jackets extruded to the form of a "tube") and subjecting the cables to high bending stress.

Jacket abrasion

The jacket is abraded down to the cores or to the shield. In most cases, the causes are incorrect selection of materials and/or unfavourable extrusion processes resulting in poor surface properties such that abrasion is an unavoidable effect.

Jacket swelling/jacket breakage

Jacket becomes soft and deformed or breaks until the cores/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.

Jacket breakage of (36x0.14mm²) after only 900,000 double strokes with a bend radius factor of 7.8 x d

Picture 1: **Optimised shield braiding angle over gusset-filling extruded inner jacket**

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The tricks and ingenious features of...

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 obvious: open shields only possess a limited shielding effect when moving - motion reduces this effect even further. The type of shield is therefore an important point that is not even mentioned in some catalogues.

In its approx. 70% linear and approx. 90% optical coverage cables, igus® eliminates these weaknesses by means of an optimised internal structure. In virtually all shielded chainflex® cables, a gusset-filling extruded inner jacket over the core structure is used. This "second jacket" fulfils two tasks:

- It holds the core structure together and guides the individual cores as in a channel.
- It serves as a firm, round base for a very tight-fitting shield. ▶ see picture 1.

Shield wire breakage - and how this can be prevented

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, tensile strain on the shield wires in the outer radius of the cable must be taken into account. If an unfavourable braiding angle is used, the tensile strain 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 is 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 moving energy supply systems! This is a problem that igus® has now solved with its novel approach:

- The shield braiding angle determined in long-term tests efficiently neutralises the tensile strengths and is therefore highly suitable for energy chains.
- Due to the stable inner jacket, the shield cannot become uncontrolled.
- The shield itself has a torsion protection effect on the wound structure.

Jacket abrasion/jacket breakage

Whilst defects in the internal structure are hardly detectable on the outside, jacket problems are immediately obvious. 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 from 7 jacket materials to adapt their energy chain cables to suit the conditions of the respective environment.

... lasts or your money back! igus

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

Gusset-filling extruded jacket

Here, not only is the material 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 structure with the necessary support for constant bending. The wound structure can fall apart.

Therefore, igus® is the first manufacturer of energy chain systems to offer the so-called the "gusset-filling extruded" jacket.

Here, the jacket material is injected between the core structure powdered with talc and ensures that the core 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 created between the cores during the winding process, are completely filled with jacket material by the high extrusion pressure. As a result, the jacket material creates a channel-like guide which ensures the cores have a defined longitudinal movement. The jacket also provides a supporting function for the structure. ▶ see picture 2.

The quality bundles of igus® chainflex® cables

- Strain-relieving centre
- Cores in bundles
- Gusset-filling extruded inner jacket in shielded cables
- Enclosed shield braid
- Optimised shield braiding angle
- Gusset-filling extruded jacket

Picture 2: **Gusset-filling extruded jacket**

7 basic rules for a good cable

1. Strain-relieving centre

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

2. Stranded core

With respect to the selection of core strand 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 can allow formation of kinks. Long-term testing provided the result of a combination of strand wire diameter, pitch length and pitch direction as the best overall 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 kilometres are then used in energy chain applications.

4. Structure

The structure must be wound around a stable, tension-proof centre with an optimised short pitch length. However, due to the insulating materials being used, this wound structure should still used. Starting from a quantity of 12 cores, a bundled design should be used.

5. Inner jacket

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

6. Shielding

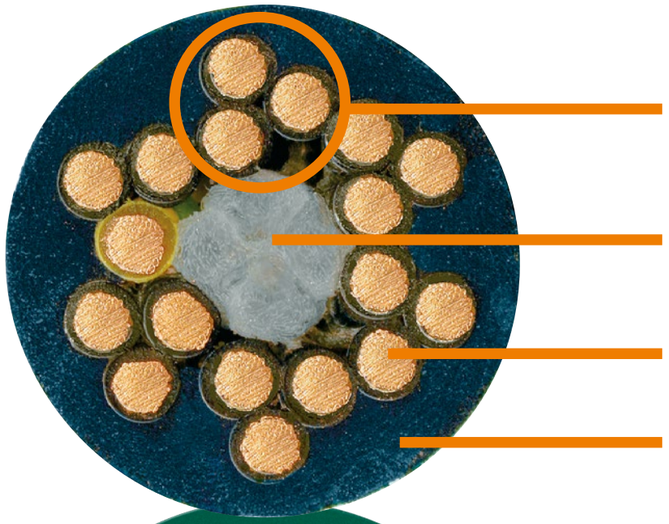
The overall shield should be made tight using an optimised shield braiding angle over an extruded inner jacket. Loose open braids or wrapped stranding reduce the EMC protection considerably and can fail very quickly due to shield wire breakage. A tight total braid shield also has a torsion protection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

7. Outer jacket

The material-optimised outer jacket can fulfil many different requirements: from UV-resistant to low-temperature-flexible, and from oil-resistant to cost-optimised. 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-filling).

Sectional views through the

Detailed structure of igus® control, data, servo and motor cables



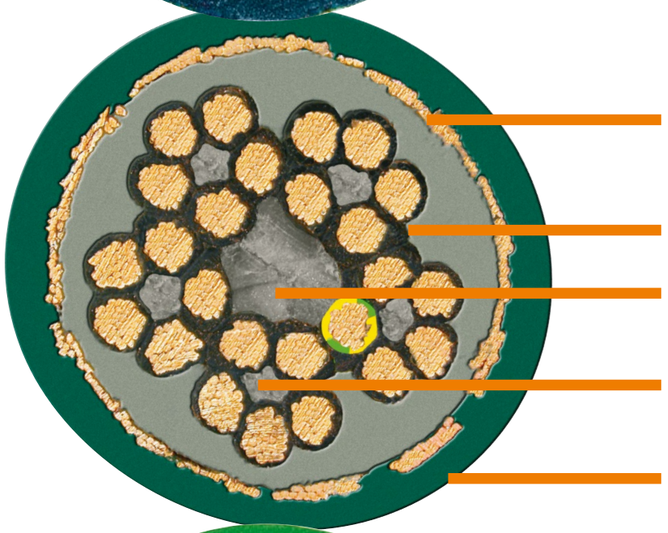
chainflex® control cable, unshielded

Individual bundles with optimised pitch length and pitch direction

Centre element for high tensile strength

Strand wire diameter optimised for energy chains

Highly abrasion-resistant, gusset-filling extruded jacket



chainflex® control cable, shielded

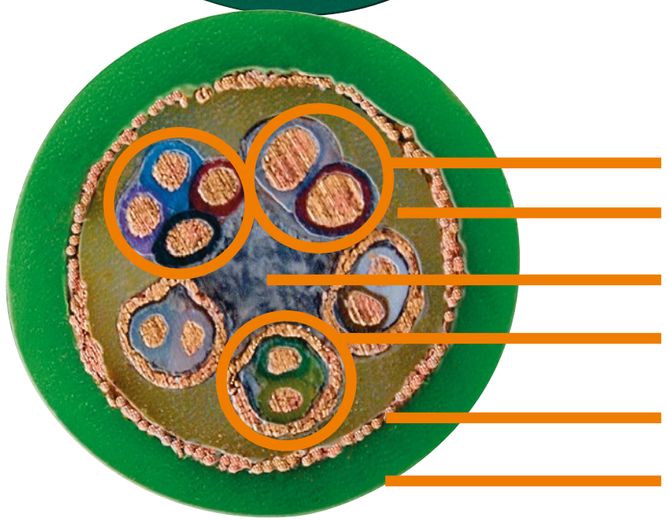
Overall shield with optimised braiding angle (approx. 70% linear, approx. 90% optical coverage)

Gusset-filling extruded inner jacket supports bundles

Centre element for high tensile strength

Centre element for high tensile strength in the individual bundles

Pressure-extruded outer jacket



chainflex® data/sensor cable, shielded

Stranded elements with optimised pitch length and pitch direction

Gusset-filling extruded inner jacket supports bundles

Centre element for high tensile strength

Pair braided shield

Overall shield with optimised braiding angle (approx. 70% linear, approx. 90% optical coverage)

Pressure-extruded outer jacket

igus® chainflex® cable types

chainflex® FOC graded index glass-fibre cable

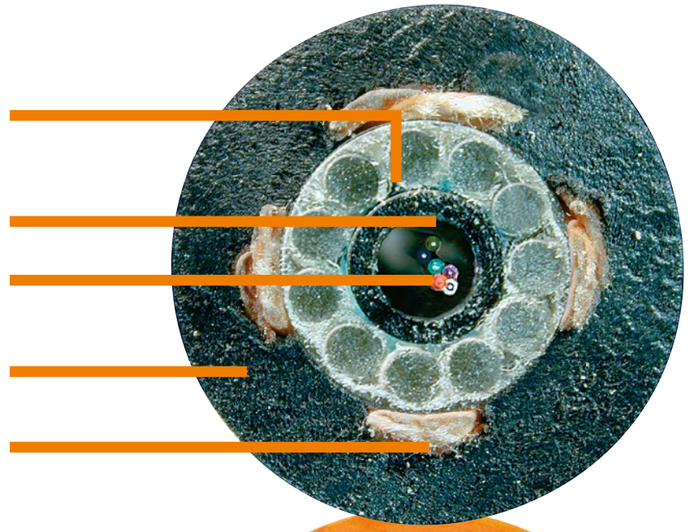
Supporting braid made of glass-yarn GRP rods

Gel-filled fibre tube

FOC fibres

Highly abrasion-resistant TPE jacket

Integrated torsion protection



chainflex® servo cable, shielded

Overall shield with optimised braiding angle (approx. 70% linear, approx. 90% optical coverage)

Optimised strand-wire diameter

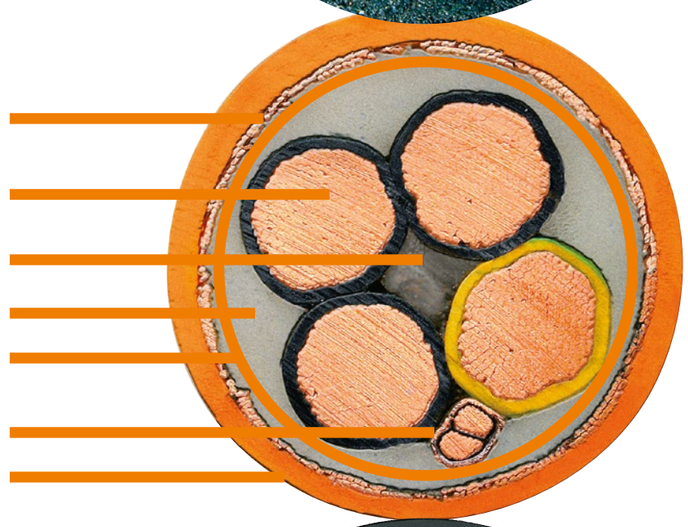
Centre element for high tensile strength

Gusset-filling extruded inner jacket

Cores wound with optimised pitch length and pitch direction

Pair braid shield over optimised wound pair

Highly abrasion-resistant pressure extruded jacket



chainflex® motor cable, shielded

Overall shield with optimised braiding angle (approx. 70% linear, approx. 90% optical coverage)

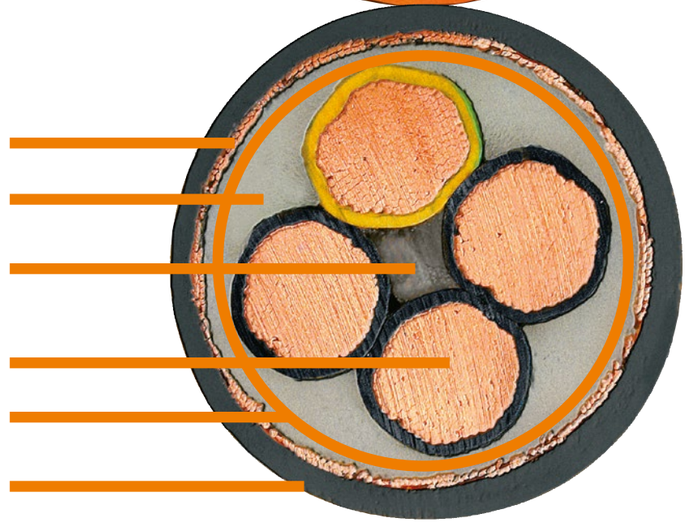
Gusset-filling extruded inner jacket

Centre element for high tensile strength

Optimised strand-wire diameter

Cores wound with optimised pitch length and pitch direction

Highly abrasion-resistant pressure extruded jacket



DIN 47100 colour code

DIN 47100 colour code (however, deviating from DIN: without colour repetition after 44th core)*

1	white
2	brown
3	green
4	yellow
5	grey
6	pink
7	blue
8	red
9	black
10	violet
11	grey-pink
12	red-blue
13	white-green
14	brown-green
15	white-yellow
16	yellow-brown
17	white-grey
18	grey-brown
19	white-pink
20	pink-brown
21	white-blue
22	brown-blue
23	white-red
24	brown-red
25	white-black
26	brown-black
27	grey-green
28	yellow-grey
29	pink-green
30	yellow-pink
31	green-blue
32	yellow-blue
33	green-red
34	yellow-red
35	green-black
36	yellow-black
37	grey-blue
38	pink-blue
39	grey-red
40	pink-red
41	grey-black
42	pink-black
43	blue-black
44	red-black
45	white-brown-black
46	yellow-green-black
47	grey-pink-black
48	red-blue-black
49	white-green-black
50	brown-green-black
51	white-yellow-black
52	yellow-brown-black
53	white-grey-black
54	grey-brown-black
55	white-pink-black
56	pink-brown-black
57	white-blue-black
58	brown-blue-black
59	white-red-black
60	brown-red-black
61	black-white

*Exception: 4-core cables are braided in the colour sequence white, green, brown, yellow.

In the case of three colours, the second and colours are printed on the basic colour.

Copper price

Calculation of the copper surcharge

The copper surcharge is the calculation of the difference between the calculated price (copper basis) and the actual price listed on the stock exchange of the copper share in a cable. In calculatory terms, the price of each chainflex® cable listed in the catalogue is based on a copper price to the amount of €150.–/100kg copper.

Calculation of the copper surcharge:

- LME[1] (London Metal Exchange) price in USD/ton
- ECB exchange rate, USD/euro
- Plus surcharges

[1] LME stands for London Metal Exchange.
Together with Shanghai and New York, it is one of the world's largest metal trading centres. This basis has been used in Europe for many decades to determine the copper price listed on the stock.

More Information online

▶ igus.eu/CF-copper

Calculate the copper surcharge online

The copper surcharge can be calculated directly for each chainflex® cable and individual length in our copper surcharge calculator on the igus® website:

▶ igus.eu/quickcopper

Copper wire dimensions according to Anglo-American AWG numbers

AWG No.	Diameter [mm]	Cross section [mm²]	AWG No.	Diameter [mm]	Cross section [mm²]
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			

Load-carrying capacity of cores

	Control/data cables			Motor/servo cables			Single-core cables	
chainflex® type	CF5, CF6, CF2, CF150.UL, CF160.UL	CF880, CF881, CF130.UL, CF140.UL, CF890, CF891, CF240, CF211, CF884	CF77.UL.D, CF78.UL, CF9, CF10, CF9.UL, CF10.UL, CF98.PLUS, CF99.PLUS, CF112, CF11, CF12, CF894, CF113.D, CF111.D, CF11.D, CFROBOT2, CFROBOT3, CFROBOT9	CF885, CF886, CF30, CF31, CF887, CF897, CF210.UL, CF220UL.H, CF21.UL, CF895, CF896	CFROBOT6, CFROBOT7	CF34.UL.D, CF35.UL, CF37.D, CF38, CF270.UL.D, CF280.UL.H, CF27.D, CF29.D	CF885, CF885.PE, CF886	CF270.UL.D, CF300.UL, CF310.UL, CF330.D, CF340, CFPE, CFROBOT
Insulation material	PVC	TPE	TPE	TPE/XLPE	TPE	XLPE	PVC	TPE
Loaded cores	2 or 3	2 or 3	2 or 3	2 or 3	2 or 3	2 or 3	1	1
Nominal cross section of copper core [mm²]	Load capacity [A]	Load capacity [A]	Load capacity [A]	Load capacity [A]	Load capacity [A]	Load capacity [A]	Load capacity [A]	Load capacity [A]
0.14	2.5	2.5	2.5	-	-	-	-	-
0.25	4	5	5	-	5	-	-	-
0.34	5	7	7	7	7	-	-	-
0.5	8	10	10	10	10	11	-	-
0.75	12	13	14	13	14	14	-	-
1	15	15	17	15	17	17	-	-
1.5	18	19	21	19	21	21	-	25
2.5	26	27	30	27	30	30	30	34
4	-	37	41	37	41	41	41	46
6	-	48	53	48	53	53	53	58
10	-	-	74	69	74	74	74	81
16	-	-	99	92	99	99	99	110
25	-	-	131	121	131	131	131	144
35	-	-	162	152	-	162	162	179
50	-	-	-	191	-	202	202	228
70	-	-	-	239	-	-	250	285
95	-	-	-	-	-	-	301	348
120	-	-	-	-	-	-	-	394
150	-	-	-	-	-	-	-	466
185	-	-	-	-	-	-	-	532
240	-	-	-	-	-	-	-	610
300	-	-	-	-	-	-	-	754
400	-	-	-	-	-	-	-	903

Table 1: Load-carrying capacity for chainflex® cables fixed or moving in e-chains® and e-tubes

Load-carrying capacity of cores

The values in these tables have been taken from the standard DIN VDE 0298, Part 4. These values have been simplified and only apply approximately. For each application, it is advisable to obtain and comply with the regulations that apply to each individual case (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 catalogue. Due to the harmonisation 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 section, the load capacity in undisturbed operation is the determining factor, i.e. the use with permissible operating temperature or permissible maximum temperature on the core.
The load-carrying capacity according to **Table 1** applies to operating-current-carrying cores.

Normally, these are 2 loaded cores in the case of 2-core and 3-core cables, as well as 3 loaded cores 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** if 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 generalised conversion factors can be offered for this large range of cables. The installation type and the conversion factors must be taken from **Table 3**, according to each individual application.

Ambient temperature [°C]	Conversion factor	
	PVC insulation	TPE /XLPE 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

Table 2: Conversion factors in case of varying ambient temperature

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 3: Conversion factors for multi-core cables with cable cross sections up to 10 mm²

Current carrying capacity CFCLEAN elements

	Cable elements
chainflex® type	CFCLEAN1, CFCLEAN2, CFCLEAN3, CFCLEAN4, CFCLEAN7, CFCLEAN8
Loaded cores	2 or 3
Nominal cross section of copper core [mm²]	Load capacity [A]
0.14	4
0.25	7
0.34	9
0.5	12
0.75	15
1	18
1.5	22
2.5	30

Table 1: Load-carrying capacity for chainflex® CFCLEAN cable elements

Load-carrying capacity of cores

The values in these tables have been taken from the standard DIN VDE 0298, Part 4. These values have been simplified and only apply approximately. For each application, it is advisable to obtain and comply with the regulations that apply to each individual case (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 catalogue. Due to the harmonisation 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 section, the load capacity in undisturbed operation is the determining factor, i.e. the use with permissible operating temperature or permissible maximum temperature on the core.
The load-carrying capacity according to **Table 1** applies to operating-current-carrying cores.

Normally, these are 2 loaded cores in the case of 2-core and 3-core cables, as well as 3 loaded cores 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** if 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 generalised conversion factors can be offered for this large range of cables. The installation type and the conversion factors must be taken from **Table 3**, according to each individual application.

Ambient temperature [°C]	Conversion factor	
	PVC insulation	TPE /XLPE 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

Table 2: Conversion factors in case of varying ambient temperature

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 3: Conversion factors for multi-core cables with cable cross sections up to 10 mm²

Chemical resistance

Group	chainflex® cable	Jacket material	1	2	3	4	5	Page
Control cables								
Control cable	CF880	PVC	●					26
Control cable	CF881	PVC	●					30
Control cable	CF130.UL	PVC	●					34
Control cable	CF140.UL	PVC	●					38
Control cable	CF150.UL	PVC		●				42
Control cable	CF160.UL	PVC		●				46
Control cable	CF5	PVC		●				50
Control cable	CF6	PVC		●				54
Control cable	CFSOFT1	PVC		●				58
Control cable	CFSOFT2	PVC		●				60
Control cable	CF890	iguPUR			●			62
Control cable	CF891	iguPUR			●			66
Control cable	CF77.UL.D	PUR				●		70
Control cable	CF78.UL	PUR				●		74
Control cable	CF2	PUR				●		78
Control cable	CF9.UL	TPE					●	82
Control cable	CF10.UL	TPE					●	86
Control cable	CF9	TPE					●	90
Control cable	CF10	TPE					●	94
Control cable	CF98.PLUS	TPE					●	98
Control cable	CF99.PLUS	TPE					●	102
Data cables								
Data cable	CF240	PVC		●				110
Data cable	CF240.PUR	PUR				●		114
Data cable	CF211	PVC		●				118
Data cable	CF211.PUR	PUR				●		122
Data cable	CF11	TPE					●	126
Data cable	CF112	PUR				●		130
Data cable	CF12	TPE					●	134
Data cable	CFKoax	TPE					●	136
Bus cables								
Bus cable	CF888	PVC	●					148
Bus cable	CFBUS.PVC	PVC		●				152
Bus cable	CF898	iguPUR			●			156
Bus cable	CFBUS.PUR	PUR				●		160
Bus cable	CFBUS	TPE					●	164
Bus cable	CFBUS.LB	TPE					●	170
Fibre Optic Cables								
Fibre Optic Cable	CFLK	PUR				●		178
Fibre Optic Cable	CFLG88	PVC	●					180
Fibre Optic Cable	CFLG.LB.PUR	PUR				●		182
Fibre Optic Cable	CFLG.LB	TPE					●	186
Fibre Optic Cable	CFLG.G	TPE					●	190
Measuring system cables								
Measuring system cable	CF884	PVC	●					200
Measuring system cable	CF211	PVC		●				204
Measuring system cable	CF894	iguPUR			●			210
Measuring system cable	CF111.D	PUR				●		214
Measuring system cable	CF113.D	PUR				●		220
Measuring system cable	CF11.D	TPE					●	226

Chemical resistance

Group	1	2	3	4	5
Inorganic chemicals					
Aqueous solutions, neutral					
Water	+	+	O	+	+
Common salt (10%)	+	+	O	+	+
Glauber's salt (10%)	+	+	O	+	+
Aqueous solutions, alkaline					
Soda (10%)	O	+	+	O	+
Aqueous solutions, acid					
Sodium bisulfate (10%)	O	+	+	O	+
Aqueous solutions, oxidising					
Hydrogen peroxide (10%)	+	+	O	+	+
Potassium permanganate (2%)	+	+	O	+	+
Inorganic acids					
Hydrochloric acid, concentrated	–	–	-	–	-
Hydrochloric acid (10%)	O	O	+	O	+
Sulfuric acid, concentrated	–	–	-	–	-
Sulfuric acid (10%)	O	O	+	O	+
Nitric acid, concentrated	-	-	-	-	–
Nitric acid (10%)	O	O	+	-	O
Inorganic caustic solutions					
Sodium hydroxide, concentrated	-	-	-	–	O
Soda lye (10%)	O	O	+	O	+
Caustic potash, concentrated	-	-	–	–	O
Caustic potash (10%)	O	O	+	O	+
Ammonia, concentrated	O	O	–	O	+
Ammonia (10%)	+	+	+	+	+
Organic chemicals					
Organic acids					
Acetic acid, concentrated (glacial acetic acid)	–	-	-	-	O
Acetic acid(10% in H_2O)	O	+	+	O	+
Tartaric acid (10% in H_2O)	O	+	+	+	+
Citric acid (10% in H_2O)	O	+	+	+	+
Ketone					
Acetone	-	–	-	-	O
Methyl ethyl ketone (MEK)	-	–	–	-	O
Alcohols					
Ethyl alcohol (spirit)	-	O	+	O	+
Isopropyl alcohol	–	O	+	O	+
Diethylene glycol	O	O	+	+	+
Aromatic compounds					
Toluol	–	–	-	O	-
Xylol	-	–	-	O	–
Fuels					
Gasoline	-	O	O	+	+
Diesel fuel	-	O	O	+	+
Synthetic oils					
Lubricating oil					
ASTM oil #2	O	+	+	+	+
Hydraulic oil					
Mineral oil base	–	O	+	+	+
Glycol base	O	O	+	+	+
Synthetic ester base	-	O	–	+	+
Vegetable oils					
Rapeseed oil	O	+	O	+	+
Olive oil	O	+	O	+	+
Soya bean oil	O	+	O	+	+
Cold cleaning agent					
Cold cleaning agent	–	O	+	+	O

\+ no or minimum negative influence
O medium reciprocal effect, short-term exposure permissible
– unstable, material partly destroyed

All information applies to room temperature

Chemical resistance

Group	chainflex® cable	Jacket material	1	2	3	4	5	Page
Servo cables								
Servo cable	CF887	PVC	●					240
Servo cable	CF210.UL	PVC		●				242
Servo cable	CF21.UL	PVC		●				246
Servo cable	CF897	iguPUR			●			250
Servo cable	CF270.UL.D	PUR				●		252
Servo cable	CF27.D	PUR				●		256
Servo cable	CF29.D	TPE					●	260
Servo cable	CF220.UL.H	PVC		●				262
Servo cable	CF280.UL.H	PUR				●		266
Motor cables								
Motor cable	CF885	PVC	●					280
Motor cable	CF886	PVC	●					282
Motor cable	CF210.UL	PVC		●				284
Motor cable	CF30	PVC		●				286
Motor cable	CF31	PVC		●				290
Motor cable	CF895	iguPUR			●			294
Motor cable	CF896	iguPUR			●			296
Motor cable	CF270.UL.D	PUR				●		298
Motor cable	CF27.D	PUR				●		302
Motor cable	CF34.UL.D	TPE					●	306
Motor cable	CF35.UL	TPE					●	310
Motor cable	CF37.D	TPE					●	314
Motor cable	CF38	TPE					●	318
Spindle cable/Single core	CF885	PVC	●					322
Spindle cable/Single core	CF885.PE	PVC	●					324
Spindle cable/Single core	CF886	PVC	●					326
Spindle cable/Single core	CF270.UL.D	PUR				●		328
Spindle cable/Single core	CF300.UL.D	TPE					●	330
Spindle cable/Single core	CFPE	TPE					●	334
Spindle cable/Single core	CF310.UL	TPE					●	336
Spindle cable/Single core	CF330.D	TPE					●	340
Spindle cable/Single core	CF340	TPE					●	342
Medium voltage cable	CFCRANE.PUR	PUR					●	344
Medium voltage cable	CFCRANE	igupren					●	346
Twistable cables								
Twistable cable	CF77.UL.D	PUR				●		354
Twistable cable	CFROBOT2	PUR				●		358
Twistable cable	CFROBOT3	PUR				●		360
Twistable cable	CFROBOT4	PUR				●		362
Twistable cable	CFROBOT5	TPE					●	366
Twistable cable	CFROBOT6	PUR				●		368
Twistable cable	CFROBOT7	PUR				●		370
Twistable cable	CFROBOT	TPE					●	374
Twistable cable	CFROBOT8	PUR				●		376
Twistable cable	CFROBOT8.PLUS	PUR				●		380
Twistable cable	CFROBOT9	PUR				●		384
Special cables								
Special cable	CFTHERMO	PUR				●		392
Special cable	CFFLAT	TPE					●	394
Special cable	CFSPECIAL.182	PUR				●		396
Special cable	CFSPECIAL.192	PUR				●		398
Special cable	CFSPECIAL.532	PUR				●		400
Special cable	CFSPECIAL.562.PE	PUR				●		402
Special cable	CFSPECIAL.572	PUR				●		404
Special cable	CFSPECIAL.592	PUR				●		406
Special cable	CFSPECIAL.792	PUR				●		408

Chemical resistance

Group	1	2	3	4	5
Inorganic chemicals					
Aqueous solutions, neutral					
Water	+	+	O	+	+
Common salt (10%)	+	+	O	+	+
Glauber's salt (10%)	+	+	O	+	+
Aqueous solutions, alkaline					
Soda (10%)	O	+	+	O	+
Aqueous solutions, acid					
Sodium bisulfate (10%)	O	+	+	O	+
Aqueous solutions, oxidising					
Hydrogen peroxide (10%)	+	+	O	+	+
Potassium permanganate (2%)	+	+	O	+	+
Inorganic acids					
Hydrochloric acid, concentrated	-	–	–	–	-
Hydrochloric acid (10%)	O	O	+	O	+
Sulfuric acid, concentrated	–	–	-	-	–
Sulfuric acid (10%)	O	O	+	O	+
Nitric acid, concentrated	–	–	–	-	-
Nitric acid (10%)	O	O	+	-	O
Inorganic caustic solutions					
Sodium hydroxide, concentrated	-	-	–	-	O
Soda lye (10%)	O	O	+	O	+
Caustic potash, concentrated	–	-	-	-	O
Caustic potash (10%)	O	O	+	O	+
Ammonia, concentrated	O	O	-	O	+
Ammonia (10%)	+	+	+	+	+
Organic chemicals					
Organic acids					
Acetic acid, concentrated (glacial acetic acid)	-	–	-	–	O
Acetic acid(10% in H_2O)	O	+	+	O	+
Tartaric acid (10% in H_2O)	O	+	+	+	+
Citric acid (10% in H_2O)	O	+	+	+	+
Ketone					
Acetone	–	–	–	–	O
Methyl ethyl ketone (MEK)	-	-	–	–	O
Alcohols					
Ethyl alcohol (spirit)	-	O	+	O	+
Isopropyl alcohol	-	O	+	O	+
Diethylene glycol	O	O	+	+	+
Aromatic compounds					
Toluol	-	–	–	O	-
Xylol	-	–	–	O	-
Fuels					
Gasoline	-	O	O	+	+
Diesel fuel	–	O	O	+	+
Synthetic oils					
Lubricating oil					
ASTM oil #2	O	+	+	+	+
Hydraulic oil					
Mineral oil base	–	O	+	+	+
Glycol base	O	O	+	+	+
Synthetic ester base	-	O	-	+	+
Vegetable oils					
Rapeseed oil	O	+	O	+	+
Olive oil	O	+	O	+	+
Soya bean oil	O	+	O	+	+
Cold cleaning agent					
Cold cleaning agent	-	O	+	+	O

\+ no or minimum negative influence
O medium reciprocal effect, short-term exposure permissible
– unstable, material partly destroyed

All information applies to room temperature

Cables and hoses

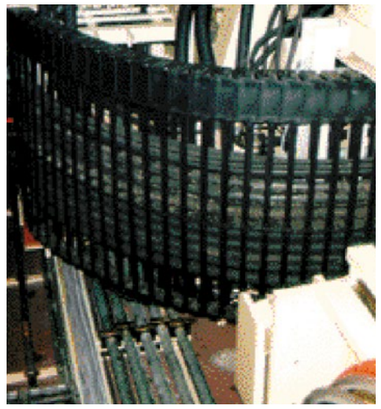
Rules for:
- **Maximum cable diameters**
- **Separation**
- **Bend radius**

General rules for cables and hoses in e-chains®

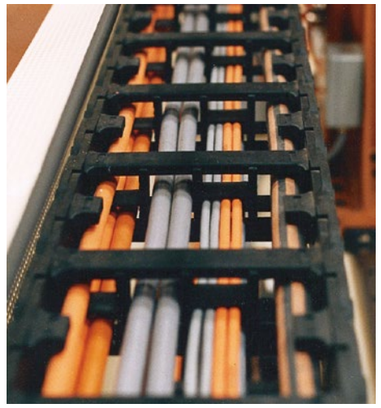
Data and energy supply in all forms – in an energy chain system

The key advantage of an igus® e-chain system® is the safe accommodation of various forms of data cables and energy supply in one system. We recommend the optimal separation layout of the cables and hoses in the e-chain®, but you, the customer, are still afforded the final choice. It is possible, for instance, to maintain minimum distances between bus and motor cables and mix pneumatics, electric and hydraulics in the same compartments.

In addition to the quality of the cables used, the arrangement of each service within the e-chain® and the space allowed, are important for the service life of the system. Various separation options enable the adaptation of the e-chains® to the specific requirements of each respective application. Generalised rules such as "No more than 80% of the clear space of energy chains should be used" no longer make sense given the complexity of present-day applications. In this chapter, we give you detailed recommendations. Due to the variety of the application parameters, we strongly recommend you take advantage of our free consultation services.Simply give us a list of your cable requirements (or merely the required electrical or other services) and you will receive our recommendation.



Hydraulics and electric cables are separated from one another in this example



Well ordered cables with igus® interior separation

Maximum cable and hose diameters

The maximum cable and/or hose diameter corresponds to the inner height of the selected e-chain®/e-tube, with additional minimum clearance. This minimum clearance would be, for example, 10% for round electrical cables, 20% for hydraulic hoses. An e-chain® is ideal if a minimum lateral gap to the next cable or hose has been factored in. Depending on the nature of the cables, the dynamics, and the expected service life, more clearance must be allowed. In specific cases, clearances may be altered further. Please contact us.

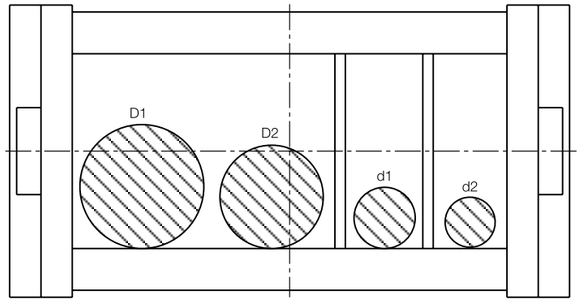
Electrical cables need at least 10% clearance space all around, hydraulic hoses need 20%

The maximum cable diameter is specified for each series in its respective chapter

Cables and hoses

Distribution in e-chains®

- Cables and hoses with very different diameters should be laid separately. The separation is achieved using modular separators.
- Cables and hoses must under no circumstances have the opportunity to tangle. Therefore, the clearance height of a compartment with several similar cables or hoses next to one another must **not amount to more than one and a half times the cable/hose diameter.**



D1 + D2 > 1.2 x hi **d1 + d2 ≤ 1.2 x hi**

Expressed in rules, this means:

Rule 1:
If D1 + D2 > 1.2 x e-chain® inner height, no separation between the two cables/ hoses is necessary. Two cables/ hoses should never be left unguided on top of one another or be allowed to become tangled.

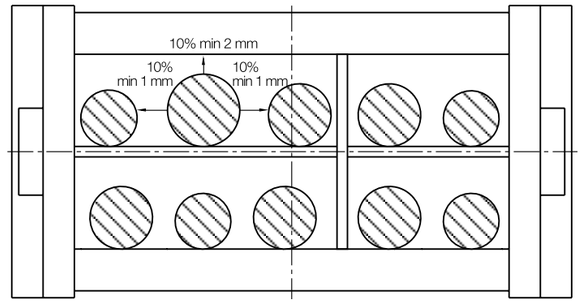
Rule 2:
if d1 + d2 ≤ 1.2 x e-chain® inner height, a vertical separator or a horizontal shelf must be used to reduce the inner height. Thereby preventing the entanglement of d1 and d2.

The reason for this rule is:
The cables and hoses must be laid so that they can move freely at all times and so that no tensile force is exerted at the radius of the e-chains®.

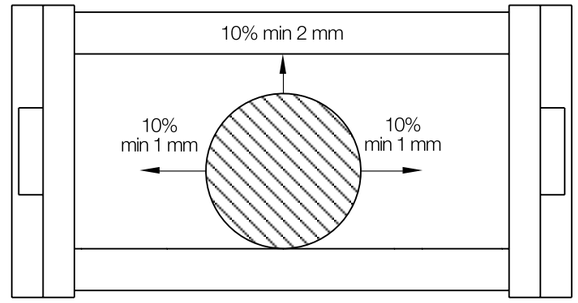
For high-speed applications and high cycles, cables or hoses **must not be laid on top of each other without horizontal separation**. The standard values for this are:

Travel speed over **0.5m/s** and cycles over **10,000 p.a.**

igus® interior separation offers a safe solution for this situation.



d1 + d2 ≤ 1.2 x hi



Clearance space for round electrical cables

Clearance space in % for various cables

Cables	Clearance space
Round electrical cables	**10%**
Electrical flat cables	**10%**
Pneumatics	**5-10%**
Hydraulics	**20%**
Media hoses	**15-20%**

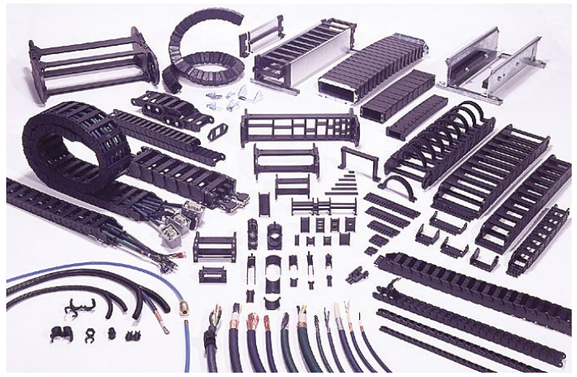
Cables and hoses

Further guidelines for distribution

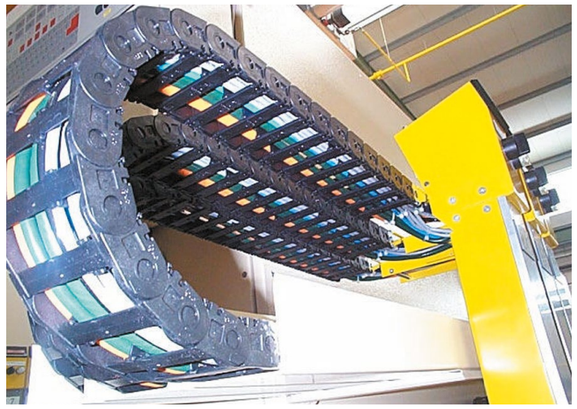
- The cable weight should be symmetrically distributed across the width of the e-chain®.
- Cables with different outer jacket materials must not be allowed to rub together. If necessary, they must be laid separately. All igus® chainflex® cables can be combined with each other and other brands of cables.
- The cables should always be fixed at the moving end. The fixed end should also always have strain relief. Exceptions are made only for certain hydraulic hoses with length compensation issues or other high pressure hoses. (refer to "hydraulic hoses").
- Generally, the faster and more frequently the e-chain® operates, the more important the exact positioning of the cables and hoses inside the e-chain® becomes. Due to the wide variety of the possibilities, we strongly recommend you take advantage of our free consultation services for your specific applications.

Bend radius R

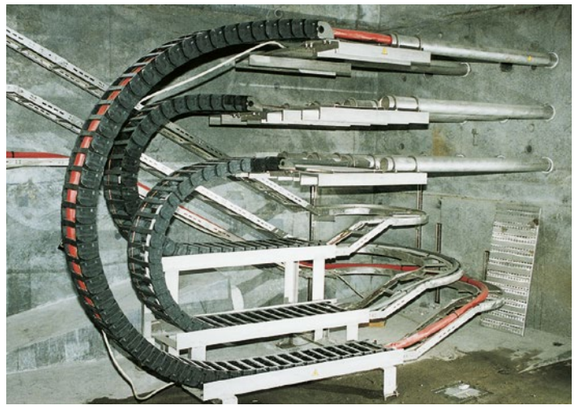
- The bend radius of your e-chain® depends on the thickest or stiffest cable or hose in your application.
- The bend radii of the e-chains® should be adjusted to the recommendations of the cable or hose manufacturer. The selection of a larger radius than the minimum will positively affect service life.
- The specification of minimum bend radii for cables refers to use at normal temperatures. Other bend radii may be recommended. Please ask your cable supplier for details.



The igus® construction kit of energy chain systems solves all the requirements for interior separation known today.



igus® chainflex® cables permit the smallest bend radius of 5 x d for one million strokes.



The igus® product range offers up to 12 different bend radii for each chain series from stock. Here series 50 in the Storebaelt bridge project.

We recommend complete e-chain systems®, - where bend radii for all cables and hoses, interior separation and service life are optimally matched. Also ask for the igus® system guarantee. ▶ readychain® **from page 432**

Round electrical cables

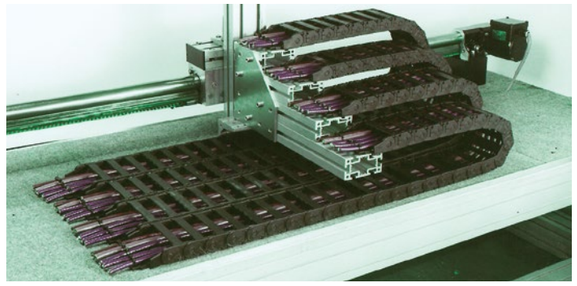
Round electrical cables

For electrical cables, the round cable is a safe, modular and cost-effective solution for e-chain systems®. We recommend the following criteria for selecting the proper round electrical cables:

Selection criteria:

- Small minimum bend radii and mounting heights
- Long service life at minimum bend radius
- Service life expectations for your application (short or long travel, hanging)
- Test data on service life from realistic tests
- Uncomplicated installation process - no hanging, laying out, etc, of cables required
- Strain relief integrated directly into the mounting bracket
- Flexible shields for shielded cables
- Abrasion-resistant and non-adhesive outer jackets
- Large selection to avoid expensive custom designs

For bus cables and fibre optic cables, special attention must be paid to how effective transmission rates and shielding remain after millions of cycles at the minimum bend radius.



Example at igus® test laboratory: constant development and testing of chainflex® cables

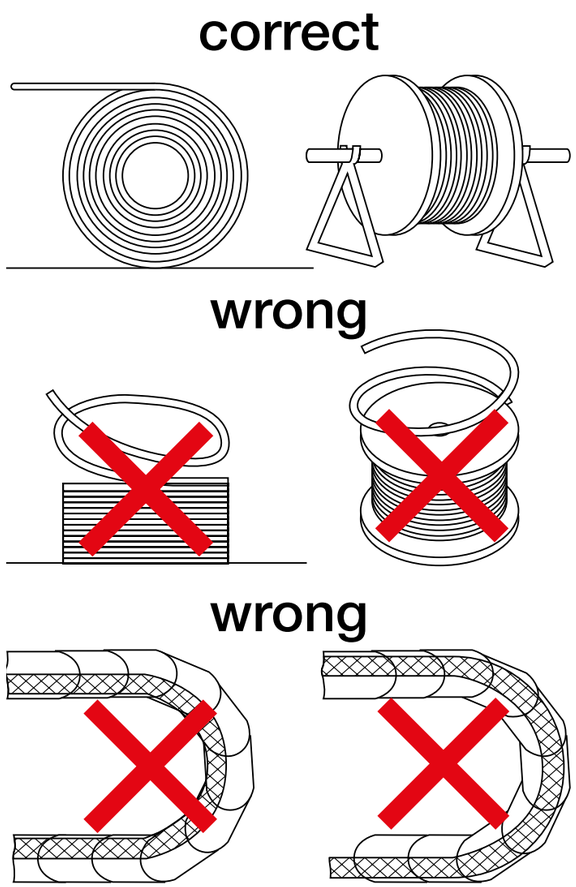
Round electrical cables

Installation and strain relief of round electrical cables

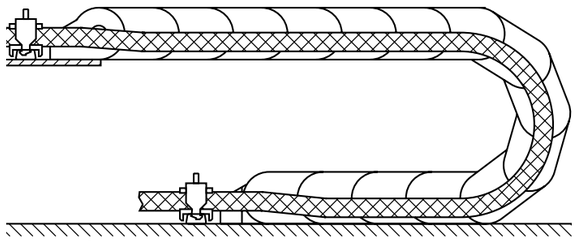
1. The cables must be laid straight, without twisting. Cables must not be uncoiled from the top of the spool. igus® chainflex® cables are immediately ready for fitting directly into the e-chain®. They need not be disconnected or laid out before installation.
2. The cables must be laid so that each individual cable can move freely from side to side.
3. The cables must be able to move freely along the radius. This must be double-checked if the upper run operates at the cable's maximum bend radius.
4. The division of the e-chains® interior using igus® interior separators or shelves is necessary if several cables and/or hoses with varying diameters are laid out. It is important to prevent cables and hoses from tangling.
5. For cables and hoses with different jacket materials, it is important to prevent them from "sticking" to one another. If necessary, they should be separated. igus® chainflex® cables can be combined with all others.
6. Round electrical cables must be secured with strain relief at both ends. In exceptional cases, the cables may be fixed with strain relief at the moving end of the e-chain® only. A gap of 10-30 x cable diameter between the end of the bend segment and the fixed point is recommended for most cables. chainflex® cables can, on the other hand, be secured directly to the mounting bracket with strain relief (this has been confirmed with testing).

We will be pleased to provide you with recommendations for complete e-chain systems®:
"readychain®: chain-cable harnessing".

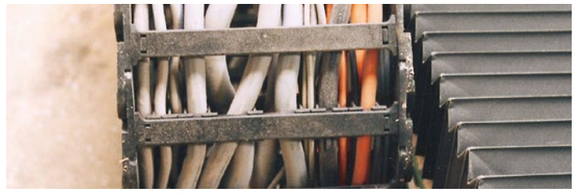
▶ readychain® **from page 432**



The cables must be able to move freely along the radius



chainflex® cables can be strain-relieved directly at the mounting bracket.

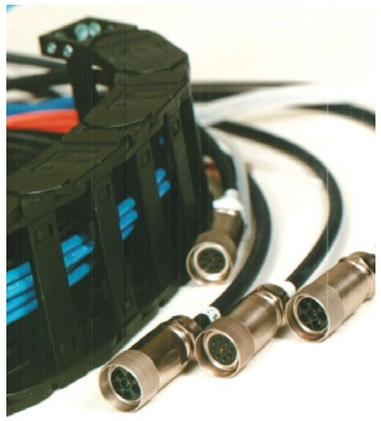


Corkscrewing: an effect of improper cable and hose placement in an e-chain®

Pneumatic hoses

Pneumatic hoses

In principle, the same rules apply for pneumatic hoses as for round cables. In practice, it has been demonstrated that pneumatic hoses are less susceptible to wear. After consultation, they can be laid together more closely than the "10% all-around clearance" rule. A double-sided strain relief is required under these conditions. For pneumatic hoses made of rubber, we recommend strictly following the "10% clearance" rule because they tend to adhere to each other and to other cables and hoses.



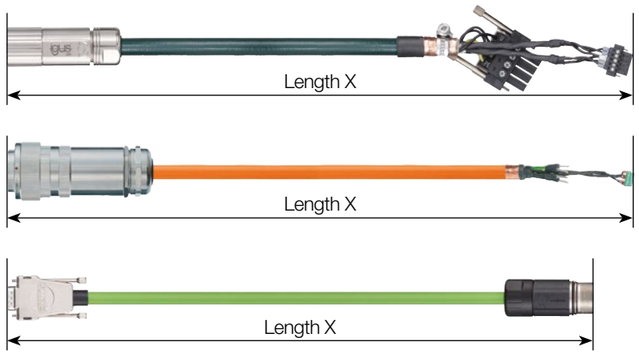
Fully pre-assembled e-chain system® with several pneumatic and hydraulic hoses.

The igus® product range also offers thermo polymer pneumatic hoses called "chainflex® CFAir and CFCleanAir" ▶ Page 428

Design parameters| **Definition of length**

Harnessed cables

igus® GmbH defines cable length as entire length including connectors or open harnessing.
Further length definitions possible on request. Feel free to contact us!



Welcome to the world ...

The chainflex® approvals and their significance:
www.igus.eu/chainflex-certificates

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

UL Marketing Claim Verification

Today, plant safety or availability can be the decisive reason to choose one machine over another.
As the complexity of the machines and number of electrical parts increases, the difficulty for designers to choose the best product also increases.
This is not helped by the fact that there is a lot of marketing information given, which is not norm based, and therefore difficult for the designer to verify the facts.
This is where the UL Marketing Claim Verification initiated by UL will help the designer.
This is because UL checks the marketing statements of the supplier for the technical data and accuracy.

The UL verified label now proves that the guarantee and quality statements for chainflex® cables and their durability, service life and functionality have been certified by UL. For companies that use these cables in their equipment, they offer more safety from purchasing parts for machine construction, customs clearance and shipping of the machines to America, right through to commissioning. Those who use chainflex® cables in energy chains can have confidence in terms of parameters such as temperature, type of movement, torsion, media influence or minimum bend radius.

The complex certification procedure for the claim (Diagram 1) for the claim „igus® 4-year chainflex® cable guarantee and service life calculator based on 2 billion test cycles per year" was carried out by auditors of the US institute at the igus® location in Cologne.

To achieve this, the processes and logic of service life determination were evaluated in a comprehensive audit program of the 5,500 m² chainflex® test laboratory, which has over 800 parallel running tests and over 2 billion test cycles per year.

The following four areas were scrutinised:

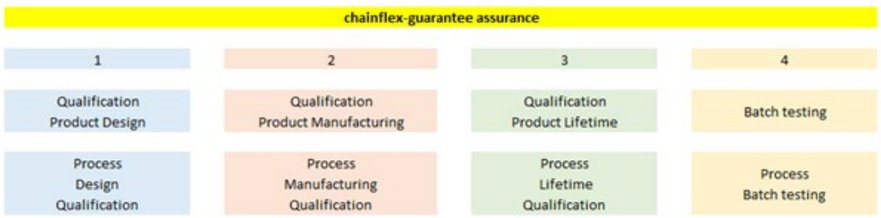


Figure 1: The complex process to get the UL marketing certificate (source: igus®)

More details online:
verify.ul.com/verifications/368

More information:
www.igus.eu/chainflex-welcome-to-the-world

UL listed

Cables for applications that can be fully described in a standard are certified as "UL Listed". Example: A cable for a washing machine power supply can be clearly described for its application; therefore a normative description of the application of the cable and the associated test setup can be clearly defined. To certify that the cable is in accordance with "UL Listed" and then to manufacture, test and mark according to "UL Listed". It is not permissible to use a different kind of cable in such a clearly described application in the USA.

UL/CSA Recognized

The "UL/CSA Recognized" certification marks are issued for components of larger systems. In this case, only components that are not intended for a single, precisely defined installation or application are certified.
Cables for applications that cannot be described normatively and completely are then certified according to "UL/CSA Recognized" (AWM).

Example: Cables for use in energy chains are so diverse and complex that a normative description is impossible. This is where the "UL/CSA Recognized" certification is applicable. It allows cable developers a whole range of different combinable options with respect to insulation material, jacket material and design. From this cable manufacturers develop a combination that works, which means that it can be used for a specific customer application.

Be aware: "UL/CSA Recognized" describes a large, extremely varied range of applications. Here, it is the responsibility of the designer and manufacturer of such an "AWM cable" to work out and carry out appropriate additional tests to prove a specific application, e.g. in an energy chain.

UL

The institution responsible for approval in the USA is Underwriters Laboratories (UL). The Canadian Standards Association (CSA) is responsible for it in Canada. Certification guidelines and certification processes differ in their complexity, depending on the market and country. A so-called Memorandum of Understanding allows use in both countries, regardless of the place of certification. Both testing organisations distinguish between the so-called "UL/CSA Listed" and "UL/CSA Recognized" certification, both of which fulfil normative safety requirements that are verified by test procedures.

More details online:
iq.ul.com/

More information:
www.igus.eu/chainflex-welcome-to-the-world

Approvals and standards

NFPA

The US **N**ational **F**ire **P**rotection **A**ssociation (NFPA), is a non-profit organisation that has been active in fire protection since 1896.
NFPA publishes numerous safety standards including electrical standards that are used in the USA today.
These include the "NFPA 79 - Electrical Standard for Industrial Machinery". The subject of the standard is primarily the correct application of electrical systems in industrial machinery and equipment used in the USA. With the help of the standard, designers can develop safe machines with the highest level of protection for operating personnel.
NFPA 79-2018 includes the topic "*Special Cables and Conductors*" relevant for chainflex cables in section 12.9.

More details online:
www.nfpa.org/

CLPA

The **C**C-**L**ink **P**artner **A**ssociation is an organisation based in Japan and represented in 11 regions of the world.
The purpose of CLPA is to spread and establish the industry network "CC-Link" standard worldwide.
In addition to the marketing of this standard, CC-Link products that are to be used for this standard are tested by this organisation and, if they are technically compliant with the corresponding certificates, are approved for use in CC-Link networks.

More details online:
www.cc-link.org/sch/c012List?userSeqNo=76&menuSeqNo=2

DNV approval

The maritime economy is developing towards more automation and digitalisation: Whether vessel manufacture, shipping companies or the gas and oil industry - ships are becoming autonomous factories, shipping companies are becoming fully-fledged logistics providers, and refineries are becoming automated conveyor systems.
DNV is responsible for certifications in the maritime environment, offshore facilities, gas and oil pipelines, and onshore applications such as wind, tidal or solar energy. The classification society was formed in 2012 through the merger of the Norwegian company Det Norske Veritas (DNV) and Germanischer Lloyd (GL).
The components used in maritime environments have to meet different requirements than those of classic factory automation on land.
This requires a separate approval for the operation of these components. The certification society checks compliance with international standards and guidelines, which are applied accordingly to these components. If existing regulations or standards do not describe the application sufficiently, additional testing measures are defined or developed.

If products have DNV approval, it simplifies and speeds up their use in the maritime sector, as it is not necessary to test individual components.

More details online:
www.dnv.com

More information:
www.igus.eu/chainflex-welcome-to-the-world

Approvals and standards

REACH directive

The term REACH stands for a regulation called **R**egistration, **E**valuation, **A**uthorisation and Restriction of **Ch**emicals.

Its scope covers manufacturers or importers of more than one tonne of substances per year into the European Union.

The REACH directive is only partially valid for igus®: As a manufacturer of cables, the company is defined as a so-called "downstream user" with regard to the value add chain.

Nevertheless, the contents of the REACH directive and its rules for the production and processing of chemical substances are observed at igus®. For example, no chemicals are used in the production of chainflex® cables that are above the valid REACH limits. The entire range of chainflex® cables is free from materials such as sodium peroxometaborates, cadmium sulphides or also dihexyl phthalates.

More details online:
echa.europa.eu/de/regulations/reach/understanding-reach

RoHS-II / RoHS-III

More safety for people and the environment
The abbreviation RoHS stands for **R**estriction **o**f **H**azardous **S**ubstances and regulates the use of selected hazardous substances in electrical and electronic equipment, which includes cables. By complying with this directive, companies prove that problematic materials such as lead, mercury or phthalates - known as plasticisers - have been banned from electronic waste and also from working environments. One example is lead. It occurs, among other things, in the form of solder on circuit boards, which are installed in complex machine systems in a variety of ways.

Materials research in recent years has also produced new jacket materials which, among other things, do not contain hazardous plasticisers and thus function flexibly in dynamic applications. Until now, plasticisers have been used in industry mainly where plastics had to remain particularly pliable, soft and elastic in use.

igus® develops and tests special jacket materials for use in e-chains in its own laboratory, which are RoHS II /III compliant according to the respective requirements.

More details online:
ec.europa.eu/environment/waste/rohs_eee/legis_en.htm

Approvals and standards

CE mark

The CE marking makes it clear that the manufacturer of a product such as chainflex® cables complies with the applicable EU directives. The CE marking is not a seal of approval or quality mark and was created for trade in the European Economic Area.

- The CE certification basis has come to encompass more than 25 EU directives (issue 2020).
- The CE certificate is a kind of voluntary commitment.
- The CE mark on a machine and the corresponding signature confirms that this machine was planned, designed and built in accordance with the applicable standards.
- The CE marking is part of further regulations. These include the Machinery Directive, the Electromagnetic Compatibility (EMC) Directive, the Low Voltage Directive (often referred to as LVD), RoHS substance restrictions and protective equipment, etc.

CE conformity is based on a complex risk assessment.

Risk assessment - the iterative procedure consists of:

- Verification of the intended use of e.g. e-chain® and chainflex® cables
- Analysis of conceivable, foreseeable misuse
- Determination of relevant and valid standards for the production of chainflex® cables and e-chains®
- Determination of specific requirements and conditions for the use of chainflex® cables
- Research of the responsible "notified body", e.g. at the accreditation body DAkkS (Institute for the monitoring of all certification, testing and inspection bodies)
- (Laboratory) tests of the chainflex® cables and e-chains®
- Data evaluation
- Preparation of technical documentation and translation into target languages
- Creation of the certificate/provision for download
- Attaching the CE mark

More details online:
c.europa.eu/growth/single-market/ce-marking_de

More information:
www.igus.eu/chainflex-welcome-to-the-world

Approvals and standards

igus® chainflex® cables for DESINA

DESINA: **DE**central and **S**tandardised **IN**st**A**llation 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

Det Norske Veritas

For further information: www.dnv.com

Underwriters Laboratories Inc.

For further information: www.ul-europe.com

Canadian Standards Association

For further information: www.csa.ca

Commission Électrotechnique Internationale

Communauté Européenne

General conditions
The General Conditions of Sale of igus® shall apply. Excessive and short deliveries of ± 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.eu.
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 catalogue, all previous publications lose their validity. Subject to printing errors.

Disclaimer
The terms "igus", "chainflex", "CFRIP", "readycable", "readychain", "e-chain", "e-chain systems", "e-ketten", "e-kettensysteme", "flizz", "iglidur", "drylin" are legally protected trademarks in the Federal Republic of Germany and in case also in foreign countries.

Outer jacket color according to RAL
chainflex® cable jacket colours are given with the similar RAL colour number; for example yellowgreen, similar to RAL 6018. Slight differences can occur from the exact RAL colour, depending on the cable jacket material. However, this has no effect on the quality or functionality of the cable.
A RAL number is used to describe different shades of colour more consistently. For example, RAL 7040 is light grey and RAL 7016 is a dark grey. The RAL number describes the colour, but cannot guarantee the same shade in different applications.

RAL: German Institute for Quality Assurance and Certification e.V. ▶ www.RAL.de

KTG
If cable drums are to be used, please visit KTG directly online.▶ 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 listed on this page have been developed and manufactured for the mechanically demanding industrial application in e-chain systems®. High resistance against oil and lubricants are guaranteed, and also a high protection against electro-magnetic interference fields. 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 proof for a perfectly running system.
Of course we support you with the details of these electrical tests.

The specifications in the catalogue referring to temperature range, bend 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!

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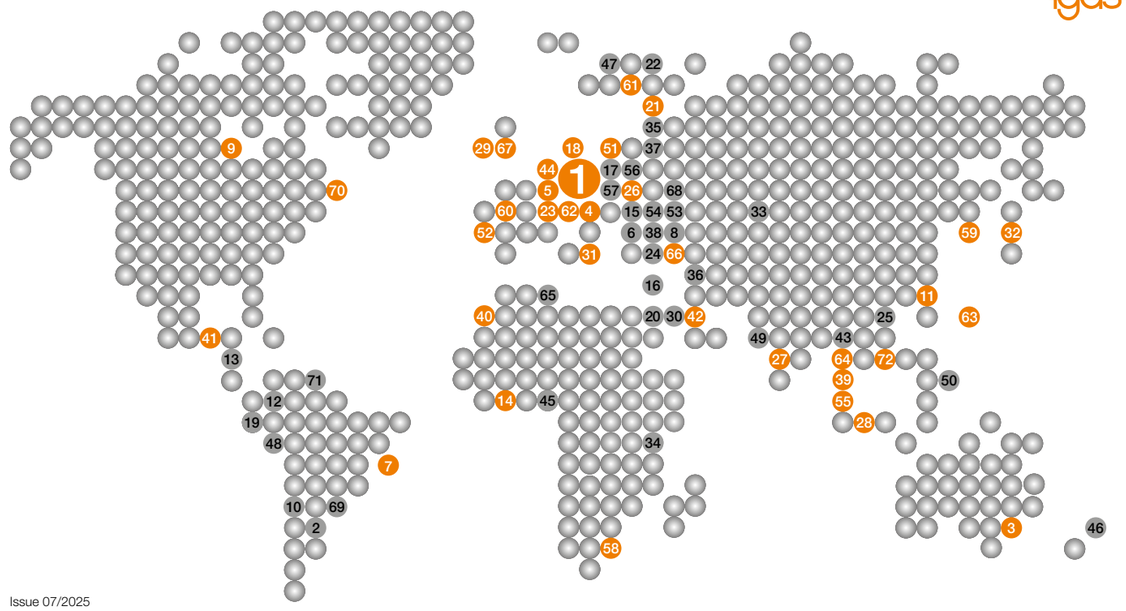

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Temperature

v max.
unsupported/gliding

a max.

Travel distance

Torsion

UV-resistant

Nominal voltage

Testing voltage

Oil-resistant

Offshore

Flame-retardant

Silicone-free

Halogen-free

PTFE-free

Outer jacket

CFRIP®

Inner jacket

Core structure

Core identification

Conductor

Fibre Optic Cable

Core insulation

Overall shield

Centre element

Filler

Element shield

Element jacket

Material

Dimensions

Operating
pressure

Vacuum

UL listed

UL/CSA

NEC

NFPA

CLPA

DNV

REACH

Lead-free

Cleanroom

Dry cleanroom

DESINA

CE

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